IMPORTANT NOTICE

THIS OFFERING IS AVAILABLE ONLY TO INVESTORS WHO ARE OUTSIDE OF THE UNITED STATES.

IMPORTANT: You must read the following disclaimer before continuing. The following disclaimer applies to the attached offering memorandum (the "Offering Memorandum"). You are advised to read this disclaimer carefully before accessing, reading or making any other use of the attached Offering Memorandum. In accessing the attached Offering Memorandum, you agree to be bound by the following terms and conditions, including any modifications to them from time to time, each time you receive any information from Mongolian Mining Corporation (the "Company") and/or Energy Resources LLC ("ER LLC", and together with the Company, the "Issuers") as a result of such access.

Confirmation of Your Representation: You have accessed the attached Offering Memorandum on the basis that you have confirmed your representation to the Issuers and to Deutsche Bank AG, Hong Kong Branch and Morgan Stanley & Co. International plc (together, the "Initial Purchasers") that (1) you consent to delivery of the attached Offering Memorandum and any amendments or supplements thereto by electronic transmission and agree to the terms set forth herein, (2) you are outside the United States and, to the extent you purchase the securities described in the attached Offering Memorandum, you will be doing so pursuant to Regulation S under the Securities Act, and the e-mail address to which the attached Offering Memorandum has been delivered is not located in the United States of America (including the States and the District of Columbia), its territories, its possessions and other areas subject to its jurisdiction and (3) you acknowledge that you will make your own assessment regarding any legal, taxation or other economic conditions with respect to your decision to subscribe for or purchase any securities.

Notice to Prospective Investors in the United Kingdom – The communications in the attached document and any other document or materials relating to the issue of the securities offered thereby is not being made, and such documents and/or materials have not been approved, by an authorized person for the purposes of section 21 of the United Kingdom's Financial Services and Markets Act 2000, as amended (the "FSMA"). Accordingly, such documents and/or materials are not being distributed to, and must not be passed on to, the general public in the United Kingdom. The communication of such documents and/or materials as a financial promotion is only being made to those persons in the United Kingdom falling within the definition of investment professionals (as defined in Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005, as amended (the "Financial Promotion Order")), or within Article 43(2) of the Financial Promotion Order, or who are any other persons to whom it may otherwise lawfully be made under the Financial Promotion Order (all such persons together being referred to as "relevant persons"). In the United Kingdom, the securities offered thereby are only available to, and any investment or investment activity to which the attached document relates will be engaged in only with, relevant persons. Any person in the United Kingdom that is not a relevant person should not act or rely on the attached document or any of its contents.

Notice to Prospective Investors in the European Economic Area – The attached document is not a prospectus for the purposes of the Prospectus Regulation (as defined below). The attached document has been prepared on the basis that any offer of the Notes in any Member State of the European Economic Area (the "EEA") will only be made to a legal entity which is a qualified investor under the Prospectus Regulation ("Qualified Investors"). Accordingly any person making or intending to make an offer in that Member State of Notes which are the subject of the offering contemplated in the attached document may only do so with respect to Qualified Investors. Neither the Issuer nor the Initial Purchasers has authorized, nor do they authorize, the making of any offer of Notes other than to Qualified Investors. The expression "Prospectus Regulation" means Regulation (EU) 2017/1129.

Prohibition of Sales to EEA Retail Investors – The Notes are not intended to be offered, sold or otherwise made available to and should not be offered, sold or otherwise made available to any retail investor in the European Economic Area ("EEA"). For these purposes, a retail investor means a person who is one (or more) of: (i) a retail client as defined in point (11) of Article 4(1) of Directive 2014/65/EU (as amended, "MiFID II"); or (ii) a customer within the meaning of Directive (EU) 2016/97 (the "Insurance Distribution Directive"), where that customer would not qualify as a professional client as defined in point (10) of Article 4(1) of MiFID II or (iii) not a qualified investor as defined in the Prospectus Regulation. Consequently no key information document required by Regulation (EU) No 1286/2014 (as amended, the "PRIIPs Regulation") for offering or selling the Notes or otherwise making them available to retail investors in the EEA has been prepared and therefore offering or selling the Notes or otherwise making them available to any retail investor in the EEA may be unlawful under the PRIIPs Regulation.

Prohibition of Sales to UK Retail Investors – The Notes are not intended to be offered, sold or otherwise made available to and should not be offered, sold or otherwise made available to any retail investor in the United Kingdom ("UK"). For these purposes, a retail investor means a person who is one (or more) of: (i) a retail client, as defined in point (8) of Article 2 of Regulation (EU) No 2017/565 as it forms part of domestic law of the United Kingdom by virtue of the European Union (Withdrawal) Act 2018, as amended by the European Union (Withdrawal Agreement) Act 2020 ("EUWA"); or (ii) a customer within the meaning of the provisions of the Financial Services and Markets Act 2000 ("FSMA") and any rules or regulations made under the FSMA to implement the Insurance Distribution Directive, where that customer would not qualify as a professional client, as defined in point (8) of Article 2(1) of Regulation (EU) No 600/2014 as it forms part of domestic law of the United Kingdom by virtue of the EUWA; or (iii) not a qualified investor as defined in Article 2 of Regulation (EU) 2017/1129 as it forms part of domestic law of the United Kingdom by virtue of the EUWA. Consequently, no key information document required by Regulation (EU) No 1286/2014 as it forms part of domestic law of the United Kingdom by virtue of the EUWA (the "UK PRIIPs Regulation") for offering or selling the Notes or otherwise making them available to retail investors in the UK has been prepared and therefore offering or selling the Notes or otherwise making them available to any retail investor in the UK may be unlawful under the UK PRIIPs Regulation.

Notification under section 309B of the Securities and Futures Act 2001 of Singapore – The Notes are prescribed capital markets products (as defined in the Securities and Futures (Capital Markets Products) Regulations 2018) and Excluded Investment Products (as defined in MAS Notice SFA 04-N12: Notice on the Sale of Investment Products and MAS Notice FAA-N16: Notice on Recommendations on Investment Products).

NOTHING IN THE OFFERING MEMORANDUM OR ANY DISTRIBUTION THEREOF CONSTITUTES AN OFFER OF SECURITIES FOR SALE IN ANY JURISDICTION WHERE IT IS UNLAWFUL TO DO SO. THE NOTES AND THE SUBSIDIARY GUARANTEES HAVE NOT BEEN, AND WILL NOT BE, REGISTERED UNDER THE SECURITIES ACT, OR THE SECURITIES LAWS OF ANY STATE OF THE UNITED STATES OR OTHER JURISDICTIONS, AND THE SECURITIES MAY NOT BE OFFERED OR SOLD WITHIN THE U.S., EXCEPT PURSUANT TO AN EXEMPTION FROM, OR IN A TRANSACTION NOT SUBJECT TO, THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT AND APPLICABLE LAWS OF OTHER JURISDICTIONS.

The attached Offering Memorandum has been made available to you in electronic form. You are reminded that documents transmitted via this medium may be altered or changed during the process of transmission and consequently none of the Issuers, the Subsidiary Guarantors (as defined in the attached Offering Memorandum), the Initial Purchasers or any of their respective affiliates, directors, officers, employees, representatives and agents, nor any other person controlling any of the Issuers, any Subsidiary Guarantor, the Initial Purchasers or any of their respective affiliates accepts any liability or responsibility with respect to any discrepancies between the Offering Memorandum distributed to you in electronic format and the hard copy version. The Issuers will provide a hard copy version of the Offering Memorandum to you upon request.

Restrictions: The attached Offering Memorandum is being furnished in connection with an offering exempt from registration under the U.S. Securities Act solely for the purpose of enabling prospective investors an opportunity to consider the purchase of the securities described therein.

The Notes and the Subsidiary Guarantees (each as defined in the attached Offering Memorandum) have not been, and will not be, registered under the U.S. Securities Act, or the securities laws of any other jurisdiction, and may not be offered or sold within the United States unless registered under the U.S. Securities Act or offered or sold pursuant to an exemption from such registration.

You are not authorized to and you may not forward or deliver the attached Offering Memorandum, electronically or otherwise, to any other person or reproduce such Offering Memorandum in any manner whatsoever. Any forwarding, distribution or reproduction of this document and the attached Offering Memorandum in whole or in part is unauthorized. Failure to comply with this directive may result in a violation of the U.S. Securities Act or the applicable laws of other jurisdictions.

The materials relating to this offering of the Notes and Subsidiary Guarantees do not constitute, and may not be used in connection with, an offer or solicitation in any jurisdiction where offers or solicitations are not permitted by law. No action has been or will be taken in any jurisdiction by the Initial Purchasers or the Issuers that would, or is intended to, permit a public offering of the Notes, or possession or distribution of the Offering Memorandum (in preliminary, proof or final form) or any other offering or publicity material relating to the Notes, in any jurisdiction where action for that purpose is required. If a jurisdiction requires that this offering be made by a licensed broker or dealer, and any Initial Purchaser or an affiliate of the Initial Purchasers is a licensed broker or dealer in that jurisdiction, this offering shall be deemed to be made by such Initial Purchaser or such affiliate on behalf of the Issuers and the Subsidiary Guarantors in such jurisdiction.

Under no circumstances shall this Offering Memorandum constitute an offer to sell or the solicitation of an offer to buy nor shall there be any sale of these securities in any jurisdiction in which such offer, solicitation or sale would be unlawful.

You are reminded that you have accessed the attached Offering Memorandum on the basis that you are a person into whose possession this Offering Memorandum may be lawfully delivered in accordance with the laws of the jurisdiction in which you are located and you may not nor are you authorized to deliver this Offering Memorandum, electronically or otherwise, to any other person. If you have gained access to this transmission contrary to the foregoing restrictions, you will be unable to purchase any of the Notes and Subsidiary Guarantees described therein.

If you receive this Offering Memorandum by e-mail, you should not reply by e-mail to this announcement, and you may not purchase any of the Notes and Subsidiary Guarantees by doing so. Any reply e-mail communications, including those you generate by using the "Reply" function on your e-mail software, will be ignored or rejected. If you receive this Offering Memorandum by e-mail, your use of this e-mail is at your own risk and it is your responsibility to take precautions to ensure that it is free from viruses and other items of a destructive nature.

MONGOLIAN MINING CORPORATION

(Incorporated in the Cayman Islands with limited liability)

and

ENERGY RESOURCES LLC

(Incorporated in Mongolia with limited liability)

US$4,287,000

12.50% Guaranteed Senior Notes due 2026

Our US$4,287,000 12.50% Guaranteed Senior Notes due 2026 (the "Notes") will bear interest from September 13, 2023 at 12.50% per annum payable semiannually in arrears on March 13 and September 13 of each year, beginning on March 13, 2024. The Notes will mature on September 13, 2026.

The Notes are general obligations of Mongolian Mining Corporation (the "Company") and Energy Resources LLC ("ER LLC", and together with the Company, the "Issuers"), guaranteed by certain of our existing subsidiaries (the "Subsidiary Guarantors"). The guarantees by the Subsidiary Guarantors are referred to herein as "Subsidiary Guarantees".

The Issuers may at their option redeem the Notes, in whole or in part, at any time and from time to time on or after September 13, 2025, at the redemption price equal to 106.25% of the principal amount of the Notes, plus accrued and unpaid interest, if any, to (but not including) the redemption date.

At any time and from time to time prior to September 13, 2025, the Issuers may at their option redeem the Notes, in whole or in part, at a redemption price equal to 100% of the principal amount of the Notes plus the Applicable Premium (as defined herein) as of, plus accrued and unpaid interest, if any, to (but not including) the redemption date. At any time and from time to time prior to September 13, 2025, the Issuers may redeem up to 35% of the Notes, at a redemption price of 112.50% of the principal amount, plus accrued and unpaid interest, if any, to (but not including) the redemption date, in each case, using the net cash proceeds from certain equity offerings.

Upon the occurrence of a Change of Control Triggering Event (as defined herein), the Issuers must make an offer to repurchase all Notes outstanding at a purchase price equal to 101% of their principal amount, plus accrued and unpaid interest, if any, to (but not including) the date of repurchase.

The Notes will be (1) general obligations of the Issuers; (2) effectively subordinated to secured obligations of the Issuers, to the extent of the value of the assets serving as security therefor; (3) senior in right of payment to any existing and future obligations of the Issuers expressly subordinated in right of payment to the Notes; (4) at least pari passu in right of payment with all other unsecured, unsubordinated Indebtedness of the Issuers (subject to any priority rights of such unsubordinated Indebtedness pursuant to applicable law); (5) guaranteed by the Subsidiary Guarantors on an unsubordinated basis, subject to the limitations described in "Description of the Notes – The Subsidiary Guarantees" and in "Risk Factors – Risks Relating to the Notes and the Subsidiary Guarantees"; and (6) effectively subordinated to all existing and future obligations of any subsidiary of the Company other than ER LLC and the Subsidiary Guarantors. In addition, applicable law may limit the enforceability of the Subsidiary Guarantees. See "Risk Factors – Risks Relating to the Notes and the Subsidiary Guarantees".

For a more detailed description of the Notes, see the section entitled "Description of the Notes" beginning on page 186.

Concurrently with this offering, ER LLC and we commenced an offer to exchange any and all of the outstanding 2024 Notes issued by the Company and ER LLC and represented by Regulation S Global Note ("Reg S Notes") for additional Notes (the "Exchange Notes"), upon the terms and subject to the Minimum Acceptance Amount (as defined in the Exchange Offer Memorandum) and other conditions set forth in an exchange offer memorandum, as it may be supplemented and amended from time to time (the "Exchange Offer Memorandum"). The total principal amount of the Notes to be issued in this offering and the Exchange Notes to be issued in the Exchange Offer is US$180,000,000.

Issue Price: 97.0%

Investing in the Notes involves risks. See the section entitled "Risk Factors" beginning on page 26.

Approval in-principle has been received from the Singapore Exchange Securities Trading Limited (the "SGX-ST") for the listing and quotation of the Notes on the Official List of the SGX-ST. The SGX-ST assumes no responsibility for the correctness of any of the statements made or opinions expressed or reports contained herein. Approval in-principle for the listing and quotation of the Notes and admission of the Notes to the Official List of the SGX-ST are not to be taken as an indication of the merits of the Issuers, the Subsidiary Guarantors (if any), any of their respective subsidiaries and/or associated companies, the Notes or the Subsidiary Guarantees. The Notes will be traded on the SGX-ST in a minimum board lot size of S$200,000 for so long as any of the Notes are listed on the SGX-ST and the rules of the SGX-ST so require.

Notification pursuant to Section 309B of the Securities and Futures Act 2001 of Singapore, the Notes are prescribed capital markets products (as defined in the Securities and Futures (Capital Markets Products) Regulations 2018 of Singapore) and Excluded Investment Products (as defined in the Monetary Authority of Singapore ("MAS") Notice SFA 04-N12: Notice on the Sale of Investment Products and MAS Notice FAA-N16: Notice on Recommendations on Investment Products).

The Notes and the Subsidiary Guarantees have not been and will not be registered under the United States Securities Act of 1933, as amended (the "Securities Act"), and may not be offered or sold within the United States, except pursuant to an exemption from, or in a transaction not subject to, the registration requirements of the Securities Act. Accordingly, the Notes are being offered and sold only outside the United States in compliance with Regulation S under the Securities Act. For a description of certain restrictions on resale or transfer, see the section entitled "Transfer Restrictions" beginning on page 248.

It is expected that the delivery of the Notes will be made on or about September 13, 2023 (the "Closing Date"), being the fifth business day following the date of pricing of the Notes ("T+5"). The Notes will be issued only in registered form in minimum denominations of US$125,000 and integral multiples of US$1,000 in excess thereof, registered in the name of a nominee of and deposited with a common depositary for Euroclear Bank SA/NV ("Euroclear") and Clearstream Banking S.A.. ("Clearstream") on or about the Closing Date for the accounts of their respective accountholders. Solely for operational purposes of Euroclear and Clearstream, Mongolian Mining Corporation has been designated as the issuer and Energy Resources LLC has been designated as the co-issuer.

The Notes are expected to be rated "B" by Fitch Ratings Ltd. ("Fitch") and "B3" by Moody's Investors Service, Inc. ("Moody's"). A rating is not a recommendation to buy, sell or hold securities, and may be subject to revision, suspension or withdrawal at any time by the assigning rating agency.

Joint Bookrunners and Joint Lead Managers

Deutsche Bank **Morgan Stanley**

Offering Memorandum dated September 6, 2023

TABLE OF CONTENTS

			Page
Definitions			1
Glossary			8
Summary			12
Summary of the Offering			16
Summary Historical Consolidated Financial Information and Other Data			21
Risk Factors			26
Use of Proceeds			66
Capitalization and Indebtedness			67
Selected Historical Consolidated Financial Information and Other Data			68
Management's Discussion and Analysis of Financial Condition and Results of Operations			72
Mongolia			94
Industry Overview			101
Corporate Structure and History			118
Business			121
Regulations			154
Directors and Management			174
Principal Shareholders			181
Related Party Transactions			182
Description of Other Material Indebtedness and Perpetual Securities			183
Description of the Notes			186
Taxation			246
Transfer Restrictions			248
Plan of Distribution			250
Ratings			259
Legal Matters			260
Independent Accountants			261
Independent Mining and Geological Expert			262
Listing and General Information			263
Index to Consolidated Financial Statements			F-1
Exhibit A	–	BN and THG Glogex Reserve Statement as at January 1, 2023	Ex A-1
Exhibit B	–	BN and THG Glogex Reserve Report as at January 1, 2022	Ex B-1
Exhibit C	–	BN Resource Statement from Company as at December 31, 2022	Ex C-1
Exhibit D	–	THG Resource Statement from Company as at December 31, 2022	Ex D-1
Exhibit E	–	BN and THG Resource Report as at December 31, 2021	Ex E-1
Exhibit F	–	UHG Glogex Reserve Statement as at January 1, 2023	Ex F-1
Exhibit G	–	UHG Glogex Reserve Report as at January 1, 2022	Ex G-1
Exhibit H	–	UHG Resource Statement from Company as at December 31, 2022	Ex H-1
Exhibit I	–	UHG Resource Report as at December 31, 2021	Ex I-1

IMPORTANT INFORMATION

You should rely only on the information contained in this Offering Memorandum. The Issuers have not, and Deutsche Bank AG, Hong Kong Branch and Morgan Stanley & Co. International plc (together the "Initial Purchasers") have not, authorized any other person to provide you with information that is different. The information in this Offering Memorandum is accurate only as of the date on the front cover of this Offering Memorandum or otherwise as of the date specifically referred to in connection with the particular information. Our business, prospects, financial condition and results of operations may have changed since that date. Neither the delivery of this Offering Memorandum nor any sale made hereunder shall, under any circumstances, create any implication that there has been no change in our affairs since the date hereof or that the information contained herein is correct as of any time subsequent to its date.

This Offering Memorandum does not constitute an offer to sell or the solicitation of an offer to buy any securities other than the securities to which it relates or an offer to sell or the solicitation of an offer to buy such securities by any person in any circumstances in which such offer or solicitation is unlawful. In addition, there may be legal restrictions on the distribution of this Offering Memorandum, this offering and the sale of the Notes in certain jurisdictions. If you come into possession of this Offering Memorandum, the Issuers and the Initial Purchasers require that you inform yourself about and observe any such restrictions. For a further description of certain restrictions on the offering, and the offer, sale or resale of the Notes, see the sections headed "Plan of Distribution" and "Transfer Restrictions" in this Offering Memorandum.

Neither the U.S. Securities and Exchange Commission (the "SEC"), nor any state securities commission in the United States has approved or disapproved of these securities or determined if this Offering Memorandum is truthful, complete or adequate. Any representation to the contrary is a criminal offense.

The Notes and the Subsidiary Guarantees have not been and will not be registered under the Securities Act and may not be offered or sold in the United States, except pursuant to an exemption from, or in a transaction not subject to, the registration requirements of the Securities Act. The Notes are not transferable except in accordance with the restrictions described herein. See the sections headed "Plan of Distribution" and "Transfer Restrictions" in this Offering Memorandum.

Each person receiving this Offering Memorandum acknowledges that: (i) such person has been afforded an opportunity to request from us and to review, and has received, all additional information considered by it to be necessary to verify the accuracy of, or to supplement, the information contained herein; (ii) such person has not relied on the Initial Purchasers, the Trustee or the Agents (each as defined herein) or any person affiliated with the Initial Purchasers, the Trustee or the Agents in connection with any investigation of the accuracy of such information or its investment decision; and (iii) no person has been authorized to give any information or to make any representation concerning us, our subsidiaries and affiliates, the Notes or the Subsidiary Guarantees (other than as contained herein and information given by our duly authorized officers and employees in connection with investors' examination of us and the terms of the offering of the Notes) and, if given or made, any such other information or representation should not be relied upon as having been authorized by us, the Initial Purchasers, the Trustee or the Agents. This Offering Memorandum summarizes certain material documents and other information, and we refer you to them for a more complete understanding of what we discuss in this Offering Memorandum.

This Offering Memorandum is confidential. You should not reproduce or distribute this Offering Memorandum, in whole or in part, and should not disclose any contents or use any information in this Offering Memorandum for any purpose other than considering an investment in the Notes.

The Issuers are furnishing this Offering Memorandum solely for the purpose of enabling you to consider the purchase of the Notes. You should not consider this Offering Memorandum to be legal, business or tax advice. In making an investment decision, you must rely on your own examination of us and the terms of the offering, including the merits and risks involved. If you are in any doubt about this Offering Memorandum, you should consult your legal counsel, professional accountant or other professional advisors. We have provided information contained in this Offering Memorandum and have also relied on

other identified sources. The Initial Purchasers make no representation or warranty, express or implied, as to the accuracy or completeness of such information, and you should not rely on anything contained in this Offering Memorandum as a promise or representation by the Initial Purchasers. By accepting delivery of this Offering Memorandum, you agree to these terms. In making an investment decision, you should rely on your own examination of us and the terms of this offering, including the merits and risks involved. You are responsible for making your own examination of us and your own assessment of the merits and risks of investing in the Notes.

The Issuers reserve the right to withdraw the offering of the Notes at any time, and the Initial Purchasers reserve the right to reject any commitment to subscribe for or purchase the Notes in whole or in part and to allot to any prospective purchaser less than the full amount of purchase of the Notes sought by such purchaser. The Initial Purchasers and certain related entities may acquire for their own account a portion of the Notes.

IN CONNECTION WITH THIS OFFERING, MORGAN STANLEY & CO. INTERNATIONAL PLC, AS STABILIZING MANAGER (THE "STABILIZING MANAGER"), OR ANY PERSON ACTING FOR THE STABILIZING MANAGER, MAY, SUBJECT TO ALL APPLICABLE LAWS AND REGULATIONS, PURCHASE AND SELL THE NOTES IN THE OPEN MARKET WITH A VIEW TO SUPPORTING THE MARKET PRICE OF THE NOTES AT A LEVEL ABOVE THAT WHICH MIGHT OTHERWISE PREVAIL. THESE TRANSACTIONS MAY, TO THE EXTENT PERMITTED BY APPLICABLE LAWS AND REGULATIONS, INCLUDE SHORT SALES, STABILIZING TRANSACTIONS AND PURCHASES TO COVER POSITIONS CREATED BY SHORT SALES. HOWEVER, NEITHER THE STABILIZING MANAGER NOR ANY PERSON ACTING ON BEHALF OF THE STABILIZING MANAGER IS OBLIGATED TO COMMENCE SUCH TRANSACTIONS. IF THESE ACTIVITIES ARE COMMENCED, THEY MAY BE DISCONTINUED AT ANY TIME AND MUST IN ANY EVENT BE BROUGHT TO AN END AFTER A LIMITED TIME THAT IS NO LATER THAN THE EARLIER OF 30 DAYS AFTER THE ISSUE DATE OF THE NOTES AND 60 DAYS AFTER THE DATE OF ALLOTMENT OF THE NOTES.

This Offering Memorandum does not constitute a prospectus for the purposes of the Prospectus Rules of the United Kingdom's Financial Conduct Authority ("FCA") or section 85 of the United Kingdom's Financial Services and Markets Act 2000 (as amended) ("FSMA") and has not been, and will not be, approved by or filed with the FCA. This Offering Memorandum does not constitute an offer or any part of an offer to the public within the meaning of sections 85 and 102B of FSMA.

EU MiFID II Product Governance/Professional Investors and ECPs Only Target Market – Solely for the purposes of each manufacturer's product approval process, the target market assessment in respect of the Notes has led to the conclusion that: (i) the target market for the Notes is eligible counterparties and professional clients only, each as defined in Directive 2014/65/EU on markets in financial instruments (as amended, "MiFID II"); and (ii) all channels for distribution of the Notes to eligible counterparties and professional clients are appropriate. Any person subsequently offering, selling or recommending the Notes (a "distributor") should take into consideration the manufacturers' target market assessment; however, a distributor subject to MiFID II is responsible for undertaking its own target market assessment in respect of the Notes (by either adopting or refining the manufacturers' target market assessment) and determining appropriate distribution channels.

UK MiFIR Product Governance/Professional Investors and ECPs Only Target Market – Solely for the purposes of each manufacturer's product approval process, the target market assessment in respect of the Notes has led to the conclusion that: (i) the target market for the Notes is only eligible counterparties, as defined in the FCA Handbook Conduct of Business Sourcebook, and professional clients, as defined in Regulation (EU) No 600/2014 as it forms part of domestic law by virtue of the European Union (Withdrawal) Act 2018 (the "EUWA") and the regulations made under the EUWA ("UK MiFIR"); and (ii) all channels for distribution of the Notes to eligible counterparties and professional clients are appropriate. Any person subsequently offering, selling or recommending the Notes (a "distributor") should take into consideration the manufacturers' target market assessment; however, a distributor subject to the FCA Handbook Product Intervention and Product Governance Sourcebook (the "UK MiFIR Product Governance Rules") is responsible for undertaking its own target market assessment in respect of the Notes (by either adopting or refining the manufacturers' target market assessment) and determining appropriate distribution channels.

Prohibition of Sales to EEA Retail Investors – The Notes are not intended to be offered, sold or otherwise made available to and should not be offered, sold or otherwise made available to any retail investor in the European Economic Area ("EEA"). For these purposes, a retail investor means a person who is one (or both) of: (i) a retail client as defined in point (11) of Article 4(1) of MiFID II; or (ii) a customer within the meaning of Directive 2016/97/EU (the "Insurance Distribution Directive"), where that customer would not qualify as a professional client as defined in point (10) of Article 4(1) of MiFID II. Consequently, no key information document required by Regulation (EU) No 1286/2014 (the "EU PRIIPs Regulation") for offering or selling the Notes or otherwise making them available to retail investors in the EEA has been prepared and therefore offering or selling the Notes or otherwise making them available to any retail investor in the EEA may be unlawful under the EU PRIIPs Regulation.

Prohibition of Sales to UK Retail Investors – The Notes are not intended to be offered, sold or otherwise made available to and should not be offered, sold or otherwise made available to any retail investor in the United Kingdom ("UK"). For these purposes, a retail investor means a person who is one (or more) of: (i) a retail client, as defined in point (8) of Article 2 of Regulation (EU) No 2017/565 as it forms part of domestic law by virtue of the European Union (Withdrawal) Act 2018 ("EUWA") and the regulations made under the EUWA; (ii) a customer within the meaning of the provisions of the Financial Services and Markets Act 2000 (as amended, the "FSMA") and any rules or regulations made under the FSMA to implement Directive (EU) 2016/97, where that customer would not qualify as a professional client, as defined in point (8) of Article 2(1) of Regulation (EU) No 600/2014 as it forms part of domestic law by virtue of the EUWA and the regulations made under the EUWA. Consequently no key information document required by Regulation (EU) No 1286/2014 as it forms part of domestic law by virtue of the EUWA and the regulations made under the EUWA (the "UK PRIIPs Regulation") for offering or selling the Notes or otherwise making them available to retail investors in the UK has been prepared and therefore offering or selling the Notes or otherwise making them available to any retail investor in the UK may be unlawful under the UK PRIIPs Regulation.

Notification under section 309B of the Securities and Futures Act 2001 of Singapore: The Notes are prescribed capital markets products (as defined in the Securities and Futures (Capital Markets Products) Regulations 2018) and Excluded Investment Products (as defined in MAS Notice SFA 04-N12: Notice on the Sale of Investment Products and MAS Notice FAA-N16: Notice on Recommendations on Investment Products).

IMPORTANT NOTICE TO PROSPECTIVE INVESTORS

Prospective investors should be aware that certain intermediaries in the context of this offering of the Notes, including certain Joint Bookrunners and Joint Lead Managers, are "capital market intermediaries" ("CMIs") subject to Paragraph 21 of the Code of Conduct for Persons Licensed by or Registered with the Securities and Futures Commission (the "SFC Code"). This notice to prospective investors is a summary of certain obligations the SFC Code imposes on such CMIs, which require the attention and cooperation of prospective investors. Certain CMIs may also be acting as "overall coordinators" ("OCs") for this offering and are subject to additional requirements under the SFC Code.

Prospective investors who are the directors, employees or major shareholders of the Issuers, a CMI or its group companies would be considered under the SFC Code as having an association ("Association") with the Issuers, the CMI or the relevant group company. Prospective investors associated with the Issuers or any CMI (including its group companies) should specifically disclose this when placing an order for the Notes and should disclose, at the same time, if such orders may negatively impact the price discovery process in relation to this offering. Prospective investors who do not disclose their Associations are hereby deemed not to be so associated. Where prospective investors disclose their Associations but do not disclose that such order may negatively impact the price discovery process in relation to this offering, such order is hereby deemed not to negatively impact the price discovery process in relation to this offering. Prospective investors should ensure, and by placing an order prospective investors are deemed to confirm, that orders placed are bona fide, are not inflated and do not constitute duplicated orders (i.e., two or more corresponding or identical orders placed via two or more CMIs). If a prospective investor is an asset management arm affiliated with any Joint Bookrunner and Joint Lead Manager, such prospective investor

should indicate when placing an order if it is for a fund or portfolio where the Joint Bookrunner and Joint Lead Manager or its group company has more than 50% interest, in which case it will be classified as a "proprietary order" and subject to appropriate handling by CMIs in accordance with the SFC Code and should disclose, at the same time, if such "proprietary order" may negatively impact the price discovery process in relation to this offering. Prospective investors who do not indicate this information when placing an order are hereby deemed to confirm that their order is not a "proprietary order". If a prospective investor is otherwise affiliated with any Joint Bookrunner and Joint Lead Manager, such that its order may be considered to be a "proprietary order" (pursuant to the SFC Code), such prospective investor should indicate to the relevant Joint Bookrunner and Joint Lead Manager when placing such order. Prospective investors who do not indicate this information when placing an order are hereby deemed to confirm that their order is not a "proprietary order". Where prospective investors disclose such information but do not disclose that such "proprietary order" may negatively impact the price discovery process in relation to this offering, such "proprietary order" is hereby deemed not to negatively impact the price discovery process in relation to this offering.

Prospective investors should be aware that certain information may be disclosed by CMIs (including private banks) which is personal and/or confidential in nature to the prospective investor. By placing an order, prospective investors are deemed to have understood and consented to the collection, disclosure, use and transfer of such information by the Joint Bookrunners and Joint Lead Managers and/or any other third parties as may be required by the SFC Code, including to the Issuers, any OCs, relevant regulators and/or any other third parties as may be required by the SFC Code, it being understood and agreed that such information shall only be used for the purpose of complying with the SFC Code, during the bookbuilding process for this offering. Failure to provide such information may result in that order being rejected.

CERTAIN DEFINITIONS, CONVENTIONS AND CURRENCY PRESENTATION

Certain financial numerical figures, including financial information and percentages, contained in this Offering Memorandum have been rounded for convenience. As a result, discrepancies may exist in the numerical figures shown as total in some tables as they may not be exact arithmetic aggregations of the figures that precede them.

PRESENTATION OF FINANCIAL INFORMATION

Our financial results are reported in U.S. dollars. For convenience only and unless otherwise noted, all translations from Togrogs into U.S. dollars in this Offering Memorandum were made at the rate of MNT3,432.67 to US$1.00, which translation represents the basic exchange rate published by the Bank of Mongolia on June 30, 2023. On August 24, 2023 the translation of Togrogs into U.S. dollars published by the Bank of Mongolia was MNT3,474.23 to US$1.00. No representation is made that the Togrog amounts could have been, or could be, converted into any U.S. dollar amounts, at the rates indicated or at all. Certain financial amounts presented in this Offering Memorandum may not correspond directly to our financial statements included elsewhere in this Offering Memorandum or may not add up due to rounding.

Our financial information is prepared and presented in accordance with International Financial Reporting Standards, or IFRS, which differ in certain respects from accounting principles generally accepted in the United States, or U.S. GAAP, which might be material to the financial information herein. We have made no attempt to quantify the impact of those differences. In making an investment decision, investors must rely upon their own examination of us, the terms of this offering and the financial information. Potential investors should consult their own professional advisors for an understanding of the differences between IFRS and U.S. GAAP, and how those differences might affect the financial information herein.

NON-IFRS FINANCIAL MEASURE

Earnings before interest, tax, depreciation and amortization and certain other items ("Adjusted EBITDA") and the related ratios presented in this Offering Memorandum are supplemental measures of our performance and liquidity that are not required by, or presented in accordance with, IFRS. Adjusted EBITDA is not a measurement of financial performance or liquidity under IFRS and should not be

considered as an alternative to net income, operating income or any other performance measures derived in accordance with IFRS or as an alternative to cash flows from operating activities as a measure of liquidity. In addition, Adjusted EBITDA is not a standardized term; hence, a direct comparison of Adjusted EBITDA as reported by different companies may not be possible or meaningful.

We believe that Adjusted EBITDA facilitates comparisons of operating performance from period to period and company to company by eliminating potential differences caused by variations in capital structures (affecting interest and finance charges), tax positions (such as the impact on periods or companies of changes in effective tax rates or net operating losses), the age and booked depreciation and amortization of assets (affecting relative depreciation and amortization expenses), foreign exchange gains or losses, allowance for doubtful debts and other related non-cash expenses. Adjusted EBITDA has been presented because we believe that it is frequently used by securities analysts, investors and other interested parties in evaluating similar companies, many of whom present such non-IFRS financial measures when reporting their results. Finally, Adjusted EBITDA is presented as a supplemental measure of our ability to service our debt. Nevertheless, Adjusted EBITDA has limitations as an analytical tool, and you should not consider it in isolation from, or as a substitute for, analysis of our financial condition or results of operations, as reported under IFRS. Because of these limitations, Adjusted EBITDA should not be considered as a measure of discretionary cash available to us to invest in the growth of our businesses. The term "Consolidated EBITDA", as used in the section titled "Description of the Notes" summarizing certain provisions of the Indenture, the Notes and the Subsidiary Guarantees, is calculated differently from Adjusted EBITDA and is not a measurement of financial performance or liquidity under IFRS.

INDUSTRY AND MARKET DATA

We have commissioned Shanxi Fenwei Energy Information Services Co., Ltd, or Fenwei, as our industry consultant, to prepare an independent expert report the "Fenwei Report") on the energy sector in Mongolia and China for use in whole or in part in the Industry Overview section of this Offering Memorandum. Fenwei prepared its report based on Fenwei's in-house database, independent third-party reports and publicly available data from reputable industry organizations. Fenwei has assumed that the information and data which it relied on are complete and accurate. The definition of the terms used in the Fenwei Report may be different than the definition of the terms used in this Offering Memorandum. The information contained in the Industry Overview has been obtained from sources believed by Fenwei to be reliable, but there can be no assurance as to the accuracy or completeness of included information. Unless otherwise specified, all of the data presented in this section with respect to the Mongolian and Chinese coal industries has been extracted from the Fenwei Report.

This Offering Memorandum includes market share and industry data and forecasts that we have obtained from industry publications and surveys, reports of governmental agencies, publicly available corporate information and internal company surveys or estimates. Industry publications and surveys and forecasts generally state that the information contained therein has been obtained from sources believed to be reliable, but there can be no assurance as to the accuracy or completeness of the information. While we have taken reasonable care to ensure that the information is extracted accurately and in its proper context, we have not independently verified any of the data from third-party sources or ascertained the underlying economic assumptions relied upon therein. None of us or the Initial Purchasers makes any representation as to the accuracy and reliability of such information. Due to possible inconsistent data collection and consolidation methods and other associated data collection difficulties, the statistics and estimates herein may be inaccurate and should not be unduly relied upon.

ENFORCEABILITY OF CIVIL LIABILITIES

The Company is an exempted company incorporated under the laws of the Cayman Islands with limited liability. All or a substantial portion of its assets are located in Mongolia. In addition, most of the Company's directors and officers are residents of Mongolia or Hong Kong, and all or a substantial portion of their assets are or may be located in Mongolia or Hong Kong. As a result, it may be difficult for you to effect service of process upon the Company or such persons, or to enforce against the Company or them judgments obtained in courts or arbitral tribunals outside Mongolia, Hong Kong or the Cayman Islands predicated upon the laws of jurisdictions other than Mongolia, Hong Kong or the Cayman Islands, including the civil liability provisions of the United States federal or state securities laws.

We have been advised by our Mongolian legal counsel, Snowhill Consultancy LLP, that there is uncertainty as to whether the courts of Mongolia would enforce judgments in original actions brought in Mongolia, of liabilities against ER LLC, its directors or officers predicated upon the U.S. federal or state securities laws. Mongolian courts will not enforce judgments of U.S. courts obtained against ER LLC, its directors or officers predicated upon the civil liability provisions of the U.S. federal or state securities laws in the absence of a bilateral treaty between Mongolia and the United States or the mutual recognition of court judgments between the two countries. As of the date of this Offering Memorandum, no such treaty exists.

We have been advised by our Cayman Islands legal adviser, Maples and Calder (Hong Kong) LLP, that a judgment obtained in a foreign court (other than certain judgments of a superior court of any state of the Commonwealth of Australia) will be recognized and enforced in the courts of the Cayman Islands without any re-examination of the merits at common law, by an action commenced on the foreign judgment in the Grand Court of the Cayman Islands, where the judgment: (a) is final and conclusive; (b) is one in respect of which the foreign court had jurisdiction over the defendant according to Cayman Islands conflict of law rules; (c) is either for a liquidated sum not in respect of penalties or taxes or a fine or similar fiscal or revenue obligations or, in certain circumstances, for in person and non-money relief; and (d) was neither obtained in a manner, nor is of a kind enforcement of which is contrary to natural justice or the public policy of the Cayman Islands.

We have been advised by our Hong Kong legal adviser, Davis Polk & Wardwell, that Hong Kong has no statutory or other arrangement for the reciprocal enforcement of judgments between Hong Kong and the United States. A judgment obtained in the courts of New York cannot be enforced by registration in Hong Kong. Subject to the Foreign Judgments (Restriction on Recognition and Enforcement) Ordinance (Cap 46 of the Laws of Hong Kong), a judgment given by the courts of New York could form the basis of a claim in the Hong Kong courts in respect of the judgment debt if: (a) the judgment was not obtained by fraud, misrepresentation or mistake nor obtained in proceedings which contravene the rules of natural justice; (b) enforcement of the judgment would not be contrary to public policy in Hong Kong; (c) the relevant court of United States had jurisdiction in accordance with the Hong Kong rules on the conflict of laws; (d) the judgment is for a definite sum of money which is not payable in respect of taxes or other charges of a similar nature or in respect of a fine or other penalty; and (e) the judgment is final and conclusive between the parties, but if it is capable of being appealed or an appeal is pending, the proceedings in Hong Kong are likely to be stayed by the courts of Hong Kong pending any such appeal being heard.

We have been advised by our Luxembourg counsel, Loyens & Loeff Luxembourg S.à r.l., that the United States and the Grand Duchy of Luxembourg ("Luxembourg") are not currently bound by a treaty providing for reciprocal recognition and enforcement of judgments, other than arbitral awards rendered in civil and commercial matters. According to such counsel, an enforceable judgment for the payment of monies rendered by any U.S. federal or state court based on civil liability would not directly be enforceable in Luxembourg. However, a party who received such favorable judgment in a U.S. court may initiate enforcement proceedings in Luxembourg by requesting enforcement of the U.S. judgment rendered in civil or commercial matters by the Luxembourg District Court pursuant to the relevant provisions of the New Luxembourg Code of Civil Procedure and in Luxembourg case law. The Luxembourg District Court will authorize the enforcement in Luxembourg of the U.S. judgment if it is satisfied that the following conditions are met:

- the U.S. court had full jurisdiction over the subject matter leading to the judgment (that is, its jurisdiction was in compliance both with Luxembourg private international law rules and with the applicable domestic U.S. federal or state jurisdictional rules and, in particular, the Luxembourg courts had no exclusive jurisdiction over the case at hand to adjudicate the respective matter under applicable Luxembourg private international law rules or U.S. federal or state jurisdiction rules);

- the judgment is enforceable in the U.S.;

- the U.S. court has applied to the dispute the substantive law which would have been designated by the Luxembourg courts in compliance with the Luxembourg conflict of law rules, or, at least, the order must not contravene the principles underlying those rules (based on case law and legal doctrine, it is not certain that this condition would still be required for an enforcement (*exequatur*) to be granted by a Luxembourg court);

- the principles of natural justice have been complied with and the judgment was granted following proceedings where the counterparty had the opportunity to appear, and, if it appeared, to present a defense;

- the U.S. court has acted in accordance with its own procedural laws;

- the judgment must not have been obtained by fraud;

- the judgment of the U.S. court must not contain contradictions with an existing Luxembourg court order or order does not contravene overriding mandatory provisions of Luxembourg law; and

- the considerations of the order or judgement of the U.S. court do not contravene international public policy as understood under the laws of Luxembourg or must not have been given in proceedings of a penal, criminal or tax nature (which would include awards of damages made under civil liabilities provisions of the U.S. federal securities laws, or other laws, to the extent that the same would be classified by Luxembourg courts as being of a penal or punitive nature (for example, fines or punitive damages)) or rendered subsequent to an evasion of Luxembourg law (*fraude a la loi*).

If an original action is brought in Luxembourg, Luxembourg courts may refuse to apply the designated law among others and notably if its application contravenes Luxembourg public policy. In an action brought in Luxembourg on the basis of U.S. Federal or state securities laws, Luxembourg courts may not have the requisite power to grant the remedies sought. Also, an enforcement proceeding may be refused in respect of punitive damages.

Further, in the event of any proceedings being brought in a Luxembourg court in respect of a monetary obligation expressed to be payable in a currency other than Euro, a Luxembourg court would have power to give judgment expressed as an order to pay a currency other than Euro. However, enforcement of the judgment against any party in Luxembourg would be available only in Euro and for such purposes all claims or debts would be converted into Euro.

Subject to the foregoing, purchasers of the Notes may be able to enforce judgments in civil and commercial matters obtained from U.S. federal or state courts in Luxembourg. We cannot, however, assure you that attempts to enforce judgments in Luxembourg will be successful.

FORWARD-LOOKING STATEMENTS

This Offering Memorandum contains forward-looking statements that are, by their nature, subject to significant risks and uncertainties. Statements that are not historical facts, including statements about our intentions, beliefs, expectations or predictions for the future, are forward-looking statements. These forward-looking statements include, without limitation, statements relating to:

- our business strategies;

- our capital expenditure plans;

- our future production targets;

- our operations and business prospects;

- our financial performance;

- our dividend policy;

- the regulatory environment as well as the industry outlook generally;

- the changes in the amount of recoverable resources and reserves;

- fluctuations in the market prices of our products;
- future developments in our industry, including but not limited to the statements in the "Industry" section of this Offering Memorandum; and
- general economic, political and legislative trends in China and Mongolia.

This Offering Memorandum contains certain statements that are "forward-looking" and uses forward-looking terminology such as "anticipate", "believe", "expect", "estimate", "may", "ought to", "should", "will", "can", "could", "continue", "going forward", "intend", "plan", "potential", "seek" and similar expressions. Those statements include, among other things, the discussion of our growth strategy and expectations concerning our future operations, liquidity and capital resources. Purchasers of the Notes are cautioned that reliance on any forward-looking statement involves risks and uncertainties and that, although we believe the assumptions on which the forward-looking statements are based are reasonable, any or all of those assumptions could prove to be inaccurate and as a result, the forward-looking statements based on those assumptions could also be incorrect. The risks and uncertainties in this regard include those identified in the "Risk Factors" section in this Offering Memorandum. Actual results may differ materially from information contained in forward-looking statements as a result of numerous factors, including, without limitation, those described in the "Risk Factors" section in this Offering Memorandum and the following:

- public health crises and pandemics/epidemics, such as the COVID-19 pandemic;
- changes in political, economic, legal and social conditions in Mongolia and China, including their respective governments' specific policies with respects to the coal industry, economic growth, inflation, foreign exchanges and the availability of credit;
- export transportation inefficiency and delays in road, railway and cross border infrastructure development programs;
- our ability to maintain licenses and permits;
- changes in coking coal prices and competition;
- availability of fuel and other materials necessary for our operations;
- the effects of the Russia-Ukraine war;
- circumstance and developments related to climate change, the environmental and social impacts of fossil fuel extraction and use;
- our ability to service our indebtedness;
- our ability to comply with the financial tests and other covenants in our existing and future debt instruments, including limitations on our flexibility in operating our business;
- our history of losses and uncertainty regarding our profitability in the future;
- our production capabilities;
- our plans and objectives for future operations;
- our relationship with, and other conditions affecting, our customers;
- risks inherent to our mining and production;

- difficult conditions in the global economy, financial markets and geopolitical relations;
- future legislation, including regulations and rules as well as changes in enforcement policies;
- inflationary trends and interest rate changes;
- the effects of changes in currency exchange rates;
- environmental laws and regulations;
- regulatory and court decisions;
- weather conditions or catastrophic weather-related damage; and
- our liquidity and financial condition.

We do not undertake and are under no obligation to publicly update or revise any forward-looking statements contained in this Offering Memorandum, whether as a result of new information, future events or otherwise, except as required by applicable laws, rules and regulations. All forward-looking statements contained in this Offering Memorandum are qualified by reference to this cautionary statement.

In light of these and other risks and uncertainties, the inclusion of forward-looking statements should not be regarded as representations by us that our plans and objectives will be achieved.

CAUTIONARY NOTE REGARDING RESOURCES AND RESERVES

We have estimated the coal resources and reserves reported in this Offering Memorandum in accordance with the JORC Code which governs such disclosures by companies listed on the Australian Stock Exchange.

The JORC Code recognizes two types of classification, mineral resources and ore reserves, based on the nature of the technical and economic evaluation carried out.

- Mineral resources are based on mineral occurrences quantified on the basis of geological data and quality, and are divided into measured, indicated and inferred categories reflecting decreasing confidence in geological and quality continuity. No allowances are included for dilution and losses during mining, but the reporting of mineral resource estimates carries the implication that there are reasonable prospects for eventual economic exploitation. Mineral resources may therefore be viewed as the estimation stage prior to the application of more stringent economic criteria for ore reserve definition, such as a rigorously defined cut-off grade and mine design outlines, along with allowances for dilution and losses during mining. Under this system of reporting, it is common practice for companies to include in the mineral resource category material with a high expectation of conversion to ore reserves, but for which final technical and economic viability has not been determined.

- Ore reserves as defined by the JORC Code are the economically mineable part of measured or indicated resources. Ore reserves are designated within proved and probable categories, and are derived from the corresponding measured and indicated mineral resource estimates after inclusion of allowances for mining and recovery factors. In addition to geological considerations, other modifying economic, mining, metallurgical, marketing, legal, environmental, social and governmental factors are taken into account in determining the extent to which mineral resources could be converted to ore reserves.

The resource and reserve estimates provided in this Offering Memorandum comply with the resource and reserve definitions of the JORC Code. The resource estimates are presented as measured, indicated and inferred, and the reserve estimates are presented as proved and probable.

You should not assume that all or any part of measured or indicated resources will ever be converted into reserves. You are also cautioned not to assume that all or any part of an inferred resource exists or is economically or legally mineable.

COAL RESOURCE AND RESERVE REPORTS AND STATEMENTS

Information contained in this Offering Memorandum relating to estimates of (i) coal resources report at our UHG deposit and, BN and THG deposit as of December 31, 2021 was prepared by Mr. Byambaa Barkhas (Competent Person as defined by JORC code 2012 edition, ID #318198, member of Australasian Institute of Mining and Metallurgy), who is employed by Energy Resources LLC, (ii) coal reserves report at our UHG deposit and, BN and THG deposit as at January 1, 2022 was prepared by Mr. Naranbaatar Lundeg (Competent Person as defined by JORC code 2012 edition, ID #326646, member of Australasian Institute of Mining and Metallurgy), who is employed by Glogex Consulting LLC, (iii) coal resources statements for our UHG deposit and, BN and THG deposit as at December 31, 2022 was prepared by Mr. Byambaa Barkhas (Competent Person as defined by JORC code 2012 edition, ID #318198, member of Australasian Institute of Mining and Metallurgy) who is employed by Energy Resources LLC; and (iv) coal reserves statements for our UHG deposit and, BN and THG deposit as at January 1, 2023 was prepared by Mr. Naranbaatar Lundeg (Competent Person as defined by JORC code 2012 edition, ID #326646, member of Australasian Institute of Mining and Metallurgy), who is employed by Glogex Consulting LLC, each according to the requirements of the JORC Code effective as of the date of the respective report and statement. All Competent Persons provided written consent statement according to Clause 9 of the JORC code 2012 edition.

You should be aware that the coal reserves we state are estimates of the material we believe we will be able to profitably mine taking into account the economic, legal and technical factors in its extraction and sale, while the coal resources stated is primarily based on geological factors, (although such a declaration implies that there are reasonable prospects for the eventual economic extraction of the resource). Accordingly, you should not assume that we will be able to profitably extract the mineral resources estimated in this Offering Memorandum, particularly that portion of the estimated mineral resources identified as "inferred resources". When coal resources and reserves are reported under the JORC Code, the mineral reserve figures (tonnage and coal quality) are included within the mineral resource figures (tonnage and coal quality).

Estimates of coal resources and reserves depend significantly on the interpretation of geological data obtained from drill holes and other exploration techniques, which is extrapolated to produce estimates of the location, volume and qualities of coal deposits. In addition, to calculate our coal reserves, we make estimates and assumptions regarding a number of technical factors, such as recoverability and process efficiency, as well as economic factors such as forecast costs and revenues. These economic and technical estimates and assumptions may change in future in ways that affect the quantity of our stated coal reserves. We generate additional geological data as we mine, which may not be consistent with the data on which we based our coal resource and reserve estimates, resulting in changes to such estimates. No assurance can be given that the coal resources and reserves presented in this Offering Memorandum will be recovered at the quality or quantity presented. Estimates of coal resources of our UHG deposit and BN deposits disclosed herein have not been adjusted to reflect production after December 31, 2022. Estimates of coal reserves of our UHG and BN deposits disclosed herein have not been adjusted to reflect production after January 1, 2023.

DEFINITIONS

In this Offering Memorandum, unless the context otherwise requires, the following terms shall have the meanings set forth below. Certain other terms are explained in the section headed "Glossary" in this Offering Memorandum.

"2006 Minerals Law"	the Minerals Law of Mongolia, enacted on July 8, 2006, and effective from August 26, 2006, and as amended and supplemented from time to time
"2022 Notes"	the U.S. dollar senior notes due 2022 issued by the Company bearing interest ranging from 5%-8% per annum based on the benchmark coal price index
"2024 Notes"	the U.S. dollar 9.25% guaranteed senior notes due 2024
"2024 Notes Indenture"	an indenture entered into by the Company, ER LLC, the subsidiary guarantors named therein and The Bank of New York Mellon as trustee on April 15, 2019, pursuant to which the 2024 Notes were issued
"ADB"	Asian Development Bank
"affiliate(s)"	any other person, directly or indirectly, controlling or controlled by or under direct or indirect common control with a specified person
"aimag"	the highest level of Mongolian administrative subdivision (essentially equivalent to a province), of which there are 21 in Mongolia
"Audit Committee"	the audit committee of the Board
"Auto Road Use Agreement"	the toll fee arrangement for the UHG-GS paved road, owned by Erdenes MGL, entered into with Gashuun Sukhait Auto Road LLC in 2018
"BN"	Baruun Naran, one of the mine sites in Mongolia
"BN deposit"	our BN deposit located in South Gobi Province which includes coal resources and reserves identified for surface (<300m depth of cover) and underground (>300m depth of cover) mining, including both the BN mining license and the THG mining license
"BN mine"	the surface mining applicable (<300m depth of cover) portion of our BN deposit
"BN mining license"	the Mining License MV-014493 of 4,482 hectares area obtained through acquisition of Baruun Naran Limited on June 1, 2011
"Board"	the board of directors of the Company
"C&F"	Cost-and-Freight, meaning the seller must pay the cost and freight to bring the goods to the port of destination. The risk is transferred to the buyer once the goods are loaded on the vessel

"China"	the People's Republic of China, and for the purposes of this Offering Memorandum, excluding Hong Kong, Macau and Taiwan
"CHPP"	coal handling and preparation plant
"Clearstream"	Clearstream Banking S.A., a company incorporated as a société anonyme under the laws of the Grand Duchy of Luxembourg, having its registered office at 42, avenue J.F. Kennedy, L-1855 Luxembourg, registered with the Luxembourg Register of Commerce and Companies under number B-9248, or any successor thereof
"CMI"	capital market intermediaries
"Company", "our Company", "Group", "our Group", "we", "us", "our", "MMC" or "Mongolian Mining Corporation"	Mongolian Mining Corporation, an exempted company incorporated in the Cayman Islands with limited liability on May 18, 2010 and except where the context indicates otherwise (i) our subsidiaries; and (ii) with respect to the period before our Company became the holding company of our present subsidiaries, the business operated by our present subsidiaries or (as the case may be) their predecessors
"COVID-19"	an infectious disease caused by the most recently discovered coronavirus (severe acute respiratory syndrome coronavirus 2), first reported in December 2019
"DAP"	Delivered-at-Place, the seller delivers the goods to the buyer on the arriving means of transport, ready for unloading at the named place of destination, pays for carriage to the named place, except for costs related to import clearance, and assumes all risks prior to the point that the goods are ready for unloading by the buyer
"DGMC"	the Department of Geological and Mining Cadaster, a subordinate agency of MRPAM responsible for registration of exploration licenses and mining license rights in Mongolia
"Director(s)"	director(s) of our Company
"EM Group"	EM LLC, Singapore EM HoldCo and their respective successors and subsidiaries
"EM LLC"	Erdene Mongol LLC, a limited liability company incorporated in Mongolia
"Environmental, Social and Governance Committee" or "ESG Committee"	the Environmental, Social and Governance Committee of the Board
"ER LLC"	Energy Resources LLC, a limited liability company organized under Mongolian law on April 22, 2005
"Erdenes MGL"	Erdenes MGL LLC, a state-owned enterprise

"Erdenes Tavan Tolgoi"	Erdenes Tavan Tolgoi Joint Stock Company, which was established on October 20, 2010 by the Government by Resolution No. 272
"Euroclear"	refers to Euroclear Bank S.A./N.V. or any successor thereof
"Exchange Act"	the U.S. Securities and Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder
"EXW"	ex-works, meaning the seller delivers when it places the goods at the disposal of the buyer at the seller's premises or at another named place
"FCA"	free carrier, meaning the seller of goods to deliver those goods to a named airport, shipping terminal, warehouse, or other carrier location specified by the buyer
"Fitch"	Fitch Ratings Ltd. and its successors
"FOB"	Free-on-Board, meaning the risk passes to the buyer, including payment of all transportation and insurance costs, once goods are delivered on board of the ship by the seller
"FOT"	Free-on-Transport, meaning the risk passes to the buyer, including payment of all transportation and insurance costs, once goods are delivered on a truck at a named loading point
"FSMA"	United Kingdom's Financial Services and Markets Act 2000 (as amended)
"GDP"	gross domestic product
"Glogex"	Glogex Consulting LLC, a company incorporated under the laws of Mongolia with limited liability
"GM"	Ganqimaodu or Gants Mod, the Chinese side of the Sino-Mongolian border crossing, where the Company currently exports its coal products
"Government of Mongolia" or "Government"	the Government of Mongolia
"Group"	the Company and its subsidiaries
"GS"	Gashuun Sukhait, the Mongolia side of the Sino-Mongolian border crossing, where the Company currently exports its coal products
"GS-GM"	Gashuunsukhait-Ganqimaodu checkpoint from Mongolia to China
"GS Terminal"	a customs bonded terminal for containerized shipments at the Gashuunsukhait border checkpoint

"Hong Kong" or "HK"	the Hong Kong Special Administrative Region of China
"Hong Kong Stock Exchange"	The Stock Exchange of Hong Kong Limited
"HSE MS"	our integrated Health, Safety and Environment Management System
"IAAC"	Independent Authority Against Corruption of Mongolia
"IFRS"	International Financial Reporting Standards
"IMF"	International Monetary Fund
"Initial Purchasers"	Deutsche Bank AG, Hong Kong Branch and Morgan Stanley & Co. International plc
"Law on VAT"	Law of Mongolia on Value-Added Tax
"Listing Rules"	Rules Governing the Listing of Securities on The Stock Exchange of Hong Kong Limited
"MAS"	Monetary Authority of Singapore
"MCS Group"	MCS Mongolia and its subsidiaries (other than our Group)
"MCS Holding"	MCS Holding LLC, a wholly owned subsidiary of MCS Mongolia, a limited liability company organized under Mongolian law on March 29, 2001
"MCS International"	MCS International LLC, a wholly owned subsidiary of MCS Holding, principally engaged in project management, engineering, operation and maintenance of power plant, electricity and thermal energy distribution facilities, and supply of electricity and thermal energy
"MCS Mongolia"	MCS (Mongolia) LLC, a limited liability company organized under Mongolian law
"Mineral Deposit of Strategic Importance"	under the 2006 Minerals Law, a deposit that may have the potential to impact national security, or the economic and social development of Mongolia, or that is generating, or has the potential to generate, more than 5% of Mongolia's GDP in any given year
"Minerals License Transfer Agreement"	the minerals license transfer agreement entered into between ER LLC and the Government of Mongolia on March 21, 2008, pursuant to which ER LLC agreed to transfer all of the mining licenses held by it at the time, except for the one covering our UHG deposit, to a state owned enterprise at nil consideration
"MMHI"	the Ministry of Mining and Heavy Industry, a cabinet-level ministry of the Government of Mongolia

"MNT" or "togrog"	the lawful currency of Mongolia
"Moody's"	Moody's Investors Service, Inc. and its successors
"MPC"	the Monetary Policy Committee of the Bank of Mongolia
"MPP"	Mongolian People's Party
"MPRP"	Mongolian People's Revolutionary Party
"MRPAM"	the Mineral Resources and Petroleum Authority of Mongolia, a subordinate agency of the MMHI, under which the DGMC operates (former Mineral Resources Authority of Mongolia or MRAM)
"MSE"	the Mongolian Stock Exchange
"New Share Option Scheme"	the new share option scheme adopted on June 16, 2021
"NIC"	NIC LLC, an oil import and distribution company in Mongolia
"Nomination Committee"	the nomination committee of the Board
"Non-Guarantor Restricted Subsidiaries"	any Restricted Subsidiary that is not a Subsidiary Guarantor
"Notes"	US$4,287,000 12.50% Guaranteed Senior Notes due 2026
"Parliament" or "State Great Hural"	the legislature in Mongolia
"Perpetual Securities"	the U.S. dollar-denominated perpetual securities issued by Mongolian Mining Corporation
"Perpetual Securities Indenture"	an indenture entered into by the Company and The Bank of New York Mellon as trustee on May 4, 2017, pursuant to which the Perpetual Securities were issued
"Proved Coal Reserve"	the economically mineable part of a mineral measured resource
"Regulation S"	Regulation S under the Securities Act
"Remuneration Committee"	the remuneration committee of the Board
"Risun Group"	Risun Coal Chemicals Group
"RMB"	Renminbi, the lawful currency of China
"SDR"	the Special Drawing Right
"SEC"	the U.S. Securities and Exchange Commission

"Securities Act"	the U.S. Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder
"Sedgman"	Sedgman Consulting (China) and Sedgman Limited, a provider of multi-disciplinary engineering, project delivery and operations services
"SFA"	the Securities Act or the Securities and Futures Act 2001 of Singapore
"SGX-ST"	the Singapore Exchange Securities Trading Limited
"Share Option Scheme"	the share option scheme adopted in September 2010
"Shunkhlai"	Shunkhlai LLC, an oil import and distribution company in Mongolia
"Singapore EM HoldCo"	Mongolian Mining Corporation Pte. Ltd, a limited liability company incorporated under the laws of Singapore and a wholly-owned subsidiary of the Company
"soum"	the second level of Mongolian administrative subdivisions (essentially equivalent to a sub-province or district)
"South Gobi Province"	Umnugobi Aimag, a province located in southern Mongolia
"Strategic Deposits List"	a list of 16 deposits designated by the Parliament to be Mineral Deposits of Strategic Importance by Resolution No. 27, adopted on February 6, 2007 and amended on January 23, 2015 and June 29, 2018, respectively (Tier 1 Deposits List)
"Subsidiary Guarantors"	Mongolian Coal Corporation Limited, Mongolian Coal Corporation S.à r.l., Energy Resources Corporation LLC, Tavan Tolgoi Airport LLC, United Power LLC, Ukhaa Khudag Water Supply LLC, Baruun Naran S.à r.l. and Khangad Exploration LLC, being the initial subsidiary guarantors of the Notes
"Tavan Tolgoi" or "TT"	means the coal formation located in South Gobi, Mongolia, which includes our UHG deposit per Parliament Resolution No. 27, adopted on February 6, 2007
"THG deposit"	our THG deposit located in South Gobi Province which includes coal resources and reserves identified for surface (<300m depth of cover) and underground (>300m depth of cover) mining covering the THG mining license
"THG mining license"	the Mining License MV-017336 of 8,340 hectares area granted to us on June 24, 2013, contiguous with the BN mining license
"Thiess"	Thiess Mongolia LLC, formerly Leighton LLC, a global mining services provider

"Tier 2 Deposits List"	a list of 39 deposits designated in Resolution No. 27, adopted on February 6, 2007, to be further evaluated and determined if one or more of such deposits should be recommended by the Government of Mongolia to Parliament for designation as a Mineral Deposit of Strategic Importance
"TKH"	Tsagaan Khad, located in Khanbogd soum of South Gobi Province, approximately 21 km from GM, which is used for stockpiling
"TMR"	target market region, including Inner Mongolia, Hebei, Tianjin, Gansu, Shandong and Jiangsu provinces
"Tsogttsetsii"	Tsogttsetsii soum is the location where Tavan Tolgoi sits
"TT-GS"	Tavantolgoi-Gashuunsukhait railway, which connects Tavan Tolgoi in southern Mongolia with the GS-GM railroad on the border with China; the railway commenced operations on September 9, 2022
"TTT"	Tavan Tolgoi Tulsh LLC, a state-owned entity designated for manufacturing and distributing coal briquettes to Ulaanbaatar residents
"UHG"	Ukhaa Khudag, located in Tsogttsetsii soum of South Gobi Province
"UHG deposit"	means our Ukhaa Khudag deposit located in the Tavan Tolgoi coalfield which includes coal resources and reserves identified for surface (<300m depth of cover) and underground (>300m depth of cover) mining
"UHG-GS"	a paved road between UHG and the GS border crossing in Mongolia
"UHG mine"	means the surface mining applicable (<300m depth of cover) portion of our UHG deposit and its related infrastructure
"UHG mining license"	the Mining License MV-011952 of 2,960 hectares area granted to us on August 29, 2006 "UK" the United Kingdom
"Uniservice Solution LLC"	a wholly owned subsidiary of MCS Holding that provides ancillary services, such as cleaning and camp supporting services
"United States" or "U.S"	the United States of America
"US$" or "U.S. dollar"	United States dollar, the lawful currency of the United States
"VAT"	value added tax

GLOSSARY

The glossary of technical terms contains explanation of certain terms used in this Offering Memorandum as they relate to our Company and as they are used in this Offering Memorandum in connection with our Group and our business. These terms and their given meanings may not correspond to standard industry definitions.

"bcm"	bank cubic meter
"Bt"	billion tonnes
"Chinese Coal Classification Standard"	GB 5751-1986, the standard for classification of Chinese coals
"coke"	bituminous coal from which the volatile components have been removed
"coking coal"	coal used as a raw material in the process of manufacturing steel and iron. It is also known as metallurgical coal
"Competent Person"	as defined by the JORC Code, a minerals industry professional who is a Member or Fellow of the Australasian Institute of Mining and Metallurgy, or of the Australian Institute of Geoscientists, or of a 'Recognized Professional Organization' (RPO), as included in a list available on the JORC and ASX websites A Competent Person must have a minimum of five years relevant experience in the style of mineralization or type of deposit under consideration and in the activity which that person is undertaking. If the Competent Person is preparing documentation on exploration results, the relevant experience must be in exploration. If the Competent Person is estimating or supervising the estimation of mineral resources, the relevant experience must be in the estimation, assessment and evaluation of mineral resources. If the Competent Person is estimating or supervising the estimation of ore reserves, the relevant experience must be in the estimation, assessment, evaluation and economic extraction of ore reserves
"CSN"	Crucible Swelling Number. This number is used to compare the shape and the coking volume increase of a finely ground coal sample when 1 gram is heated in a closed crucible quickly over a brief time period. Results are only used as a comparative indication of the coking potential of the coal and not a measure of strength. Values for CSN range from 1 through 9 in increments of 0.5
"Environmental Impact Assessment"	a feasibility study by international standards which assesses in detail the environmental impact of an undeveloped mining project
"HCC"	hard coking coal; see "Business – Coal Products"

"JORC"	the Australasian Joint Ore Reserves Committee, which produces the JORC Code. JORC was established in 1971 and is sponsored by the Australian mining industry and its professional organizations The JORC comprises representatives of each of the three parent institutions: The Minerals Council of Australia (MCA), The Australasian Institute of Mining and Metallurgy (The AusIMM), and the Australian Institute of Geoscientists (AIG); as well as representatives of the Australian Securities Exchange (ASX), the Financial Services Institute of Australasia (FinSIA) and the accounting profession
"JORC Code"	the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, 2012 Edition, a professional code of practice that sets minimum standards for public reporting of minerals exploration results, mineral resources and ore reserves The JORC Code provides a mandatory system for the classification of minerals exploration results, mineral resources and ore reserves according to the levels of confidence in geological knowledge and technical and economic considerations in public reports
"km"	kilometer
"lignite"	the lowest rank of coal with the lowest energy content, typically containing 25-35% carbon. Lignite tends to be found in relatively young coal deposits that were not subjected to extreme heat or pressure, is crumbly, has high moisture content and is mainly used as fuel at power plants to generate electricity
"LOM"	life-of-mine
"m"	meter
"mineral resource"	as defined by the JORC Code, a concentration or occurrence of solid material of economic interest in or on the earth's crust in such form, grade (or quality), and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade (or quality), continuity and other geological characteristics of a mineral resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling. Mineral resources are sub-divided, in order of increasing geological confidence, into inferred, indicated and measured categories
"mining rights"	the rights to exploit minerals in areas where mining activities are licensed
"mm"	millimeter

"Modifying Factors"	as defined by the JORC Code, considerations used to convert mineral resources to ore reserves. These include but are not limited to mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors
"Mt"	million tonnes
"Mtpa"	million tonnes per annum
"MW"	megawatt
"open-pit"	mine designed to extract minerals close to the surface; also known as "open cut"
"ore reserve"	the economically mineable part of a measured or indicated mineral resource demonstrated by at least a preliminary feasibility study. This study must include adequate information on mining, processing, economic and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified. A mineral reserve includes diluting materials and allowances for 8 losses that may occur when the material is mined
"overburden"	barren rock material, either loose or consolidated, overlying a mineral deposit, which must usually be removed prior to mining of ore reserves
"PCI coal"	the term refers to coal that is used for Pulverized Coal Injection. PCI coal is characterized by its high rank, low volatile matter and generally has ash levels of less than 10.5%. PCI coal is fired directly into the lower level of the blast furnace as an effective means of injecting carbon, thereby reducing the quantity of coke required per tonne of hot metal produced. The higher the volume of PCI coal that can be utilized, the lower the volume of coke required. A wide range of coal is suitable for PCI, including thermal and semi-soft coking coal and as such it is cheaper than most coal purchased for producing coke
"Permian"	a geological period from around 299 million years ago to around 251 million years ago
"qualified person/qualified personnel"	an individual who: (a) is an engineer or geoscientist with at least five years of experience in mineral exploration, mine development or operation, or mineral project assessment, or any combination of these; (b) has experience relevant to the subject matter of the mineral project and the technical report; and (c) is a member or licensee in good standing of a professional association
"raw coal"	generally means coal that has not been washed and processed
"ROM"	run-of-mine, the as-mined coal, that includes out-of-seam dilution material which is processed through our CHPP

"seam"	a stratum or bed of coal; generally applied to large deposits of coal
"SSCC"	semi-soft coking coal; see "Business – Coal Products"
"strip ratio" or "stripping ratio"	the ratio of the amount of waste removed (in bcm) to the amount of coal (in ROM tonnes) extracted by open-pit mining methods
"thermal coal"	also referred to as "steam coal" or "steaming coal", thermal coal is used in combustion processes by power generation plants and industrial users to produce steam for power and heat. Thermal coal tends not to have the carbonization properties possessed by coking coal and generally has lower heat value and higher volatility than coking coal
"tonne"	metric tonne
"underground mining"	refers to a group of underground mining techniques used to extract coal
"washed coal"	hard coking coal that has been washed and processed to reduce its ash content
"washed thermal coal"	secondary thermal product resulting from the processing of raw coal primarily to produce coking coal, also referred to as "middlings"
"yield"	the percentage of saleable portion of product coal recovered from proposed raw coal

SUMMARY

This summary highlights information contained elsewhere in this Offering Memorandum and does not contain all the information that may be important to you in deciding to invest in the Notes. You should read the entire Offering Memorandum, including the section entitled "Risk Factors" and financial statements and related Notes thereto included elsewhere in this Offering Memorandum, before making an investment decision. This Offering Memorandum includes forward-looking statements that involve risks and uncertainties. See "Forward-looking Statements".

OVERVIEW

We are a leading Asian coking coal producer engaged in the open-pit mining and processing of coking coal sourced from our UHG and BN deposits, located in the South Gobi Province of Mongolia. These deposits are adjacent to each other and strategically located approximately 250 kilometers ("km") from the Sino-Mongolian border and approximately 600 km from Baotou, China, an important railway transportation hub providing access from Mongolia to the largest steel producing provinces in China, including Inner Mongolia, Hebei, Shandong and Jiangsu provinces. We have worked closely with a number of industry-leading experts, including Thiess and Sedgman, throughout the planning, development and operation of our business to develop integrated mining, processing, supporting infrastructure, transportation and logistics operations.

Our UHG mining license permits us to engage in coal mining activities on 2,960 hectares of land for an initial period of 30 years commencing from August 29, 2006. As of December 31, 2022, 570 Mt of JORC-compliant coal resources, and as of January 1, 2023, 365 Mt of JORC-compliant coal reserves have been identified within such area, respectively. Our BN mining license, comprising the BN mining license area of 4,482 hectares and the contiguous THG mining license area of 8,340 hectares, permits coal mining for an initial period of 30 years commencing from December 1, 2008, and June 24, 2013, respectively. Within the BN and THG mining license areas combined, a total of 500 Mt of JORC-compliant coal resources have been identified as of December 31, 2021, including 280 Mt of JORC-compliant coal reserves as of January 1, 2023. Our BN mine is located approximately 30 km by paved road southwest of our UHG mine, and its development, in integration with existing facilities at UHG, is yielding benefits through synergies achievable in terms of shared mining, processing and transportation infrastructure and marketing resources. BN mine produced 0.4 Mt ROM coal for 2022. For the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, we produced an aggregate of 7.7 Mt, 4.3 Mt, 5.7 Mt, 0.9 Mt and 8.0 Mt of ROM coal, respectively.

With a view to consistently producing high quality products, reducing product transportation costs and generating improved margins, we constructed and commissioned 15.0 Mtpa of ROM coal processing capacity onsite at the UHG mine. The coal handling and preparation plant ("CHPP"), designed and constructed by Sedgman, comprises three near identical modules of ROM coal processing nameplate capacity of 5.0 Mtpa each.

Since the commencement of the CHPP operation, we have shifted our sales strategy from raw coal to washed coal, having sold only washed coal products from the beginning of the second quarter of 2012.

We have our own fleet of over 480 double-trailer trucks and also have support facilities to flexibly conduct shipments from UHG to TKH and further from TKH to GM. Currently, we conduct shipments using the approximately 240 km long UHG-TKH ("long haul") section solely with our own double-trailer trucks, while cross border shipments for exports using the approximately 20 km long TKH-GM ("short haul") section are undertaken by our own double-trailer trucks supplemented by third-party Chinese trucking contractors.

We are one of the largest coal producers and exporters in Mongolia. The total volume of coal export from Mongolia reached 16.1 Mt in 2021, 31.8 Mt in 2022, and amounted to 29.5 Mt in the first half of 2023. During each such period, our market share accounted for 7%, 13% and 15%, respectively, of the total volume of coal exported from Mongolia. For the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, we sold our hard coking coal at an average selling price of US$121.4 per tonne, US$150.6 per tonne, US$147.1 per tonne, US$141.3 per tonne and US$161.8 per tonne, respectively.

Our major shareholder, MCS Group, is one of the largest business conglomerates in Mongolia, operating leading companies in engineering, energy, communication, property, mining, fast-moving consumer goods, health, and hospitality industries. In 2022, we were included in the Top 5 Enterprise list of Mongolia by the Government of Mongolian and the Mongolian National Chamber of Commerce and industry for the 10th consecutive year.

Our revenue for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, was US$417.4 million, US$184.1 million, US$546.2 million, US$106.5 million and US$516.7 million, respectively. We recorded profit/(loss) for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023 of US$29.6 million, US$(55.4) million, US$58.9 million, US$(32.3) million and US$136.5 million, respectively.

OUR COMPETITIVE STRENGTHS

We believe that we have the following competitive strengths:

- Fully integrated operations and sole Mongolian washed coking coal exporter
- Strategic location with close proximity to end customers
- Industry leading, competitive cost structure
- Room for further enhancement from rail transportation
- Clear pathway to diversification coupled with robust governance standards

See "Business – Our Competitive Strengths" for a detailed description of these strengths.

OUR STRATEGIES

We intend to pursue the following key strategies to maintain and enhance our position as a leading Asian coking coal mining company.

- Minimize operating cost and improve operating efficiency
- Continue to develop and diversify our long-term customer base and promote our own brand
- Expand and diversify our business operations through acquisitions, investments and joint ventures
- Continued strong commitment to safety, the environment and social responsibility

See "Business – Our Strategies" for a detailed description of these strategies.

RECENT DEVELOPMENTS

EM Transaction

In January 2023, MMC announced that it has entered into an investment agreement with EM LLC and ERD, pursuant to which the Company agreed to subscribe for securities in EM LLC for the total consideration of US$40 million. The consideration is paid in three instalments subject to the terms and conditions of the investment agreement. At the first closing, which occurred in January 2023, EM LLC issued and MMC subscribed for a convertible promissory note in the aggregate principal amount of US$5.0 million in cash. At the second closing, which occurred in May 2023, EM LLC issued and MMC subscribed for second instalment note in the aggregate subscription amount of US$5.0 million in cash. At the third and final closing, which is expected to occur during the course of 2023, subject to completion of certain milestones, EM LLC shall issue to MMC or its assignee the third instalment shares in the amount

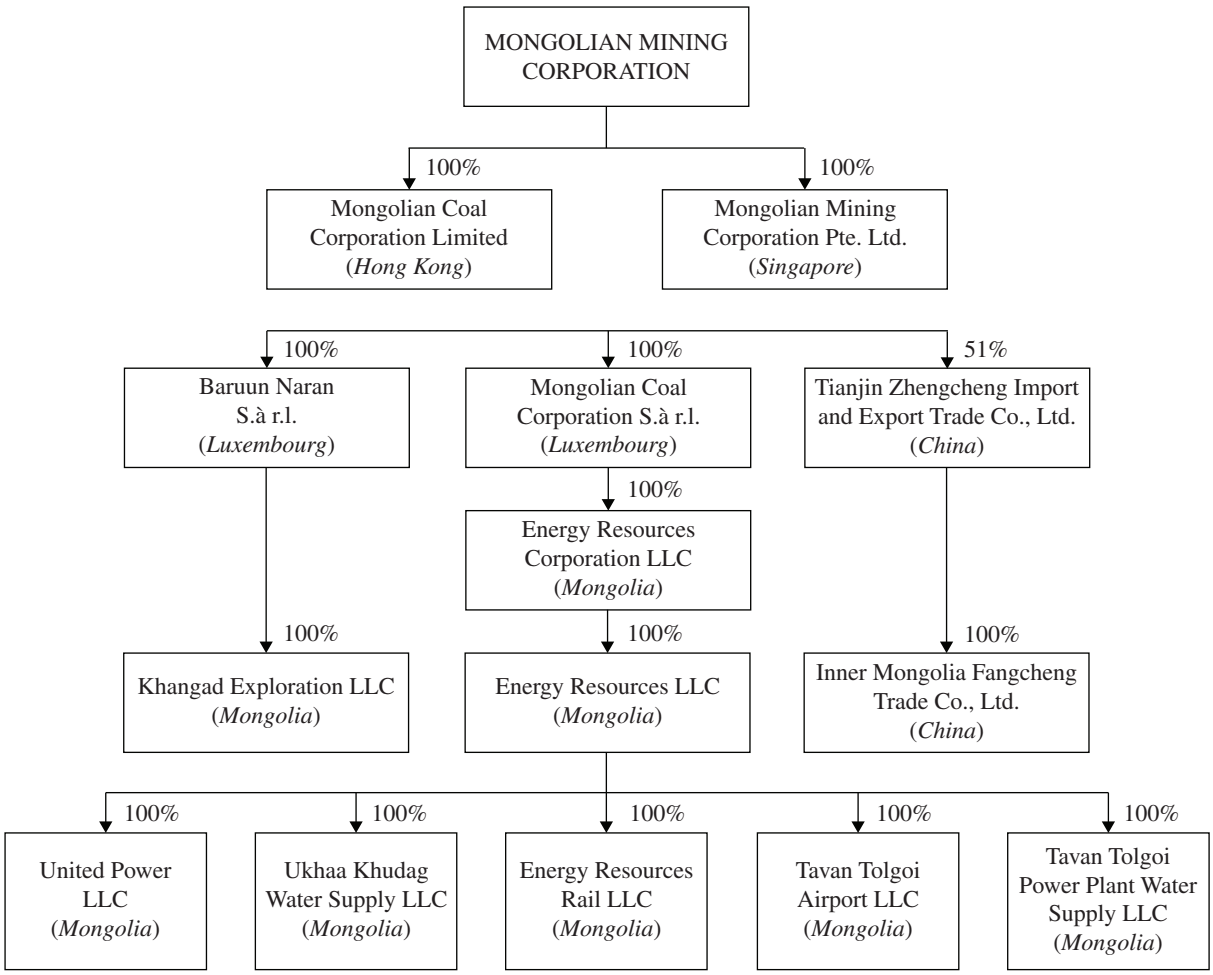
of US$30.0 million. In addition, at the final closing, all the outstanding principal amount and accrued interest of the convertible notes shall be converted into shares of EM LLC, which coupled with the third installment shares, shall altogether represent 50% of the issued and outstanding share capital of EM LLC immediately after such conversion and calculated on a fully diluted basis. For more information, see "Business – EM Transaction"

COVID-19 Pandemic and Government Response

During the past three years, COVID-19 has spread globally and has led to significant global economic and financial disruptions, including an adverse impact on global supply chains, international trade and business activities. In response to the COVID-19 pandemic, the Parliament of Mongolia and the Mongolian Government took extensive legislative, economic, fiscal and preventive measures, which have been relatively effective in response to the COVID-19 pandemic. The effective period of the Law on Prevention from and Fight against Coronavirus (COVID-19) Pandemic and Mitigating its Social and Economic Impact expired on December 31, 2022. However, the economic effects of efforts to contain the disease have had a substantial adverse effect on the Mongolian economy. Mongolia's economic growth has been adversely affected, with GDP contracting by 4.6% in 2020, compared to growth of 5.6% in the preceding year. Since 2021, despite the occasional re-imposition of restrictive measures in response to a resurgence of cases, Mongolia has in general relaxed its restrictions gradually and officially opened up its air borders to all visitors in February 2022. Starting in December 2022 and during the periods thereafter, the Chinese government started to announce series of measures to reopen its borders and economy, and also to support businesses in their recovery. See "Risk Factors – Risks Relating to Our Business and Industry – Public health crises and pandemics/epidemics, such as the COVID-19 pandemic, may materially adversely affect our results of operations".

CORPORATE STRUCTURE

As of June 30, 2023, our corporate structure is as follows:



We were incorporated in the Cayman Islands on May 18, 2010 as an exempted company with limited liability under the Companies Act (As Revised) of the Cayman Islands. Our principal place of business in Mongolia is at 16th Floor, Central Tower, Sukhbaatar District 8, Ulaanbaatar 14200, Mongolia. Our place of business in Hong Kong is at 5/F, Manulife Place, 348 Kwun Tong Road, Kowloon, Hong Kong. Our registered office is located at Cricket Square, Hutchins Drive, P.O. Box 2681, Grand Cayman, KY1-1111, Cayman Islands. Our shares have been listed for trading on the Hong Kong Stock Exchange since October 13, 2010. Our website is www.mmc.mn. Information contained on our website does not constitute part of this Offering Memorandum.

EXCHANGE OFFER

Concurrently with this offering, ER LLC and we commenced an offer to exchange any and all of the outstanding Reg S Notes, upon the terms and subject to the Minimum Acceptance Amount and other conditions set forth in an in the Exchange Offer Memorandum. The consummation of the Exchange Offer is not conditional upon successful issuance of the Notes. We cannot assure you as to the amount of Reg S Notes that may be tendered for exchange in the Exchange Offer or that the Exchange Offer will be consummated at all. The consummation of the Exchange Offer is a condition precedent to the closing of this offering. Pursuant to the Exchange offer, ER LLC and we expect to issue Exchange Notes. Any Exchange Notes will have the same terms as and form a single class with the Notes to be issued in this offering. The Exchange Notes are expected to be delivered on the same date as the Notes. The total principal amount of the Notes to be issued in this offering and the Exchange Notes to be issued in the Exchange Offer is US$180,000,000.

This Offering Memorandum is neither an offer to exchange nor a solicitation of an offer to sell, buy or exchange the Reg S Notes. Any offer to exchange the Reg S Notes will be made solely on the terms and subject to the conditions set forth in a separate offer to exchange memorandum that will be directed to eligible holders of the Reg S Notes.

SUMMARY OF THE OFFERING

The following is a brief summary of the term of this offering and is qualified in its entirety by the remainder of this Offering Memorandum. Terms used in this summary and not otherwise defined shall have the meanings given to them in "Description of the Notes".

Issuers	Mongolian Mining Corporation (the "Company") and ER LLC (the "Co-Issuer", and together with the Company, the "Issuers")
Notes Offered	US$4,287,000 aggregate principal amount of 12.50% Guaranteed Senior Notes due 2026 (the "Notes").
Maturity Date	September 13, 2026
Interest	The Notes will bear interest from and including September 13, 2023 at the rate of 12.50% per annum, payable semi-annually in arrears.
Interest Payment Dates	March 13 and September 13 of each year, commencing March 13, 2024.
Ranking of the Notes	The Notes are: • general obligations of the Issuers; • effectively subordinated to secured obligations of the Issuers, to the extent of the value of the assets serving as security therefor; • senior in right of payment to any existing and future obligations of the Issuers expressly subordinated in right of payment to the Notes; • at least *pari passu* in right of payment with all other unsecured, unsubordinated Indebtedness of the Issuers (subject to any priority rights of such unsecured, unsubordinated Indebtedness pursuant to applicable law); • guaranteed by the Subsidiary Guarantors on an unsubordinated basis, subject to the limitations described in "Description of the Notes – The Subsidiary Guarantees" and in "Risk Factors – Risks Relating to the Notes and the Subsidiary Guarantees"; and • effectively subordinated to all existing and future obligations of any subsidiaries of the Company other than the Co-Issuer and the Subsidiary Guarantors.

Subsidiary Guarantees	Each of the Subsidiary Guarantors will jointly and severally guarantee the due and punctual payment of the principal of, premium, if any, and interest on, and all other amounts payable under, the Notes. On the Original Issue Date, the Co-Issuer and all of the Company's other Subsidiaries, other than Singapore EM HoldCo, will be Restricted Subsidiaries. Singapore EM Holdco will be an Unrestricted Subsidiary on the Original Issue Date, and upon consummation of the EM Transaction, each of EM LLC and its Subsidiaries (if any), to the extent they become Subsidiaries of the Company, will be an Unrestricted Subsidiary. On the Original Issue Date, the initial Subsidiary Guarantors will consist of Mongolian Coal Corporation Limited, Mongolian Coal Corporation S.à r.l., Energy Resources Corporation LLC, Tavan Tolgoi Airport LLC, United Power LLC, Ukhaa Khudag Water Supply LLC, Baruun Naran S.à r.l. and Khangad Exploration LLC. Tianjin Zhengcheng Import and Export Trade Co., Ltd., Inner Mongolia Fangcheng Trade Co., Ltd., Energy Resources Rail LLC and Tavan Tolgoi Power Plant Water Supply LLC will not guarantee the Notes, and accordingly, such entities and any future Restricted Subsidiaries of the Company that do not become Subsidiary Guarantors are collectively referred to herein as the "Non-Guarantor Restricted Subsidiaries". A Subsidiary Guarantee given by a Subsidiary Guarantor may be released in certain circumstances. See "Description of the Notes – The Subsidiary Guarantees – Release of the Subsidiary Guarantees". The Company will cause each of its future Wholly Owned Restricted Subsidiaries which, directly or indirectly, own any mining deposits or reserves or any mining license, as soon as practicable but in any event within five days after becoming a Restricted Subsidiary, to execute and deliver to the Trustee a supplemental indenture to the Indenture pursuant to which such Restricted Subsidiary will guarantee the payment of the Notes. Notwithstanding the foregoing, the Company will not be obligated to cause any Restricted Subsidiary to guarantee the Notes to the extent such guarantee could reasonably be expected to give rise to or result in any conflict with or violation of applicable law (or risk of personal or criminal liability for the officers, directors, managers or shareholders of such Restricted Subsidiary). For the avoidance of doubt, the Company shall not be obligated to cause any member of EM Group to guarantee the Notes except in the event that each member of EM Group becomes a Wholly Owned Restricted Subsidiary.

Ranking of the Subsidiary Guarantees	The Subsidiary Guarantee of each Subsidiary Guarantor: • is a general obligation of such Subsidiary Guarantor; • is effectively subordinated to secured obligations of such Subsidiary Guarantor (if any, to the extent of the value of the assets serving as security therefor; • is senior in right of payment to all future obligations of such Subsidiary Guarantor expressly subordinated in right of payment to such Subsidiary Guarantee; • ranks at least *pari passu* with all other unsecured, unsubordinated Indebtedness of such Subsidiary Guarantor (subject to any priority rights of such unsecured, unsubordinated Indebtedness pursuant to applicable law); and • is effectively subordinated to all existing and future obligations of any subsidiaries of the Company other than the Co-Issuer and the Subsidiary Guarantors.
Optional Redemption	At any time and from time to time on or after September 13, 2025, the Issuers may at their option redeem the Notes, in whole or in part, at the redemption price equal to 106.25% of the principal amount of the Notes, plus accrued and unpaid interest, if any, to (but not including) the redemption date. At any time and from time to time prior to September 13, 2025, the Issuers may at their option redeem the Notes, in whole or in part, at a redemption price equal to 100% of the principal amount of the Notes plus the Applicable Premium as of, plus accrued and unpaid interest on the Notes redeemed, if any, to (but not including) the redemption date. In addition, at any time and from time to time prior to September 13, 2025, the Issuers may at their option redeem up to 35% of the aggregate principal amount of the Notes with the Net Cash Proceeds of one or more sales of Common Stock of the Company in an Equity Offering at a redemption price of 112.50% of the principal amount of the Notes, plus accrued and unpaid interest on the Notes redeemed, if any, to (but not including) the redemption date; *provided* that at least 65% of the aggregate principal amount of the Notes issued on the Original Issue Date remains outstanding after each such redemption and any such redemption takes place within 60 days after the closing of the related Equity Offering. In connection with any Change of Control Offer (as defined in the "Description of the Notes") or any other tender offer to purchase all of the Notes for cash at a purchase price not less than par ("Cash Tender Offer"), if Holders of not less than 90.0% of the aggregate principal amount of the then outstanding Notes validly tender and do not validly withdraw such Notes and the Issuers, or any third party making such offer in lieu of the Issuers, purchases all of such Notes, the Issuers or such third party will have the right, upon notice, to redeem all Notes that remain outstanding following such purchase at a price equal to the price paid to each other Holder in such Change of Control Offer or Cash Tender Offer, *plus* accrued and unpaid interest, if any, to (but not including) the redemption date.

Repurchase of Notes Upon a Change of Control Triggering Event	Not later than 30 days following a Change of Control Triggering Event, the Issuers will make an Offer to Purchase all outstanding Notes at a purchase price equal to 101% of the principal amount thereof plus accrued and unpaid interest, if any, to (but not including) the Offer to Purchase Payment Date. See "Description of the Notes – Repurchase of Notes Upon a Change of Control Triggering Event".
Redemption for Tax Reasons	Subject to certain exceptions and as more fully described herein, the Issuers may redeem the Notes, in whole but not in part, at a redemption price equal to 100% of the principal amount thereof, together with accrued and unpaid interest, if any, to the date of redemption, if the Issuers or a Subsidiary Guarantor would be obligated to pay certain Additional Amounts (as defined in the "Description of the Notes") as a result of certain changes in specified tax laws. See "Description of the Notes – Redemption for Tax Reasons".
Covenants	The Notes, the indenture governing the Notes and the Subsidiary Guarantees will limit the Company's ability and the ability of its Restricted Subsidiaries to, among other things: • incur additional Indebtedness; • make investments or other Restricted Payments; • pay dividends or make other distributions; • enter into agreements that restrict the Company's Restricted Subsidiaries' ability to pay dividends; • issue or sell Capital Stock of Restricted Subsidiaries; • guarantee Indebtedness; • enter into certain transactions with affiliates; • create Liens; • enter into Sale and Leaseback Transactions; • sell assets; • effect a consolidation or merger; and • engage in different business activities. All of these limitations are subject to a number of important qualifications and exceptions. See "Description of the Notes – Certain Covenants".

Transfer Restrictions	The Notes will not be registered under the Securities Act or under any state securities laws of the United States and will be subject to customary restrictions on transfer and resale. See "Transfer Restrictions".
Form, Denomination and Registration	The Notes sold will be issued only in fully registered form, without coupons, in denominations of US$125,000 and integral multiples of US$1,000 in excess thereof and will be initially represented by or held by one or more global notes registered in the name of a nominee of Euroclear and/or Clearstream.
Book-Entry	The Notes sold will be issued in book-entry form through the facilities of Euroclear and/or Clearstream for the accounts of its/their participants. For a description of certain factors relating to clearance and settlement, see "Description of the Notes – Book – Entry; Delivery and Form".
Delivery of the Notes	The Issuers expect to make delivery of the Notes on or about September 13, 2023, which is expected to be the fifth business day following the date of this Offering Memorandum. You should note that initial trading of the Notes may be affected by the T+5 settlement.
Trustee	The Bank of New York Mellon, London Branch
Paying Agent	The Bank of New York Mellon, London Branch
Transfer Agent and Registrar	The Bank of New York Mellon, SA/NV, Dublin Branch
Listing	Approval in-principle has been received from the SGX-ST for the listing and quotation of the Notes on the SGX-ST. The Issuers will use commercially reasonable efforts to obtain and maintain such listing as long as any Notes remain outstanding.
Governing Law	The Notes, the Subsidiary Guarantees and the Indenture will be governed by and will be construed in accordance with the laws of the State of New York.
ISIN	XS2616603770
Common Code	261660377
Legal Entity Identifier	Mongolian Mining Company: 254900XQ2EY5O3SAYL47 Energy Resources LLC: 2549000NXAL5JJHJYT18
Risk Factors	For a discussion of certain factors that should be considered in evaluating an investment in the Notes, see "Risk Factors".

SUMMARY HISTORICAL CONSOLIDATED FINANCIAL INFORMATION AND OTHER DATA

The following summary consolidated statement of profit or loss and other comprehensive income and summary consolidated statement of cash flow data for the years ended December 31, 2020, 2021 and 2022 and the summary consolidated statement of financial position as of December 31, 2020, 2021 and 2022 set forth below have been derived from our consolidated financial statements which have been prepared in accordance with IFRS (the "Audited Financial Statements"). The following summary consolidated statement of profit or loss and other comprehensive income and summary consolidated condensed statement of cash flow data for the six months ended June 30, 2022 and 2023 and the summary consolidated statement of financial position as of June 30, 2023 set forth below have been derived from our unaudited but reviewed condensed consolidated financial statements, which have been prepared in accordance with International Accounting Standard 34 (the "Unaudited Interim Financial Statements"). Our Audited Financial Statements have been audited by KPMG and our Unaudited Interim Financial Statements have been reviewed by KPMG.

Our Unaudited Interim Financial Statements may not provide the same quality of information associated with information that has been subject to an audit. Potential purchasers must exercise caution when using such data to evaluate our financial condition and results of operations. None of the Joint Bookrunners, the Joint Lead Managers nor any of their directors, officers, employees, representatives, agents, advisers or affiliates makes any representation or warranty, express or implied, regarding the sufficiency of such financial information for an assessment of, and potential investors must exercise caution when using such data to evaluate our financial condition, results of operations and results. Our Unaudited Interim Financial Statements should not be taken as an indication of the expected financial condition or results of operations of the Group for the full financial year ending December 31, 2023 and they are not comparable to the financial information for the years ended December 31, 2020, 2021 and 2022.

You should read the summary historical financial information below in conjunction with our financial statements and the accompanying notes included in this Offering Memorandum.

SUMMARY CONSOLIDATED STATEMENT OF PROFIT OR LOSS AND OTHER COMPREHENSIVE INCOME DATA

	Year ended December 31,			Six months ended June 30,	
	2020	**2021**	**2022**	**2022**	**2023**
				(Unaudited)	*(Unaudited)*
	(in US$'000, except earnings per share)				
Revenue	417,424	184,069	546,248	106,539	516,701
Cost of revenue	(288,848)	(161,490)	(451,131)	(126,425)	(291,597)
Gross profit/(loss)	128,576	22,579	95,117	(19,886)	225,104
Other cost	(2,155)	(3,422)	(1,328)	–	–
Other net income	2,418	3,382	5,509	(2,306)	3,095
Selling and distribution costs	(27,645)	(9,625)	(2,434)	(647)	(2,107)
General and administrative expenses	(19,773)	(24,242)	(24,775)	(7,352)	(14,049)
Profit/(loss) from operations	81,421	(11,328)	72,089	(30,191)	212,043
Finance income	5,053	54	6,286	2,671	616
Finance costs	(46,191)	(48,980)	(47,081)	(27,250)	(26,360)
Net finance costs	(41,138)	(48,926)	(40,795)	(24,579)	(25,744)
Gain from repurchase of 2024 Notes	–	–	23,144	–	3,970

	Year ended December 31,			Six months ended June 30,	
	2020	**2021**	**2022**	**2022**	**2023**
				(Unaudited)	*(Unaudited)*
	(in US$'000, except earnings per share)				
Share of (losses)/profit of associates	(77)	(196)	286	22	307
Share of losses of joint ventures	(5)	(1)	(16)	(10)	–
Profit/(loss) before taxation	40,201	(60,451)	54,708	(54,758)	190,576
Income tax	(10,596)	5,013	4,183	22,446	(54,123)
Profit/(loss) for the year/period	29,605	(55,438)	58,891	(32,312)	136,453
Attributable to					
Equity shareholders of the Company	28,940	(55,238)	59,177	(32,361)	136,635
Non-controlling interests	665	(200)	(286)	49	(182)
Other comprehensive income for the year/period (after tax and reclassification adjustments)					
Exchange differences on translation/re-translation	(7,556)	184	(21,726)	(12,004)	21
Surplus on revaluation of plants, buildings, and machinery and equipment	–	62,895	–	–	–
Total comprehensive income for the year/period	22,049	7,641	37,165	(44,316)	136,474
Profit/(loss) attributable to the equity shareholders of the Company	28,940	(55,238)	59,177	(32,361)	136,635
Total comprehensive income attributable to the equity shareholders of the Company	21,384	7,841	38,306	(44,365)	136,721
Basic earnings/(loss) per share	2.81 cents	(5.35) cents	5.68 cents	(3.10) cents	13.11 cents
Diluted earnings/(loss) per share	2.81 cents	(5.35) cents	5.68 cents	(3.10) cents	13.11 cents

SUMMARY CONSOLIDATED STATEMENT OF FINANCIAL POSITION

	As of December 31,			As of June 30,
	2020	2021	2022	2023
				(Unaudited)
		(in US$'000)		
Total non-current assets	1,496,013	1,594,018	1,560,862	1,568,427
Total current assets	239,527	285,120	259,646	414,377
Total assets	1,735,540	1,879,138	1,820,508	1,982,804
Total current liabilities	172,286	335,118	328,288	730,762
Total non-current liabilities	675,090	647,442	565,143	187,775
Total liabilities	847,376	982,560	893,431	918,537
Total equity attributable to equity shareholders of the Company	821,209	829,823	872,556	1,009,993
Non-controlling interests	386	186	(955)	(1,202)
Total liabilities and shareholders' equity	1,668,585	1,812,383	1,765,987	1,928,530

SUMMARY CONSOLIDATED CASH FLOW DATA

	Year ended December 31,			Six months ended June 30,	
	2020	2021	2022	2022	2023
				(Unaudited)	*(Unaudited)*
			(in US$'000)		
Net cash generated from operating activities	108,687	84,911	233,779	80,332	247,810
Net cash used in investing activities	(70,794)	(56,763)	(87,916)	(36,116)	(52,239)
Net cash used in financing activities	(41,650)	(41,664)	(103,874)	(17,694)	(46,241)

OTHER FINANCIAL DATA

	Year ended December 31,			Six months ended June 30,	
	2020	2021	2022	2022	2023
			(Unaudited)		
			(in US$'000, except otherwise indicated)		
Adjusted EBITDA/(LBITDA)[(1)]	142,417	38,060	133,791	(8,696)	258,008
Adjusted EBITDA/(LBITDA) margin[(2)]	34%	21%	24%	(8)%	50%

Notes:

(1) We calculate Adjusted EBITDA/LBITDA by adding income tax, share of losses of associates and joint venture, net finance costs, depreciation and amortization, impairment loss on trade and other receivables, impairment loss on non-financial assets, provision losses on coal inventories, loss on disposal of property, plant and equipment, equity-settled share-based payment expenses, accrued employee benefit and subtracting share of profits of associates and joint venture, gain on disposal of property, plant and equipment, gain on repurchase of Senior Note, finance income from profit for the year/period as calculated under IFRS. We have included Adjusted EBITDA/LBITDA data because such data is commonly used by investors to measure a company's ability to service debt. Adjusted EBITDA/LBITDA is not, and should not be used as, an indicator or alternative to profit from operations, profit for the year or cash flow as reflected in our consolidated financial statements, is not intended to represent funds available for debt service, dividends or other discretionary uses, is not a measure of financial performance under IFRS and should not be considered in isolation or as a substitute for measures of performance prepared in accordance with IFRS. Investors should not compare Adjusted EBITDA/LBITDA to EBITDA presented by other companies because not all companies use the same definition. For example, we subtract the depreciation expense associated with mining equipment while other competitors who own their equipment do not subtract this cost. Investors should also note that the Adjusted EBITDA/LBITDA as presented herein is calculated differently from Consolidated EBITDA as defined and used in the Indenture governing the Notes. See "Description of the Notes – Definitions" for a description of the manner in which Consolidated EBITDA is defined for purposes of the Indenture governing the Notes. The following table reconciles our profit for the year/period under IFRS to the definition of Adjusted EBITDA/(LBITDA) for the periods indicated:

	Year ended December 31,			Six months ended June 30,	
	2020	2021	2022	2022	2023
				(Unaudited)	*(Unaudited)*
			(in US$'000)		
Profit/(loss) for the year/period	29,605	(55,438)	58,891	(32,312)	136,453
Adjustments					
Income tax	10,596	(5,013)	(4,183)	(22,446)	54,123
Share of losses/(profit) of associates and joint venture	82	197	(270)	(12)	(307)
Net finance costs	41,138	48,926	40,795	24,579	25,744
Depreciation and amortization	61,199	49,704	61,708	22,954	46,026
Loss/(gain) on disposal of property, plant and equipment	1	(29)	(6)	(6)	–
Equity-settled share-based payment expenses	136	34	–	(1,453)	–
Employee benefit accrued	(340)	(321)	–	–	(61)
Gain from repurchase of 2024 Notes	–	–	(23,144)	–	(3,970)
Adjusted EBITDA/(LBITDA)	142,417	38,060	133,791	(8,696)	258,008

(2) Adjusted EBITDA margin is calculated by dividing Adjusted EBITDA by revenue.

OPERATION DATA

	Year ended December 31,			Six months ended June 30,
	2020	2021	2022	2023
	(in US$'000, except otherwise indicated)			
ROM coal production (Mt)	7.7	4.3	5.7	8.0
Average accounting stripping ratio (actual) (bcm/t)	3.7	3.7	4.7	4.1
Total coal sales (Mt)	4.2	1.6	4.7	4.9
Average sales price per tonne of HCC (US$ per tonne)[(1)(2)]	121.4	150.6	147.1	161.8

Notes:

(1) See "Management's Discussion and Analysis of Financial Condition and Results of Operations – Factors Affecting Results of Operation and Financial Condition – Global Coking Coal Prices and Average Selling Prices" for a description of the factors affecting average sales prices of our coal.

(2) Average sales price is the blended average of HCC sold under all sales terms.

RISK FACTORS

In addition to other information in this Offering Memorandum, you should carefully consider the following risk factors before making any investment decision in relation to the Notes. If any of the events described below occurs, our business, prospects, financial condition and results of operations could be materially and adversely affected and the market price of the Notes could decline. See "Definitions" and "Glossary" for specific or specialized vocabulary used in this section.

Risks Relating to our Business and Industry

Public health crises and pandemics/epidemics, such as the COVID-19 pandemic, may materially adversely affect our results of operations.

The COVID-19 pandemic has led to significant global economic and financial disruptions, including an adverse impact on international trade and business activities. More infectious variants and subvariants, including the omicron variant, have continuously emerged, leading to resurgences of cases and prolonged imposition of restrictive measures by governments around the world. Mongolia declared a state of emergency in response to the pandemic in February 2020. Measures taken by the Government to combat the spread of COVID-19, such as suspensions of air travel, limited operation hours for all types of restaurants and closures of schools, adversely affected various sectors of the economy. In early 2022, many countries including Mongolia had cancelled a number of containment measures. COVID-19 significantly affected the Mongolian economy, and the continued severity and duration of COVID-19's impact on the global economy remains difficult to predict.

In early 2020, as part of its "Zero COVID" policy, China imposed a strict lockdown and physical closures of border crossings between Mongolia and China for extended periods, which resulted decrease in coal imports. For example, we suspended our operations at the BN mine intermittently during 2020-2022, largely to manage cross-border throughput due to COVID-19 related restrictions then in effect. Recently, local governments across China have gradually lifted the restrictive measures and the border crossings between Mongolia and China have been more normalized. In December 2022, the PRC Government has cancelled a number of containment measures and has started to open up the economy. Although China's rollback of its strict anti-COVID-19 measures is expected to boost its domestic economic growth and promote trades between Mongolia and China, it cannot be guaranteed that China will quickly and sustainably recover to previous levels of economic growth, or that raw materials and commodities import volume will reach pre-COVID-19 levels.

Our business could be adversely affected by the future outbreaks of diseases such as COVID-19, severe acute respiratory syndrome ("SARS"), Middle East respiratory syndrome, avian influenza or other contagious diseases. Historically, Mongolia has experienced an outbreak of the H1N1 strain of swine influenza and there were a limited number of reported cases of avian flu in Mongolia although to date there have not been any confirmed cases of human infection. In January 2019, Mongolia experienced another H1N1 outbreak in Mongolia. There have been reports on the occurrences of avian flu, H5N1 virus, H1N1 influenza, H7N9 influenza and Middle East respiratory syndrome in various parts of China, including a few confirmed cases of human infection. An outbreak of avian flu in the human population of China could result in a widespread health crisis that has the potential to spread to Mongolia and could adversely affect the economies and financial markets of many countries, particularly in Asia. As a significant portion of Mongolia's economy relies on trade with China and all of our customers are located in China, these outbreaks of contagious diseases, or the fear of these outbreaks, and other adverse public health developments in China, could have a material adverse effect on our business, financial condition and results of operations. Any further outbreak of COVID-19, the emergence of any new COVID-19 variants, a recurrence of SARS or an outbreak of any other epidemics could lead to resurgence in infection rates and re-imposition of tight border control and travel restrictions and economic activities, posing further economic growth risk, and may result in material influence on the Group's business, which in turn may adversely affect its financial condition and results of operations.

Our results of operations are subject to economic, political and legal developments and policy changes in China.

Substantially all of our sales are made, and are expected to continue to be made in the future, to customers based in China. Given Mongolia is a landlocked country sharing borders only with China and Russia, unless we benefit from transit transportation agreement with our neighbor countries, we may be unable to access other markets if there is reduced demand for coal in China. This would have a material and adverse impact on our business, prospects, financial condition and results of operations.

Accordingly, the economic, political and social conditions, as well as government policies, of China may affect our business. The Chinese economy differs from the economies of most developed countries in many respects, including: (i) structure; (ii) level of government involvement; (iii) level of development; (iv) growth rate; (v) control of foreign exchange; and (vi) allocation of resources. The Chinese economy has been transitioning from a planned economy to a more market-oriented economy. For the past four decades, the Chinese government has implemented economic reform measures emphasizing the utilization of market forces in the development of the Chinese economy. Changes in Chinese political, economic and social conditions, laws, regulations and policies could materially and adversely affect our business, prospects, financial condition and results of operations.

The growth of the Chinese economy has been uneven across different geographic regions and different economic sectors. In order to stabilize national economic growth, the Chinese government may adopt macroeconomic policies that include measures to restrict excessive growth in specific sectors of the economy, such as the steel industry. Any future economic downturn that reduces the demand for steel will have a negative impact on the demand for steel in China. China's steel consumption decreased by 2.6% year-on-year to 948.2 Mt in 2022, compared to 973.1 Mt in 2021 according to public sources. In addition, since September 2021, many PRC property developers have defaulted on their offshore bonds, which has led to the slow down in the Chinese real estate sector and consequently demand for steel. Construction has been one of the principal uses of steel in China, and any slowdown in the construction sector of the Chinese economy, whether as a result of falling housing prices, oversupply or otherwise, could significantly reduce the demand for steel in China. We cannot predict future economic reforms or the effects that any such measure may have on our business, prospects, financial condition or results of operations. The Chinese government exercises significant control over the growth of the Chinese economy through the allocation of resources, controlling payment of foreign currency-denominated obligations, setting monetary policy and providing preferential treatment to particular industries or companies as it deems fit.

During the COVID-19 pandemic, the Chinese government implemented a "zero COVID" policy which included strict lockdown and containment measures throughout the country, including in major cities such as Shanghai, which led to reduction in overall economic activity. The series of measures taken to combat the spread of the virus, such as travel restrictions, voluntary and mandatory cessations of business operations, mandatory quarantines, work-from-home and other alternative working arrangements, limitations on social and public gatherings and lockdowns of cities or regions, have negatively impacted China's construction industry and hence its steel demand. These actions, as well as future actions and policies of the Chinese government to exert influence over certain segments of the economy, could materially and adversely affect the level of overall economic activity and our Chinese customers' liquidity and access to capital and hence, in turn, affect our ability to operate our business. China has started to loosen its "zero COVID" policy since December 2022. See also "– Risks Relating to our Business and Industry – Public health crises and pandemics/epidemics, such as the COVID-19 pandemic, may materially adversely affect our results of operations".

China has been one of the world's fastest growing economies as measured by GDP in recent years. However, China may not be able to sustain such a growth rate going forward. In order to maintain the sustainable growth of the economy, the PRC Government from time to time implements various macroeconomic and other policies and measures, including but not limited to contractionary or expansionary policies and measures at times of or in anticipation of changes in the PRC's economic conditions. In an effort to stimulate the growth of the Chinese economy, the PRC Government has

implemented and may continue to implement various monetary, fiscal or other economic measures to expand investments in infrastructural projects, increase liquidity in the credit markets and encourage employment. However, there is no assurance that such monetary, fiscal or other economic measures will prove to be effective. There can be no assurance that the Chinese economy will continue to grow, or that its growth will be steady or in geographic regions or economic sectors to our benefit. Since substantially all of our sales will be made into China, we depend heavily on general economic conditions in China for our continued growth. A downturn in China's economic growth, any restrictive minerals polices, or a decline in its economic conditions may have a material and adverse effect on our business, prospects, financial condition and results of operations.

The Chinese government may take steps towards the adoption of more stringent environmental regulations. In April 2016, China signed the Paris Agreement, a global agreement on the reduction of climate change, by which it has committed to peak its carbon dioxide emissions around 2030 and to make best efforts to peak earlier. In September 2020, China declared its commitment to achieving carbon neutrality by 2060. China has also announced commitments to reduce coal-fired power stations in the future and to step-up support for renewable energy. In line with these commitments, the Chinese government is moving towards more rigorous enforcement of applicable environmental laws and regulations and the adoption of more stringent environmental standards. If efforts to increase energy efficiency, control greenhouse gas emissions and enhance environmental protection result in a decrease in coal consumption in China, our revenue may significantly decrease and our business may be materially and adversely affected.

In addition, the Chinese government may tighten its restrictions on the import of Mongolian coal or adopt policies favorable to Chinese coal producers. The Chinese government has imposed a 3% import tax on coking coal and a 6% import tax on thermal coal imports since October 2014. However, these import taxes were suspended from May 1, 2022 to December 31, 2023. There can be no assurance that the Chinese government will not increase such import tax rates or directly or indirectly adopt any other policies that support domestic Chinese coking coal producers. The Chinese government may also delay, restrict or close its border crossing with Mongolia for various reasons, such as political differences with the Mongolian government. See "– Disruptions in transportation could adversely affect sales of our coal" for a detailed discussion on border crossing issues. If we are unable to sell our coal into China on commercially viable terms or at all, there can be no assurance that we will be able to sell our coal to customers in any other jurisdiction. Furthermore, as the only paved road with capacity to transport our coal leads to the Chinese border and all of our coal currently passes through China, any restriction on the transport of Mongolian coal through China will effectively prohibit our coal from reaching any of our Chinese customers or potential overseas customers unless a transit transportation agreement through China is materialized.

Disruptions in transportation could adversely affect our business and sales of our coal.

Substantially all of our coal production is exported into China. Thus, our mining operations are highly dependent on road and rail services in Mongolia and China. Inadequate and underdeveloped transportation infrastructure on both the Mongolia and Chinese sides of the border affects the pricing terms under which we sell our coal to customers and the willingness and ability of our customers to purchase coal from us. Our customers factor in any delays and the costs and availability of transportation in determining whether to purchase coal products from us and the prices they are willing to pay. The COVID-19 pandemic and the series of measures taken to combat the spread of the virus, including border closures or limitation on transportation significantly reduced our export volume to China and increased transportation costs.

We use a paved road that is approximately 240 km long from our UHG mine to GS to transport all of our coal products to China under the Auto Road Use Agreement with Gashuun Sukhait Auto Road LLC that is renewed on a yearly basis. The latest renewal of the agreement was made in February 2023, and we pay an agreed toll fee per tonne of coal we transport on the road. While we are able to continue to use the paved road under a toll fee arrangement within the scope of the Auto Road Use Agreement, there can be no assurance that we would have access to enough capacity on the road to transport all of our current coal output, and any future increases of our coal output, on the road. See "Business – Transportation and Logistics". Furthermore, we will not be able to use the paved road under a toll fee arrangement if our usage

falls out of the scope of the Auto Road Use Agreement. Also, there is no assurance that the paved road would be well maintained or would not encounter other operational problems. In addition, the Government of Mongolia, who is the owner and operator of the paved road, might propose to increase the toll fee rate, narrow the current scope of the toll fee arrangement or refuse to extend or pursue such contractual arrangement in future. If any such event occurs, there can be no assurance that we would find an alternative route to transport our products, and even if we can, it may be on less favorable terms than the paved road. If we are unable to use the paved road, our transportation capacity will be materially and adversely affected and our transportation cost will increase. In 2022, ER LLC was identified as a civil respondent by the Independent Authority Against Corruption of Mongolia (the "IAAC") in an investigation of Erdenes MGL, a state-owned company, regarding the purchase of 240 km paved road from ER LLC. After the court of first instance hearings between April and July 2023, the court dismissed the civil claim against ER LLC and concluded that ER LLC was not responsible for the civil claim of MNT36,423,614,978.34 (approximately US$10.6 million). As of the date of this Offering Memorandum, we are not aware of any appeal in connection with this case. See also "Risks Relating to our Business and Industry – The nature of our businesses includes risks related to litigation and administrative proceedings that may adversely affect our business and financial performance in the event of an unfavorable ruling".

A bottleneck in the transportation of coal from our UHG mine to customers in China may arise if the road connecting our UHG mine to the GS border crossing does not have sufficient capacity to support any increase in the amount of cargo traffic or is affected by external factors such as disruptions caused by bad weather or delays or closures by governmental authorities for any reason. For example, in July and August 2018, the roads from the mine to the Mongolia side of the border were closed for over 10 days due to heavy rains and flooding. While the Company had backstock and was able to continue its operations without disruption, the closure could have impacted the Company's financial performance had the disruption continued. There is no assurance that future transportation bottlenecks or closures will not materially and adversely impact our operations and financial performance.

The hours of operation, the handling capacity and the potential closure of the GS and GM border crossings also affect our ability to expedite the movement of our coal transportation. Border closures have happened in the past and could happen due to the central or local government policies and decisions, customs control and other relevant authority supervision on importing operation, installation and application of new or revised registration and supervision systems which can adversely affect our sales, financial performance and general operations. For example, due to the restrictions imposed by stringent preventive and disinfection procedures by the authorities of both Mongolia and China related to COVID-19, coal exports through GS-GM border points were suspended several times between 2020 and 2022 and only trucks carrying containers were allowed with haulers and double trailers allowed for exports while number of trucks with open bed carrying coal sharply decreased. This situation not only limited the Group's sales volume but also increased our transportation cost. Our unit transportation costs increased from US$17.2 per tonne in 2020 to US$37.8 per tonne in 2021 and decreased to US$26.9 per tonne in 2022. Our unit transportation cost was US$13.1 per tonne for the six months ended June 30, 2023, compared to US$40.2 per tonne for the six months ended June 30, 2022. The total transportation costs, including fees paid for the usage of the UHG-GS paved road, increased from US$31.5 million for the six months ended June 30, 2022 to US$41.8 million for the six months ended June 30, 2023. Due to actions taken by relevant authorities in China and/or Mongolia, the average number of trucks going through the GS-GM border crossing experienced significant fluctuations in the past, which affected border crossing throughput. There can be no assurance that such events will not occur in the future. There can be no assurance that the Mongolian and Chinese governments will continue to support further development and expansion of border-crossing handling capacity or that the respective customs authorities will handle our coal shipments in an efficient manner or in priority over other coal or freight being transported by other parties.

Mongolia completed the development of two major railways in 2022. The Tavan Tolgoi-Gashuunsukhait railway commenced operation on September 9, 2022, and the Zuunbayan-Khangi railway, commenced operations on November 25, 2022. After the cross-border section of the railways are completed, they would be the second and third cross-border railway connecting Mongolia and China. The commissioning of these railways is expected to help increase export volume to China. See "Business – Transportation and Logistics – Railroad Development". However, the Government of Mongolia may impose tariffs on the railway use at a level which makes future railway transportation uneconomical. There can be no assurance that, in such situations, there would be any other cost-effective means of transporting coal to our customers in China. As a result, our coal sales may be constrained and our results of operation may be adversely affected.

In China, rail and road infrastructure and capacity have in the past been affected by extreme weather conditions, earthquakes, delays caused by major rail accidents, the diversion of rolling stock needed to deliver emergency food relief and seasonal congestion during public holidays. There can be no assurance that any of these aforementioned events, or other new events will not occur in the future. A substantial portion of our costs are spent on transportation. For the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, we incurred US$67.6 million, US$43.1 million, US$100.9 million, US$31.5 million and US$41.8 million, respectively, in transportation cost. If any of the aforementioned were to occur, our transportation costs could significantly increase. Moreover, customers may not be able to take delivery of our coal, which may lead to delays in payment or refusal to pay for our coal. As a result, our business, prospects, financial condition and results of operations could be materially and adversely affected.

Our licenses and permits are subject to termination, renewal and other uncertainties.

Our most significant licenses are (i) the license covering our UHG deposit located in the Tavan Tolgoi coal formation located in South Gobi Province, which gives us the right to mine coal within the license area for a period of 30 years commencing from August 29, 2006, (ii) our BN mining license covering our BN deposit located in South Gobi Province, which gives us the right to mine coal within the license area for a period of 30 years commencing from December 1, 2008, and (iii) our THG mining license covering our BN deposit located in Tsaikhar Khudag, which gives us the right to mine coal within the license area for a period of 30 years commencing from June 24, 2013, all of which are extendable twice, each for an additional 20 years, subject to certain conditions. We must maintain a variety of other licenses, permits and related agreements in our regular course of business, including those related to water and land use, vehicles and the environment.

The Government of Mongolia could revoke any of our licenses or permits if we fail to satisfy our obligations thereunder, including payment of fees, royalties and taxes to the Government of Mongolia and the satisfaction of certain mining, environmental, health and safety requirements. Although we have made all such payments within the permitted time frame pursuant to invoices issued by relevant authorities, there have been instances in the past where local authorities have delayed certifying our water usage amounts and acknowledging receipt of payment against issued invoices. We cannot assure you that similar delays by relevant authorities may not occur again. In addition, records maintained by relevant authorities with respect to our permits and licenses, and payments thereunder, may not be up to date and may contain omissions and ambiguities, and we cannot assure you that such uncertainties will not impact the validity of our permits and licenses in the future. As we conduct our operations through contractors, any failure by these contractors to perform under their operating agreements may result in our failure to satisfy our obligations under our licenses. As a result, our mining licenses could be terminated by the Government of Mongolia, which will materially and adversely affect our business, prospects, financial condition and results of operations. In addition, we could require additional licenses or permits to conduct our mining or exploration operations in Mongolia or to export coal to China. There can be no assurance that we will be able to obtain and maintain such licenses or permits on terms favorable to us, or at all, for our future intended mining or exploration targets in Mongolia, or that such terms would not be subject to various changes.

Coking coal prices are cyclical and subject to significant fluctuation.

Our results of operations are highly dependent on world coal prices, which tend to be highly cyclical and subject to significant fluctuations. The global coal markets are sensitive to changes in coal mining capacity and output levels, patterns of demand and consumption of coal from the steel industry and other industries, for which coal is the principal raw material, and changes in the world economy. For example, events such as the Russia-Ukraine war or Indonesia's coal export ban have affected coking coal prices globally. Our average selling price for HCC was US$121.4 per tonne, US$150.6 per tonne, US$147.1 per tonne, US$141.3 per tonne and US$161.8 per tonne for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, respectively. Although the coal price and market demand have been strong during the aforesaid financial years, the coking coal market could fluctuate in the future depending on the global economy and in particular the Chinese economy, and there can be no assurance

that we will not experience another prolonged coking coal down cycle in the future. Changes in coal prices could have a material and adverse effect on our business, prospects, financial condition and results of operations. See also "– Risks Relating to our Business and Industry – Public health crises and pandemics/epidemics, such as the COVID-19 pandemic, may materially adversely affect our results of operations".

Coal markets are highly competitive and are affected by factors beyond our control.

We sell substantially all of the coal we produce into China. We compete with Chinese, Mongolian and other foreign coal producers in the Chinese coal market. Competition in the Chinese coal market is based on many factors, including, among others, price, production capacity, coal quality and characteristics, transportation capability and costs, border crossing efficiency, blending capability and brand name. The Chinese coal market is highly fragmented and we face price competition from local coal producers which may enjoy certain operational cost advantages, such as lower expenditure on safety and regulatory compliance and lower transportation costs than we do due to their location. For example, Australian coal producers have low operational costs and some of our international competitors may have greater coal production capacity as well as greater financial, marketing, distribution and other resources than we do, and may benefit from more established brand names in international markets. In 2021, Russia overtook Mongolia as the largest exporter of coking coal to China as a result of supply disruptions from Mongolia and Australia as well as with the completion of a new railway connecting the China and Russia. As Mongolia is a landlocked country sharing borders only with China and Russia, we may be unable to access other markets if there is reduced demand for coal from China. Our inability to maintain our competitive position as a result of these or other factors could materially and adversely affect our business, prospects, financial condition and results of operation.

We are dependent on limited sources for fuel, diesel and blasting materials and any impact to their availability or increases in their cost would affect our operations.

We are dependent on a few local providers, to meet our diesel requirements. All of our suppliers source substantially all of their petroleum products from Russia. For the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, NIC provided 32.2%, 36.2%, 31.5%, 30.1% and 43.7%, respectively, of our diesel needs and Shunkhlai provided 62.3%, 49.5%, 53.0%, 45.5% and 41.4%, respectively. The rest was provided by smaller local suppliers. Although we have entered into fuel supply agreements with NIC and Shunkhlai, which have been renewed in June 2023 and will expire in May 2026, there can be no assurance that we will be able to successfully renew such agreements on acceptable terms or at all, or that our suppliers will continue to supply diesel, lubricants and other fuels on terms that are acceptable to us or that we will be able to maintain our relationships with our current suppliers or establish new supplier relationships to ensure a steady supply of diesel and other fuels in a timely and cost efficient manner. If there is a sudden increase in the price of diesel, fuel and blasting services supplied by such providers or we are unable to renew our agreements, and if we are unable to find suitable alternatives, our business, prospects, financial condition and results of operations may be materially and adversely affected. While we have reserved the option to contract with other fuel suppliers, there is no assurance that we would be able to source the requisite amounts of fuel necessary to run our operations from other suppliers, and our business, prospects, financial condition and results of operations may be materially and adversely affected as a result.

We directly bear the costs of diesel and blasting services. We do not engage in any fuel hedging arrangements to cover our fuel price risk. Any significant increases in the price of fuel or shortages of fuel or increases in the price of blasting services would cause a corresponding increase in our costs or limit our operations, either of which could result in termination of sales contracts by our customers and materially and adversely affect our business, prospects, financial condition and results of operations.

In addition, as a landlocked country, Mongolia is highly dependent on Russia for fuel and diesel supply. The ongoing war between Russia and Ukraine has had an adverse effect on supply of goods and raw materials from Russia to Mongolia. The war has resulted in higher prices for fuel, diesel and other materials, and there has been a significant decrease in overall supplies in the markets in 2022. While the

Mongolian government was able to secure supply agreements with Russia, there's no assurance that supply of fuel will not be interrupted or decreased, which would significantly impact our operations and financial results. The sanctions imposed on Russia has also made payments to such sanctions companies more difficult for Mongolian companies. See "Risks Relating to Mongolia – Mongolia's economy has been adversely impacted by the war between Russia and Ukraine".

Increased focus on climate change, the environmental and social impacts of fossil fuel extraction and use could result in additional costs or risks and adversely impact our business and reputation and our access to capital and ability to refinance our indebtedness.

Stakeholders, such as investors, customers, regulators and the lending community, have increased their focus on environmental, social and governance matters, including practices related to greenhouse gas emissions and climate change. Additionally, an increasing percentage of the investment community considers sustainability factors in making investment decisions, and an increasing number of entities are considering sustainability factors in awarding business. If we are unable to meet our commitments and targets and appropriately address sustainability enhancement, we may lose customers or business partners, and our reputation may be negatively affected. It may be more difficult for us to compete effectively, all of which could have a material adverse effect on our business, reputation, financial condition, results of operations, cash flows (including negative cash flows) and prospects.

Moreover, in recent years some leading asset managers have expressed a commitment to divest from investments in fossil fuels due to concerns over climate change, and some pension and endowment funds and other investors have begun to divest fossil fuel equities and pressure lenders to limit funding to companies engaged in the extraction of fossil fuels. In addition, the increased focus by the investment community on ESG-related practices and disclosures, including emission rates and overall impacts to global climate, has created, and will create for the foreseeable future, increased pressure regarding enhancement and modification of the disclosure and governance practices in our industry. The initiatives aimed at limiting climate change and reducing air pollution and the emission of greenhouse gases, including divestment from the oil and gas industry, could significantly interfere with our operations and business activities and restrict our ability to access the capital markets and refinance our debt.

Difficult conditions in the global economy and financial markets may adversely affect our financial condition and results of operations.

We have been, and in the future will continue to be, materially affected by geopolitical, economic and market conditions, including factors such as the liquidity of the global financial markets, the level and volatility of debt and equity prices, interest rates, currency and commodities prices, investor sentiment, inflation and the availability and cost of capital and credit. The stress experienced by the global financial markets in 2020 due to the COVID-19 pandemic, the series of measures taken by major economies in response and the consequences of such measures continue to impact the global economy in varying degrees in different regions over the years. The financial markets continue to be impacted by general uncertainty, and growth rates have declined recently. The slow economic recoveries around the world, the Ukraine-Russia war and the high inflation, high interest environment have contributed to higher global volatility.

In recent years, there have been political and trade tensions among a number of the world's major economies, which resulted in the implementation of tariffs, non-tariff trade barriers and sanctions, including the use of export control restrictions and sanctions against certain countries and individual companies. Relations between the U.S. and China have further deteriorated due to economic, trade and foreign policies adopted by both countries as well as various incidents that have occurred. Furthermore, the United States has implemented sanctions and trade restrictions in respect of Chinese companies, including Huawei Technologies Co., Ltd, and Chinese government have taken similar measures. Since the first half of 2022, the war between Russia and Ukraine, including imposition of financial and trade sanctions as a result of the conflict, and risks of inflation have created additional uncertainties in global economic growth. The imposition of economic sanctions and trade restrictions of the types discussed above are highly political, and it is difficult to predict when and how they will be imposed. While the

imposition of these types of sanctions and trade restrictions have not yet had a significant impact on Mongolia's economy, if the scope of these types of measures – including the entities that are subject to them – were to broaden, they could limit Mongolia's ability to do business with its two major trading partners. These or similar developments could adversely affect Mongolia's economic condition and growth prospects, which could in turn adversely affect trading in the Notes.

Concerns over inflation, uncertainty relating to currency exchange rates and interest rates, the availability and cost of credit, volatility in commodity, oil, debt and equity prices, all have contributed to a general decline in lending activity by financial institutions and in commercial lending markets and increased volatility. In addition, tighter monetary policy in the United States could further undermine financial stability in emerging market economies. Central banks around the world, including in the United States and several large emerging markets, have tightened monetary policy and have indicated that they would continue to do so in the near future. Moreover, recent adverse developments relating to the financial services industry, such as actual events or concerns involving liquidity, defaults, or non-performance by financial institutions or transactional counterparties, have generated uncertainty within the global financial market.

The credit tightening environment may affect our ability to obtain financing, or banks may even reduce the amount of or discontinue the banking facilities currently available to us. An environment of credit tightening can adversely affect our ability to secure sufficient financing to fund our projects. Any capital expenditure project will be highly dependent upon our ability to obtain additional financing, which is subject to a variety of uncertainties, including:

- our future financial condition and credit rating;
- general market conditions for financing activities;
- our share price; and
- Government of Mongolia policies and regulations relating to coal mining enterprises and lending in general.

External financing may not be available in a timely manner, on acceptable terms, or at all. If we are unable to expand our capacity, we may be unable to grow our business and remain competitive, or provide services to companies with significant capacity requirements, which may have a material adverse effect on our ability to grow our revenue.

Our mining activities are subject to operational risks, hazards and unexpected disruptions.

Our mining activities are subject to a number of operational risks and hazards, some of which are beyond our control, and could delay the production and delivery of our coal, increase our cost of mining or result in accidents in our mine. These risks and hazards include unexpected maintenance or technical problems, periodic interruptions due to inclement or hazardous weather conditions, natural disasters such as earthquakes, industrial accidents, power, water, explosives or fuel supply interruptions or increase in price of such supplies, critical equipment failure, malfunction and breakdowns of information management systems, fires, and unusual or unexpected variations in mineralization, geological or mining conditions.

These risks and hazards may result in personal injury, damage to or destruction of properties or production facilities, environmental damage, business interruption, possible legal liability, damage to our business reputation and corporate image and, in severe cases, fatalities. In the three years ended December 31, 2022 and the six months ended June 30, 2023, four fatal traffic accidents involving the Group's staff occurred outside of the Group's premises and no accidents occurred in connection with operations. We have cooperated with the local authorities on these accidents and have completed the standard procedures. See "Business – Safety and Environmental Matters". As of June 30, 2023, none of these accidents resulted in a significant financial or operational impact to our operations. There can be no assurance that accidents will not occur in the future. Such accidents may have a material adverse effect on our reputation, business, prospects, financial conditions and results of operations.

Inclement weather may require us to evacuate personnel or curtail operations and may cause damage to our mine sites, transportation roads and loading facilities. This could result in the temporary suspension of our operations or generally reduce our productivity. For the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2023, we suspended our mining operations at UHG mine for about two days due to inclement weather whereas operations at the BN mine was suspended for about two days due to inclement weather. While we suffered no material losses due to the inclement weather events during this period, there can be no assurance that inclement weather will not cause significant losses in the future. Any damage to our mine sites, transportation roads and loading facilities caused by prolonged periods of inclement weather could materially and adversely affect our business, prospects, financial condition and results of operations.

We are subject to stringent health and safety laws and regulations that give rise to significant costs and could give rise to significant liabilities.

We may also experience safety incidents or accidents at our mine sites. Despite our efforts to monitor and reduce accidents at our facilities, health and safety incidents do occur, some of which may result in costs and liabilities and negatively impact our reputation or the operations of the affected facility. Such accidents could include explosions or gas leaks, fires or collapses in underground mining operations, vehicular accidents, and other accidents involving mobile equipment or exposure to potentially hazardous materials. Some of our industrial activities involve the use, storage and transport of dangerous chemicals and toxic substances, and we are therefore subject to the risk of industrial accidents which could have significant adverse consequences for our workers and facilities, as well as the environment. Such accidents could lead to production stoppages, loss of key personnel, the loss of key assets or put at risk employees (and those of subcontractors and suppliers) or persons living near affected sites.

We are subject to a broad range of health and safety laws and regulations in Mongolia. These laws and regulations, as interpreted by relevant agencies and the courts, impose increasingly stringent health and safety protection standards. The costs of complying with, and the imposition of liabilities pursuant to, health and safety laws and regulations could be significant, and failure to comply could result in the assessment of civil and criminal penalties, the suspension of permits or operations and lawsuits by third parties. In addition, under certain circumstances authorities could require our facilities to curtail or suspend operations based on health and safety concerns.

Our business depends substantially on the continuing efforts of our executive officers and our mining contractors and our ability and the ability of our mining contractors to attract and retain qualified technical personnel.

Our business depends substantially on the continued services of our executive officers and, to a significant extent, on our ability to attract, train and retain qualified technical personnel, particularly those with expertise in coal mining and production. There can be no assurance that we will be able to attract or retain qualified technical personnel. Our executive officers and key employees primarily include Mr. Odjargal Jambaljamts, Dr. Battsengel Gotov, Mr. Oyunbat Lkhagvatsend, Mr. Enkhbat Dorjpalam, Ms. Ulemj Baskhuu, Ms. Uurtsaikh Dorjgotov, Mr. Tuvshinbayar Tagarvaa and Mr. Lkhagva-Ochir Said. If one or more of our executive officers or key employees were unable or unwilling to continue providing their services to us, we might not be able to replace them with persons of equivalent expertise and experience within a reasonable period of time or at all. If any of our executive officers or key employees joins a competitor or forms a competing company, we may lose customers, suppliers, know-how and key personnel and staff members. If any dispute arises between such employees and us, there can be no assurance as to the extent to which any non-competition undertakings of such employees could be enforced in our favor or at all. If we lose any of our executive officers and key employees, our business may be severely disrupted, our financial condition and results of operations may be materially and adversely affected, and we may incur additional expenses to recruit, train and retain personnel.

In addition, we rely on our contractors to perform key aspects of our operations. Currently, we cooperate with Thiess, our mining contractor, at our UHG mine. Substantially all of the mining equipment used in our UHG mine is provided by Thiess and their personnel supervise the maintenance of our mining operations and our personnel supervise essentially all of our mining operations. Actual mining activities are conducted by our employees who have been trained by Thiess personnel. At the BN mine, we engage Mongolian domestic contractors with formal contracts and no termination penalties or charges are payable by us. See "Business – Mining and Processing". Failure by Thiess or any of such other contractors to perform their respective contractual obligations or the loss of their services could materially and adversely affect our business, prospects, financial condition and results of operations. If Thiess or our BN contractors terminate their contracts with us, the amount of remedies we may be able to receive may not be sufficient to cover losses we may sustain. There can be no assurance that replacement contractors could be found in a timely manner or at all, or would be able to perform at the same competencies, at the same prices or on the same terms as our current contractors if any of our contractors cease to perform their services or terminate their contracts with us. In addition, if we decide to terminate our agreement with Thiess, we will be required to purchase all equipment provided by Thiess at a specific value. Furthermore, some of our technical personnel are trained by our contractors. If our contractors cease to train our technical personnel, we may not be able to train or find qualified parties to train our technical personnel. In addition, we believe our future success will depend on our contractors' continued ability to attract and retain their own skilled and qualified personnel. Any difficulty in our contractors' ability to attract, recruit, train and retain skilled and qualified personnel could materially and adversely affect our operations. As our business has grown and is expected to continue to grow rapidly, our ability to train and integrate new employees into our operations may not meet the growing demands of our business.

We may have to make additional payments under the acquisition agreement for our BN mining license.

We acquired our BN mining license in 2011. If the specified semi-annual ROM production exceeds 5.0 Mt, the consideration is subject to adjustment of the royalty provision contained therein and we may be required to make additional payments or royalties during the period in which such mine is operational. Although we consider the probability of such royalty provision very low as the Company has sole control over its production volume, we cannot assure you that such adjustment will not occur. The determination of our production volume is generally based on a variety of factors such as the market conditions and our development strategies, and we may not be able to lower the production volume or make any adjustment to our production activities for the sole purpose of such royalty provision. To the extent that any such amounts become payable, the payment of such amounts could adversely affect our financial condition. A failure to pay such amounts would constitute a default under the acquisition agreement and potentially cross defaults under our other existing and future contractual arrangements.

The accuracy of our resources and reserves estimates is based on a number of assumptions and we may produce less coal than our current estimates.

Our resources and reserves estimates are based on a number of assumptions in accordance with the JORC Code. There can be no assurance that our resources and reserves will be recovered in the quantities, qualities or yields presented in this Offering Memorandum. Coal resources and reserves estimates are inherently prone to variability. They involve expressions of judgment with regard to the presence and quality of mineralization and the ability to extract and process the mineralization economically. These judgments are based on a variety of factors, such as knowledge, experience and industry practice. The accuracy of these estimates may be affected by many factors, including the quality of the results of drilling and sampling of the coal deposits and analysis of the coal samples and the procedures adopted and experience of the person(s) making the estimates. There are risks associated with such estimates, including that coal mined may be of a different or inferior quality, volume, overburden strip ratio or stripping cost from the resource estimates. Such estimates may also be revised following further exploration or analysis. We may at any time commission a new report to estimate the resources and reserves of our deposits.

If we encounter mineralization or geological or mining conditions different from those predicted by historical drilling, sampling and similar examinations, we may have to adjust our mining plans in a way that may materially and adversely affect our business, prospects, financial condition and results of operations and reduce the estimated amount of coal resources and reserves available for production plans.

You should not assume that the resources estimated are capable of being directly reclassified as reserves under the JORC Code. The inclusion of resources estimates should not be regarded as a representation that these amounts could be exploited economically. You are cautioned not to place undue reliance on resources and reserves estimates.

We may not be able to successfully complete or integrate our recent acquisitions or any potential future acquisitions or experience challenges in realizing expected benefits of each such acquisition, including the EM Transaction.

We plan to increase our mineral resources through acquisitions of companies with existing exploration rights and additional mining assets. For example, on January 10, 2023, we entered into an investment agreement with EM LLC and Erdene Resource Development Corporation to subscribe for securities for the total consideration of US$40 million in EM LLC. The parties have also entered into (i) a strategic alliance agreement to govern certain shareholders and management rights over EM LLC; and (ii) a net smelter return agreement to jointly develop the mineral assets and to govern the royalty arrangement. EM LLC is principally engaged in the exploration of gold and other precious metals. Erdene Resource Development Corporation, or ERD, is a company incorporated under the federal laws of Canada, whose common shares are traded on the Toronto Stock Exchange and Mongolian Stock Exchange under the symbols ERD and ERDN. Upon the final closing of the transaction, subject to conditions of the investment agreement, MMC or its assignee is expected to hold a total of 50% equity interest in EM LLC. For more information, see also "Business – EM Transaction."

This and potential future acquisitions may pose significant risks to our existing operations if they cannot be successfully completed or integrated into our existing operations. These acquisitions and the related process of completing the transaction would place additional demands on our managerial, operational, financial and other resources and create operational complexity requiring additional personnel and other resources. In particular, our ability to ensure commercial viability of the mining assets held by EM LLC would depend on the market price of gold. If there is material decline in the price gold, we may not be able successfully consummate the EM Transaction or benefit from EM LLC, which may adversely affect our financial condition and results of operation.

In addition to mining licenses and mining assets, if we are presented with strategically attractive opportunities, we may acquire other businesses or assets that are complementary to our business. We do not have specific timetables for such plans and there can be no assurance that we will be successful in any such acquisitions. In addition, we must receive various regulatory approvals or permits in order to develop new reserves or businesses. For instance, we may not be able to successfully complete the EM Transaction, which is subject to various conditions precedents at different closing stages. Our inability to successfully acquire companies with existing exploration rights and additional mining assets, develop mineral resources or obtain necessary governmental approvals may have a material adverse effect on our business, prospects, financial condition and results of operations.

Future acquisitions may also expose us to potential risks and unforeseen operating difficulties and expenditures. Any potential and completed acquisitions, including the EM Transaction, could present a number of risks, including:

- incorrect assumptions regarding the future results of acquired operations or assets or expected cost reductions or other synergies expected to be realized as a result of acquiring operations or assets;
- failure to integrate the operations or management of any acquired operations or assets successfully and on a timely and cost effective basis;
- insufficient knowledge of the operations and markets of acquired businesses;
- loss of key personnel;
- risks associated with the assimilation of new technologies and personnel;

- diversion of management's attention from existing operations or other priorities;
- increased costs or liabilities as a result of undetected or undisclosed legal, regulatory or financial issues related to acquired operations or assets; and
- inability to secure, on terms we find acceptable, sufficient financing that may be required for any such acquisition or investment.

Any difficulties encountered in the acquisition and integration process may have a material adverse effect on our business, prospects, financial condition and results of operations. In addition, if we are unsuccessful in completing acquisitions of other businesses, operations or assets or if such opportunities for expansion do not arise, our business, financial condition or results of operations could be materially adversely affected.

Our participation in joint ventures may expose us to additional liability and reputation risk.

We may be exposed to increase risks because of participation in joint ventures with other parties. Actions of our joint venture partners could reduce the returns on joint venture investments. We may enter into joint ventures with third parties or affiliates to acquire assets. Such investments may involve additional risks such as (i) default or insolvency of our joint venture partner; (ii) conflicting economic or business interests or goals between us and the our joint venture partner; or (iii) disputes between us and our joint venture partner that may result in litigation or arbitration which would lead to additional financial expense and prevent our officers and directors from focusing their time and effort on our operations.

Our mining operations from which we derive all of our operating cash flows and sales are currently concentrated at two mining sites.

Our mining operations are currently concentrated at our UHG and BN mines. Though we commenced operations at our BN mine in February 2012, from 2014 until the end of the third quarter of 2017, we suspended our mining plan for the BN mine in order to consolidate our personnel and assets at our UHG mine as part of our cost reduction measures taken in response to then deteriorating market conditions. We resumed operations at our BN mine in the fourth quarter of 2017. Site administration costs were US$12.8 million during the six months ended June 30, 2023 compared to US$6.2 million during the same period in 2022. Operations at the BN mine were suspended again intermittently during 2020-2022, largely to manage cross-border throughput due to COVID-19 related restrictions then in effect. All of our current operating cash flows and sales are currently derived from the sale of coal produced from the two mines. Any significant operational or other difficulties in the mining, processing, storing or transporting of coal at or from our UHG or BN mine could reduce, disrupt or halt our coal production, which would materially and adversely affect our business, prospects, financial condition and results of operations.

Our dependence on our major customers may cause significant fluctuations or declines in our revenues.

Substantially all of our coal production is exported into China and we have a concentrated group of major customers. For the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, our sales to our five largest customers accounted for 76.1%, 52.3%, 48.1%, 64.0% and 49.6%, respectively, of our total sales. For the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, our sales to our single largest customer accounted for 30.6%, 16.7%, 14.9%, 23.3% and 23.9%, respectively. Although we have been, and plan to continue to expand our customer base, we anticipate that our dependence on our major customers will continue in the near future. There can be no assurance that we will be able to retain these customers or that they will maintain current level of business with us. If there is a reduction or cessation of orders from any of these customers for any reason, our business, prospects, financial condition and results of operations will be materially and adversely affected.

Our ability to receive payments for coal sold and delivered depends on the continued creditworthiness of our customers. Competition with other coal suppliers could force us to extend credit to customers and on terms that could increase the risk of payment default. The bankruptcy of any of our customers could materially and adversely affect our business, prospects, financial condition, and results of operations.

The Government of Mongolia could determine that any one or more of our projects in Mongolia is a Mineral Deposit of Strategic Importance and could take an equity, production, profit sharing or other interest in any of our projects.

Pursuant to the 2006 Minerals Law, the Parliament has sole discretion to designate mineral deposits to be Mineral Deposits of Strategic Importance. The Government of Mongolia is entitled to participate on an equity basis with the license holder in the exploitation and/or mining of each Mineral Deposit of Strategic Importance on terms to be negotiated between the Government of Mongolia and such license holder. Details of any mineral reserves must be filed by the relevant license holder with the Government of Mongolia, and those deposits on the Strategic Deposits List represent most of the largest and highest profile deposits in Mongolia. In addition to deposits currently on the Strategic Deposits List and the additional Tier 2 Deposits List, the Parliament may at any time designate other deposits not yet currently on either list to be Mineral Deposits of Strategic Importance, add such deposits to either the Strategic Deposits List or the Tier 2 Deposits List and, in the former case, commence negotiations with the relevant license holder with respect to the terms under which the Government of Mongolia will take an interest in such deposit.

Parliament Resolution No. 27 in 2007 "On designation of some mineral deposit as Mineral Deposit of Strategic Importance" specifically states that, as one of the Mineral Deposits of Strategic Importance, the Tavan Tolgoi area shall constitute license areas held by Tavan Tolgoi JSC, ER LLC and Erdenes Tavan Tolgoi. On October 3, 2018, the Government of Mongolia issued Resolution No. 300 "On defining the boundaries of some mineral deposits of strategic importance" by which boundary coordinates of the Tavan Tolgoi were defined and whereby the Government of Mongolia expanded the boundaries for Tavan Tolgoi by including the areas under the BN and THG mining licenses. The Company has not yet received any notification or letter from the Government with regards to the consequences or follow-up actions of the above-mentioned resolution. However, there can be no assurance that our BN deposit will not be designated by the Parliament as a Mineral Deposit of Strategic Importance or the Government will not take equity or other interest in this deposit.

In February 2007, the Parliament declared the six mining licenses originally held by us to be Mineral Deposits of Strategic Importance under the 2006 Minerals Law. After taking into consideration the economic development policies of Mongolia, we decided to sign the Minerals License Transfer Agreement, pursuant to which we agreed to transfer five of our six mining licenses to the Government of Mongolia. We assumed no liability after these five mining licenses were transferred to the Government of Mongolia and received no cash consideration such transfer. Our UHG deposit was on the list of Mineral Deposits of Strategic Importance, but having entered into the Minerals License Transfer Agreement with the Government of Mongolia, the Government of Mongolia guaranteed that such mining license would not be terminated or amended by requiring state equity participation on the development. Our Mongolian counsel, SnowHill Consultancy LLP, has confirmed that the Minerals License Transfer Agreement is valid, binding and enforceable in accordance with its terms and is binding on the Government of Mongolia. SnowHill Consultancy LLP has also confirmed that the Government of Mongolia has under the Minerals License Transfer Agreement waived its right under the 2006 Minerals Law to participate jointly with us (by compulsorily taking a 50% or other ownership interest in ER LLC or the relevant minerals) in the exploitation of the minerals deposit covered by Mining License MV-011952, or withhold any further permits or licenses or access to infrastructure necessary for such exploitation provided that we apply for the same in accordance with relevant rules. However, no assurance can be made that the Government will not take equity or other interest in our UHG mine.

Under the 2006 Minerals Law, the size of the Government of Mongolia's equity participation is determined largely by the level of state funding which has been provided for the exploration of any deposit of strategic importance, with the Government of Mongolia entitled to participate up to 50% in the event that there has been state funding. Pursuant to the Amendment Law to the Minerals Law of 2006 dated February 18, 2015, the percentage of the state share shall be determined by an agreement on exploitation of the deposit, considering the amount of investment made by the state, and the amount of state shares determined under such agreement can be replaced with royalty. There can be no assurance that no legislation will be enacted which further strengthens the Government of Mongolia's right to participate or increase the volume of the participation percentages in privately held mineral resources in Mongolia such as ours.

Moreover, the 2006 Minerals Law also contains provisions requiring any company which holds a Mineral Deposit of Strategic Importance to list no less than 10% of its shares on the Mongolian Stock Exchange. This particular provision of the 2006 Minerals Law has not yet been enforced and it is not clear how it will be enforced in practice. If enforced, ER LLC may be required to list no less than 10% of its shares on the Mongolian Stock Exchange and we may be required to reduce our indirect shareholding percentage in ER LLC to 90.0% or less.

An amendment to the Constitution of Mongolia in 2019 requires that Parliament shall promulgate laws and regulations to ensure that value created from mineral deposits is fairly and equally distributed amongst the public. Pursuant to this, an initial draft of the Mineral Law has been introduced by the Ministry of Mining and Heavy Industry in March 2023 for public consultation, which retains the concept of deposit with strategic importance. The draft Mineral Law may be submitted to the Parliament in the second half of 2023. Such legal developments may materially alter the rights we have under our licenses and the regulatory environment we operate in, which may significantly affect our operations and financial results.

Our mining operations present environmental risks.

All phases of our operations are subject to the environmental regulations of Mongolia. For example, we must complete an environmental protection plan for the Government of Mongolia's approval and complete a report prepared by an independent expert on environmental compliance every year.

Failure to comply with applicable laws or regulations or to obtain the necessary permits may result in enforcement actions, including orders issued by regulatory or judicial authorities causing operations to cease or be curtailed, and may include corrective measures requiring capital expenditures, installation of additional equipment, or remedial actions. Parties engaged in mining operations may be required to compensate those suffering loss or damage by reason of the mining activities and may have civil or criminal fines or penalties imposed for violations of applicable laws or regulations.

Environmental regulation is evolving in a manner which will likely require stricter standards and enforcement, increased fines and penalties for non-compliance, more stringent environmental assessments of proposed projects and a heightened degree of responsibility for companies and their officers, directors and employees. There can be no assurance that future changes in environmental regulation, if any, will not materially and adversely affect our business, prospects, financial condition and results of operations. The Government of Mongolia's approvals and permits are also often required in connection with various aspects of our operations. To the extent such approvals or permits are required and not obtained, we may be delayed or prevented from proceeding with planned exploration or development of our mineral properties.

Water resources are scarce in the arid Gobi desert region where our mineral assets are located. According to the Law on Water and the Law on Environmental Resources Utilization Fee approved in 2012, the fee for water usage is calculated as a percentage defined by the Government within a limit specified in the Law on Environmental Resources Utilization Fee of the base ecological-economic value. The base value and applicable percentages for fee is determined according to Government resolutions 302 in 2011, which was most recently updated in 2022 by Government Resolution 416. As a result, fee rates have been increased by 15 percent per cubic meter in certain categories, including the mining processing and operation. The ecological-economic value of water also differs based on the purpose of the usage and the source of water, that is, surface and underground water. For instance, base value for underground water in Tuul river basin is MNT9,440 per cubic meter while in Galba-Uush Doloodin Gobi river basin is MNT3,996 per cubic meter, which we use for our coal handling and preparation plant ("CHPP"). There can be no assurance that the base value or fee rates applicable for the water use fee will not be increased in the near future.

Changes to the current laws, regulations and permits governing operations and activities of mining companies, including more stringent implementation or increases in or imposition of new fees, could have a material adverse impact on us including increases in our capital expenditures or production costs, reductions in our production and abandonment or delays in development of new mining properties.

Our insurance may not be adequate to cover losses or liabilities that may arise.

We do not maintain adequate insurance against some operational and infrastructure risks and natural disasters. In particular, we do not have insurance coverage for acts or omissions of our contractors. Under our agreements with mining contractors, insurance against risks or loss to operations is provided by our mining contractors for each of the relevant mining areas. However, some of our contractors may not carry adequate liability coverage.

We have obtained insurance policies from global insurers covering various aspects of our business operations, including property damage for our main assets such as processing plants and power plant, director and officer liabilities, personal injury and health insurance, excluding mining properties. Such policies may not be adequate to cover all losses or liabilities that may be incurred by us. Also, insurance premiums have risen in recent years and may only be available at levels that are prohibitively expensive so we may be unable to renew our existing policies or enter into new policies. As a result, losses incurred or payments we may be required to make may have a material adverse effect on our business, prospects, financial condition and results of operations to the extent such losses or payments are not insured or the insurance proceeds are not adequate.

Issues with local communities may materially and adversely affect our business.

Issues with the local communities directly or indirectly associated with our business activities might arise. These issues may result in community protests, blocking of roads and third-party claims, although we have not had such experience in the past five years. There is no assurance that future complaints will not occur. Moreover, the failure to successfully settle any local community issues could divert our management's attention and resources and have a material and adverse effect upon our business, reputation, prospects, financial condition and results of operations.

We could experience labor disputes that may disrupt our operations.

Strikes or work stoppages could occur prior to, or during, wage and benefits negotiations or during other periods for other reasons, in particular in connection with any announced intentions to adapt the footprint. We may experience strikes and work stoppages at various facilities. Prolonged strikes or work stoppages, which may increase in their severity and frequency, may have an adverse effect on our operations and financial results. The Company is also obliged to comply with the Tripartite Agreement on Labor and Social Coherence of the Geology, Mining and Heavy Industry Sector executed by relevant representatives of the ministry, trade unions and employers of the mining and heavy industry sector which sets (i) labor relations; (ii) wage rates; (iii) professional development of employees; (iv) social issues; (v) occupational health and safety issues; and (vi) labor union rights of those operating in the industries which are represented.

The interests of our principal shareholder, MCS Mongolia LLC, may differ from those of our other shareholders or of the holders of the Notes.

As of June 30, 2023, MCS Mongolia LLC indirectly owned approximately 31.0% of our issued share capital. Accordingly, MCS Mongolia LLC has substantial influence over our business, including decisions regarding mergers, consolidations and the sale of all or substantially all of our assets, election of directors and other significant corporate actions, timing and amount of our dividend payments, and otherwise controls or influences actions that require the approval of our shareholders and may impact the holders of the Notes. These actions may be taken even if they are opposed by our other shareholders or are not in line with the interests of the holders of the Notes. We believe that third parties may be discouraged from making a tender offer or bid to acquire us because of this concentration of ownership. For further information on the ownership of the shares, see the section headed "Corporate Structure" and "Principal Shareholders" in this Offering Memorandum.

Foreign currency fluctuations could affect expenses and any future earnings and our ability to service the Notes.

The exchange rate of the Togrog against the U.S. dollar and the RMB has exhibited volatility in recent years, with the value of the Togrog generally declining. Since March 2022, the depreciation of the Togrog against the U.S. dollar and the RMB has accelerated further, primarily due to higher imports related to infrastructure and construction projects and the increasing demand for consumer durables and services financed by savings accumulated during the COVID-19 pandemic, which in turn led to an outflow of foreign currency reserves. In response to the worsening foreign currency situation, banks in Mongolia have imposed measures restricting conversions of Togrog into foreign currencies in March 2022, including by setting daily limits on the amount that can be converted into foreign currencies. With the improvement of external and domestic economic conditions, most of these restrictions were removed in December 2022. However, there is no assurance that Mongolian banks will not impose additional and more stringent foreign exchange measures, which could prevent individuals and businesses from obtaining sufficient foreign currency to satisfy their foreign currency demands. See also "Risks Relating to Mongolia – Mongolia has limited foreign exchange reserves, significant foreign debt and faces risks of further currency depreciation.

We are exposed to foreign exchange fluctuations with respect to the U.S. dollar, the RMB and the Togrog. Our financial results are reported in U.S. dollar. The salaries for local laborers in Mongolia are paid in Togrog. Sales of coal into China have been and may continue to be settled in RMB. Since our headquarters are in Ulaanbaatar, Mongolia, a portion of our other expenses are in Togrog. Our financial obligations are denominated primarily in U.S. dollars. As a result, our financial position and results are impacted by the exchange rate fluctuations between the aforementioned currencies and the U.S. dollar.

The Togrog and RMB exchange rates could fluctuate widely against the U.S. dollar or any other foreign currency in the future. The Government and/or Chinese government may adopt reforms of its exchange rate system that may adversely affect the exchange rate of Togrog and RMB against the U.S. dollar, it may adversely impact our ability to service our U.S. dollar denominated indebtedness and other obligations. Furthermore, any depreciation of the Togrog or RMB will decrease the value of dividends and other distributions payable by our subsidiaries in foreign currency terms. See "Management's Discussion and Analysis of Financial Condition and Results of Operations – Quantitative and Qualitative Disclosures about Market Risk – Foreign Currency Exchange Risk".

The nature of our businesses includes risks related to litigation and administrative proceedings that may adversely affect our business and financial performance in the event of an unfavorable ruling.

The nature of our businesses exposes us to litigation relating to labor, environmental, health and safety matters, regulatory, tax and administrative proceedings, governmental investigations, tort claims and contract disputes, among other matters. In the context of these and any future proceedings we may not only be required to pay fines or money damages but also be subject to complementary sanctions or injunctions affecting our ability to continue our operations. For instance, ER LLC was identified as a civil respondent by the IAAC in its investigation of Erdenes MGL, a state-owned company, regarding Erdenes MGL's purchase from us of approximately 240 km paved road between Ukhaa Khudag and Gashuun Sukhait and infrastructure built under the border crossing capacity expansion at the Gashuun Sukhait border checkpoint. Erdenes MGL financed this purchase through a loan from the Development Bank of Mongolia ("DBM") in 2014. The IAAC alleges that certain expenses, mainly project financing expenses, should have been excluded from the purchase price. After completing its investigation, the IAAC has submitted the matter to the court of first instance in Mongolia for hearings. After the court of first instance hearings between April and July 2023, the court dismissed the civil claim against ER LLC and concluded that ER LLC was not responsible for the civil claim of MNT36,423,614,978.34 (approximately US$10.6 million). As of the date of this Offering Memorandum, we are not aware of any appeal in connection with this case. However, we cannot assure you that the court of appeal will uphold the same verdict in the event of an appeal by the claimant, and in which case, such proceedings and litigations can be costly, lengthy and uncertain, and we cannot accurately estimate or predict the outcome. Although we may establish provisions as we deem necessary, the amounts that we reserve could vary significantly from any amounts we actually pay due to the inherent uncertainties in the estimation and judicial processes. We cannot assure you that administrative or other legal proceedings will not have a material adverse effect on our ability to conduct our business, financial condition and results of operations in the event of an unfavorable ruling.

Information in this Offering Memorandum regarding future plans reflects current intentions and is subject to change.

Whether we ultimately implement the business plans described in this Offering Memorandum, and whether we achieve the objectives described in this Offering Memorandum, will depend on a number of factors including, but not limited to, the availability and cost of capital; current and projected coal prices; coal markets; availability of heavy equipment, supplies and personnel; success or failure of activities in areas similar to those in which our projects are situated; and changes in estimates of project completion costs. We will continue to gather information about our projects, and it is possible that additional information will cause us to alter our schedule or determine that a project should not be pursued at all. Accordingly, our plans and objectives may change from those described in this Offering Memorandum.

We may dispose of our assets or sell majority or minority stakes in our subsidiaries.

We may dispose of some of our assets or sell majority or minority stakes in our subsidiaries, including our BN mine, if we are presented with strategically attractive opportunities or seek funding opportunities. If we take on joint venture partners, we will be subject to risks associated with jointly owning and managing projects. No assurance can be given that we will or will not engage in, or as to the timing of, any such disposals or joint venture activities and there can be no assurance that we will be successful in these ventures should they occur.

We have net current liabilities and are dependent on future cash flows generated from our business and obtaining additional financing to support our business operations.

We have cash requirements for ongoing operating expenses, working capital, general corporate purposes and for interest and principal payments on our outstanding borrowings. We had net current liabilities of US$68.6 million and US$316.4 million as of December 31, 2022 and June 30, 2023, respectively. The net current liabilities were primarily attributable to the economic downturn as a result of the COVID-19 pandemic. If we are unable to generate sufficient revenue and cash flows from our operations to service our payment dues or secure additional financing, we may not be able to meet our working capital and financing requirements. Our ability to do so is dependent, among other things, upon the current economic environment and the sustainability of the price of coking coal in the market.

The development of any new technology or the use of alternative supply sources in the production of iron and steel may directly impact the demand for coking coal.

The demand for coking coal is directly correlated with the production of crude steel. As a result, any alternative energy source, such as PCI coal, or any heavy fuel oil injection into blast furnaces, or any new technology in steel production, such as electric arc furnace which omits coke from the steel production process, if adopted by steel manufacturers in China, would negatively affect the demand for coking coal. This could, in turn, materially and adversely affect our business, prospects, financial condition and results of operations.

Destabilizing events in other parts of the world could interrupt our business.

Geopolitical instability, conflict in various parts of the world, events relating to terrorist and violent attacks around the world and natural disasters increase the uncertainty of global economic prosperity and could lead to an economic slowdown and recessionary pressures globally and in Asia. We cannot assure you that further terrorist acts or other destabilizing events will not occur in the future. In addition, although such acts and events have not been targeted at or directly affected Mongolia, our assets or those of our customers, we cannot assure you that they will not do so in the future. Our current insurance policies do not cover terrorist attacks or other such destabilizing events. Any terrorist attack, natural disaster or other such event, including damage to our infrastructure or that of our customers, could cause interruption to our business and materially and adversely affect our business, financial condition, results of operations, cash flows and prospects.

Risks Relating to Mongolia

Mongolia's economy has been adversely impacted by the war between Russia and Ukraine.

On February 24, 2022, Russia launched a full-scale war against Ukraine. The war, which is still ongoing, significantly amplified existing geopolitical tensions among Russia, Ukraine, the North Atlantic Treaty Organization, the U.S., the EU and its member states, the UK and various other countries, and has led to significant volatility and disruption in global trade and financial markets. In response to Russia's war against Ukraine, various countries and organizations, including the U.S., the UK, and the EU, have instituted broad-ranging economic sanctions against Russia.

As a land-locked developing country located between Russia and China, Mongolia relies heavily on Russia for many of its imports, including petroleum and certain agriculture products, and the country has limited space for geographical diversification. As a result of sanctions against Russia, Mongolia's payments to Russia for energy were temporarily delayed. The Government has worked closely with its Western partners to resolve issues with the corresponding banks to Russia and is now relying on a combination of general and specific licenses to make these payments.

The Russia-Ukraine war has resulted in higher prices for natural gas, oil, and grains – Russia's major export products – and there has been a significant drop in export volumes and overall supplies in the markets for these goods. For Mongolia, the prices for energy and food increased substantially in 2022, and Mongolia's inflation rate was 13.2% in 2022. To alleviate the supply shortage of imported goods from Russia, the Government has been holding regular discussions with Russia to ensure stable supply of various import goods.

The duration and impact of the ongoing Russia-Ukraine war remain unpredictable. The associated risks, including globally high inflation, rising energy prices, particularly in Europe, and increased uncertainties in financial markets, are likely to remain, and sanctions against Russia are likely to persist. Any occurrence and continuation of the foregoing may limit Mongolia's ability to trade and cooperate with Russia and accordingly may adversely affect Mongolia's economic conditions and growth prospects.

Mongolia's economy has historically experienced periods of slow or negative growth.

Historically, Mongolia has experienced periods of slow growth or economic contractions and depreciation of the Togrog. In 2020, the Mongolian economy contracted, with GDP declining by 4.6%. It further recorded four successive quarters of economic contraction between second quarter of 2021 and first quarter of 2022. Although the Mongolian economy has started to show signs of recovery, its GDP growth was relatively low at 1.6% in 2021 and 2.5% in 2022. China's "Zero COVID" policy continued to affect Mongolia's ability to export to China in 2022, but with improved cross-border throughput conditions the mining and quarrying sector expanded by 40% in 2022, which helped drive economic growth from a low of 1.6% in 2021 to 2.5% in 2022. Historically, certain policies implemented by the Government from time to time and other factors have caused fiscal imbalances or current account deficits. While the Government has implemented various measures in an attempt to stabilize the economy and reduce its budget deficits and improve fiscal discipline, factors outside of its control, such as the collapse of copper prices in 2008 and 2015, the outbreak of COVID-19 in 2019, the Russia-Ukraine war from early 2022, periods of continued weak commodity prices, or a slowdown in China's economic growth, may materially and adversely affect the economy and operating environment in Mongolia.

Any slowdown in the Mongolian economy, including a significant deterioration of the fiscal budget or the value of the Togrog, an increase in interest rates or future volatility of global commodity prices could adversely affect the ability of Mongolia to meet its obligations under its outstanding borrowings. Substantially all of our business operations and assets are based in Mongolia. As a result, our income, results of operations and the quality and growth of our assets depend, to a large extent, on the performance of the Mongolian economy. This, in turn, could adversely affect our business, the quality of our assets, our financial performance and trading in the Notes.

Any downgrade of Mongolia's credit rating could have a material adverse effect on us.

On November 28, 2019, S&P affirmed Mongolia's long-term sovereign credit rating at "B" with a stable outlook, Mongolia's evolving institutional settings and elevated external imbalances. On July 5, 2019, Fitch affirmed Mongolia's long-term foreign-current issuer default rating at "B" with a stable outlook, citing robust growth outlook, improving fiscal metrics and strong governance indicators. On March 16, 2021, Moody's changed Mongolia's outlook to stable from negative and affirmed its long-term "B3" issuer and foreign currency senior unsecured bond ratings, citing the stabilization of liquidity risks and external pressures. On May 25, 2021, Fitch affirmed Mongolia's long-term foreign-currency issuer rating at "B" with a stable outlook, reflecting Fitch's assessment that economic recovery will continue during the remainder of 2021 that will facilitate a modest decline in the government debt/GDP ratio, despite temporary disruptions associated with a spike in COVID-19 cases since March 2021. On July 21, 2022, S&P affirmed Mongolia's long-term sovereign credit rating at B with a stable outlook, citing Mongolia's sound economic growth prospects and ongoing improvements to its fiscal metrics and decreased external debt risk. On July 13, 2022, Moody's affirmed Mongolia's long-term issuer ratings and senior unsecured ratings at B3 and the senior unsecured MTN program rating at (P)B3, with outlook remaining stable. On May 18, 2022, Fitch affirmed Mongolia's long-term foreign-currency issuer rating at "B" with a stable outlook, reflecting Fitch's assessment that economic recovery will continue and the border disruptions between Mongolia and China associated with COVID-19 pandemic will ease in 2023. On May 15, 2023, Fitch affirmed Mongolia's long-term foreign-currency issuer rating at "B" with a stable outlook citing that the ratings are constrained by the country's high reliance on external funding and commodity exports to China amid high external debt and low foreign-exchange reserves.

Any downgrades in Mongolia's sovereign rating or placement of Mongolia on ratings watch may have an adverse effect on the market value and trading price of the Notes. Furthermore, as a consequence of any downgrade, our ability to obtain external funding to meet obligations may be adversely affected. A credit rating is not a recommendation to buy, sell, or hold securities and may be subject to suspension, reduction or withdrawal at any time by the assigning rating agency. A credit rating may not reflect the potential impact of all risks related to the structure, market, additional factors above and other factors that may affect the value of the Notes issued. Negative changes to Mongolia's credit ratings may affect the availability of financing for the Company from new and existing sources.

Mongolia has limited foreign exchange reserves, significant foreign debt and faces risks of further currency depreciation.

The Mongolian economy has from time to time been subject to serious pressure on its balance of payments due to the significant deterioration of commodity export prices, expenditures for exports and sharp declines in foreign direct investment. Foreign exchange liquidity has also been under pressure from time to time, including due to import growth (including to fund equipment imports for mining and mineral processing operations) and sharp declines in inward financial flows and commodity export proceeds. Mongolia's foreign exchange reserves were US$4,534.2 million, US$4,366.1 million, US$3,399.6 million and US$3,811.9 million as of December 31, 2020, 2021 and 2022 and as of June 30, 2023, respectively.

Mongolia has significant amounts of outstanding foreign currency denominated bonds and Government-guaranteed indebtedness. In addition, Mongolia has other outstanding external debt obligations, including borrowings from international financial institutions and bilateral creditors, such as the World Bank and the ADB. For instance, the DBM has outstanding foreign currency notes which are coming due in 2023. Weak external demand, lower capital inflows and the slowdown in the Mongolian economy present refinancing risks with respect to these debt instruments. If foreign exchange reserves were to decline, Mongolia's ability to repay its foreign currency-denominated debts, including the Notes, would be materially and adversely affected.

Mongolia's financial situation depends heavily on China, which is Mongolia's largest trading partner, including due to the significant long-term currency swaps between the People's Bank of China and the Bank of Mongolia through which the Togrog and RMB are exchanged. The first swap arrangement between the two countries was established in 2011 with the objective of promoting bilateral and providing short-term liquidity to stabilize financial markets. In August 2014, a three-year swap agreement was signed for up to RMB15.0 billion, which represented over 15% of Mongolia's 2015 GDP. The agreement was extended in June 2017, August 2020 and November 2022, each for another three years. In April 2023, Mongolia plans to submit and confirm its request for the extension of the swap agreements.

Mongolia may be subject to periods of high inflation, which could have a material adverse effect on Mongolia's economy.

Mongolia depends on imported goods from foreign countries. Mongolia recently experienced periods of high inflation, especially for food, refined petroleum and electricity, primarily as a result of supply-side and global factors, including high international prices, stagnancy in domestic production, and supply disruption related to China's border restrictions in response to the COVID-19 pandemic and sanctions against Russia related to the Russia-Ukraine conflict. Mongolia's inflation has been exacerbated by currency devaluation, as this had significantly increased the prices for imported goods, which are primarily priced in foreign currencies, including the U.S. dollar. In 2020, 2021, 2022 and the first half of 2023, Mongolia's inflation rate was 2.3%, 13.4%,13.2% and 10.6%, respectively.

The Bank of Mongolia has implemented a number of measures to try to contain inflationary pressures. Between December 2021 and September 2022, the Monetary Policy Committee (the "MPC") of the Bank of Mongolia raised the policy rate by an aggregate of 6.0 percentage points, with the policy rate reaching 13.0% in December 2022. However, there can be no assurance that measures taken by the Bank of Mongolia and the Government will be successful in meeting the Bank of Mongolia's inflation target or that inflation will not otherwise increase further in the future. In particular, inflation may continue for prolonged periods if China's reinstates COVID-19 containment policies, if the Russia-Ukraine conflict is not timely resolved, or if energy prices continue to rise. Increased prices of energy and commodities have disproportionally affected low-income families and local farmers and herders, who have to cut back on other necessities and incur additional debts. Similarly, small and medium enterprises that suffered from the COVID-19 outbreak pandemic were further impacted by consequences resulted from the Russia-Ukraine conflict. In addition, increases in the policy rate have also increased the domestic borrowing costs and may result in lower levels of lending and decreased economic growth. High and persistent inflation may materially and adversely affect Mongolia's economic growth and stability, thereby negatively impacting investor confidence and adversely affecting the price of the Notes.

Mongolia faces uncertainty with regard to legislation on labor and occupational hazard safety requirements.

The Labor Law of Mongolia was first adopted by the Parliament in 1999. In January 2022, Mongolia's new Labor Law came into force. Notwithstanding a number of amendments made within last twenty years, the core principles of such law remain stable through last three decades. However, there are still uncertainties to its implementation and interpretation. The Parliament and or local governments may impose various labor regulations from time to time, for example in November 2022, Parliament amended the Law on Minerals to require that employers employ at least 5 percent of the total workforce from citizens of soum and district where the mining activities are carried out.

With regards to changes made in occupational hazard safety legal framework, on May 14, 2015, the Law on Labor Safety was amended and, the employers have become responsible for subscribing for the employees insurance equivalent to salary of not less than 36 months in the case that the job position is considered as a job with high risk as determined by the Government of Mongolia. As of June 30, 2023, the Government of Mongolia has not yet approved the list of job positions with high risk. There is no assurance that job positions in mining section will not be included in the list and the cost of labor safety and sanitation will not increase.

There is uncertainty as to whether the courts of Mongolia would enforce judgments in original actions brought in Mongolia, of liabilities against us, our directors or officers predicated upon the U.S. federal or state securities laws.

We have been advised by our Mongolian legal counsel, SnowHill Consultancy LLP, that there is uncertainty as to whether the courts of Mongolia would enforce judgments in original actions brought in Mongolia, of liabilities against us, our directors or officers predicated upon the U.S. federal or state securities laws. Mongolian courts will not enforce judgments of U.S. courts obtained against us, our directors or officers predicated upon the civil liability provisions of the U.S. federal or state securities laws in the absence of a bilateral treaty between Mongolia and the United States or the mutual recognition of court judgments between the two countries. As of the date of this Offering Memorandum, no such treaty exists.

Mongolia faces uncertainty with regard to implementation of recent changes in tax laws.

On March 22, 2019, the Parliament of Mongolia passed the revisions to taxation related laws with effect from January 1, 2020. This reform introduced the revised editions of the General Tax Law, the Corporate Income Tax Law, Value Added Tax Law and the Personal Income Tax Law. Tax authorities in Mongolia can exercise discretion based on their judgment, and hence there may be uncertainties involved in the application and implementation of such regulations.

Pursuant to the new General Tax Law, a rule whereby tax debt shall be firstly collected over any other debts of taxpayers has been introduced and tax debt is to be collected immediately from a taxpayer if it is considered that such tax debt is at risk. Tax authority is permitted to collect tax debts by expropriating the properties of the taxpayers and disposing them via auctions for cash and it can freeze bank accounts and instruct banks to transfer funds for the tax debt collection. The law has also imposed severe administrative penalties for the failure of transfer pricing documentation requirements and these administrative penalties are apart from penalties and fines resulting from transfer pricing adjustments.

While the definition of "ultimate holder" has been clarified under the newly approved tax regulations, the application of special tax regime imposing 10% withholding tax on the rights holder entity in case of overseas share transfer under the Corporate Income Tax Law is still uncertain. For example, the definition of "transaction" subject to the special tax is not clear and determining the taxable income is a complicated process under the methodology approved by the Ministry of Finance. Uncertainties in the application of such special tax regime may limit or affect the Company's future decisions in terms of acquisitions and restructuring.

In recent amendments made to the Personal Income Tax Law, the Parliament has approved the introduction of a progressive personal income tax rate on salaries, wages, equivalent income and indirect income starting from 2023. The employer, as a withholder, bears the responsibility to properly calculate and duly report the taxes. Application of this progressive tax is triggering uncertainties in terms of the timing of tax payment and reporting.

Pursuant to the Law on Excise Tax, the Government is entitled to determining the rate of excise duty for diesel and gasoline with regard to the nature of the sector. Since the latest government resolution of setting the rates applicable for imported diesel and gasoline came into effect on January 19, 2015, the rates have been adjusted and modified eight times. In addition, to reduce the fuel cost burden, the Government has elected to not impose any tax on diesel fuel until January 1, 2025. There can be no assurance that the rates applicable for diesel fuel will not be increased in the future.

Pursuant to the recent amendments to the Law on Social Insurance, the rate of the sub-contribution pension, which is a component of the social insurance contribution, payable by each of employee and employer was approved to gradually increase from 7% to 8.5% of the salary income on an annual basis. There can be no assurance that such rate of contribution will not be further increased and therefore increase the Company's salary cost.

In October 2022, to ensure transparency, the Government passed a resolution to introduce an electronic system covering all production stages of mineral extraction, processing, and transportation to trace origin of products by registering all related contracts in a unified tax system. We have completed such procedure to comply with the requirement. There is no assurance that the Government will not impose any additional requirements or impose further procedural standards on our operations.

Our ability to conduct our business activity in Mongolia is subject to political risk.

Our ability to efficiently conduct our business activities is subject to changes in government policy or shifts in political attitudes within Mongolia that are beyond our control. Government policy may change to discourage foreign investment, nationalization of mining industries may occur or other government limitations, restrictions or requirements not currently foreseen may be implemented. There can be no assurance that our assets will not be subject to nationalization, requisition or confiscation, whether

legitimate or not, by any authority or body. The provisions under Mongolian law for compensation and reimbursement of losses to investors under such circumstances may not be effective to restore the value of our original investment. In addition, Mongolia may experience political instability. Such instability could have a material adverse effect on economic or social conditions in Mongolia and may result in outbreaks of civil unrest, terrorist attacks or threats or acts of war in the affected areas, any of which could materially and adversely affect our business, prospects, financial condition and results of operations. See also "– Mongolia may experience political and social instability".

Legislation in Mongolia may be subject to conflicting interpretations.

The Mongolian legal system exhibits several of the qualitative characteristics typically found in developing countries and many of its laws, particularly with respect to matters of taxation, are still evolving. The legal framework in Mongolia is, in many instances, based on recent political reforms or newly enacted legislation, which may not be consistent with long-standing local conventions and customs. Local institutions and bureaucracies responsible for administrating laws may lack a proper understanding of the laws or the experience necessary to apply them in a modern business context. Many laws have been enacted, but in many instances they are neither understood nor enforced and may be applied in an inconsistent, arbitrary manner, while legal remedies may be uncertain, delayed or unavailable. A transaction or business structure that would likely be regarded under a more established legal system as appropriate and relatively straightforward might be regarded in Mongolia as outside the scope of existing Mongolian law, regulation or legal precedent. As a result, certain business arrangements or structures and certain tax planning mechanisms may carry significant risks. In particular, when business objectives and practicalities dictate the use of arrangements and structures that, while not necessarily contrary to settled Mongolian law, are sufficiently novel within a Mongolian legal context, it is possible that such arrangements may be invalidated. The legal system in Mongolia has inherent uncertainties that could limit the legal protections available to us, which include: (i) inconsistencies between laws; (ii) limited judicial and administrative guidance on interpreting Mongolian legislation; (iii) substantial gaps in the regulatory structure due to delay or absence of implementing regulations; (iv) the lack of established interpretations of new principles of Mongolian legislation, particularly those relating to business, corporate and securities laws; (v) a lack of judicial independence from political, social and commercial forces; and (vi) bankruptcy procedures that are not well developed and are subject to abuse.

The Mongolian judicial system has relatively little experience in enforcing the laws and regulations that currently exist, leading to a degree of uncertainty as to the outcome of any litigation. It may be difficult to obtain swift and equitable enforcement, or to obtain enforcement of a judgment by a court of another jurisdiction. In addition, while legislation has been enacted to protect private property against expropriation and nationalization, due to the lack of experience in enforcing these provisions and political factors, these protections may not be enforced in the event of an attempted expropriation or nationalization. Expropriation or nationalization of any of our assets, or portions thereof, potentially without adequate compensation, could materially and adversely affect our business, prospects, financial condition and results of operations.

Application of and amendments to legislation could adversely affect our mining rights or make it more difficult or expensive to develop our projects and continue mining.

The Government of Mongolia has, in the past, expressed its strong desire to foster, and has to date protected the development of, an enabling environment for investments in the mining sector. However, there are political constituencies within Mongolia that have espoused ideas that would not be regarded by the mining industry as conducive to investment if they were to become law or official government policy. There can be no assurance that the present government or a future government will refrain from enacting legislation or adopting government policies that are adverse to our interests or that impair our ability to develop and operate our UHG and BN mines or any other mine or asset in the future.

Mining operations in Mongolia are subject to extensive laws and regulations. These relate to production, development, exploration, exports, imports, taxes and royalties, labor standards, occupational health, waste disposal and re-processing, protection and remediation of the environment, mine safety, transportation safety and other matters. Compliance with these laws and regulations increases the costs of exploring, drilling, developing, constructing, operating and closing mines and other facilities. It is possible that the costs, delays and other effects associated with these laws and regulations may impact our decision as to whether to continue to proceed with the development of our UHG and BN mines. Since Mongolian legal requirements change frequently, are subject to interpretation and may be enforced to varying degrees in practice, we are unable to predict the ultimate cost of complying with these requirements or their effect on our operations. Although we believe our property ownership interests are valid and in accordance with all applicable rules and regulations, there can be no assurance that the underlying agreements, licenses or legislation upon which our property ownership interests is based will not be interpreted and enforced in a way that materially and adversely affects our rights and obligations. Furthermore, changes in governments, regulations and policies and practices could have an adverse impact on our future cash flows, earnings, results of operations and financial condition.

For example, the 2006 Minerals Law contains provisions that increase the potential for political interference and weakened the rights and security of title holders of mineral licenses in Mongolia. Certain provisions of the 2006 Minerals Law are ambiguous and it is unclear how they will be interpreted and applied in practice. Examples of such provisions include those relating to the designation of a mineral deposit as a Mineral Deposit of Strategic Importance. See "– The Government of Mongolia could determine that any one or more of our projects in Mongolia is a Mineral Deposit of Strategic Importance and could take an equity, production, profit sharing or other interest in any of our projects".

There can be no assurance that future political and economic conditions in Mongolia will not result in the Government of Mongolia adopting different policies in relation to foreign development and ownership of mineral resources. Any such changes in government or policy may result in changes in laws affecting ownership of assets, environmental protection, labor relations, repatriation of income, return of capital, investment agreements, income tax laws, royalty regulation, government incentive and other areas, each of which may materially and adversely affect our ability to undertake exploration and development activities in the manner currently contemplated. Similarly, any restrictions imposed, or Government of Mongolian charges levied or raised (including royalty fees), under Mongolian law on the export of coal could harm our competitiveness.

Key decisions concerning foreign participation in the country's mining sector may have an adverse impact on the Mongolian economy.

The Mongolian economy depends heavily on commercial activity associated with the Mongolian mining industry. The development of mining laws and regulations in Mongolia continues to be at a nascent stage and is influenced by the interests of political parties, mining interests, domestic financial interests as well as the need to maintain the Mongolian mining industry as a commercially attractive choice for foreign investment.

Laws governing Mongolia's mining industry, including provisions pertaining to Government participation in or control of certain projects as well as the royalties and other taxes payable by the mining industry, have historically been subject to periodic substantive revision by the Parliament. For example, the amendments made to the Corporate Income Tax Law in 2017 require payment of a 30% withholding tax on the overseas transfer of shares in a company having mining license or land rights, which has been reduced to 10% subsequently under the 2019 revision. In addition, the Investment Law requires investors with foreign (direct or indirect) state ownership of 50.0% or more to obtain approval from the Ministry of Economy and Development when acquiring an interest of 33.0% or more in a company operating in certain strategic sectors, which includes the mining sector.

Furthermore, the Government executed the Mine Plan with Oyu Tolgoi LLC, Turquoise Hill and Rio Tinto in May 2015 to address funding and feasibility studies for Oyu Tolgoi, and a project financing facility agreement for Oyu Tolgoi's Phase II was signed in December 2015. The development of underground mining at Oyu Tolgoi was approved in May 2016, with a then total expected investment of US$5.3 billion. In June 2022, the updated estimate of total investment increased to US$7.1 billion, which was US$1.8 billion more than the original estimate. In January 2022, Rio Tinto and the Mongolian Government reached an agreement, on the commencement of underground operations at the Oyu Tolgoi copper mine. For the first half of 2023, approximately 1.6 Mt of underground ore were treated by Oyu Tolgoi. Approximately US$5.3 billion has been invested in the underground mining development as of September 30, 2022. Although the Government has a significant role in major mining projects such as Oyu Tolgoi, legislative changes in 2015 permitting the Government to transfer its equity interests in such projects in exchange for royalties created uncertainties for investors in the mining sector. Future revisions to this legal regime may adversely impact foreign direct investment in Mongolia and its mining industry in particular, and in turn, the Mongolian economy could be materially adversely affected.

The Mongolian economy is heavily dependent on its export trade and, in particular, relies on China as its main export market. Any decrease in the level of demand in China for exports from Mongolia will affect the Mongolian economy.

The Mongolian economy relies heavily on its export trade and produces and exports large amounts of metal ores, coal and agricultural products. Since its transition to a market economy in the 1990s, China has emerged as Mongolia's largest trading partner, mainly due to its geographic proximity, the size of its economy and its demand for Mongolia's export commodities. According to the National Statistical Office of Mongolia, China accounted for 82.7%, 87.2%, 84.5% and 92.1% of Mongolia's total exports in 2020, 2021 and 2022 and the first half of 2023, respectively. Mining products such as coal, copper and other metals represent the majority share of Mongolian exports to China. As the Mongolian economy is heavily dependent on its export trade, trade relationships with China can influence Mongolian economic conditions and, in particular, any decrease in the level of demand for its exports would adversely affect Mongolia's GDP and overall economy. For example, the growth of the Chinese economy has slowed in recent years and trade volume between the two countries was reduced in 2019 and 2020. There is no assurance that China's economy will not experience future slowdowns, which could adversely impact China's demand for exports from Mongolia. In particular, as a result of the outbreak of COVID-19, between 2020 and the first half of 2022, Mongolian exports to China were suppressed, as trade was essentially suspended for prolonged periods of time and China's economy slowed, lowering demand for raw materials and commodities. Furthermore, China's "zero COVID" policy also substantially limited Mongolia's ability to export its products to China. The total quantity of exports from Mongolia to China decreased from US$6.8 billion in 2019 to US$5.5 billion in 2020, although it recovered to US$7.6 billion in 2021. While China has started to loosen strict enforcement of its "zero COVID" policy, trade between Mongolia and China and China's overall economic growth may continue to be suppressed. We cannot assure you that there will not be an increase in Mongolian imports, a decrease in Mongolian exports, or a reduction in prices of Mongolian exports, that would lead to trade deficits. In addition, any extended slowdown in the growth of China's economy may lead to decreased demand or lower prices for Mongolian exports to China, which would also adversely impact trade between China and Mongolia and potentially give rise to a trade deficit.

Emerging markets such as Mongolia are subject to greater risks than more developed markets, and are particularly vulnerable to fluctuations in the global economy.

The Mongolian market and the Mongolian economy are influenced by economic and market conditions in other countries. Moreover, financial turmoil in any emerging market country tends to adversely affect prices in capital markets of many emerging market countries, including Mongolia, as investors move their money to more stable, developed markets. As has happened in the past, financial problems or an increase in the perceived risks associated with investing in emerging economies could dampen foreign investment in Mongolia and adversely affect the Mongolian economy. A loss of investor confidence in the financial systems of other emerging markets may cause volatility in Mongolian financial markets and indirectly, in the Mongolian economy in general. Any worldwide financial instability could also have a negative impact

on the Mongolian economy. This in turn could negatively impact the Mongolian economy, including the movement of exchange rates and interest rates in Mongolia. In addition, during such times, companies that operate in emerging markets can face severe liquidity constraints as foreign funding sources are withdrawn. Thus, even if the Mongolian economy remains relatively stable, financial turmoil in any emerging market country could seriously disrupt our business, as well as adversely affect trading in the Notes. Mongolia's inflation rate is also higher than some of the more developed economies. A further increase in Mongolia's inflation rate could materially and adversely impact our business, financial condition and results of operations.

Generally, investment in emerging markets is only suitable for sophisticated investors who fully appreciate the significance of the risks involved in, and are familiar with, investing in emerging markets.

Investors should also note that emerging markets such as Mongolia are subject to rapid change and that the information set out in this Offering Memorandum may become outdated relatively quickly.

Weaknesses relating to the Mongolian legal system and Mongolian legislation create an uncertain environment for investment and business activity.

The legal system in Mongolia is at an early stage of development and has various uncertainties that could limit the full legal protections that may be available to holders of the Notes in more developed countries. The following risks relating to the Mongolian legal system create uncertainties, many of which rarely exist in countries with more developed market economies:

- inconsistencies among, or uncertainties in the application or official interpretation of, laws, decrees, orders and regulations, and regional and local rules and regulations, as a result of limited judicial guidance, lack of stare decisis or established precedents and other factors;

- limited judicial guidance on interpreting Mongolian legislation;

- gaps in the regulatory structure due to delay in, or absence of, implementing regulations;

- the lack of experience of judges and courts in interpreting new principles of Mongolian legislation, particularly those relating to securities laws;

- a relatively high degree of discretion on the part of governmental authorities; and

- bankruptcy procedures that are not well developed and are subject to abuse.

In general, the Mongolian judicial system is relatively inexperienced in enforcing the laws and regulations that currently exist, leading to a degree of uncertainty as to the outcome of any litigation.

Further, it may be difficult to obtain swift and equitable enforcement, or to obtain enforcement of a judgment by a court of another jurisdiction. The introduction of new Mongolian laws and regulations and the application or interpretation of existing ones may be subject to policy changes reflecting domestic political or social changes. As the Mongolian legal system continues to develop, we cannot assure you that changes in such legislation or application or interpretation thereof will not have a material adverse effect on our business, financial condition, results of operations and future prospects.

In addition, while legislation has been enacted to protect private property against expropriation and nationalization, due to the lack of experience in enforcing these provisions and political factors, these protections may not be enforced in the event of an attempted expropriation or nationalization. Expropriation or nationalization of any of our businesses, our assets or portions thereof, potentially without adequate compensation, could have a material adverse effect on our business and prospects and on the trading price of the Notes.

Certain facts and statistics contained in this Offering Memorandum have come from official government sources or other industry publications, the reliability of which cannot be assumed or assured.

Certain facts and statistics in this Offering Memorandum related to Mongolia, its economy and the industries in which we operate, are derived directly or indirectly from official government sources generally believed to be reliable. While we have taken reasonable care to reproduce such information, we cannot guarantee the quality and reliability of such source material. These facts and statistics have not been independently verified by us, the Initial Purchasers or any of our or their respective affiliates or advisors or any other parties involved in this offering and, therefore, we make no representation as to the accuracy of such facts and statistics, which may not be consistent with other information compiled within or outside Mongolia and may not be complete or up-to-date. Due to possibly flawed or ineffective collection methods or discrepancies between published information and market practice, the facts and statistics in this Offering Memorandum may be inaccurate and the statistics may not be comparable to statistics produced for other economies. Further, there can be no assurance that they are stated or compiled on the same basis or with the same degree or accuracy as may be the case elsewhere. In all cases, investors should give consideration as to how much weight or importance they should attach to or place on all such facts and statistics.

Mongolia may experience political and social instability.

Since the collapse of communism in 1990, Mongolia has experienced a process of democratic change, resulting in political and social events that have highlighted the unpredictable nature of Mongolia's changing political landscape. Such events have resulted in political instability as well as general social and civil unrest on certain occasions in the past few years. Prior to 1990, Mongolia was a socialist country and the only functioning political party was the Mongolian People's Revolutionary Party (the "MPRP"). In March 1990, due to extended street protests carried out in public and popular demands for faster reform, the political bureau of the MPRP resigned. In May 1990, the constitution was amended, which removed the MPRP's role as the guiding force in the country, legalized opposition parties, created a standing legislative body and established the office of president.

Mongolia's transition to democracy has been relatively peaceful, and transitions between governments have generally been smooth and peaceful (aside from the protests and riots of 2008). However, since there has historically been representation of various political parties in the Government, tensions continue to exist between the political parties and within each political party. We cannot assure you that politically generated disturbances will not occur in the future or on a wider scale, or that the Government will not pursue or implement policies that differ significantly from those of previous governments. For example, in December 2022, large-scale political demonstrations were held in Ulaanbaatar in response to allegations of coal theft and corruption in the coal industry, which involved several former leaders and members of Parliament. On December 13, 2022, the IAAC announced the arrest of 17 individuals in relation to the alleged coal theft, including the former President Battulga Khaltmaa, two of former ministers, seven members of Parliament, and several former directors of Erdenes Tavan Tolgoi JSC. While the demonstrations remained largely peaceful, focused primarily on the incident itself rather than broader political issues and have generally ceased, there is no assurance that, the demonstrations will not recur or escalate into more serious political unrest.

Future changes in the Government, the ruling party, major policy shifts or lack of consensus between the various political groups could lead to political instability that could also have material adverse effect on our business. In addition, the possibility of political instability and uncertainty could adversely affect trading in the Notes and have a significant adverse impact on the economy of Mongolia, and investors may adopt a more cautious approach towards Mongolia's securities markets or investments in Mongolia in general, and such factors could adversely affect trading in the Notes.

Corruption and bribery are threats to Mongolia's economic growth and democratic governance.

Corruption and bribery are threats to Mongolia's economic growth and democratic governance. The IAAC has investigated, and is conducting ongoing investigations, in relation to allegations of corruption, misuse of power, misappropriation of state funds and bribery against former Government officials.

In particular, following the large-scale political demonstration that broke out in Ulaanbaatar in response to the corruption in the coal industry, the Government initiated an investigation into the coal exports by Erdenes Tavan Tolgoi JSC, the Mongolian state-owned enterprise that holds the mining licenses for Mongolia's largest coal deposit, the Tavan Tolgoi coal deposit, which produces and exports the substantial majority of Mongolia's coal exports to China. The IAAC subsequently announced the names of several current and former officials in relation to the alleged coal theft, including the former President Battulga Khaltmaa, two former ministers, and seven members of Parliament. On December 21, 2022, a public hearing with the relevant Government authorities was held to review Mongolia's coal exports and related transportation issues and other relevant reports and information. These investigations are ongoing. Meanwhile, all contracts related to Erdenes Tavan Tolgoi JSC were made public, and the Government plans to accelerate the public listing of Erdenes Tavan Tolgoi JSC to address the problems of transparency in the mining sector and corruption. We are not involved in these investigations.

Moreover, the IAAC has completed investigation of certain former members of the DBM management and other former Government officials. The IAAC alleges that these individuals have misused their power and misappropriated state funds in violation of DBM internal procedure when granting loans. The investigation also covered the legal entities which have obtained and allegedly misused loans from the DBM. IAAC has submitted its findings to the court of first instance of Mongolia for hearings. ER LLC was identified as a civil respondent by the IAAC in connection with an overdue loan obtained by Erdenes MGL from DBM, which was used for Erdenes MGL's purchase from us of approximately 240 km paved road between Ukhaa Khudag and Gashuun Sukhait and infrastructure built under the border crossing capacity expansion at the Gashuun Sukhait border checkpoint. After the court of first instance hearings between April and July 2023, the court dismissed the civil claim against ER LLC and concluded that ER LLC was not responsible for the civil claim of MNT36,423,614,978.34 (approximately US$10.6 million). As of the date of this Offering Memorandum, we are not aware of any appeal in connection with this case. See also "Risks Relating to our Business and Industry – The nature of our businesses includes risks related to litigation and administrative proceedings that may adversely affect our business and financial performance in the event of an unfavorable ruling".

Any actual or alleged acts of corruption and bribery by Government officials could materially and adversely affect the Government, the Mongolian economy, Mongolia's attractiveness to foreign investors, the political environment and stability, negatively impact investor confidence and adversely affect trading in the Notes.

Uncertainties regarding VAT reimbursement and other revisions to the Mongolian royalty fee system could adversely affect our financial position.

Pursuant to the VAT Law of Mongolia, only exported "finished mineral products" are subject to zero-rate VAT. An exporter or producer of mineral products, other than "finished mineral products" for export, is not entitled to have the VAT paid on the purchases of goods and services used for its mining operation refunded. The definition of "finished mineral products" was initially provided in the Government Resolution No. 286, dated October 11, 2010, on the List of Final Mining Products, which included washed and processed coal, briquette and compressed coal generated from the coal and similar solid fuel, coal coke and semi-coke, and lignite coke and semi-coke. As a result, operating costs of an exporter or producer of non-finished mineral products, which include certain types of mineral ores and unprocessed minerals has been increased.

On December 21, 2015, the Government issued Resolution No. 502 on the List of Final Mining Products, which continues to consider washed and processed coal, briquette and compressed coal generated from the coal and similar solid fuel, coal coke and semi-coke, and lignite coke and semi-coke as final mining products. However, no assurance can be given that the regulations concerning VAT will not be further changed or interpreted in a way, that could adversely affect us, or our processed coal will continue to be considered as a finished mining product.

As of December 31, 2020, 2021 and 2022 and as of June 30, 2023, our VAT and other tax receivables were US$31.4 million, US$24.2 million, US$33.2 million and US$40.5 million, respectively.

On November 25, 2010, the Parliament amended the 2006 Minerals Law. Effective from January 1, 2011, we started to pay a flat 5% royalty on the sale value of all extracted minerals that are sold, shipped for sale or otherwise used, and an additional royalty which is calculated based on the degree to which coal is processed. The additional royalty is based on the monthly comparative price stipulated on the website of the MMHI and is applied at a progressive rate. The level of the progressive royalty rate depends on the level of processing of the minerals. The more processed the minerals are, the lower the progressive royalty rate will be. If coal was processed, the progressive royalty rate was lower. See "Regulation – Mongolian Laws and Regulations Relating to Exploration for Minerals and Mining – Royalties".

In June 2021, the Government issued Resolution No. 174 and terminated regulations used to define sales value of the exported coals and iron ores based on sales contract prices, subject to royalty calculation, effective from July 1, 2021. Royalty of coal were resolved to be calculated based on monthly reference sales value to be defined by the authorities based on information posted on http://en.sxcoal.com. As our coal sale contract prices are significantly lower than the prices posted on http://en.sxcoal.com, which does not take Mongolia's market context into account, our royalty fees have increased over the past two years due to such taxing method.

In December 2021, Umnugobi aimag authorities renewed respective immovable property tax and land fee calculation indicators applied in South Gobi province. Immovable property tax rates increased from 1.0% to 2.0% for mining companies and to 1.5% for contractors, transporters, and subcontractors of mining entities while the tax rate is 0.8% for local legal entities. The relevant land fees were increased depending on their designation and location zones.

We incurred US$21.8 million, US$21.3 million, US$84.0 million, US$23.1 million and US$59.4 million as royalty to the Government of Mongolia for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, respectively. There can be no assurance that the Government of Mongolia will not further increase royalty rates on and change the calculation methods for the sale value of extracted minerals.

Uncertainties and instability in global market conditions could adversely affect Mongolia's economy.

Global markets have experienced, and may continue to experience, significant dislocation and turbulence due to armed conflicts, the COVID-19 pandemic, economic instability and trade tensions in several areas of the world. These ongoing global economic conditions have led to significant volatility in capital markets around the world, including Asia, and further volatility could significantly impact investor risk appetite and capital flows into emerging markets as well as the price of the Notes. The unprecedented COVID-19 pandemic had a major negative effect on the global economy. See also "Mongolia's economy has been adversely impacted by the war between Russia and Ukraine".

Even before the outbreak of COVID-19 and the Russia-Ukraine war, the global macroeconomic environment was facing numerous challenges. The growth rate of the Chinese economy had slowed from its previous period of double-digit GDP growth. There is considerable uncertainty over the long-term effects of the expansionary monetary and fiscal policies which had been adopted by the central banks and financial authorities of some of the world's leading economies, including the EU, the United States, Japan and China. Protests, unrest, terrorist threats and the potential for war in the Middle East and elsewhere may increase market volatility across the globe. In particular, the tensions between China and the United States has raised concerns with respect to trade, treaties, tariffs, and international organizations since 2018. As both countries are important trading partners for many countries, the continued friction between them, including possible confrontations over Taiwan or the South China Sea, have introduced significant uncertainties and volatility to international trade and the financial markets. Mongolia's economy is heavily intertwined with that of China. Trade with China typically accounts a very substantial majority of Mongolia's total trade, while trade with Russia typically accounts for 11% to 15%. Any severe disruption or prolonged slowdown in the global or Chinese economy may materially and adversely affect our trade volumes, economic performance, as well as the value of the Notes.

Risks Relating to the Notes and the Subsidiary Guarantees

We may not be able to refinance our existing indebtedness.

As of June 30, 2023, we had US$343.2 million outstanding principal amount indebtedness. As of the same time, our outstanding principal amount of the Perpetual Securities was US$142.5 million with a carrying amount of US$55.5 million. See "Description of Other Material Indebtedness and Perpetual Securities".

We may be unable to repay or refinance our indebtedness as they come due, whether at maturity or as a result of acceleration. Our ability to meet our indebtedness service obligations depends on our ability to generate positive cash flows from operations, which in turn, will be influenced by various factors, including general industry, economic and financial conditions; coal prices; market competition; and other factors that are beyond our control. There can be no assurance that our business will generate sufficient cash flow from operations to repay these borrowings. In addition, repaying these borrowings with cash generated by our operating activities will divert our financial resources from the requirements of our ongoing operations and growth, and may have a material adverse effect on our business, prospects, financial condition and results of operations.

If our business does not generate sufficient cash flow from operations to service our outstanding indebtedness, we may have to undertake alternative financing plans, such as refinancing or restructuring our indebtedness and/or seeking to raise additional capital. Furthermore, any future financing may not be available at interest rates that are acceptable for us. See "Management's Discussion and Analysis of Financial Condition and Results of Operations – Quantitative and Qualitative Disclosures about Market Risk – Interest Rate Risk". If any of these events occur, our liquidity will be materially and adversely affected. There can be no assurance that we will be able to obtain sufficient financing or be able to extend maturities for such financing in the future. Even if we can secure such refinancing, the terms of such refinancing may be less favorable than the terms of existing indebtedness, which could have a material adverse effect on the our business, financial condition, results of operations and prospects. Failure to repay or to timely refinance any portion of our indebtedness could result in a default under the terms of all our debt instruments and the acceleration of all indebtedness outstanding.

Payments with respect to the Notes are structurally subordinated to liabilities, contingent liabilities and obligations of our subsidiaries that do not guarantee the Notes.

We are a holding company with no material operations. The Notes will not be guaranteed by certain current or future subsidiaries. Creditors, including trade creditors of non-guarantor subsidiaries and any holders of preferred shares in such entities, would have a claim on the assets of the non-guarantor subsidiaries that would be prior to the claims of holders of the Notes. As a result, our payment obligations under the Notes will be effectively subordinated to all existing and future obligations of our subsidiaries that do not guarantee the Notes, including their obligations under guarantees they have issued or will issue in connection with our business operations, and all claims of creditors of our non-guarantor subsidiaries will have priority as to the assets of such entities over our claims and those of our creditors, including holders of the Notes. Our non-guarantor subsidiaries may incur indebtedness, capital commitments or contingent liabilities. The Notes and the indenture permit us, the guarantors and our non-guarantor subsidiaries to incur additional indebtedness and issue additional guarantees, subject to certain limitations.

Only the Issuers and subsidiaries of the Company designated as Restricted Subsidiaries will be subject to the restrictive covenants contained in the Indenture.

On the Original Issue Date, the Co-Issuer and all of the Company's other Subsidiaries, other than Singapore EM HoldCo, will be Restricted Subsidiaries. Singapore EM Holdco will be an Unrestricted Subsidiary on the Original Issue Date, and upon consummation of the EM Transaction, each of EM LLC and its Subsidiaries (if any), to the extent they become Subsidiaries of the Company, will be an Unrestricted Subsidiary. Further, under certain circumstances, the Company will be permitted to designate certain of its other Subsidiaries (other than the Co-Issuer) as "Unrestricted Subsidiaries". The Company's Unrestricted Subsidiaries will generally not be subject to the restrictive covenants in the Indenture and will

not guarantee the Notes. There will be no limitation in the Indenture on the amount of indebtedness that the Unrestricted Subsidiaries may incur in the future and there can be no assurance that we will not operate or dispose of such subsidiaries in a manner less beneficial to the Holders of the Notes than the methods permitted under the Indenture with respect to our Restricted Subsidiaries.

The Issuers' future indebtedness may be secured by their assets in which case such secured creditors or those of any Subsidiary Guarantor would have priority as to the Issuers' assets or the assets of such Subsidiary Guarantor securing the related obligations over claims of holders of the Notes.

The Notes and the Subsidiary Guarantees will constitute unsubordinated obligations and will rank *pari passu* in right of payment with all other existing and future unsubordinated indebtedness and senior in right of payment to all subordinated indebtedness, if any. The Notes and each Subsidiary Guarantee will be issued as a general obligation of the Issuers. However, although the Issuers' do not have any secured obligations as of the date of this Offering Memorandum, the Notes and the Subsidiary Guarantees will be effectively subordinated to any of the Issuers' or the Subsidiary Guarantors' future secured obligations to the extent of the assets serving as security for such secured obligations. In bankruptcy, the holder of a security interest with respect to any assets of the Issuers or the Subsidiary Guarantors would be entitled to have the proceeds of such assets applied to the payment of such holder's claim before the remaining proceeds, if any, are applied to the claims of the holders of the Notes.

We have incurred indebtedness in the past and may incur additional indebtedness in the future.

We have incurred indebtedness in the past and may incur additional indebtedness in the future. In addition to this Notes offering, ER LLC and we are conducting a separate exchange offer in relation to our Reg S Notes. See "Summary – Exchange Offer." We have also completed repurchases of the 2024 Notes in December 2022 and during the six months ended June 30, 2023 and are committed to improving our capital structure. Our total borrowings, including both current and non-current borrowings, as of June 30, 2023 were US$343.2 million. See "Description of Other Material Indebtedness and Perpetual Securities". Our existing indebtedness could have important consequences to you. For example, it could (i) limit our ability to satisfy our obligations under the Notes and other debt; (ii) increase our vulnerability to adverse general economic and industry conditions; (iii) require us to dedicate a substantial portion of our cash flow from operations to servicing and repaying our indebtedness, thereby reducing the availability of our cash flow to fund working capital, capital expenditures and for other general corporate purposes; (iv) limit our flexibility in planning for or reacting to changes in our businesses and the industry in which we operate; (v) limit, along with the financial and other restrictive covenants of our indebtedness, our ability to borrow additional funds; and (vi) increase the cost of additional financing.

We may from time to time incur additional indebtedness and contingent liabilities. The indentures governing our existing notes prohibit us and our Restricted Subsidiaries from incurring additional debt and contingent liabilities unless (i) we are able to satisfy a certain financial ratio or (ii) we are able to incur such additional indebtedness pursuant to any of the exceptions to the financial ratio requirement, and meet any other applicable restrictions. Our ability to meet our financial ratio requirement may be affected by events beyond our control. We might not be able to meet this ratio. Such restrictions in the Notes and our other financing arrangements may impair our ability to react to changes in market conditions, take advantage of business opportunities we believe to be desirable, obtain future financing, fund required capital expenditures, or withstand a continuing or future downturn in our business. If we or our subsidiaries incur additional debt, the risks that we face as a result of our existing indebtedness and leverage could also be increased. Any of these factors could materially and adversely affect our ability to satisfy our obligations under the Notes and other debt. For additional details, see "Description of the Notes".

Our ability to generate sufficient cash to satisfy our outstanding and future debt obligations will depend upon our future operating performance, which will be affected by prevailing economic conditions and financial, business and other factors, many of which are beyond our control. We anticipate that our operating cash flow will be sufficient to meet our anticipated operating expenses and to service our debt obligations as they become due. However, we may not generate sufficient cash flow for these purposes.

If we are unable to service our indebtedness, we will be forced to adopt an alternative strategy that may include actions such as reducing or delaying capital expenditures, selling assets, restructuring or refinancing our indebtedness or seeking equity capital. These strategies may not be instituted on satisfactory terms, if at all.

Our subsidiaries are subject to restrictions on the payment of dividends and the repayment of intercompany loans or advances to us and our subsidiaries.

As a holding company, the Company depends on the receipt of dividends and the interest and principal payments on intercompany loans or advances from our subsidiaries to satisfy our obligations, including our obligations under the Notes. The ability of our subsidiaries to pay dividends and make payments on intercompany loans or advances to their shareholders is subject to, among other things, distributable earnings, cash flow conditions, restrictions contained in the articles of association of our subsidiaries, applicable laws and restrictions contained in the debt instruments of such subsidiaries. The Company and its subsidiaries are in compliance with the applicable laws and restriction contained in such debt instruments of such subsidiaries. See "Description of Other Material Indebtedness and Perpetual Securities". In addition, if any of our subsidiaries raises capital by issuing equity securities to third parties, dividends declared and paid with respect to such shares would not be available to us to make payments on the Notes. These restrictions or legal requirements could reduce the amounts that we receive from our subsidiaries, which would restrict our ability to meet our payment obligations under the Notes and the guarantees for the Notes.

Mongolian laws and regulations permit payment of dividends only out of accumulated profits as determined in accordance with Mongolian accounting standards and regulations and such profits differ from profits determined in accordance with IFRS in certain respects, including the use of different bases of recognition of revenue and expenses. Dividends paid by our Mongolian subsidiaries (i) to their Mongolian parent companies are subject to a 10% withholding tax and (ii) to non-Mongolian parent companies are subject to a 20% withholding tax, unless there is a tax treaty between Mongolia and the jurisdiction in which the non-Mongolian parent company is incorporated, which specifically exempts or reduces such withholding tax.

The double taxation treaty between Mongolia and Luxembourg is no longer in force, as a result of which any dividend paid by our Mongolian subsidiary to its Luxembourg parent company is subject to 20% withholding tax in Mongolia. Dividends and distributions from our Luxembourg subsidiaries are also subject to a 15% withholding tax under Luxembourg law. A reduction may apply under a tax treaty between Luxembourg and the jurisdiction in which the non-Luxembourg parent company is incorporated, which specifically exempts or reduces such withholding tax.

As a result of the foregoing, we may not have sufficient cash flow from dividends or payments on intercompany loans or advances from our subsidiaries to satisfy our obligations under the Notes or the obligations of the guarantors under the guarantees.

If we are unable to comply with the terms of the indenture or our existing or future debt agreements, there could be a default under those agreements, which could cause repayment of our debt to be accelerated.

If we are unable to comply with the terms in the indenture or our existing or future debt obligations and other agreements, there could be a default under those agreements. If that occurs, the holders of the debt could terminate their commitments to lend to us, accelerate repayment of the debt and declare all outstanding amounts due and payable or terminate the agreements, as the case may be. Furthermore, the indenture contains, and our future debt agreements are likely to contain, cross-acceleration or cross-default provisions. As a result, our default under one debt agreement may cause the acceleration of repayment of not only such debt but also other debt, including the Notes, or result in a default under our other debt agreements, including the indenture. If any of these events occur, our assets and cash flow might not be sufficient to repay in full all of our indebtedness and we might not be able to find alternative financing. Even if we could obtain alternative financing, it might not be on terms that are favorable or acceptable to us.

Our operations are restricted by the terms of the Notes, which could limit our ability to plan for or to react to market conditions or meet our capital needs, which could increase your credit risk.

The indenture includes a number of significant restrictive covenants. These covenants restrict, among other things, our ability, and the ability of our Restricted Subsidiaries, to:

- incur or guarantee additional indebtedness and issue disqualified or preferred stock, including, with respect to the Subsidiary Guarantors, layering of debt;
- make investments, capital expenditures or other specified restricted payments;
- declare dividends on capital stock or purchase or redeem capital stock;
- issue or sell capital stock of Restricted Subsidiaries;
- guarantee indebtedness of Restricted Subsidiaries;
- prepay or redeem subordinated debt or equity;
- sell, lease or transfer assets;
- create liens;
- enter into sale and leaseback transactions;
- engage in any business other than permitted business;
- enter into agreements that restrict the Restricted Subsidiaries' ability to pay dividends, transfer assets or make intercompany loans;
- enter into transactions with shareholders or affiliates; and
- effect a consolidation or merger.

These covenants could limit our ability to plan for or react to market conditions or to meet our capital needs. Our ability to comply with these covenants may be affected by events beyond our control, and we may have to curtail some of our operations and growth plans to maintain compliance.

The insolvency laws of the Cayman Islands and other local insolvency laws may differ from U.S. bankruptcy law or those of another jurisdiction with which holders of the Notes are familiar.

Because we and some of the guarantors are incorporated under the laws of the Cayman Islands, Hong Kong, Mongolia or Luxembourg, an insolvency proceeding relating to us or any such guarantor, even if brought in the United States, would likely involve Cayman Islands, Hong Kong, Mongolian or Luxembourg insolvency laws, the procedural and substantive provisions of which may differ from comparable provisions of United States federal bankruptcy law or other jurisdictions with which the holders of the Notes are familiar. We conduct substantially all of our business operations through Mongolian-incorporated subsidiaries in Mongolia. You should analyze the risks and uncertainties carefully before you invest in our Notes.

The Issuers may not be able to repurchase the Notes upon a change of control triggering event.

The Issuers must offer to purchase the Notes upon the occurrence of a change of control triggering event, at a purchase price equal to 101% of the principal amount plus accrued and unpaid interest. See "Description of the Notes". The source of funds for any such purchase would be their available cash or third-party financing. However, the Issuers may not have enough available funds at the time of the

occurrence of any change of control triggering event to make purchases of outstanding Notes. The Issuers' failure to make the offer to purchase or purchase the outstanding Notes would constitute an event of default under the Notes. The event of default may, in turn, constitute an event of default under other indebtedness, any of which could cause the related debt to be accelerated after any applicable notice or grace periods. If their other debt were to be accelerated, the Issuers may not have sufficient funds to purchase the Notes and repay the debt.

In addition, the definition of change of control for purposes of the indenture does not necessarily afford protection for the holders of the Notes in the event of some highly leveraged transactions, including certain acquisitions, mergers, refinancing, restructurings or other recapitalizations, although these types of transactions could increase our indebtedness or otherwise affect our capital structure or credit ratings. The definition of change of control for purposes of the indenture also includes a phrase relating to the direct or indirect sale, lease, transfer, conveyance or other disposition of "all or substantially all" of the properties or their assets taken as a whole. Although there is a limited body of case law interpreting the phrase "substantially all", there is no precise established definition under applicable law. Accordingly, the Issuers' obligation to make an offer to purchase the Notes and the ability of a holder of the Notes to require the Issuers to purchase its Notes pursuant to the offer as a result of a highly-leveraged transaction or a sale of less than all of the Issuers' assets may be uncertain.

The liquidity and price of the Notes following the offering may be volatile.

The price and trading volume of the Notes may be highly volatile. Factors such as variations in our revenues, earnings and cash flows and proposals for new investments, strategic alliances and acquisitions, interest rates, the general state of the securities market and fluctuations in price for comparable companies could cause the price of the Notes to change. Any such developments may result in large and sudden changes in the trading volume and price of the Notes. We cannot assure you that these developments will not occur in the future.

A trading market for the Notes may not develop, and there are restrictions on resale of the Notes.

The Notes are a new issue of securities for which there is currently no trading market. While the approval in-principle has been received from the SGX-ST for the listing and quotation of the Notes on the SGX-ST, we cannot assure you that we will be able to obtain or maintain a listing on the SGX-ST and, even if listed, a liquid trading market might not develop. If no active trading market develops, you may not be able to resell your Notes at their fair market value or at all. Future trading prices of the Notes will depend on many factors, including prevailing interest rates, our operating results and the market for similar securities, which are beyond our control. We have been advised that the Initial Purchasers intend to make a market in the Notes, but the Initial Purchasers are not obligated to do so and may discontinue such market making activity at any time without notice. In addition, the Notes are being offered pursuant to exemptions from registration under the Securities Act and, as a result, you will only be able to resell your Notes in transactions that have been registered under the Securities Act or in transactions not subject to or exempt from registration under the Securities Act. See "Transfer Restrictions". We cannot predict whether an active trading market for the Notes will develop or be sustained. If an active trading market for the Notes does not develop or is not sustained, the market price and liquidity of the Notes may be adversely affected.

The transfer of the Notes and the Subsidiary Guarantees is restricted, which may adversely affect their liquidity and the price at which they may be sold.

The Notes and the Subsidiary Guarantees have not been registered under, and the Issuers are not obligated to register the Notes or the Subsidiary Guarantees under, the Securities Act or the securities laws of any other jurisdiction and, unless so registered, may not be offered or sold except pursuant to an exemption from, or a transaction not subject to, the registration requirements of the Securities Act or the Securities and Futures Act 2001 of Singapore (the "SFA") and any other applicable laws. See "Plan of Distribution" and "Transfer Restrictions". The Issuers have not agreed to or otherwise undertaken to register the Notes and the Subsidiary Guarantees with the SEC or the Monetary Authority of Singapore (the "MAS") or the securities regulatory authority of any other jurisdiction, and the Issuers have no intention of doing so.

The ratings provisionally assigned to the Notes may be lowered or withdrawn.

The Notes have been provisionally assigned a rating of "B" by Fitch and "B3" by Moody's. The ratings address our ability to perform our obligations under the terms of the Notes and credit risks in determining the likelihood that payments will be made when due under the Notes. In addition, MMC has been assigned a rating of "B" with a negative outlook by Fitch and "B3" with a review for downgrade by Moody's. A rating is not a recommendation to buy, sell or hold securities and may be subject to revision, suspension or withdrawal at any time. A rating might not remain for any given period of time and could be lowered or withdrawn entirely by the relevant rating agency. The Issuers have no obligation to inform holders of the Notes of any such revision, downgrade or withdrawal. A suspension, reduction or withdrawal at any time of the rating assigned to the Notes may adversely affect the market price of the Notes.

Since the Notes will initially be issued in book-entry form, holders must rely on the procedures of the relevant clearing systems to exercise their rights and remedies.

The Notes will initially only be issued in global note form and held through Euroclear and Clearstream. Interests in the Notes represented by the global note will trade in book entry form only, and notes in definitive registered form, or definitive registered notes, will be issued in exchange for book-entry interests only in very limited circumstances. Owners of book entry interests will not be considered owners or holders of the Notes. The nominee of the common depositary for Euroclear and Clearstream will be the sole registered holder of the global note representing the Notes. Payments of principal, interest and other amounts owing on or in respect of the global note representing the Notes will be made to the paying agent, which will make payments to Euroclear and Clearstream. Thereafter, these payments will be credited to accounts of participants that hold book-entry interests in the global note representing the Notes and credited by such participants to indirect participants. After payment to the nominee of the common depositary for Euroclear and Clearstream, we will have no responsibility or liability for the payment of interest, principal or other amounts to the owners of book entry interests. Accordingly, if you own a book-entry interest, you must rely on the procedures of Euroclear and Clearstream or, if you are not a participant in Euroclear and Clearstream, on the procedures of the participant through which you own your interest, to exercise any rights and obligations of holders of Notes under the Indenture.

Unlike the holders of the Notes themselves, owners of book-entry interests will not have the direct right to act upon our solicitations for consents, requests for waivers or other actions from holders of Notes. Instead, if you own a book-entry interest, you will be permitted to act only to the extent you have received appropriate proxies to do so from Euroclear and Clearstream. The procedures implemented for the granting of such proxies may not be sufficient to enable you to vote on a timely basis.

Similarly, upon the occurrence of an event of Default under the Indenture, unless and until definitive registered notes are issued in respect of all book-entry interests, if you own a book-entry interest, you will be restricted to acting through Euroclear and Clearstream. The procedures to be implemented through Euroclear and Clearstream may not be adequate to ensure the timely exercise of rights under the Notes.

The Issuers will follow the applicable corporate disclosure standards for debt securities listed on the SGX-ST, which standards may be different from those applicable to debt securities listed in certain other countries.

The Issuers will be subject to reporting obligations in respect of the Notes to be listed on the SGX-ST. The disclosure standards imposed by the SGX-ST may be different from those imposed by securities exchanges in other countries such as the United States or Hong Kong. As a result, the level of information that is available may not correspond to what investors in the Notes are accustomed to.

Certain transactions that constitute "connected transactions" under the Listing Rules will not be subject to the "Limitation on Transactions with Shareholders and Affiliates" covenant in the Description of the Notes.

Our shares are listed on the Hong Kong Stock Exchange and we are required to comply with the Listing Rules, which provide, among other things, that a "connected transaction" exceeding the applicable de minimis value thresholds will require certain procedures requirements to be completed or approvals to be obtained. However, the "Limitation on Transactions with Shareholders and Affiliates" covenant set forth in the "Description of the Notes" does not capture transactions between the Company or any Restricted Subsidiary, on the one hand, and an Affiliate of any Restricted Subsidiary, on the other hand. As a result, we are not required by the terms of the Notes to ensure that any such transactions are on terms that are fair and reasonable, and we will not need to deliver officer's certificates or procure the delivery of fairness opinions of accounting, appraisal or investment banking firms to the trustee of the Notes for any such transactions.

Disclosure standards that apply to us may differ from those in the United States or other jurisdictions.

Our consolidated financial information is prepared in accordance with IFRS, which differs in certain respects from U.S. GAAP. As a result, our consolidated financial information and reported earnings could be significantly different if they were prepared in accordance with U.S. GAAP. We have made no attempt to quantify the impact of those differences. This Offering Memorandum does not contain reconciliation of our consolidated financial information to U.S. GAAP, and there is no assurance that such reconciliation would not reveal material differences. Potential investors should consult their own professional advisors for an understanding of the differences between IFRS and U.S. GAAP, and how these differences might affect the financial information herein. In addition, our shares are listed on the Hong Kong Stock Exchange. There may be less publicly available information about us than is regularly made available by public companies listed on certain other stock exchanges.

We cannot assure you that a guarantee issued by Mongolian company in favor of a parent company will not be challenged or will not have its enforceability impaired.

Few Mongolian-incorporated companies have participated in international financing transactions, especially transactions where a Mongolian company has provided a guarantee with respect to the payment obligations of its offshore parent company. Furthermore, the Mongolian legal system is young and exhibits several of the characteristics typically found in a developing country and its judicial system has relatively little experience in enforcing the laws and regulations that currently exist. See "Risks Relating to Mongolia – Legislation in Mongolia may be subject to conflicting interpretations" and "Risks Relating to Mongolia – Weaknesses relating to the Mongolian legal system and Mongolian legislation create an uncertain environment for investment and business activity". There can be no assurance that a guarantee provided by a Mongolian entity will not be voided or claims in respect of a guarantee provided by a Mongolian entity will not be subordinated to other debt of that entity whether pursuant to law or governmental or judicial mandate.

See "– The Subsidiary Guarantees may be challenged under applicable bankruptcy, fraudulent transfer insolvency or similar laws, which could impair the enforceability of the Subsidiary Guarantees".

If a court voids a guarantee, subordinates such guarantee to other indebtedness of the guarantor, or holds the guarantee unenforceable for any other reason, holders of the Notes would cease to have a claim against that guarantor based upon such guarantee, would be subject to the prior payment of all liabilities (including trade payables) of such guarantor, and would solely be creditors of us and any guarantors whose guarantees have not been voided or held unenforceable. In such an event, after providing for all prior claims, there might not be sufficient assets to satisfy the claims of the holders of the Notes.

The Subsidiary Guarantees may be challenged under applicable bankruptcy, fraudulent transfer, insolvency or similar laws, which could impair the enforceability of the Subsidiary Guarantees.

Under bankruptcy, fraudulent transfer, insolvency or similar laws in Hong Kong, Luxembourg or Mongolia and other jurisdictions where future guarantors may be established, a guarantee could be voided, or claims in respect of a guarantee could be subordinated to all other debts of that guarantor if, among other things, the guarantor, at the time it incurred the indebtedness evidenced by, or when it gives, its guarantee:

For guarantors incorporated in Mongolia:

- was liquidated by a court decision due to bankruptcy based on voluntary or involuntary insolvency;
- was liquidated or reorganized due to intentional arrangement between guarantor and obligor prior to the obligation term, or liquidated on grounds provided by other laws;
- became insolvent even if not liquidated or bankrupt;
- had its license revoked, pledged or suspended, or had guarantor's assets sealed or confiscated due to the guarantor's illegal action or based a government organization decision;
- fraudulently appeared to be financially insolvent;
- was unable to fulfill its obligation due to the occurrence of conditions that makes the issuance of the guarantee impossible (if stated in the guarantee agreement); or
- was unable to fulfill its obligation due to the occurrence of other conditions (such as change of laws and regulations and consequences caused by force majeure events) for guarantors incorporated in other jurisdictions;
- incurred the debt with the intent to hinder, delay or defraud creditors or was influenced by a desire to put the beneficiary of the guarantee in a position which, in the event of the guarantor's insolvency, would be better than the position the beneficiary would have been in had the guarantee not been given;
- received less than reasonably equivalent value or fair consideration for the incurrence of such guarantee;
- was insolvent or rendered insolvent by reason of the incurrence of such guarantee;
- was engaged in a business or transaction for which the guarantor's remaining assets constituted unreasonably small capital; or
- intended to incur, or believed that it would incur, debts beyond its ability to pay such debts as they mature.

In addition, for guarantors or collateral providers incorporated in Luxembourg:

The insolvency laws of Luxembourg may not be as favorable to holders of the Notes as insolvency laws of jurisdictions with which investors may be familiar. For any Subsidiary Guarantor incorporated and having its center of main interests in Luxembourg, insolvency proceedings with respect to that Subsidiary Guarantor may proceed under, and be governed by, Luxembourg insolvency laws which may have a material adverse effect on the business and assets of a Subsidiary Guarantor as well as on its respective obligations under the Notes. The following is a brief description of certain aspects of insolvency laws in Luxembourg.

Under Luxembourg law, the following types of proceedings (altogether referred to as 'insolvency proceedings') may be opened against a company organized and existing under the laws of Luxembourg and whose center of main interests within the meaning of Regulation (EU) 2015/848 of the European Parliament and of the Council of May 20, 2015 on insolvency proceedings (the "EU Insolvency Regulation") (respectively its central administration, if different, and if the center of main interest is located in a jurisdiction where the EU Insolvency Regulation is not applicable) is or it has an establishment in Luxembourg (in latter case assuming that the center of main interests is located in a jurisdiction where the EU Insolvency Regulation is applicable):

- bankruptcy proceedings (*faillite*), the opening of which may be requested by the company, by any of its creditors or by the courts *ex officio*. Following such a request, the Luxembourg courts having jurisdiction may open bankruptcy proceedings if the company: (i) is unable to pay its debts as they fall due (*cessation des paiements*) and (ii) has lost its creditworthiness (*ébranlement de crédit*) or if the court finds on its own, in the absence of a request, that a company meets the aforementioned conditions;

- controlled management proceedings (*gestion contrôlée*), the opening of which may only be requested by the company and not by its creditors; or

- composition proceedings, the opening of which may only be requested by the company (subject to obtaining the consent of the majority of its creditors) and not by its creditors themselves. The Luxembourg court's decision to admit a company to the composition proceedings triggers a provisional stay on enforcement of claims by creditors.

In addition to these proceedings, the ability of a holder of the Notes to call the guarantee may be affected by a decision of a Luxembourg court to grant a stay on payments *(sursis de paiement)* or to put a Luxembourg company into judicial liquidation *(liquidation judiciaire)*. Judicial liquidation or administrative dissolution without liquidation proceedings may be opened at the request of the public prosecutor against companies pursuing an activity violating criminal laws or that are in serious breach or violation of the Luxembourg Commercial Code or of the Luxembourg law dated August 10, 1915 on commercial companies, as amended. The management of such liquidation proceedings will generally follow similar rules as those applicable to Luxembourg insolvency proceedings.

Liability of the Luxembourg companies in respect of the guarantee will, in the event of a liquidation of the company following bankruptcy or judicial liquidation proceedings, only rank junior to the cost of such proceedings (including any debt incurred for the purpose of such proceedings) and any claims that are preferred under Luxembourg law. Preferential claims under Luxembourg law include, among others:

- liquidation or insolvency fees;

- certain amounts owed to the Luxembourg Revenue and value-added tax and other taxes and duties owed to the Luxembourg Customs and Excise;

- social security contributions; or

- remuneration owed to employees.

Luxembourg insolvency laws may affect transactions entered into, or payments made, by a Luxembourg company during the suspect period which is a maximum of six months preceding the judgment declaring bankruptcy, except that in certain specific situations the court may set the start of the suspect period at the ten days preceding it. In particular:

- some specific transactions (in particular, the granting of a security interest for antecedent debts, the payment of debts which have not fallen due, whether payment is made in cash or by way of assignment, sale, set-off or by any other means; the payment of debts which have fallen due by any means other than in cash or by bill of exchange; the sale of assets without consideration or with substantially inadequate consideration) entered into during the suspect period must be set aside or declared null and void, if so requested by the insolvency receiver;

- payments made for matured debts as well as other transactions concluded for consideration during the suspect period are subject to cancellation by the court upon proceedings instituted by the insolvency receiver if they were concluded with the knowledge of the bankrupt's cessation of payments; and

- the insolvency receiver (acting on behalf of the creditors) has the right to challenge any fraudulent payments and transactions, including the granting of security with an intent to defraud, made prior to the bankruptcy, without any time limit.

Additionally, international aspects of Luxembourg insolvency proceedings may be subject to the EU Insolvency Regulation. In particular, rights *in rem* over assets located in another jurisdiction where the EU Insolvency Regulation is applicable will not be affected by the opening of insolvency proceedings, without prejudice however to the applicability of rules relating to the voidness, voidability or unenforceability of legal acts detrimental to all the creditors (subject to the application of Article 24 of the Luxembourg Collateral Law as described above and Article 13 of the EU Insolvency Regulation).

Assets over which a security interest has been granted will not, in principle, be available for distribution to unsecured creditors (except after enforcement and to the extent a surplus is realized).

As indicated, during insolvency proceedings in Luxembourg, all enforcement measures by unsecured creditors are suspended. Other than as described above, the ability of certain secured creditors to enforce their security interest may also be limited, in particular in the event of controlled management proceedings providing expressly that the rights of secured creditors are frozen until a final decision has been taken by a Luxembourg court as to the petition for controlled management, and may be affected thereafter by a reorganization order given by the court. A reorganization order requires the prior approval by more than 50% of the creditors representing more than 50% of the relevant Luxembourg company's liabilities in order to take effect. Furthermore, declarations of default and subsequent acceleration (such as acceleration upon the occurrence of an event of default) may not be enforceable during controlled management proceedings.

It is important to note that the measure of insolvency for purposes of the foregoing discussion of the legal regimes of Hong Kong, Luxembourg, Mongolia and other jurisdictions will vary depending on the laws of the applicable jurisdiction. Generally, however, a guarantor would be considered insolvent at a particular time if it were unable to pay its debts as they fell due or if the sum of its debts was then greater than all of its properties at a fair valuation or if the present fair saleable value of its assets was then less than the amount that would be required to pay its probable liabilities in respect of its existing debts as they became absolute and matured.

In addition, a guarantee may be subject to review under applicable bankruptcy, fraudulent transfer, insolvency or similar laws in certain jurisdictions or subject to a lawsuit by or on behalf of creditors of the guarantor. In such case, the analysis set forth above would generally apply, except that the guarantee could also be subject to the claim that, since the guarantee was not incurred for the benefit of the guarantor, the obligations of the guarantor thereunder were incurred for less than reasonably equivalent value or fair consideration.

In an attempt to limit the applicability of bankruptcy, fraudulent transfer, insolvency and other laws in certain jurisdictions, the obligations of the guarantors under the guarantees will be limited to the maximum amount that can be guaranteed by the applicable guarantor without rendering the guarantee, as it relates to such guarantor, voidable under such applicable bankruptcy, fraudulent transfer, insolvency or similar laws.

If a court voids a guarantee, subordinates such guarantee to other indebtedness of the guarantor, or holds the guarantee unenforceable for any other reason, holders of the Notes would cease to have a claim against that guarantor based upon such guarantee, would be subject to the prior payment of all liabilities (including trade payables) of such guarantor, and would solely be creditors of us and any guarantors whose guarantees have not been voided or held unenforceable. In such an event, after providing for all prior claims, there might not be sufficient assets to satisfy the claims of the holders of the Notes.

Corporate benefit, capital maintenance laws and other limitations on the Subsidiary Guarantees may adversely affect the validity and enforceability of the Subsidiary Guarantees.

The laws of certain of the jurisdictions in which the Subsidiary Guarantors are incorporated, including Luxembourg, may limit their ability to guarantee the debt of a parent or sister company. These limitations arise from principles of corporate law, which include rules governing capital maintenance, under which, among others, the risks associated with the guaranteeing a parent or sister company's debt need to be reasonably, economically and operationally appreciated in the global context of the case and in a perspective of continuity from the Subsidiary Guarantor's perspective, as well as financial assistance, thin capitalization and fraudulent transfer principles. If these limitations were not considered, observed or justified, the guarantees by those Subsidiary Guarantors could be subject to legal challenge and be declared invalid. In these jurisdictions, the Subsidiary Guarantees usually contain language limiting the amount of debt that can be guaranteed by the relevant Subsidiary Guarantor to mitigate the risk of legal challenge, which could cause the Guarantee to be voidable or otherwise ineffective under applicable laws. In Luxembourg, the granting of a guarantee in absence of sufficient corporate benefit for the guarantor may constitute a misappropriation of corporate assets and the law makes it a criminal offense. See "Description of the Notes – The Subsidiary Guarantees".

The amount recoverable under the Subsidiary Guarantees may be limited to a certain maximum amount that can be guaranteed by a particular Subsidiary Guarantor without rendering such Subsidiary Guarantee, as it relates to such Subsidiary Guarantor, voidable or otherwise ineffective under applicable law, or without creating liability risks for its management.

Our Subsidiary Guarantors may not have the funds necessary to satisfy our financial obligations under the Subsidiary Guarantees.

Certain of our current and future subsidiaries will not provide any guarantee for the Notes now or at any time in the future. As a result, the Notes will be effectively subordinated to all the debt and other obligations, including contingent obligations and trade payables, of such non-guarantor subsidiaries.

We cannot assure you that the initial guarantors or any subsidiaries that may become guarantors in the future will have the funds necessary to satisfy our financial obligations under the Notes if the Issuers are unable to do so.

The guarantees from the Subsidiary Guarantors will be shared on a pari passu basis with the other creditors.

The proceeds from the enforcement of the guarantees from the Subsidiary Guarantors will be shared on a *pari passu* basis among the holders of the Notes and may be shared on a *pari passu* basis with other indebtedness ranking *pari passu* with the Notes that the Issuers may issue or incur in the future. Accordingly, in the event of a default on the Notes or such other indebtedness and an enforcement of such guarantees, any proceeds so recovered would be shared by the holders of such indebtedness in proportion to the outstanding amounts of each class of such indebtedness. Since certain of the Subsidiary Guarantors are holding companies with no substantial assets, the proceeds of recovery resulting from such enforcement are likely to be insufficient to discharge the obligations under the Notes and other *pari passu* indebtedness.

The Trustee may request that the Holders provide an indemnity and/or security and/or prefunding to its satisfaction before taking certain actions on behalf of the Holders.

In certain circumstances, the Trustee may (at its sole discretion) request the Holders to provide an indemnity and/or security, and/or prefunding to its satisfaction before it takes action on behalf of Holders. The Trustee shall not be obliged to take any such action if not indemnified and/or secured, and/or prefunded to its satisfaction. Negotiating and agreeing to any indemnity and/or security, and/or prefunding can be a lengthy process and may impact on when such action can be taken. The Trustee may not be able to take action notwithstanding the provision of an indemnity or security or prefunding to it, in breach of

the terms of the indenture (as subsequently supplemented and/or amended) governing the Notes and in circumstances where there is uncertainty or dispute as to the applicable laws or regulations and, to the extent permitted by the agreements and the applicable law, it will be for the holders of Notes to take such actions directly.

Holders of the Notes may not realize any recovery if the Notes are accelerated.

If the Notes are accelerated because an event of default was triggered in respect of any or both of the Issuers, and a demand is made on the Issuers to make payments of all amounts due under the Notes, it is possible that the Issuers would not be able to make such payment. If a liquidator is appointed with respect to any or both of the Issuers, there are likely to be various consequences that would make it more likely for the holders of the Notes to recover less or none of their investment. Additionally, liquidation proceedings may take a substantial time period to complete before payments to creditors (if any) are declared, and there is no assurance that the holders of the Notes would be able to recover in a reasonable time period all amounts, or a reasonable amount due to the holders of the Notes, or at all.

Furthermore, any event of default(s) triggering under the Notes (including failure to pay any amount thereunder when due) may in turn trigger cross-defaults under the Issuers' other existing indebtedness, which could have a material adverse effect on the businesses, results of operations and financial conditions of the Issuers. Any of the above adverse events may affect the holders of the Notes to recover the investment under the Notes.

USE OF PROCEEDS

We estimate that the gross proceeds from the sale of the Notes will be approximately US$4.2 million, before discounts and commissions of the initial purchasers, and general expenses payable by us in respect of this offering and the Exchange Offer. We intend to use the net proceeds from this offering for refinancing purposes.

This Offering Memorandum is neither an offer to purchase, offer to exchange nor a solicitation of an offer to sell, buy or exchange the 2024 Notes. Any offer to purchase or exchange the Reg S Notes will be made solely on the terms and subject to the conditions set forth in a separate exchange offer memorandum that will be directed to holders of the Reg S Notes. For more information about the Exchange Offer, see "Summary – Recent Developments – Exchange Offer".

CAPITALIZATION AND INDEBTEDNESS

The following table sets forth our borrowings, equity and capitalization as of June 30, 2023:

- on an actual basis under IFRS; and

- as adjusted to give effect to (i) the issuance of the Notes in connection with the offering, (ii) the issue of the Exchange Notes in connection with the Exchange Offer, (iii) the cancellation of the 2024 Notes in connection with the Exchange Offer and (iv) the cancellation of the 2024 Notes held as treasury notes.

The as adjusted information below is illustrative only and does not take into account any changes in our borrowings and capitalization after June 30, 2023 other than as noted above. For the avoidance of doubt, the "As adjusted" data set forth below does not give effect to the payment of the Fractional Cash Payment (if applicable) and the Accrued Interest (if any) (each as defined in the Exchange Offer Memorandum) in connection with the Exchange Offer.

	At June 30, 2023	
	Actual	**As adjusted**
	US$'000	*US$'000*
Current borrowings:		
2024 Notes	341,607[(1)]	83,934[(2)]
Non-current borrowings:		
Notes and Exchange Notes to be issued	–	174,600[(3)]
Total borrowings	341,607	258,534
Equity:		
Perpetual Securities[(4)]	55,476	55,476
Total equity	1,064,267	1,064,267
Total capitalization[(5)]	1,405,874	1,322,801

Notes:

(1) Represents the carrying amount of the 2024 Notes as shown on our consolidated financial statements.

(2) Represents the carrying amount of the 2024 Notes after the cancellation of the 2024 Notes in connection with the Exchange Offer and cancellation of the 2024 Notes held as treasury notes in the aggregate carrying amount of US$257,673,000.

(3) Represents the estimated initial recognition amount of US$174,600,000 of the Notes and the Exchange Notes, taking into account the issue price of the Notes and the Exchange Notes but before deducting the fees and commissions and other estimated expenses payable in connection with this offering.

(4) Represents the carrying amount of the Perpetual Securities as shown on our consolidated financial statements.

(5) Total capitalization includes total equity and total borrowings.

Except as disclosed above, there has been no material change in our capitalization since June 30, 2023.

SELECTED HISTORICAL CONSOLIDATED FINANCIAL INFORMATION AND OTHER DATA

The following summary consolidated statement of profit or loss and other comprehensive income and summary consolidated statement of cash flow data for the years ended December 31, 2020, 2021 and 2022 and the summary consolidated statement of financial position as of December 31, 2020, 2021 and 2022 set forth below have been derived from our Audited Financial Statements. The following summary consolidated statement of profit or loss and other comprehensive income and summary consolidated condensed statement of cash flow data for the six months ended June 30, 2022 and 2023 and the summary consolidated statement of financial position as of June 30, 2023 set forth below have been derived from our Unaudited Interim Financial Statements. Our Audited Financial Statements have been audited by KPMG and our Unaudited Interim Financial Statements have been reviewed by KPMG. Our Unaudited Interim Financial Statements may not provide the same quality of information associated with information that has been subject to an audit. Potential purchasers must exercise caution when using such data to evaluate our financial condition and results of operations. None of the Joint Bookrunners, the Joint Lead Managers nor any of their directors, officers, employees, representatives, agents, advisers or affiliates makes any representation or warranty, express or implied, regarding the sufficiency of such financial information for an assessment of, and potential investors must exercise caution when using such data to evaluate our financial condition, results of operations and results. Our Unaudited Interim Financial Statements should not be taken as an indication of the expected financial condition or results of operations of the Group for the full financial year ending December 31, 2023 and they are not comparable to the financial information for the years ended December 31, 2020, 2021 and 2022.

SUMMARY CONSOLIDATED STATEMENT OF PROFIT OR LOSS AND OTHER COMPREHENSIVE INCOME DATA

	Year ended December 31,			Six months ended June 30,	
	2020	**2021**	**2022**	**2022**	**2023**
				(Unaudited)	*(Unaudited)*
	(in US$'000, except earnings per share)				
Revenue	417,424	184,069	546,248	106,539	516,701
Cost of revenue	(288,848)	(161,490)	(451,131)	(126,425)	(291,597)
Gross profit/(loss)	128,576	22,579	95,117	(19,886)	225,104
Other cost	(2,155)	(3,422)	(1,328)	–	–
Other net income	2,418	3,382	5,509	(2,306)	3,095
Selling and distribution costs	(27,645)	(9,625)	(2,434)	(647)	(2,107)
General and administrative expenses	(19,773)	(24,242)	(24,775)	(7,352)	(14,049)
Profit/(loss) from operations	81,421	(11,328)	72,089	(30,191)	212,043
Finance income	5,053	54	6,286	2,671	616
Finance costs	(46,191)	(48,980)	(47,081)	(27,250)	(26,360)
Net finance costs	(41,138)	(48,926)	(40,795)	(24,579)	(25,744)
Gain from repurchase of 2024 Notes	–	–	23,144	–	3,970

	Year ended December 31,			Six months ended June 30,	
	2020	**2021**	**2022**	**2022**	**2023**
				(Unaudited)	*(Unaudited)*
			(in US$'000, except earnings per share)		
Share of (losses)/profit of associates	(77)	(196)	286	22	307
Share of losses of joint venture	(5)	(1)	(16)	(10)	–
Profit/(loss) before taxation	40,201	(60,451)	54,708	(54,758)	190,576
Income tax	(10,596)	5,013	4,183	22,446	(54,123)
Profit/(loss) for the year/period	29,605	(55,438)	58,891	(32,312)	136,453
Attributable to					
Equity shareholders of the Company	28,940	(55,238)	59,177	(32,361)	136,635
Non-controlling interests	665	(200)	(286)	49	(182)
Other comprehensive income for the year/period (after tax and reclassification adjustments)					
Exchange differences on translation/re-translation	(7,556)	184	(21,726)	(12,004)	21
Surplus on revaluation of plants, buildings, and machinery and equipment	–	62,895	–	–	–
Total comprehensive income for the year/period	22,049	7,641	37,165	(44,316)	136,474
Profit/(loss) attributable to the equity shareholders of the Company	28,940	(55,238)	59,177	(32,361)	136,635
Total comprehensive income attributable to the equity shareholders of the Company	21,384	7,841	38,306	(44,365)	136,721
Basic earnings/(loss) per share	2.81 cents	(5.35) cents	5.68 cents	(3.10) cents	13.11 cents
Diluted earnings/(loss) per share	2.81 cents	(5.35) cents	5.68 cents	(3.10) cents	13.11 cents

SUMMARY CONSOLIDATED STATEMENT OF FINANCIAL POSITION

	As of December 31,			As of June 30,
	2020	2021	2022	2023
				(Unaudited)
		(in US$'000)		
Total non-current assets	1,496,013	1,594,018	1,560,862	1,568,427
Total current assets	239,527	285,120	259,646	414,377
Total assets	1,735,540	1,879,138	1,820,508	1,982,804
Total current liabilities	172,286	335,118	328,288	730,762
Total non-current liabilities	675,090	647,442	565,143	187,775
Total liabilities	847,376	982,560	893,431	918,537
Total equity attributable to equity shareholders of the Company	821,209	829,823	872,556	1,009,993
Non-controlling interests	386	186	(955)	(1,202)
Total liabilities and shareholders' equity	1,668,585	1,812,383	1,765,987	1,928,530

SUMMARY CONSOLIDATED CASH FLOW DATA

	Year ended December 31,			Six months ended June 30,	
	2020	2021	2022	2022	2023
				(Unaudited)	*(Unaudited)*
			(in US$'000)		
Net cash generated from operating activities	108,687	84,911	233,779	80,332	247,810
Net cash used in investing activities	(70,794)	(56,763)	(87,916)	(36,116)	(52,239)
Net cash used in financing activities	(41,650)	(41,664)	(103,874)	(17,694)	(46,241)

OTHER FINANCIAL DATA

	Year ended December 31,			Six months ended June 30,	
	2020	2021	2022	2022	2023
			(Unaudited)		
			(in US$'000, except otherwise indicated)		
Adjusted EBITDA/(LBITDA)[(1)]	142,417	38,060	133,791	(8,696)	258,008
Adjusted EBITDA/(LBITDA) margin[(2)]	34%	21%	24%	(8)%	50%

Notes:

(1) We calculate Adjusted EBITDA/LBITDA by adding income tax, share of losses of associates and joint venture, net finance costs, depreciation and amortization, impairment loss on trade and other receivables, impairment loss on non-financial assets, provision losses on coal inventories, loss on disposal of property, plant and equipment, equity-settled share-based payment expenses, accrued employee benefit and subtracting share of profits of associates and joint venture, gain on disposal of property, plant and equipment, gain on repurchase of Senior Note from profit for the year/period as calculated under IFRS. We have included Adjusted EBITDA/LBITDA data because such data is commonly used by investors to measure a company's ability to service debt. Adjusted EBITDA/LBITDA is not, and should not be used as, an indicator or alternative to profit from operations, profit for the year/period or cash flow as reflected in our consolidated financial statements, is not intended to represent funds available for debt service, dividends or other discretionary uses, is not a measure of financial performance under IFRS and should not be considered in isolation or as a substitute for measures of performance prepared in accordance with IFRS. Investors should not compare Adjusted EBITDA/LBITDA to EBITDA presented by other companies because not all companies use the same definition. For example, we subtract the depreciation expense associated with mining equipment while other competitors who own their equipment do not subtract this cost. Investors should also note that the Adjusted EBITDA/LBITDA as presented herein is calculated differently from Consolidated EBITDA as defined and used in the Indenture governing the Notes. See "Description of the Notes – Definitions" for a description of the manner in which Consolidated EBITDA is defined for purposes of the Indenture governing the Notes. The following table reconciles our profit for the year/period under IFRS to the definition of Adjusted EBITDA for the periods indicated:

	Year ended December 31,			Six months ended June 30,	
	2020	**2021**	**2022**	**2022**	**2023**
				(Unaudited)	*(Unaudited)*
			(in US$'000)		
Profit/(loss) for the year/period	29,605	(55,438)	58,891	(32,312)	136,453
Adjustments					
Income tax	10,596	(5,013)	(4,183)	(22,446)	54,123
Share of losses/(profit) of associates and joint venture	82	197	(270)	(12)	(307)
Net finance costs	41,138	48,926	40,795	24,579	25,744
Depreciation and amortization	61,199	49,704	61,708	22,954	46,026
Loss/(gain) on disposal of property, plant and equipment	1	(29)	(6)	(6)	–
Equity-settled share-based payment expenses	136	34	–	(1,453)	–
Employee benefit accrued	(340)	(321)	–	–	(61)
Gain from repurchase of 2024 Notes	–	–	(23,144)	–	(3,970)
Adjusted EBITDA/(LBITDA)	142,417	38,060	133,791	(8,696)	258,008

(2) Adjusted EBITDA margin is calculated by dividing Adjusted EBITDA by revenue.

OPERATION DATA

	Year ended December 31,			Six months ended June 30,
	2020	**2021**	**2022**	**2023**
			(in US$'000, except otherwise indicated)	
ROM coal production (Mt)	7.7	4.3	5.7	8.0
Average accounting stripping ratio (actual) (bcm/t)	3.7	3.7	4.7	4.1
Total coal sales (Mt)	4.2	1.6	4.7	4.9
Average sales price per tonne of HCC (US$ per tonne)[(1)(2)]	121.4	150.6	147.1	161.8

Notes:

(1) See "Management's Discussion and Analysis of Financial Condition and Results of Operations – Factors Affecting Results of Operation and Financial Condition – Global Coking Coal Prices and Average Selling Prices" for a description of the factors affecting average sales prices of our coal.

(2) Average sales price is the blended average of HCC sold under all sales terms.

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

You should read the following discussion and analysis in conjunction with our financial statements prepared in conformity with IFRS, which may differ in certain material aspects from generally accepted accounting principles in other jurisdictions, together with the accompanying notes, set forth in the audited consolidated financial statements included in this Offering Memorandum. You should read the whole of the audited consolidated financial statements included in this Offering Memorandum and not rely merely on the information contained in this section.

The following discussion contains certain forward-looking statements that involve risks and uncertainties. Our actual results reported in future periods could differ materially from those discussed below. Factors that could cause or contribute to such differences include those discussed in the sections headed "Risk Factors" and "Business" and elsewhere in this Offering Memorandum.

For the purpose of this section, unless the context otherwise requires, references to 2020, 2021 and 2022 refer to our financial year ended December 31 of such year. Unless the context otherwise requires, financial information described in this section is described on a consolidated basis.

OVERVIEW

We are a leading Asian coking coal producer engaged in the open-pit mining and processing of coking coal sourced from our UHG and BN deposits, located in the South Gobi Province of Mongolia. These deposits are adjacent to each other and strategically located approximately 250 km from the Sino-Mongolian border and approximately 600 km from Baotou, China, an important railway transportation hub providing access from Mongolia to the largest steel producing provinces in China, including Inner Mongolia, Hebei, Shandong and Jiangsu provinces. We have worked closely with a number of industry-leading experts, including Thiess and Sedgman, throughout the planning, development and operation of our business to develop integrated mining, processing, supporting infrastructure, transportation and logistics operations.

Our UHG mining license permits us to engage in coal mining activities on 2,960 hectares of land for an initial period of 30 years commencing from August 29, 2006. As of December 31, 2022, 570 Mt of JORC-compliant coal resources, and as of January 1, 2023, 365 Mt of JORC-compliant coal reserves have been identified within such area, respectively. Our BN mining license, comprising the BN mining license area of 4,482 hectares and the contiguous THG mining license area of 8,340 hectares, permits coal mining for an initial period of 30 years commencing from December 1, 2008, and June 24, 2013, respectively. Within the BN and THG mining license areas combined, a total of 500 Mt of JORC-compliant coal resources have been identified as of December 31, 2021, including 280 Mt of JORC-compliant coal reserves as of January 1, 2023. Our BN mine is located approximately 30 km by paved road southwest of our UHG mine, and its development, in integration with existing facilities at UHG, is yielding benefits through synergies achievable in terms of shared mining, processing and transportation infrastructure and marketing resources. BN mine produced 0.4 Mt ROM coal for 2022. For the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, we produced an aggregate of 7.7 Mt, 4.3 Mt, 5.7 Mt, 0.9 Mt and 8.0 Mt of ROM coal, respectively.

With a view to consistently producing high quality products, reducing product transportation costs and generating improved margins, we constructed and commissioned 15.0 Mtpa of ROM coal processing capacity onsite at the UHG mine. The CHPP, which was designed and constructed by Sedgman, comprises three near identical modules of ROM coal processing nameplate capacity of 5.0 Mtpa each.

Since the commencement of the CHPP operation, we have shifted our sales strategy from raw coal to washed coal, having sold only washed coal products from the beginning of the second quarter of 2012.

We have our own fleet of over 480 double-trailer trucks and also have support facilities to flexibly conduct shipments from UHG to TKH and further from TKH to GM. Currently, we conduct shipments using the approximately 240 km long UHG-TKH ("long haul") section solely with our own double-trailer trucks, while cross border shipments for exports using the approximately 20 km long TKH-GM ("short haul") section are undertaken by our own double-trailer trucks supplemented by third-party Chinese trucking contractors.

We are one of the largest coal producers and exporters in Mongolia. For the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, we sold our hard coking coal at an average selling price of US$121.4 per tonne, US$150.6 per tonne, US$147.1 per tonne, US$141.3 per tonne and US$161.8 per tonne, respectively.

Our major shareholder, MCS Group, is one of the largest business conglomerates in Mongolia, operating leading companies in engineering, energy, communication, property, mining, fast-moving consumer goods, health, and hospitality industries. In 2022, we were included in the Top 5 Enterprise list of Mongolia by the Government of Mongolian and the Mongolian National Chamber of Commerce and industry for the 10th consecutive year.

Our revenue for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, was US$417.4 million, US$184.1 million, US$546.2 million, US$106.5 million and US$516.7 million, respectively. We recorded profit/(loss) for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, of US$29.6 million, US$(55.4) million, US$58.9 million, US$(32.3) million and US$136.5 million, respectively.

FACTORS AFFECTING RESULTS OF OPERATIONS AND FINANCIAL CONDITION

Our business and financial condition and results of operations have been, and will continue to be, affected by a number of important factors, including the following:

Production – Coal Mining

We operate the UHG and BN open-pit coking coal mines, both located in close proximity to each other within the Greater Tavan Tolgoi coalfield in Umnugobi aimag, Mongolia. Our UHG and BN mines were commissioned in April 2009 and in February 2012, respectively.

For the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, a total of 7.7 Mt, 4.3 Mt, 5.7 Mt, 0.9 Mt and 8.0 Mt of ROM coal, respectively, was mined by us from both UHG and BN mines. This was achieved at an actual stripping ratio of 5.6 bcm, 6.7 bcm, 5.3 bcm, 6.2 bcm and 4.1 bcm of overburden per ROM tonne, as a result of moving approximately 39.4 million bcm, 25.3 million bcm, 27.9 million bcm, 5.6 million bcm and 27.1 million bcm of overburden for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, respectively, at UHG mine. At BN mine, a total of 5.0 million bcm, 4.3 million bcm, 3.6 million bcm, nil, and 9.6 million bcm of prime overburden was removed, resulting in an actual stripping ratio of 6.7 bcm, 8.0 bcm, 8.1 bcm, nil and 7.2 bcm per ROM coal tonne for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, respectively.

Production – Coal Processing

ROM coal mined from UHG and BN mines is processed using our CHPP located at UHG mine. Based on ROM coal quality, suitable ROM coal is blended and processed to produce the following three distinguished washed coal products: (i) hard coking coal ("HCC"); (ii) semi-soft coking coal ("SSCC"); and (iii) washed thermal coal ("middlings"). The CHPP has three operating modules with combined name-plate capacity of 15.0 Mt per annum supplemented by its own power and water supply infrastructure.

A total of 7.4 Mt, 3.7 Mt, 6.6 Mt, 0.9 Mt and 6.8 Mt of ROM coal was processed by us in 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, respectively. Resulting from this plant feed, we were able to produce 3.5 Mt of washed coking coal and 1.2 Mt of middlings for 2020, 1.8 Mt of washed coking coal and 0.6 Mt of middlings for 2021, 3.0 Mt of washed coking coal and 1.2 Mt of middlings for 2022, 0.4 Mt of washed coking coal and 0.2 Mt of middlings for the first half of 2022, and 3.0 Mt of washed coking coal and 1.2 Mt of middlings for the first half of 2023.

Global Coking Coal Prices and Average Selling Prices

Our contracts have pricing terms that are denominated in RMB and are adjustable periodically. Most of our coal is currently sold into the Chinese market. Unlike seaborne coking coal prices, which tend to rigidly follow periodic settlements between Australian producers and Japanese consumers, domestic Chinese prices are subject to ongoing negotiation and adjustment according to market dynamics. The far larger size and highly fragmented nature of the Chinese market results in a more fluid pricing system. Our average selling prices are affected by various market factors such as the discovery and development of new deposits, closure of old mines, transportation infrastructure bottlenecks and specific demand of end users. Pursuant to our customer agreements, our selling prices are based on existing market prices and reviewed from time to time. In determining the price of coal sold under our customer agreements, we take into account the delivery point of the coal sold. See "Risk Factors – Risks Relating to our Business and Industry – Coking coal prices are cyclical and subject to significant fluctuation".

In recent years, as a result of the global and in particular Chinese economic recovery, coking coal prices have increased and remained stable in 2021 and 2022 as well as the first half of 2023. For the year ended December 31, 2020, we sold our HCC at an average selling price of US$120.6 per tonne and US$154.8 per tonne, respectively, under FOT GM and C&F terms. For the year ended December 31, 2021, we sold our HCC at an average selling price of US$146.2 per tonne, US$168.9 per tonne and US$141.4 per tonne, respectively, under FOT GM, DAP GM and EXW UHG terms. For the year ended December 31, 2022, we sold our HCC at an average selling price of US$169.1 per tonne, US$144.9 per tonne, US$156.8 per tonne and US$127.0 per tonne, respectively, under FOT GM, DAP GM, FCA TKH and EXW UHG terms. For the six months ended June 30, 2022, we sold our HCC at an average selling price of US$161.7 per tonne, US$144.3 per tonne and US$126.1 per tonne, respectively, under FOT GM, DAP GM and EXW UHG terms. For the six months ended June 30, 2023, we sold our HCC at an average selling price of US$167.9 per tonne, US$149.5 per tonne, US$165.7 per tonne and US$118.5 per tonne, respectively, under FOT GM, DAP GM, FCA TKH and EXW UHG terms.

Mining Costs

We cooperate with Thiess as our mining contractor under a long-term alliance style contract, and work closely with them in all aspects of our coal mining operations at our UHG mine. We have two components of mining costs: (i) costs directly incurred by us and (ii) costs related to our mining contractor. Costs directly incurred by us primarily include fuel costs, labor costs, employee-related expenses (onsite accommodations) and blasting expenses. Costs related to our mining contractor include plant rates for mining equipment operation, expatriate staff wages, corporate overhead and contractor fee. Plant rates include contractor costs related to the depreciation, financing, insurance and maintenance of the mining equipment used at our UHG mine. The contractor fee payable is correlated to the contractor's investment in mining equipment brought to site and its utilization, productivity and efficiency.

We have engaged a local contractor, UARP LLC, who is responsible for mining operations at the BN mine, including fleet operation and maintenance of overburden stripping. Costs directly incurred by us primarily include fuel costs, labor costs, employee-related expenses (onsite accommodations) and blasting expenses. Costs related to our mining contractor include plant rates for a mining equipment operation. Due to COVID-19 related restrictions, we suspended our operations at the BN mine intermittently during 2020-2022, largely to preserve liquidity. In October 2022, as a result of improved conditions for cross-border logistics from the second half of 2022, we resumed operations at the BN mine. See "Risk Factors – Risks Relating to our Business and Industry – Our mining operations from which we derive all of our operating cash flows and sales are currently concentrated at two mining sites."

Mining costs represent and will continue to represent a significant portion of our cost of revenue. Our mining costs, excluding idling cost, associated with coal sold were US$108.3 million, US$42.5 million, US$147.8 million, US$26.9 million and US$124.3 million for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, respectively. In 2022, 30.6% of our mining costs were primarily fuel, labor and other employee-related costs, as well as drilling and blasting expenses directly incurred by us. The remainder is associated with our mining contractor costs, the majority of

which was related to plant rates. In the first half of 2023, 35.8% of our mining costs were primarily fuel, labor and other employee-related costs, as well as drilling and blasting expenses directly incurred by us. The remainder is associated with our mining contractor costs, the majority of which was related to plant rates.

Transportation Costs

Transportation costs are costs associated with the transportation of our coal from UHG to Tsagaan Khad ("TKH"), where we stockpile our coal, by our own truck fleet, and from TKH to GM with mainly third-party contractors' trucks. In addition, transportation between our BN and UHG mines is performed by our own truck fleet as well as third-party contractors. We transported all of the coal produced at our UHG mine to the Sino-Mongolian border on the paved road owned and operated by Erdenes MGL under a toll fee arrangement.

The cost of our own transportation can be maintained at relatively stable levels as compared to those of third-party trucking contractors, which can be highly volatile depending on the coal market. Transportation costs of our third party contractors increased significantly over the past three years due to COVID-19 related restrictions. We are focused on maximizing our fleet utilization in order to mitigate the volatility of third-party contractor costs while continuing to maintain a sufficient fleet of trucks to meet our annual targeted volume for export.

Transportation costs associated with coal sold were approximately US$17.2 per tonne (comprising cash cost of US$16.4 per tonne and non-cash cost of US$0.8 per tonne), US$37.8 per tonne (comprising cash cost of US$35.1 per tonne and non-cash cost of US$2.7 per tonne), US$26.9 per tonne (comprising cash cost of US$26.3 per tonne and non-cash cost of US$0.6 per tonne), US$40.2 per tonne (comprising cash cost of US$38.8 per tonne and non-cash cost of US$0.4 per tonne) and US$13.1 per tonne (comprising cash cost of US$13.0 per tonne and non-cash cost of US$0.1 per tonne) for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, respectively. Transportation costs from BN to UHG mine site were nil per tonne and US$2.2 per tonne, respectively, for the six months ended June 30, 2022 and 2023. In addition, a further nil and 1.2 Mt of ROM coal at BN was transported by our own fleet of double-trailer heavy haulage trucks and third party contractor fleet to UHG for processing in the first half of 2022 and 2023, respectively.

Fuel Costs

We directly bear the costs related to the use of fuel in our mining operations and for the coal hauling trucks owned by us for coal transport. Fuel costs are included in both mining costs and transportation costs. For the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, fuel costs relating to our mining operations represented 14.4%, 13.2%, 16.3%, 13.1% and 22.3%, of mining costs, respectively. During the same period, fuel costs associated with the transportation of our coal were 10.7%, 6.2%, 9.7%, 4.5% and 19.9% of transportation costs, respectively. Our fuel costs for mining and own transportation for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023 were US$22.6 million, US$8.3 million, US$33.6 million, US$5.0 million and US$35.8 million, respectively.

We signed a fuel supply contract with NIC for mining and processing activities and with Shunkhlai for transportation and logistics activities in 2017, under which the two suppliers have agreed to supply fuel products, including diesel fuel, lubricants and other types of fuel and provide other related services. The fuel price is adjusted monthly in accordance with the change in the monthly fuel import price on a DAP basis. All other costs, such as taxes, transportation and service fees, are fixed under the contract. Our agreements with NIC and Shunkhlai have will expire in May 2026.

As Mongolia is dependent on Russia for its fuel supplies, the ongoing Ukraine-Russia war continues to impose higher fuel costs for Mongolia. See "Risk Factors – Risks Relating to Mongolia – Mongolia's economy has been adversely impacted by the war between Russia and Ukraine".

CRITICAL ACCOUNTING POLICIES

Critical accounting policies are those that require our management to exercise judgment and to make estimates that would yield materially different results if our management applied different assumptions or made different estimates. These accounting policies are set forth in note 2 to our financial statements included elsewhere in this Offering Memorandum. The preparation of our financial information pursuant to IFRS requires our management to adopt accounting policies and make estimates and assumptions that affect the amount reported in our financial information. These estimates and assumptions are continually evaluated by management and are based on historical experience and other factors, including expectations of future events that are believed to be reasonable under the circumstances. Actual results may differ from those estimates and assumptions. We have identified the following accounting policies as critical to an understanding of our financial condition and results of operations.

In the process of applying our accounting policies, we have made the following accounting judgments:

Revenue Recognition

Income is classified by the Group as revenue when it arises from the sale of goods or the provision of services in the ordinary course of the Group's business.

Revenue is recognized when control over a product or service is transferred to the customer, at the amount of promised consideration to which the Group is expected to be entitled, excluding those amounts collected on behalf of third parties such as value added tax or other sales taxes.

Fair Value of Buildings and Plants, Machinery and Equipment Classified as Property, Plant and Equipment and Construction in Progress

We have changed our accounting policy for our buildings and plants, machinery and equipment, and such class of items under construction status from cost model to valuation model with effect from December 31, 2016. Buildings and plants, machinery and equipment classified as property, plant, equipment and construction in progress were revalued by an external appraiser as at December 31, 2016 and December 31, 2021, respectively. Such valuations were based on certain assumptions which are subject to uncertainty and might materially differ from the actual results. Judgment is required in relation to the selection of assumptions in arriving at the fair values and the determination of the frequency of performing a revaluation with sufficient regularity.

Reserves

We estimate and report Mineral Resources and Ore Reserves, commonly referred to as Coal Resources and Coal Reserves in the coal mining industry, meeting requirements of the JORC Code, and subsequently the Australian Guidelines for the Estimation and Classification of Coal Resources (2014).

A "Coal Reserve" is the economically mineable part of a Measured and/or Indicated Coal Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.

A "Probable Coal Reserve" is the economically mineable part of an Indicated, and in some circumstances, a Measured Coal Resource. The confidence in the Modifying Factors applying to a Probable Coal Reserve is lower than that applying to a Proved Coal Reserve. A Proved Coal Reserve is the economically mineable part of a Measured Mineral Resource. A Proved Coal Reserve implies a high degree of confidence in the Modifying Factors.

The Modifying Factors are considerations used to convert Coal Resources to Coal Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors. Modifying Factors may change from one estimation to the next, where the materiality of such changes is demonstrable. Such changes may be as result of variation to any of the mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social, governmental or other factors.

Because the Modifying Factors used to estimate Coal Reserves may change from one estimate to the next, estimates of Coal Reserves may change from one period to another. Changes in reported Coal Reserves thus may affect the Group's financial results and financial position in a number of ways, including the following:

- Asset recoverable amounts may be affected due to changes in estimated future cash flows.
- Depreciation, depletion and amortization charged to the statement of profit or loss may change where such charges are determined on the units of production basis, or where the useful economic lives of assets change.
- Overburden removal costs recorded on the statement of financial position or charged to the statement of profit or loss may change due to changes in stripping ratios or the units of production basis of depreciation.
- Reclamation and mine closure provisions may change where changes in estimated reserves affect expectations about the timing or cost of these activities.
- The carrying amount of deferred tax assets may change due to changes in estimates of the likely recovery of the tax benefits.

Useful Lives of Property, Plant and Equipment

We determine the estimated useful lives of and related depreciation charges for our property, plant and equipment. This estimate is based on the actual useful lives of assets of similar nature and functions. It could change significantly as a result of significant technical innovations and competitor actions in response to industry cycles. We will increase the depreciation charges where useful lives are less than previously estimated, or will write-off or write-down technically obsolete or non-strategic assets that have been abandoned or sold.

Impairment of Mining Related Assets

We identify if there is any indication of impairment of mining related assets at each end of the reporting period to determine whether there is objective evidence of impairment. When indication of impairment is identified, we prepare discounted future cash flow to assess the differences between the carrying amount and value in use and provide for impairment loss. Any change in the assumptions adopted in the cash flow forecasts would result in increase or decrease the provision of the impairment loss and affect our net asset value.

An increase or decrease in the above impairment loss would affect the net profit in future years.

Obligation for Reclamation

The estimation of the liabilities for final reclamation and mine closure involves the estimates of the amount and timing for the future cash spending as well as the discount rate used for reflecting current market assessments of the time value of money and the risks specific to the liabilities. We consider the factors including future production volume and development plan, the geological structure of the mining regions and reserve volume to determine the scope, amount and timing of reclamation and mine closure activities to be performed. Determination of the effect of these factors involves judgments by us, and the estimated liabilities may turn out to be different from the actual expenditure to be incurred. The discount rate used by us may also be altered to reflect the changes in the market assessments of the time value of money and the risks specific to the liability, such as changes in borrowing rate and inflation rate in the market. As changes in estimates occur (such as mine plan revisions, changes in estimated costs, or changes in timing of the performance of reclamation activities), the revisions to the obligation will be recognized at the appropriate discount rate.

Derivative Financial Instruments

In determining the fair value of the derivative financial instruments, considerable judgment is required to interpret market data used in the valuation techniques. The use of different market assumptions and/or estimation methodologies may have a material effect on the estimated fair value amounts.

Capitalized Stripping Costs

The process of removing overburden and other mine waste materials to access mineral deposits is referred to as stripping. Stripping costs (waste removal costs) are incurred during the development and production phases at open-pit mining and are accounted for separately for each component of an ore body, unless the stripping activity provides improved access to the whole of the ore body. A component is a specific section within an ore body that is made more accessible by the stripping activity. The identification of components is dependent on the mine plan. Judgment is required to identify and define these components and also to determine the expected volumes of waste to be stripped and ore to be mined in each of these components. Judgment is also required to identify a suitable production measure that can be applied in the calculation and allocation of production stripping costs between inventory and production stripping activity. These are used to calculate and allocate the production stripping costs to inventory and/or the stripping activity assets.

Development stripping costs are capitalized as a stripping activity asset, in construction in progress and forming part of the cost of constructing the mine, when:

- It is probable that future economic benefits associated with the asset will flow to the entity; and
- The costs can be measured reliably.

Capitalization of development stripping costs ceases and these costs are transferred to mine properties in property, plant and equipment when the ore body or component of ore body is ready for its intended use.

Production stripping can give rise to two benefits being the extraction of ore in the current period and improved access to the ore body or component of ore body in future periods. To the extent the benefit is the extraction of ore, the stripping costs are recognized as an inventory cost.

To the extent the benefit is improved access to the ore body or component of ore body in future periods, the stripping costs are capitalized as mine properties in property, plant and equipment, if the following criteria are met:

- It is probable that the future economic benefit (improved access to ore) will flow to the Group;
- The ore body or component of the ore body for which access has been improved can be identified; and
- The costs relating to the stripping activity can be measured reliably.

Production stripping costs are allocated between the inventory produced and the mine properties capitalized using a life-of-component waste to ore strip ratio. When the current strip ratio is greater than the life-of-component ratio, a portion of the stripping costs is capitalized to the existing mine properties.

The development and production stripping assets are depreciated using the units of production method based on the proven and probable mineral reserves of the relevant ore body or component of ore body.

Translation of Foreign Currencies

Our reporting currency is the U.S. dollar. The functional currency of our main operating subsidiaries and offshore holding companies is the U.S. dollar and the functional currency of our remaining subsidiaries is primarily the Togrog.

Foreign currency transactions during the year are translated at the foreign exchange rates as at the transaction dates. Monetary assets and liabilities denominated in foreign currencies are translated at the foreign exchange rates as at the end of the reporting period. Exchange gains and losses are recognized in profit or loss.

Non-monetary assets and liabilities that are measured in terms of historical cost in a foreign currency are translated using the foreign exchange rates as at the transaction dates.

The results of subsidiaries using a functional currency other than the U.S. dollar are translated into U.S. dollars at the exchange rates approximating the foreign exchange rates as at the dates of the transactions. Statement of financial position items are translated into U.S. dollars at the foreign exchange rates as at the end of the reporting period. The resulting exchange difference is recognized directly in a separate component of equity.

SUMMARY CONSOLIDATED STATEMENT OF PROFIT OR LOSS AND OTHER COMPREHENSIVE INCOME DATA

	Year ended December 31,			Six months ended June 30,	
	2020	**2021**	**2022**	**2022**	**2023**
				(Unaudited)	*(Unaudited)*
	(in US$'000, except otherwise indicated)				
Revenue	417,424	184,069	546,248	106,539	516,701
Cost of revenue	(288,848)	(161,490)	(451,131)	(126,425)	(291,597)
Gross profit/(loss)	128,576	22,579	95,117	(19,886)	225,104
Other cost	(2,155)	(3,422)	(1,328)	–	–
Other net income	2,418	3,382	5,509	(2,306)	3,095
Selling and distribution costs	(27,645)	(9,625)	(2,434)	(647)	(2,107)
General and administrative expenses	(19,773)	(24,242)	(24,775)	(7,352)	(14,049)
Profit/(loss) from operations	81,421	(11,328)	72,089	(30,191)	212,043
Finance income	5,053	54	6,286	2,671	616
Finance costs	(46,191)	(48,980)	(47,081)	(27,250)	(26,360)
Net finance costs	(41,138)	(48,926)	(40,795)	(24,579)	(25,744)
Gain from repurchase of 2024 Notes	–	–	23,144	–	3,970
Share of (losses)/profit of associates	(77)	(196)	286	22	307
Share of losses of joint ventures	(5)	(1)	(16)	(10)	–
Profit/(loss) before taxation	40,201	(60,451)	54,708	(54,758)	190,576
Income tax	(10,596)	5,013	4,183	22,446	(54,123)
Profit/(loss) for the year/period	29,605	(55,438)	58,891	(32,312)	136,453
Attributable to					
Equity shareholders of the Company	28,940	(55,238)	59,177	(32,361)	136,635
Non-controlling interests	665	(200)	(286)	49	(182)
Profit/(loss) for the year/period	29,605	(55,438)	58,891	(32,312)	136,453
Basic earnings (loss) per share	2.81 cents	(5.35) cents	5.68 cents	(3.10) cents	13.11 cents
Diluted earnings (loss) per share	2.81 cents	(5.35) cents	5.68 cents	(3.10) cents	13.11 cents
Profit/(Loss) for the year/period	29,605	(55,438)	58,891	(32,312)	136,453
Other comprehensive income for the year/period (after tax and reclassification adjustments)					
Items that may be reclassified subsequently to profit or loss:					
Surplus on revaluation of plants, buildings, and machinery and equipment	–	62,895	–	–	–
Item that may be reclassified subsequently to profit or loss:					
Exchange differences on translation/re-translation	(7,556)	184	(21,726)	(12,004)	21
Other comprehensive income for the year/period	(7,556)	63,079	(21,726)	(12,004)	21
Total comprehensive income for the year/period	22,049	7,641	37,165	(44,316)	136,474
Attributable to:					
Equity shareholders of the Company	21,384	7,841	38,306	(44,365)	136,721
Non-controlling interests	665	(200)	(1,141)	49	(247)
Total comprehensive income for the year/period	22,049	7,641	37,165	(44,316)	136,474

DESCRIPTION OF SELECTED STATEMENT OF PROFIT OR LOSS LINE ITEMS

Revenue

We are principally engaged in the mining, processing, transportation and sale of coking coal. Revenue represents the sales value of goods sold to customers, exclusive of VAT or sales taxes and after deduction of any trade discounts and volume rebates.

We generated total revenue of US$417.4 million, US$184.1 million, US$546.2 million, US$106.5 million and US$516.7 million, respectively, for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023. In 2020, 2021, and 2022 and the six months ended June 30, 2022 and 2023, revenue amounting to US$6.3 million, US$41.2 million, US$382.4 million, US$69.4 million and US$81.5 million, equivalent to 1.5%, 22.4%, 70.0%, 65.1% and 15.8% of the total revenue, respectively, were from sales on DAP GM terms, of which nil, US$41.2 million, US$380.5 million, US$67.9 million and US$81.5 million, respectively, were from sales of HCC, and nil, nil, US$1.9 million, US$1.5 million and nil, respectively, were generated from sales of SSCC. As a result of our strategy to penetrate the inland China market implemented since 2014, we generated 18.7% of the total revenue from sales under FOT term amounting to US$96.7 million in the first half of 2023, 12.6% of the total revenue from sales under FOT term amounting to US$13.5 million in the first half of 2022, 16.9% of the total revenue from sales under FOT term amounting to US$92.5 million in 2022, 69.1% of the total revenue from sales under FOT term amounting to US$127.2 million in 2021, and 97.2% of the total revenue from sales under FOT and C&F terms amounting to US$394.2 million and US$11.4 million, respectively, in 2020. The total HCC revenue including inland China sales was US$378.6 million, US$174.2 million, US$508.4 million, US$94.2 million and US$450.2 million, representing 90.7%, 94.6%, 93.1%, 88.5% and 87.1% of the total revenue for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, respectively.

For the year ended December 31, 2020, we sold our HCC at an average selling price of US$120.6 per tonne and US$154.8 per tonne, respectively, under FOT GM and C&F terms. For the year ended December 31, 2021, we sold our HCC at an average selling price of US$146.2 per tonne, US$168.9 per tonne and US$141.4 per tonne, respectively, under FOT GM, DAP GM and EXW UHG terms. For the year ended December 31, 2022, we sold our HCC at an average selling price of US$169.1 per tonne, US$144.9 per tonne, US$156.8 per tonne and US$127.0 per tonne, respectively, under FOT GM, DAP GM, FCA TKH and EXW UHG terms. For the six months ended June 30, 2022, we sold our HCC at an average selling price of US$161.7 per tonne, US$144.3 per tonne and US$126.1 per tonne, respectively, under FOT GM, DAP GM and EXW UHG terms. For the six months ended June 30, 2023, we sold our HCC at an average selling price of US$167.9 per tonne, US$149.5 per tonne, US$165.7 per tonne and US$118.5 per tonne, respectively, under FOT GM, DAP GM, FCA TKH and EXW UHG terms.

Our total sales volume for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023 reached approximately 4.2 Mt, 1.6 Mt, 4.7 Mt, 0.9 Mt and 4.9 Mt of coal products, respectively. Total sales volume for HCC for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023 reached approximately 3.1 Mt, 1.2 Mt, 3.5 Mt, 0.7 Mt and 2.8 Mt, respectively.

Cost of Revenue

Our cost of revenue consists primarily of mining costs, processing and handling costs, transportation and logistics costs, and costs related to site administration, stockpile and transportation loss, and governmental royalties and fees.

The cost of revenue decreased by 44.1% from US$288.8 million in 2020 to US$161.5 million in 2021. The cost of revenue increased by 179.4% to US$451.1 million in 2022 as a result of increased sales volume. The cost of revenue increased by 130.7% from US$126.4 million in the first half of 2022 to US$291.6 million in the first half of 2023 as a result of an increase in sales volume.

The following table presents, for the periods indicated, individual costs of revenue in terms of amount and percentages of our total cost of revenue:

	Year ended December 31,						Six months ended June 30,			
	2020		2021		2022		2022		2023	
							(Unaudited)		*(Unaudited)*	
	US$'000	*%*	*US$'000*	*%*	*US$'000*	*%*	*US$'000*	*%*	*US$'000*	*%*
Cost of revenue	288,848	100.0	161,490	100.0	451,131	100.0	126,425	100.0	291,597	100.0
Idling costs	7,633	2.6	20,021	12.4	24,445	5.4	24,379	19.3	–	–
Cost of revenue excluding idling costs and inventory provision	281,215	97.4	141,469	87.6	426,686	94.6	102,046	80.7	291,597	100.0
Mining cost	108,333	37.5	42,475	26.3	147,846	32.8	26,942	21.3	124,285	42.6
Variable cost	55,734	19.3	20,700	12.8	74,045	16.4	13,615	10.8	78,429	26.9
Fixed cost	32,765	11.3	12,771	7.9	46,707	10.4	8,016	6.3	19,612	6.7
Depreciation and amortization	19,834	6.9	9,004	5.6	27,094	6.0	5,311	4.2	26,244	9.0
Processing cost	35,430	12.3	11,950	7.4	43,734	9.7	7,332	5.8	29,472	10.1
Variable cost	12,302	4.3	3,464	2.1	16,182	3.6	1,765	1.4	12,910	4.4
Fixed cost	4,233	1.5	1,703	1.1	7,172	1.6	1,459	1.2	5,586	1.9
Depreciation and amortization	18,895	6.5	6,783	4.2	20,380	4.5	4,108	3.2	10,976	3.8
Handling cost	9,862	3.4	4,734	2.9	9,960	2.2	1,592	1.3	8,336	2.9
Transportation costs	67,587	23.4	43,138	26.7	100,942	22.4	31,454	24.9	41,831	14.3
Logistics cost	5,572	1.9	3,129	1.9	9,589	2.1	3,664	2.9	5,959	2.0
Variable cost	3,331	1.2	1,596	1.0	5,633	1.2	2,114	1.7	3,109	1.1
Fixed cost	1,868	0.6	1,166	0.7	2,326	0.5	734	0.6	2,100	0.7
Depreciation and amortization	373	0.1	367	0.2	1,630	0.4	816	0.6	750	0.3
Site administration cost	19,461	6.7	10,837	6.7	26,373	5.8	6,157	4.9	12,828	4.4
Transportation and stockpile loss	8,293	2.9	2,269	1.4	479	0.1	856	0.7	6,921	2.4
Royalties and fees	26,677	9.2	22,937	14.2	87,763	19.5	24,049	19.0	61,965	21.3
Royalty	21,849	7.6	21,293	13.2	84,047	18.6	23,115	18.3	59,441	20.4
Air pollution fee	2,669	0.9	984	0.6	1,833	0.4	568	0.4	459	0.2
Customs fee	2,159	0.7	660	0.4	1,883	0.4	366	0.3	2,065	0.7

Idling Cost

Idling costs primarily consist of fixed charges paid to the mining contractor and depreciation expenses relating to idled plants and equipment during the suspension of operations. In accordance with our policy to conserve cash outflow during times when the average selling price of coal is trending lower in the market, we temporarily suspended operations at certain times during the year for conservation and efficiency purposes.

Mining Cost

Mining cost consists of costs associated with overburden and topsoil removal and ROM coal extraction, including the costs related to mining staff and equipment, together with base and performance fees paid to the mining contractor, blasting contractor fees and costs paid to fuel suppliers. The mining contractor's base fee is indexed to the market coal price and is charged based on the total number of fleets utilized under the mining contract.

Unit mining cost, excluding idling cost, was US$14.6 per ROM tonne (comprising cash cost of US$11.9 per ROM tonne and non-cash cost of US$2.7 per ROM tonne), US$16.7 per ROM tonne (comprising cash cost of US$13.2 per ROM tonne and non-cash cost of US$3.5 per ROM tonne), US$17.8 per ROM tonne (comprising cash cost of US$14.5 per ROM tonne and non-cash cost of US$3.3 per ROM tonne), US$16.8 per ROM tonne (comprising cash cost of US$13.5 per ROM tonne and non-cash cost of US$3.3 per ROM tonne) and US$17.5 per ROM tonne (comprising cash cost of US$13.8 per ROM tonne and non-cash cost of US$3.7 per ROM tonne) for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, respectively.

Processing Cost

Processing cost primarily includes the costs associated with the operations of CHPP, including power and water costs.

Unit processing cost, excluding idling cost, calculated per ROM coal in-feed tonne was US$4.8 (comprising cash cost of US$2.2 and non-cash cost of US$2.64), US$4.8 (comprising cash cost of US$2.1 and non-cash cost of US$2.7), US$5.2 (comprising cash cost of US$2.7 and non-cash cost of US$2.5), US$4.6 (comprising cash cost of US$2.0 and non-cash cost of US$2.6) and US$4.3 (comprising cash cost of US$2.7 and non-cash cost of US$1.6) for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, respectively.

Handling Cost

Handling cost is related to feeding ROM coal from ROM coal stockpiles to the CHPP, raw and thermal coal handling, and the removal of coarse reject (primarily rock and sediment separated from coal) after coal processing.

Transportation Cost

Transportation cost includes cost related to the transportation of ROM coal from the BN mine to the CHPP located at the UHG mine and the transportation of coal products from UHG to TKH and GM, including fees paid for the usage of the UHG-GS paved road.

Our unit transportation costs increased from US$17.2 per tonne in 2020 to US$37.8 per tonne in 2021 and decreased to US$26.9 per tonne in 2022. Our unit transportation cost was US$13.1 per tonne for the six months ended June 30, 2023, compared to US$40.2 per tonne for the six months ended June 30, 2022. The total transportation costs, including fees paid for the usage of the UHG-GS paved road, increased from US$31.5 million for the six months ended June 30, 2022 to US$41.8 million for the six months ended June 30, 2023. Since early 2020 due to the COVID-19 pandemic, the prolonged and tightened control procedure of the customs reduced the number of trucks crossing the border. This situation not only limited the Group's sales volume but also increased our transportation cost. In addition, the improved coal market environment increased the demand for coal transport, while the bottleneck at the border extended turnaround time required for coal export. As a result, the cost of third party contractors increased, increasing our total transportation costs. The border crossing throughput started to improve from mid-2022 resulting in decrease in transportation cost in 2022.

Logistics Cost

Logistics cost is mainly related to cost associated with loading and unloading of coal products at UHG, TKH and GST. Our logistics cost was US$5.6 million in 2020, US$3.1 million in 2021, US$9.6 million in 2022, US$3.7 million in the six months ended June 30, 2022 and US$6.0 million in the six months ended June 30, 2023.

Site Administration Costs

Site administration costs are primarily related to site support facilities, such as overall supervision and joint management of the Group's mining, processing, transportation and logistics operations. Our site administration cost decreased from US$19.5 million in 2020 to US$10.8 million in 2021 and further increased to US$26.4 million in 2022 due to higher sales volume. For the six months ended June 30, 2022, our site administration cost was US$6.2 million and increased to US$12.8 million in the six months ended June 30, 2023 due to an increase in operations while mining and processing operations were mostly suspended during the six months ended June 30, 2022.

Royalties and Fees

Governmental royalties and fees are related to royalties, air pollution fees and custom fees paid according to the applicable laws and regulations in Mongolia. The progressive royalty rate is applied in the range of 5% to 8% for exported processed coal products and 5% to 10% for exported raw coal products based on monthly reference price determined by the relevant governmental authorities of Mongolia, which increased rapidly following the market price increase during 2021. Historically, the Group's average selling prices and reference prices were more closely aligned and effective royalty rates have been stable between 5% to 6%. Since the second half of 2021, reference prices have increased substantially while delivery period of coal products was prolonged as a result of border throughput limitations and arbitrary reference prices sources set by the authorities, which led to a substantial difference between average selling price of the Group and the reference prices. As a result, our effective royalty average rate increased for the years ended December 31, 2020, 2021 and 2022 and for the six months ended June 30, 2022 and 2023 and was approximately 6.0%, 11.6%,15.4%, 21.7% and 11.5%, respectively, for coal exported from Mongolia based on customs clearance documentation.

Gross Profit/(Loss)

Gross profit/(loss) equals revenue less cost of revenue.

Selling and Distribution Costs

Our selling and distribution costs are associated with the inland China sales activities and include expenses relating to fees and charges incurred for importing coal into China, logistics, transportation, governmental fees and charges and fixed agent fees. The selling and distribution cost is linked to sales volume realized under FOT GM and C&F sales terms.

General and Administrative Expenses

Our general and administrative expenses relate primarily to staff costs, share option expenses, consultancy and professional fees, donations, depreciation and amortization of office equipment and other expenses. The general and administrative expenses were US$19.8 million, US$24.2 million, US$24.8 million, US$7.4 million and US$14.0 million for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, respectively.

Net Finance Costs

Net finance costs primarily consist of (i) accrued interest expense on 2022 Notes and 2024 Notes (ii) amortization of the difference between the fair value and the principal amounts due on the 2022 Notes and 2024 Notes using the effective interest rate method, and (iii) foreign exchange net gain/loss.

Income Tax Expenses/Income

We are subject to income tax on an entity basis on profit arising in or derived from the tax jurisdictions in which we or our subsidiaries operate. The general income tax rate applicable to business entities with Mongolian source income is 10% on the first MNT6 billion of taxable income and 25% on amounts in excess thereof.

Subsidiary Financial Performance

For the six months ended June 30, 2023, the consolidated revenue and net loss for Tianjin Zhengcheng Import and Export Trade Co., Ltd (China) was US$44.2 million and US$(0.5) million, respectively. As of June 30, 2023, consolidated net assets for Tianjin Zhengcheng Import and Export Trade Co., Ltd (China) was US$0.5 million.

For the year ended December 31, 2022, the consolidated revenue and net loss for Tianjin Zhengcheng Import and Export Trade Co., Ltd (China) was US$48.9 million and US$2.3 million, respectively. As of December 31, 2022, consolidated net assets for Tianjin Zhengcheng Import and Export Trade Co., Ltd (China) was US$0.9 million.

RESULTS OF OPERATIONS AND FINANCIAL CONDITION

The Six Months ended June 30, 2023 Compared to the Six Months ended June 30, 2022

Revenue. Our revenue increased significantly from US$106.5 million for the six months ended June 30, 2022 to US$516.7 million for the six months ended June 30, 2023. The increase in revenue was primarily attributable to increase in sales volume. Our HCC sales volume increased from 0.7 Mt for the six months ended June 30, 2022 to 2.8 Mt for the six months ended June 30, 2023. Our average selling price of HCC was US$141.3 per tonne for the six months ended June 30, 2022 compared to US$161.8 per tonne for the six months ended June 30, 2023.

Cost of Revenue. Our cost of revenue increased by 130.7% from US$126.4 million for the six months ended June 30, 2022 to US$291.6 million for the six months ended June 30, 2023 as a result of an increase in sales volume.

Our mining costs increased significantly from US$26.9 million for the six months ended June 30, 2022 to US$124.3 million for the six months ended June 30, 2023, in line with the increase in our sales volume. Our processing costs increased significantly from US$7.3 million for the six months ended June 30, 2022 to US$29.5 million for the six months ended June 30, 2023, also in line with the increase in our sales volume. Our transportation costs increased from US$31.5 million for the six months ended June 30, 2022 to US$41.8 million for the six months ended June 30, 2023, primarily due to an increase in sales volume.

Gross Profit. As a result of the foregoing, our gross profit increased significantly from US$19.9 million loss for the six months ended June 30, 2022 to US$225.1 million profit for the six months ended June 30, 2023.

General and Administrative Expenses. Our general and administrative expenses increased by 89.2% from US$7.4 million for the six months ended June 30, 2022 to US$14.0 million for the six months ended June 30, 2023.

Net Finance Costs. Our net finance cost increased by 4.5% from US$24.6 million for the six months ended June 30, 2022 to US$25.7 million for the six months ended June 30, 2023. The increase in net finance cost was primarily due to foreign exchange net loss arsing from the Renminbi depreciation against the U.S. dollar.

Income Tax Expenses. We did not have income tax expense in the first half of 2022, but had income tax credit of US$22.4 million for the six months ended June 30, 2022. We had income tax expense of US$54.1 million for the six months ended June 30, 2023 as a result of higher taxable income, resulting from higher sales volume and average selling price recorded during the six months ended June 30, 2023.

Profit/(loss) for the Year. Our profit attributable to equity shareholders of the Company increased from loss of US$32.4 million for the six months ended June 30, 2022 to profit of US$136.6 million for the six months ended June 30, 2023 as result of higher sales volume.

2022 Compared to 2021

Revenue. Our revenue increased significantly from US$184.1 million in 2021 to US$546.2 million in 2022. The increase in revenue was primarily attributable to increased sales volume. Our HCC sales volume increased significantly from 1.2 Mt in 2021 to 3.5 Mt in 2022. Our average selling price of HCC was US$150.6 per tonne in 2021 compared to US$147.1 per tonne in 2022.

Cost of Revenue. Our cost of revenue increased by 179.4% from US$161.5 million in 2021 to US$451.1 million in 2022 as a result of higher sales volume, higher cost of supplies and consumables and increased royalty fees.

Our mining costs increased significantly from US$42.5 million in 2021 to US$147.8 million in 2022, in line with the increase in our sales volume. Our processing costs increased significantly from US$12.0 million in 2021 to US$43.7 million in 2022, also in line with the increase in our sales volume. Our transportation costs increased significantly from US$43.1 million in 2021 to US$100.9 million in 2022, primarily due to increases sales volume.

Gross Profit. As a result of the foregoing, our gross profit increased significantly from US$22.6 million in 2021 to US$95.1 million in 2022.

General and Administrative Expenses. Our general and administrative expenses increased by 2.5% from US$24.2 million in 2021 to US$24.8 million in 2022.

Net Finance Costs. Our net finance cost decreased by 16.6% from US$48.9 million in 2021 to US$40.8 million in 2022. The decrease in net finance cost for 2022 was primarily due to foreign exchange net gain recorded in relation to RMB and Togrog depreciation against USD during 2022 and change in fair value of the derivative component of the 2022 Notes.

Income Tax Expenses. We did not have income tax expense in 2021 and 2022, but had income tax credit of US$5.0 million in 2021 which decreased by 16.0% to US$4.2 million in 2022 as a result of recognized deferred tax asset.

Profit/(loss) for the Year. Our profit attributable to equity shareholders of the Company increased from loss of US$55.2 million in 2021 to profit of US$59.2 million in 2022 as result of higher sales volume achieved in 2022.

2021 Compared to 2020

Revenue. Our revenue decreased by 55.9% from US$417.4 million in 2020 to US$184.1 million in 2021. The decrease was primarily attributable to the decrease in our sales volume resulting from the reduced cross border throughput of the GS-GM checkpoint as a result of the significant impact of the COVID-19 pandemic. Our HCC sales volume decreased by 62.9% from 3.1 Mt in 2020 to 1.2 Mt in 2021. Our average selling price of HCC increased by 24.1% from US$121.4 per tonne in 2020 to US$150.6 per tonne in 2021.

Cost of Revenue. Our cost of revenue decreased by 44.1% from US$288.8 million in 2020 to US$161.5 million in 2021, due to the lower sales volume. Our mining costs decreased by 60.8% from US$108.3 million in 2020 to US$42.5 million in 2021, mostly in line with an decrease in sales volume. Our processing costs decreased by 66.3% from US$35.4 million in 2020 to US$12.0 million in 2021, in line with the decrease in sales volume. Our transportation costs decreased by 36.2% from US$67.6 million in 2020 to US$43.1 million in 2021, primarily as a result of an decrease in sales volume. The decrease in transportation cost was not as significant as other costs because unit transportation costs increased when cross border throughput decreased.

Gross Profit. As a result of the foregoing, our gross profit was US$22.6 million in 2021, representing a decrease of 82.4% from gross profit of US$128.6 million in 2020.

General and Administrative Expenses. Our general and administrative expenses increased by 22.6% from US$19.8 million in 2020 to US$24.2 million in 2021, mainly driven by 0.6 Mt of middlings supplied free of charge to Tavan Tolgoi Tulsh LLC, a state-owned entity designated for manufacturing and distributing coal briquettes to Ulaanbaatar residents under the Government's program to reduce air pollution and improve air quality, as part of the Group's social contribution during 2021.

Net Finance Costs. Our net finance costs increased by 18.9% from US$41.1 million in 2020 to US$48.9 million in 2021. The increase in net finance costs was mainly due to foreign exchange net loss recorded in relation to RMB appreciation against the USD, compared to the prior reporting year.

Income Tax Expenses. We did not have income tax expense for the year ended December 31, 2021 due to net loss incurred, but had income tax credit of US$5.0 million as a result of recognized deferred tax asset. Whereas we incurred income tax expense of US$10.6 million for the year ended December 31, 2020.

(Loss)/profit for the Year. Our loss attributable to equity shareholders of the Company for the year ended December 31, 2021 amounted to US$55.2 million, compared to the profit attributable to equity shareholders of US$28.9 million for the year ended December 31, 2020. The major contributing factor of our net loss position was the lower sales volume and royalty recorded in 2021 due to limited border throughput impacted by the increase of COVID-19 spread in Mongolia.

LIQUIDITY AND CAPITAL RESOURCES

For the years ended December 31, 2020, 2021 and 2022 and for the six months ended June 30, 2022 and 2023, our cash needs had been primarily related to working capital requirements. Our cash resources were funded mainly by cash generated from coal sales.

We regularly monitor current and expected liquidity requirements and compliance with debt covenants to ensure that we maintain sufficient reserves of cash and adequate committed lines of funding from major financial institutions to meet our liquidity requirements in the short and long term.

As at December 31, 2020, our net current assets were US$67.2 million. As at December 31, 2021 and 2022, our net current liabilities were US$50.0 million and US$68.6 million, respectively, which were primarily attributable to the significant adverse impact of COVID-19 on our operating environment and business performance during 2021. As at June 30 2023, our net current liabilities were US$316.4 million, which were primarily attributable to the 2024 Notes with carrying amount of US$341.6 million being classified to current liabilities from non-current liabilities. For more details related to risks associated with our liquidity and capital resources, see "Risk Factors – Risks Relating to our Business and Industry – We have net current liabilities and are dependent on future cash flows generated from our business and obtaining additional financing to support our business operations". We completed a restructuring in May 2017 involving our 2017 Notes, a tender offer and consent solicitation for our 2022 Notes in May 2019 and a tender offer for our 2024 Notes in December 2022. See "Our Corporate Structure and History".

The following table sets forth certain information regarding our consolidated cash flows for the periods indicated:

	Year ended December 31,			Six months ended June 30,	
	2020	**2021**	**2022**	**2022**	**2023**
				(Unaudited)	*(Unaudited)*
			(US$'000)		
Net cash generated from operating activities	108,687	84,911	233,779	80,332	247,810
Net cash used in investing activities	(70,794)	(56,763)	(87,916)	(36,116)	(52,239)
Net cash used in financing activities	(41,650)	(41,664)	(103,874)	(17,694)	(46,241)
Net increase/(decrease) in cash and cash equivalents	(3,757)	(13,516)	41,989	26,522	149,330
Cash and cash equivalents at beginning of the year/period	40,619	38,904	25,937	25,937	64,695
Effect of foreign exchange rate changes	2,042	549	(3,231)	(1,620)	(5,806)
Cash and cash equivalents at end of the year/period	38,904	25,937	64,695	50,839	208,219

Cash Flows from Operating Activities

We generated net cash from operating activities of US$108.7 million in 2020. We generated net cash from operating activities of US$85.0 million in 2021, decreased primarily due to lower sales volume. We generated net cash from operating activities of US$233.8 million in 2022, primarily due to the increase in sales volume. We generated net cash from operating activities of US$80.3 million for the six months ended June 30, 2022 and US$247.8 million for the six months ended June 30, 2023, primarily due to an increase in sales volume.

The table below provides details on our cash flows from operating activities for the periods indicated:

	Year ended December 31,			Six months ended June 30,	
	2020	**2021**	**2022**	**2022**	**2023**
				(Unaudited)	*(Unaudited)*
			(US$'000)		
Profit/(loss) before taxation	40,201	(60,451)	54,708	(54,758)	190,576
Adjustments for:					
Depreciation and amortization	61,199	49,704	61,708	22,954	46,026
Share of losses/(profit) of associates and joint venture	82	197	(270)	(12)	(307)
Loss/(gain) on disposal of property, plant, equipment and assets held for sale	1	(29)	(6)	(6)	–
Net finance costs	41,138	48,926	40,795	24,579	25,744
Gain from repurchase of 2024 Notes	–	–	(23,144)	–	(3,970)
Equity-settled share-based payment expenses	136	34	–	(1,453)	–
Employee benefit accrued	(340)	(321)	–	–	(61)
Changes in working capital:					
Decrease/(increase) in inventories	3,257	(53,395)	56,869	13,167	3,622
Decrease/(increase) in trade and other receivables	6,722	(5,165)	7,363	28,580	(14,829)
Increase/(decrease) in trade and other payables and contract liabilities	(64,340)	148,678	40,353	22,681	(8,316)
(Increase)/decrease in other non-current assets	370	(3,265)	(3,903)	(4,078)	20,435
(Decrease)/increase in other non-current liabilities	38,316	(39,029)	–	28,771	–
Cash generated from operations	126,742	85,884	234,473	80,425	258,920
Income tax paid	(18,055)	(973)	(694)	(93)	(11,110)
Net cash generated from operating activities	108,687	84,911	233,779	80,332	247,810

Cash Flows from Investing Activities

In 2020, net cash used in investing activities was US$70.8 million, which consisted primarily of US$63.2 million incurred for payments of deferred stripping activity, US$8.0 million used for payments of payables for purchase of property, plant and equipment sale, US$0.3 million generated from property, plant and equipment and US$0.1 million generated from interest received.

Net cash used in investing activities was US$56.8 million in 2021, which consisted primarily of US$44.5 million incurred for payments of deferred stripping activity, US$12.3 million used for acquisition of property, plant and equipment and other assets and US$0.04 million generated from sale of property, plant and equipment.

Net cash used in investing activities was US$87.9 million in 2022, which consisted primarily of (i) US$76.7 million incurred for payments of deferred stripping activity, of which US$30.0 million were payables incurred in previous years, (ii) US$11.3 million used for acquisition of property, plant and equipment and other assets, and (iii) US$0.1 million generated from interest income.

Net cash used in investing activities was US$36.1 million for the six months ended June 30, 2022, which consisted primarily of (i) US$27.5 million incurred for payments of deferred stripping activity, (ii) US$9.1 million used for acquisition of property, plant and equipment and other assets, and (iii) US$0.01 million generated from interest income.

Net cash used in investing activities was US$52.2 million for the six months ended June 30, 2023, which consisted primarily of (i) US$33.3 million incurred for payments of deferred stripping activity, (ii) US$9.1 million used for acquisition of property, plant and equipment and other assets, and (iii) US$0.2 million generated from interest income.

The table below provides details on our cash flows from investing activities for the periods indicated:

INVESTING CASH FLOW

	Year ended December 31,			Six months ended June 30,	
	2020	**2021**	**2022**	**2022**	**2023**
				(Unaudited)	*(Unaudited)*
			(US$'000)		
Payments for acquisition of property, plant and equipment and construction in progress	(68,419)	(48,130)	(80,379)	(28,465)	(42,445)
Proceeds from disposals of property, plant and equipment	291	37	6	–	–
Payments for acquisition of intangible asset	–	(2,331)	(715)	(710)	(6)
Acquisition of subsidiary, net of cash acquired	(2,776)	(5,557)	–	–	(10,000)
Payments for acquisition of an associate	–	(785)	(6,951)	(6,951)	–
Interest received	110	3	123	10	212
Net cash used in investing activities	(70,794)	(56,763)	(87,916)	(36,116)	(52,239)

Cash Flows from Financing Activities

In 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, net cash used in financing activities was US$41.7 million, US$41.7 million, US$103.9 million, US$17.7 million and US$46.2 million, respectively, primarily as a result of interest paid under the 2022 Notes and 2024 Notes.

The table below provides details on our cash flows from financing activities for the periods indicated:

FINANCING CASH FLOW

	Year ended December 31,			Six months ended June 30,	
	2020	**2021**	**2022**	**2022**	**2023**
				(Unaudited)	*(Unaudited)*
			(US$'000)		
Financing activities					
Capital element of lease rentals paid	(140)	(141)	(130)	(72)	(102)
Repayment of the 2022 Notes	–	–	(14,912)	–	–
Repurchase of the 2024 Notes	–	–	(39,671)	–	(28,978)
Repurchase of Perpetual Securities	–	–	(9,991)	–	–
Interest element of lease rentals paid	(6)	(5)	(6)	(1)	(5)
Proceeds from shares issued under share option scheme	–	–	3,325	3,325	–
Interest paid	(41,504)	(41,518)	(42,489)	(20,946)	(17,156)
Net cash used in financing activities	(41,650)	(41,664)	(103,874)	(17,694)	(46,241)

TAXATION

Income tax expenses for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023 can be reconciled to profit before income tax as follows:

	Year ended December 31,			Six months ended June 30,	
	2020	**2021**	**2022**	**2022**	**2023**
				(Unaudited)	*(Unaudited)*
			(US$'000)		
Profit/(loss) before taxation	40,201	(60,451)	54,708	(54,758)	190,576
Notional tax on profit/(loss) before taxation[(1)(2)]	8,301	(12,141)	14,335	(24,239)	48,048
Tax effect of non-deductible items[(3)]	4,052	6,732	1,743	4,765	8,039
Tax effect of non-taxable items[(3)]	(2,040)	(334)	(20,678)	(3,037)	(2,167)
Prior year tax loss utilized	–	–	(163)	–	–
Tax loss not recognized	283	730	695	180	203
Over-provision in respect of prior years	–	–	(115)	(115)	–
Actual tax expenses/credit	10,596	(5,013)	(4,183)	(22,446)	54,123

Notes:

(1) Pursuant to the Mongolian Enterprise Income Tax, we paid tax at a rate of 10% for the first MNT6 billion taxable income and 25% of the remaining taxable income for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023.

(2) We are not subject to any income tax in the Cayman Islands. We are not subject to Hong Kong, Luxembourg and Singapore profits tax as we had no assessable income arising in or derived from Hong Kong, Luxembourg and Singapore during the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023.

(3) Non-deductible and non-taxable items mainly include net unrealized exchange gain or loss, other non-deductible expenses and non-taxable income pursuant to the income tax rules and regulations of Mongolia and other related tax source regions during the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023.

INDEBTEDNESS

The following table sets forth our borrowings as of the dates indicated and the maturity profile of such borrowings:

	As at December 31,			As at June 30,
	2020	2021	2022	2023
		(US$'000)		
Indebtedness[(1)]				
2022 Notes	16,882	17,885	–	–
2024 Notes	432,736	434,716	373,756	341,607
Total	449,618	452,601	373,756	341,607

Note:

(1) Indebtedness shown on above table represents the carrying value of indebtedness as at the end of each reporting date. The face values of indebtedness outstanding as at June 30, 2023 are stated below.

The 2022 Notes bore interest ranging from 5% to 8% per annum based on the benchmark coal price index, payable semi-annually, and were due on September 30, 2022. The 2022 Notes were fully repaid on September 30, 2022 and the outstanding principal amount was nil as at June 30, 2023.

The 2024 Notes bear an interest rate of 9.25% per annum. The 2024 Notes will mature in April 2024, unless earlier redeemed. In 2022, we repurchased an aggregate principal amount of US$63,591,000 of 2024 Notes. During the six months ended June 30, 2023, we repurchased an aggregate principal amount of US$33,160,000 of 2024 Notes. As of June 30, 2023, the outstanding principal amount of 2024 Notes was US$343,249,000. See note 19 to our unaudited consolidated financial information as of and for the six months ended June 30, 2023 and 2022, respectively, included elsewhere in this Offering Memorandum. As of June 30, 2023, we had US$343.2 million in total indebtedness.

The Perpetual Securities will bear an interest rate of 10% from April 1, 2023 and are subject to 1% step-up annually starting in April 1, 2024, with total rate capped at 15%. As at June 30, 2023, the outstanding principal amount of the Perpetual Securities was US$142.5 million with a carrying amount of US$55.5 million.

For a detailed description on the Company's indebtedness, see "Description of Other Indebtedness and Perpetual Securities".

CAPITAL COMMITMENTS AND CAPITAL EXPENDITURES

The following table sets forth our capital commitments outstanding at respective dates not provided for in the financial statements for the periods indicated:

	As of December 31,			As of June 30,
	2020	2021	2022	2023
		(US$'000)		
Contracted for	1,626	763	–	6,793
Authorized but not contracted for	–	–	–	–
Total	1,626	763	–	6,793

The following table sets forth our historical capital expenditures for the periods indicated:

	Year ended December 31,			Six months ended June 30,	
	2020	**2021**	**2022**	**2022**	**2023**
			(Actual)		
			(US$'000)		
Capital Expenditures:					
CHPP	2,232	795	155	155	243
Investment in associate company	–	785	6,951	6,951	–
Others	5,748	10,764	4,189	1,467	8,821
Total	7,980	12,344	11,295	8,573	9,064

Our maintenance capital expenditure is expected to be approximately US$5 to US$10 million per year. We will reassess our capital expenditures from time to time in light of the then current circumstances, including without limitation our operational requirements and our financial capacity, and there can be no assurance that our actual capital expenditure will correspond to our forecast.

CONTINGENT LIABILITIES

We acquired our BN mining license in 2011. If the specified semi-annual ROM production exceeds 5.0 Mt, the consideration is subject to adjustment of royalty provision contained therein and we may be required to make additional payments. We consider the probability of such royalty provision very low as the Company has the sole authority on production volume. We solely make the decision on production volume of BN mine. This arrangement is effective during the life-of-mine ("LOM") of BN mine. See "Risk Factors – Risks Relating to our Business and Industry – We may have to make additional payments under the acquisition agreement for our BN mining license".

QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

We are, in the normal course of business, exposed to market risks relating primarily to credit risk, foreign currency exchange risk, interest rate risk, liquidity risk and commodity price risk.

Credit Risk

Our credit risk is primarily attributable to cash at bank and our trade and other receivables. We monitor the exposures to these credit risks on an ongoing basis. We have certain concentration credit risk as two customers accounted for 100% and 100% of our total trade receivables as of June 30, 2023 and December 31, 2022, respectively. See "Risk Factors – Our dependence on our major customers may cause significant fluctuations or declines in our revenues" and note 30(b) to our financial statements included elsewhere in this Offering Memorandum.

As at June 30, 2023, we had US$11.9 million in trade receivables and US$95.0 million in other receivables. As at December 31, 2022, we had US$4.4 million in trade receivables and US$87.7 million in other receivables. The other receivables of US$87.7 million in 2022 mainly related to US$33.0 million VAT receivables and US$53.8 million of other deposits and prepayments. The remaining amounts are deposits, advances, prepayments and other receivables in the ordinary course of business. We believe that there is no material difficulty in the collection of such receivables. As at December 31, 2021, we had US$14.0 million in trade receivables and US$85.5 million in other receivables. As at December 31, 2020, we had US$11.1 million in trade receivables and US$83.3 million in other receivables.

In accordance with our internal credit policy, we hold periodic credit committee meetings to review, assess and evaluate our overall credit quality and the recoverable amount of each individual trade credit based on quantitative and qualitative analysis. The purpose of the credit policy is to set limits for and monitor the unsecured credit provided to customers at an aggregated Group level and to a single customer, and the maximum contractual term for unsecured limit. We continue to monitor, on an ongoing basis, the exposure, including but not limited to, the current ability to pay, and takes into account information specific to the customer and pertaining to the economic environment in which the customer operates.

Foreign Currency Exchange Risk

Cash and cash equivalents denominated in the currency other than the functional currency of the entity to which they relate as at December 31, 2020, 2021 and 2022 and as at June 30, 2023 amounted to US$29.5 million, US$22.7 million, US$21.5 million and US$153.6 million, respectively. Total borrowings denominated in the currency other than the functional currency of the entity to which they relate amounted to nil as at December 31, 2020, 2021 and 2022 and at June 30, 2023.

We have not entered into any derivative instruments to manage foreign currency exchange fluctuations. However, our management monitors foreign exchange exposure and will consider hedging significant foreign currency exposure should the need arise.

Interest Rate Risk

Our exposure to interest rate risk relates to our outstanding principal amounts of 2024 Notes and 2022 Notes, which totaled US$454.8 million, US$454.9 million, US$376.4 million and US$343.2 million as of December 31, 2020, 2021 and 2022 and as of June 30, 2023, respectively. In addition, an increase in prevailing interest rates would lead to an increase in interest cost on our short-term borrowings when such debt is rolled over. To date, we have not entered into any type of interest rate agreements or derivatives to hedge against interest rate fluctuations. To the extent that we decide to do so in the future, we cannot assure you that any such hedging activities will protect us from fluctuations in interest rates.

Liquidity Risk

Liquidity risk is the risk that we will not be able to settle or manage our obligations associated with financial liabilities.

To manage our liquidity risk, we maintain a balance between continuity of funding and the flexibility through the use of borrowings. Our management closely monitors our liquidity position and expects to have adequate sources of funding to finance our projects and operations. We maintain a suitable level of liquidity to finance daily operations, capital expenditures and repayments of borrowings. We regularly monitor current and expected liquidity requirements to ensure that we maintain sufficient reserves of cash and adequate committed lines of funding from major financial institutions to meet our liquidity requirements in the short and longer terms.

Commodity Price Risk

Our financial performance depends on coal prices. Prices of bulk commodities such as coal are affected by numerous factors such as interest rates, exchange rates, inflation or deflation and global and regional supply and demand. We have not entered into any commodity derivative instruments or futures to hedge against fluctuations of coal prices. Therefore, fluctuations in the prices of coal will have a direct effect on our results of operations.

EFFECTS OF INFLATION

According to the Bank of Mongolia, Mongolia's annual inflation, as measured by the consumer price index, was 2.3% in 2020, 13.4% in 2021, 13.2% in 2022 and 10.6% in the first half of 2023. We do not consider inflation in Mongolia, where all of our operations are located, to have had a material impact on our results of operations.

SEASONALITY

Our site is fully operational throughout the year. The infrastructure and equipment used in our operations are designed to work during most weather conditions. Occasional inclement weather conditions, such as dust storms, have had no significant effect on our operations. However, our transportation and sales volume slow down during the winter period due to scheduled maintenance and the holiday seasons, such as the Mongolian Lunar New Year and the Chinese New Year, during which we usually perform additional scheduled maintenance work.

NEW ACCOUNTING PRONOUNCEMENTS

The International Accounting Standards Board has released revisions to existing and new accounting standards that may have a material impact on our future financial statements. We are currently evaluating the potential impact that the adoption of such accounting standards may have on our financial statements. See Notes 35 and 2 to our financial statements included elsewhere in this Offering Memorandum.

MONGOLIA

Unless otherwise expressly stated, the information set out in this section is derived from publicly available sources. Such information and statistics have been not verified by us or any of the Initial Purchasers or their or our respective affiliates or advisers. The information may not be consistent with other information compiled within or outside Mongolia.

OVERVIEW OF MONGOLIA

As the world's second-largest landlocked country, Mongolia is located in northern Asia bordered by Russia in the north and China in the south, east and west. Its strategic location, providing direct access to markets in neighboring countries, has enabled Mongolia to serve as a transit country with a long history of international trade, dating from the Silk Road in the 13th century to modern export activity. Mongolia is 1,564.9 thousand km^2 large with 8,253 km of borders (4,710 km in the south bordering China and 3,543 km in the north bordering Russia).

Mongolia has a diverse and abundant supply of natural resources, including over 8,000 known occurrences of more than 80 types of mineral deposits identified across 1,170 registered deposits. The IMF identified Mongolia as one of the 29 resource-rich developing countries. One of the Government of Mongolia's main objectives is to use modern technology and international mine planning and exploitation strategies to transform Mongolia's mining industry from extraction and export of unprocessed commodities to the domestic production of value-added mining products.

Mongolia's major exports are copper, coal, crude oil, zinc ore, iron ore, gold and cashmere. Its major export partner is China, with a smaller percentage of exports going to Russia, Canada, Italy, Korea, the United Kingdom, Germany, and the United States. Mongolia's major imports are oil products, machinery and equipment, vehicles, food products, chemical and metallurgical industrial products. Its major import partners are China, Russia, the United States, Japan and Korea, with a small percentage of imports coming from Germany, Ukraine and Singapore.

Mongolia is geographically diverse. It has forested mountain ranges in the north; desert steppe and steppe areas with low mountains in the south; high mountains and glaciers in the west; and vast plains in the east. Mongolia has approximately 3,000 rivers with a combined length of approximately 67,000 km, over 3,000 lakes, 6,900 springs, 190 glaciers and 250 mineral water springs. Situated at an average altitude of 1,500 m above sea level, Mongolia experiences an extreme continental climate with long winters and short summers. Its average annual rainfall measures 200 to 220 millimeters and it has approximately 250 cloudless days each year, earning it the nickname "country of blue sky".

Ulaanbaatar is Mongolia's capital. It is also Mongolia's largest city, home to approximately 69% of the country's population. Ulaanbaatar has the lowest average temperature of any national capital in the world. Mongolia is divided into 21 aimags (provinces) which are further divided into 330 soums (districts). The Government of Mongolia administers its capital city, Ulaanbaatar, as an independent municipality separate from Tov aimag, in which it is located.

As of December 31, 2021, Mongolia had a population of approximately 3.41 million people, of which approximately 1.2 million people were of working age. The average life expectancy at birth was 71.0 years in 2021. Buddhism is the most prominent religion in Mongolia, though a small number of Christians, Muslims and Shamans reside in Mongolia. The official language is Khalkha Mongolian and is spoken by 90% of the population. English is replacing Russian as the most popular foreign language. Many Mongolians also speak Korean, Japanese, Chinese and other Western European languages.

RECENT POLITICAL DEVELOPMENTS

The Mongolian political system is established under the framework of parliamentary democracy. The State Great Hural is the unicameral 76-seat parliament with members elected for a term of four years. It elects the Prime Minister of Mongolia who heads the executive branch and appoints the Cabinet Ministers. The President of Mongolia is the Head of State and the Commander-in-Chief of Mongolia's armed forces with limited executive powers. Despite Mongolia having a parliamentary system, the President has a certain level of authority and influence in the state's governance, particularly relating to Mongolian military and the judicial system. The President is elected by a universal popular vote for a term of six years. The Judicial System of Mongolia consists of a three-tiered court system, which are first instance, appellate and Supreme Court, and the judges are nominated by the Judicial General Council and by the Chief Justice of the respective instance court, for approval by the President. Specifically, judges of the first instance and appellate-level courts are appointed by the President as nominated by the General Judicial Council. Judges of the Supreme Court are first presented to Parliament and appointed by the President as nominated by the Judicial General Council.

The electoral legal framework primarily comprises the Constitution, approved in 1992 and amended 4 times with the latest amendment in 2022, the 2015 Law on Elections, the 2019 Law on Parliamentary Election, the 2020 Law on Presidential Election, the 2006 Law on the Central Election Body, the 2011 Law on the Automated Election System and regulations of the General Election Committee.

On December 25, 2015, Parliament enacted the 2015 Law on Elections which (i) replaced and integrated the existing parliamentary election law, presidential election law and municipal elections laws, (ii) set forth principles and procedural regulations for the electoral system in Mongolia, and (iii) maintained the mixed-member proportionate system. However, in April 2016, the Constitutional Court ruled that the proportional representation element of the election law breached the Constitution and repealed those provisions that provided for the proportional representation. Parliament further amended the new election law on May 5, 2016 to approve a majoritarian electoral system.

On December 20, 2019, the Parliament enacted the 2019 Law on Parliamentary Election to ensure proportionality and gender equality in the election campaign. An electronic voting system was also introduced to ensure an efficient and fair election. The 2019 Law on Parliamentary Election changed the electoral system from a majoritarian system, where the majority of parliamentary seats went to the party that received the largest number of votes, to a mixed-member proportional system. A mixed-member proportional system is designed so that each party's share of parliamentary seats is proportional to its share of votes, thereby reflecting proportionality in the overall result. Under this law, it is also required that women represent a minimum of 20% of the candidates nominated and approved for seats in Parliament.

Political Elections

There have been eight parliamentary and presidential elections since 1991, each election being held once every four years.

In the parliamentary elections held in June 2016, the Mongolian People's Party ("MPP") won 65 out of 76 seats in Parliament, winning a clear mandate and avoiding the need to form a coalition government. As a result, Mr. Erdenebat Jargaltulga was appointed the Prime Minister. On October 4, 2017, Khurelsukh Ukhnaa, a former Deputy Prime Minister of Mr. Erdenebat Jargaltulga's Cabinet, was appointed as a Prime Minister to succeed Mr. Erdenebat Jargaltulga.

The last parliamentary elections were held in June 2020, in which the MPP won 62 out of 76 seats in Parliament. As a result, Mr. Khurelsukh Ukhnaa was appointed as the Prime Minister. On January 27, 2021, Oyun-Erdene Luvsannamsrai, a former member of the Parliament, was appointed as a Prime Minister to succeed Mr. Khurelsukh Ukhnaa, who submitted his resignation to the Parliament after demonstrations took place in Ulaanbaatar over the government's handling of the COVID-19 pandemic.

The eighth presidential election was held on June 9, 2021, among the three candidates, Mr. Khurelsukh Ukhnaa of the MPP, Mr. Enkhbat Dangaasuren of the Right Person Electorate Coalition and Mr. Erdene Sodnomzundui of the Democratic Party. According to the results announced by the General Election Committee on June 11, 2021, Mr. Khurelsukh Ukhnaa, the candidate from the MPP and a former Prime Minister, won the election with 67.8% of the votes. The 2019 amendments to the Constitution, effective from 2021, changed the age requirement of a presidential candidate and the presidential term of office, according to which an indigenous citizen of Mongolia, who has attained the age of fifty years (as opposed to the previous requirement of 45) and has permanently resided in Mongolia for at least five years, shall be elected as the President once only for a term of office for six years. As per these changes, Khurelsukh Ukhnaa is the first President elected for a six-year term who began serving his presidential term on June 25, 2021.

Major Political Events

On October 26, 2022, Erdenes Tavan Tolgoi JSC, the Mongolian state-owned company holding mineral licenses to the Tavan Tolgoi coal deposit, was placed under Government investigation after allegations of losses of state-owned coal and corruption in the coal industry in connection with off-the-book offtake contracts. IAAC also reported that it commenced investigations for corruption cases against several political figures that may be involved in the so-called coal theft. Consequently, on December 4, 2022, large-scale political demonstrations were held in Ulaanbaatar in response to soaring inflation rates, allegations of the losses of state-owned coal, and corruption in the coal industry, which involved several former leaders and members of the Parliament.

As a partial response to the coal theft scandals and within the framework of the Government Action Plan for 2020-2024, the Government adopted the "Procedure on open, electronic trading of export coals" by its Resolution No. 466 dated December 14, 2022, in order to organize online trading of mining products to be exported through FCA GS Terminal or DAP GM terms in an open, transparent and fair manner, create a favorable condition where the prices are set by commodity exchanges and, improve the competitiveness in the commodity market.

Policy Developments

Mongolia's "New Revival Policy", which was approved by Resolution No. 106 of 2021 of the Parliament on December 30, 2021, targets to strengthen Mongolian economic independence, reduce the COVID-19 epidemic's impact on its economy, resolve factors limiting economic development, and lay a solid foundation for the effective implementation of the Government's Vision-2050. Mongolia has commenced the relevant work, including a framework for the implementation of a medium-term target program of up to ten years aimed at improving Mongolia's economy, infrastructure, and state productivity. Within the New Revival Policy's framework, Mongolia has identified, and aspires to eliminate, six recovery areas that limit Mongolia's development: border ports, energy, industry, urban and rural development, green development, and state productivity. By eliminating problems in these six areas, Mongolia aims to increase its economic diversification. The projects envisaged by the New Revival Policy compass (i) 11 railroad projects, (ii) seven airport projects, (iii) nine border and port projects, (iv) road projects and (v) five other infrastructure and border ports projects. The New Revival Policy also includes legislative reforms, including adoption of the Public-Private Partnership Law, the revised Investment Law, the revised Land Law and the revised Minerals Law. With the implementation of the New Revival Policy, Mongolia targets to achieve the first stage goals of the of Vision-2050, increase its average annual economic growth to 6%, and double its per capita GDP.

RECENT ECONOMIC DEVELOPMENTS

Mongolia operated as a Soviet-style centrally planned economy until the establishment of a new coalition government in 1990, which undertook a sustained transition to a free market economy. The Government relinquished its role as the central planner of Mongolia's economy and began limiting itself to making policies supporting a market-oriented economy. The main objectives of the Government include:

- increasing mining sector development, revising mining legislation, and using a portion of mining revenues from strategic mining deposits for distribution among Mongolian citizens;
- developing and implementing Mongolia's industrial program, planning and developing mining-based industries and small and medium enterprises which use locally produced raw materials;
- improving agricultural production, in particular, the production of meat, milk, flour, potatoes, and vegetables;
- providing health services and employment opportunities to Mongolian citizens and providing vocational training; and
- providing transparency and accountability in public administration.

Over the past two decades, Mongolia has transformed itself into one of the world's fastest-growing economies, largely due to its rapidly developing mining industry and related increasing foreign investment. From 2003 through 2017, Mongolia experienced average real GDP growth of 7.7% per annum according to the IMF. Since then, Mongolia's annual growth rate was on the decline, and the real GDP declined 4.5% for 2020, a 10.16% decline from the previous year, mainly due to COVID-19-related restrictions, land border closures and impeded exports. In response to the negative impacts of the COVID-19 pandemic on economic activity, the Government, in May 2020, submitted a request to the IMF for emergency financial assistance under the Rapid Financing Instrument in the amount of US$99 million. The emergency financial assistance was intended to support foreign exchange reserves, create fiscal space for essential pandemic-related expenditures and catalyze donor support. In June 2020, the Executive Board of IMF approved US$99 million disbursement under the rapid financing instrument to Mongolia. In addition, the Government implemented a wide array of stimulus packages to recover the economy amid the pandemic. Mongolia's GDP grew in 2021 by 6.2% from 2020, and the total volume of coal export reached 16.1 Mt in 2021, 31.8 Mt in 2022, and amounted to 29.5 Mt in the first half of 2023. Going forward, international organizations, including the World Bank and IMF, project that Mongolia's economic growth would remain modest in the coming years.

However, high levels of external debt and reduced foreign exchange reserves have created pressure on Mongolia's near-term fiscal stability. The Togrog depreciated against the U.S. dollar by 29.6% from December 31, 2017 to December 30, 2022, and by 25% against the RMB during the same period. In addition, the previous government administration implemented a number of monetary easing measures through policy lending programs. The Togrog has continued to depreciate against the U.S. dollar and the RMB since December 31, 2022. External indebtedness had risen significantly in recent years, and the near-term maturity of notes issued by DBM may create additional pressure on Mongolia's foreign exchange reserves.

On May 24, 2017, the Government finalized the terms of a three-year financial assistance program with the IMF, which included a three-year extended arrangement under an EFF program, in a total amount of SDR 314.5 million (approximately US$434.3 million). The EFF program was agreed as part of a broader approximately US$5.5 billion financing package supported by Japan, Korea, China, the World Bank and the ADB. The IMF staff has stated that Mongolia made major progress in strengthening the resilience of its economy, including by public debt reduction and reserve accumulation, under the program, and that the policy buffers built during the program strengthened its ability to take emergency actions to combat the COVID-19 pandemic.

An IMF staff team visited Ulaanbaatar in January 2019 to continue discussions on the sixth review under the program. The IMF staff team outlined two issues to be resolved by the Government before they could complete the sixth review: banks would need to raise the full amount of capital that the Bank of Mongolia had requested, and that raised capital must be reviewed by a forensic audit to ensure consistency with local laws and regulations. The IMF program concluded on May 23, 2020. In October 2022, after the IMF staff team visited Mongolia, the IMF staff concluded the 2022 Article IV Consultation, an annual bilateral discussion on current economic and financial updates with Mongolia. According to the IMF report, stronger policy adjustment is needed to address Mongolia's rising internal and external imbalances.

On May 18, 2022, Fitch affirmed Mongolia's Long-Term Foreign-Currency Issuer Default Rating at "B" with a stable look, citing the country's high reliance on external funding, narrow economic base predominately focused on commodity exports to China, and recurring bouts of political volatility, On July 21, 2022, S&P affirmed its "B" long- and short-term sovereign credit ratings on Mongolia, citing that Mongolia's nascent economic recovery would become more entrenched over the next 12 months, which would then lead to improvements in Mongolia's external, fiscal, and debt metrics. Moody's also affirmed Mongolia's "B3" rating and maintained the stable look, citing that external liquidity risks would remain elevated but manageable.

On November 11, 2022, the Parliament approved the 2023 state budget with a deficit of MNT1.4 billion (approx. US$411.6 million). For 2023, revenue is projected to be about MNT19.0 trillion (approx. US$5.5 billion), and spending is estimated to be around MNT20.4 trillion (approx. US$5.9 billion). On April 29, 2022, the Parliament ratified the Law on State Austerity, limiting the investments for monuments, reducing the positions of deputy heads, and strengthening fiscal discipline.

On January 25, 2022, Rio Tinto, which manages the Oyu Tolgoi copper and gold mining joint venture, and the Government of Mongolia reached a comprehensive agreement and approved the commencement of the underground mining operations. The first sustainable production has begun in March 2023. This major milestone in the development of the Oyu Tolgoi underground development project is expected to boost Mongolia's economic development.

On May 15, 2023, Fitch affirmed Mongolia's long-term foreign-currency issuer rating at "B" with a stable outlook citing that the ratings are constrained by the country's high reliance on external funding and commodity exports to China amid high external debt and low foreign-exchange reserves.

The following table sets forth Mongolia's key macroeconomic data for the years or periods or as of the dates indicated below:

	As of and for the year ended December 31,					
	2017[1]	**2018[1]**	**2019[1]**	**2020[1]**	**2021[1]**	**2022[1][2]**
Nominal GDP (MNT billions)	28,010.7	32,582.6	37,839.2	37,453.2	43,555.4	52,867.3
Nominal GDP (US$ millions[3])	11,476.8	13,177.1	14,204.2	13,311.8	15,286.4	16,810.8
Real GDP (MNT billions)[4]	24,545.6	26,446.7	27,928.3	26,655.4	27,091.7	28,404.5
Real GDP (US$ millions[3])[4]	10,081.8	10,659.0	10,498.1	9,468.5	9,508.0	8,985.8
Real GDP growth[8]	5.6	7.7	5.6	-4.6	1.6	4.8
Nominal GDP per capita (MNT thousands)[5]	9,042.5	10,314.1	11,855.6	11,612.9	13,267.87	n/a
Nominal GDP per capita (US$[3])[5]	3,705.0	4,171.0	4,450.0	4,128.0	4,657.0	n/a
Year-on-year inflation	4.3	6.8	7.3	3.7	7.3	15.2
Export (US$ millions[3])	6,200,593	7,011,765	7,619,753.9	7,576,310.8	9,241,123.1	n/a
Imports (US$ millions[3])	4,337,322.4	5,874,803.8	6,127,438.8	5,298,913.4	6,845,453.2	n/a
Balance of payments (US$ millions[3])[6]	1,253.01	333.59	188.6	1,259.4	-221.63	-1,358.94
Unemployment rate	8.8	7.8	10	7	7.8	n/a

	As of and for the year ended December 31,					
	2017[(1)]	**2018[(1)]**	**2019[(1)]**	**2020[(1)]**	**2021[(1)]**	**2022[(1)(2)]**
External debt (US$ millions[(3)(7)]) . . .	27,492.66	28,714.89	30,702.29	32,361.83	33,805.5	n/a
Current account (US$ millions)	-589.86	-820.35	-966.94	58.17	-2,108.42	-2,405.28
Financial account (US$ millions) . . .	1,682.59	1,023.87	1,220.79	973.53	1,982.21	1,193.56
Gross foreign exchange reserves (US$ millions[(3)])[(6)].	3,001.8	3,549.10	4,348.60	4,534.20	4,366.10	3,399.60
Population	3,096,030	3,163,991	3,232,430	3,294,335	3,347,782	n/a

Sources: Bank of Mongolia; World Bank; National Statistical Office of Mongolia

(1) National Statistical Office of Mongolia, except otherwise indicated.

(2) Provisional figures, subject to further adjustments.

(3) The following average exchange rates were applied: 2017 – MNT2,434.64 = US$1.00, 2018 – MNT2,481.17 = US$1.00, 2019 – MNT2,660.32 = US$1.00, 2020 – MNT2,815.17 = US$1.00, 2021 – MNT2,849.34 = US$1.00 and 2022 – MNT3,161.05.

(4) Real GDP calculated at 2015 constant prices.

(5) Nominal GDP per capita calculated at current prices.

(6) Bank of Mongolia.

(7) "External debt" includes external debt of and external debt guaranteed by the Government and the Bank of Mongolia, external debt of commercial banks and other sectors, and direct investment according to the Bank of Mongolia.

(8) Based on real GDP figures in MNT billions.

MINING SECTOR

In 2020, 2021, and 2022 and the six months ended June 30, 2022 and 2023, the mining and quarrying sector accounted for 24.1%, 25.4%, 25.1%, 24.0% and 29.8%, of nominal GDP, respectively. Total foreign trade turnover rose 27.8% in the first half of 2023, driven by increases in export revenues, particularly from resources such as coal. The contribution of coal to Mongolia's exports has significantly increased in the last couple of years. Total coal exports were 28,677.1 Mt in 2020, 16,137.6 Mt in 2021, 31,814.0 Mt in 2022, 8.1 Mt in the first half of 2022 and 29.5 Mt in the first half of 2023.

Mongolia's proven reserves include 69.9 Mt of copper, 33.4 Bt of coal, 34.2 Mt of fluorspar, and 1.84 Bt of iron ore. Mongolia produces and exports copper concentrate, coal, iron, fluorspar, gold, silver, uranium, and zinc.

Mongolia's mining industry is still in its early stage of development due in large part to the rugged and remote terrain where key deposits are located. However, a number of significant projects have been undertaken in recent years to develop Mongolia's extensive mineral resources:

- Oyu Tolgoi: The signing of an Investment Agreement in October 2009 with Rio Tinto and Ivanhoe Mines to develop the Oyu Tolgoi mine, one of the world's largest copper-gold reserves under development, represents a major milestone in the development of Mongolia's mining sector. The mine is expected to commence full operations after the construction of an underground mining expansion. On January 25, 2022, Rio Tinto, which manages the Oyu Tolgoi copper and gold mining joint venture, and the Government of Mongolia reached a comprehensive agreement and approved the commencement of the underground mining operations. The first sustainable production has begun in March 2023. According to Turquoise Hill, the in-country spend related to Oyu Tolgoi was approximately US$14.5 billion for the period from 2010 to 2022.

- Tavan Tolgoi: In 2010, Erdenes Tavan Tolgoi (a government-owned company) began developing Tavan Tolgoi, which is believed, according to the World Bank, to be one of the world's largest coal deposits under development with an estimated 7.4 Bt of coking and thermal coal resources. Tavan Tolgoi's resources are located mainly in the east and west sections of the Tsankhi coalfield and comprised of six coalfields: (i) Sharteeg, (ii) Ukhaa Khudag, (iii) Bor Tolgoi, (iv) Borteeg, (v) the Southwest coalfield and (vi) the Eastern coalfield.

- In addition, Mongolia possesses large reserves of copper, gold, uranium, iron ore, and rare earth minerals that are being developed at numerous sites.

Recent Government initiatives related to infrastructure development, particularly policy statements for national railroad expansion, are expected to accelerate the development of strategic natural resource deposits in the coming years. Key mining projects as well as improvements to infrastructure supporting these mining projects are expected to have a positive impact on Mongolia's overall economic situation as commercial production commences. Under Mongolia's long-term policy, Vision-2050 and the New Revival Policy, the Government expects to increase mineral exploration, increase value added products and distribute the wealth created from the mining sector to the general public through the creation of a national wealth fund.

INDUSTRY OVERVIEW

We commissioned Fenwei, a leading Chinese consultancy and service provider in coal and coke industry, to prepare an independent report for use, in whole or in part, in this section. Fenwei prepared its report based on its industry knowledge, in-house database, independent third-party reports and publicly available data from reputable industry organizations. Where necessary, Fenwei visits companies operating in the industry to gather and synthesize information about the market, prices and other relevant information. Fenwei has assumed that the information and data on which it relied are complete and accurate.

Forecasts and assumptions included in the Fenwei Report are inherently uncertain because of events or combinations of events that cannot reasonably be foreseen, including, without limitation, the actions of governments, individuals, third parties and competitors. Specific factors that could cause actual results to differ materially include, among others, fluctuations in coal prices, risks inherent in the mining industry, financing risks, labor risks, uncertainty of mineral reserve and resource estimates, equipment and supply risks, regulatory risks and environmental concerns.

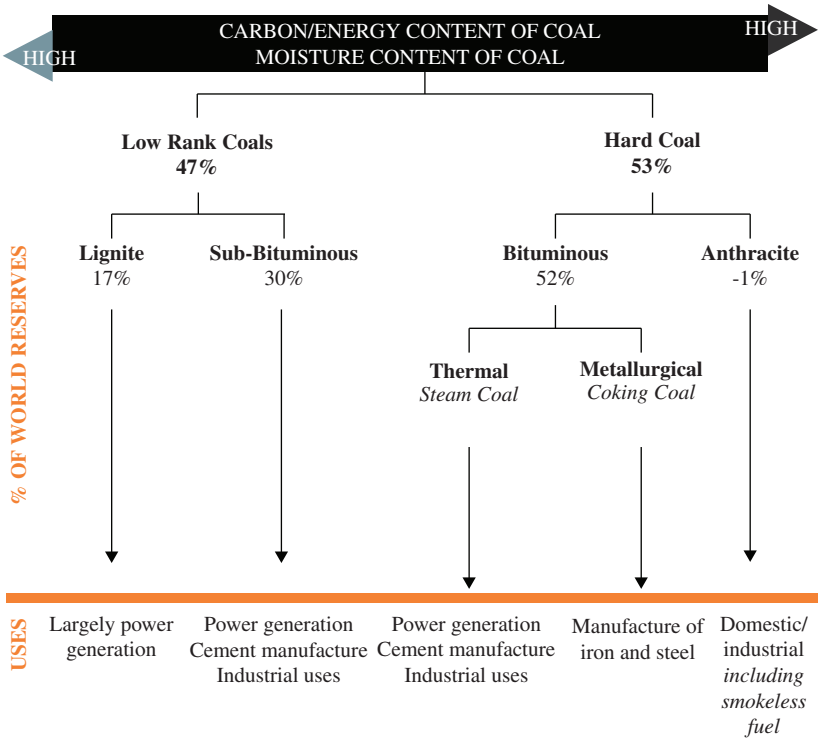
Fenwei has provided part of the statistical and graphical information contained in this section, including tables of historical data and estimated future supply, demand and market trends created by compiling, interpreting and analyzing engineering, production, economic, statistical and technical information from many third-party sources. The information contained herein has been obtained from sources believed by Fenwei to be reliable, but there can be no assurance as to the accuracy or completeness of included information. Most of the data presented in this section with respect to the coal industries in China, Mongolia and Australia has been extracted from the Fenwei Report.

Unless otherwise specified, all of the data presented in this section with respect to Chinese coal reserves and resources refer to the Chinese national standard for the Classification of Solid Mineral Resources and Reserves (2020).

While we, the Initial Purchasers and the other parties involved in the offering have taken reasonable care in the extraction, compilation and reproduction of the information and statistics from the Fenwei Report, none of us, the Initial Purchasers and the other parties involved in the offering has independently verified the information and statistics derived directly or indirectly from official government sources or made any representation as to their accuracy. Such information and statistics may be out of date and may not be consistent with other information and statistics compiled within or outside Mongolia. You should not place undue reliance on such information and statistics contained in this section.

AN INTRODUCTION TO COKING COAL

Coal is one of the most abundant fossil fuels worldwide. Different types of coal exist depending on the various changes undergone as the coal matures in carbon content from peat (lowest form) to anthracite (highest form), which also effectively "ranks" the coal in terms of its physical and chemical properties. The diagram below summarizes the different types of coal and respective end-uses, including electricity generation, coke production for steel making, and industrial applications such as cement manufacturing:



Source: World Coal Association

Low rank coal (e.g., lignite and subbituminous coal) or "brown" coal is typically softer, friable and dull and earthy in appearance. Typically, these types of coal are characterized by high moisture levels and low carbon content, yielding lower energy content. Higher rank coal or "hard" coal (e.g. thermal, coking coal and anthracite) is generally harder and stronger with a black, vitreous luster. These types of coal contain more carbon, have lower moisture content and generate more energy than low rank coal.

While there are several systems of coal classification used around the world, coking coal can be broadly categorized into four distinct grades, namely HCC, semi-HCC, semi-soft coking coal and soft coking coal. HCC/semi-HCC is essential for the production of coke, which is used as a reductant in the manufacturing of iron and steel. Semi-soft/soft coking coal is typically used for blending purposes to enhance certain physical and chemical parameters of the coke but in a way that reduces costs by maximizing the proportion of less expensive HCC.

China Coal Classification

According to the Chinese Coal Classification Standard ("CCCS"), coal is classified into three categories based on metaphoric rank: lignite, bituminous coal and anthracite. Bituminous coal is further classified into several types based on volatile matter and G Index, which is one of the main indices to classify bituminous coals in China. Coking coal is composed of meager lean coal ("PS"), lean coal ("SM"), primary coking coal ("JM"), fat coal ("FM"), 1/3 coking coal ("1/3 JM"), gas fat coal ("QF"), and gas coal ("QM"). There is no direct correlation between the Chinese and other international classifications although HCC under general international standards is equivalent to JM and FM in China, while semi-soft coking coal is similar to 1/3 JM and SM in China.

CHINESE COKING COAL INDUSTRY OVERVIEW

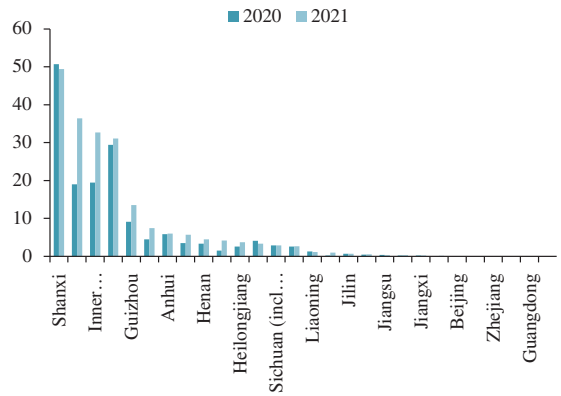
According to Fenwei, China will remain a major export market for Mongolian coal from 2023 to 2027. In this context, Fenwei analyzed the Chinese coking coal supply and demand dynamics.

China Coking Coal Reserves

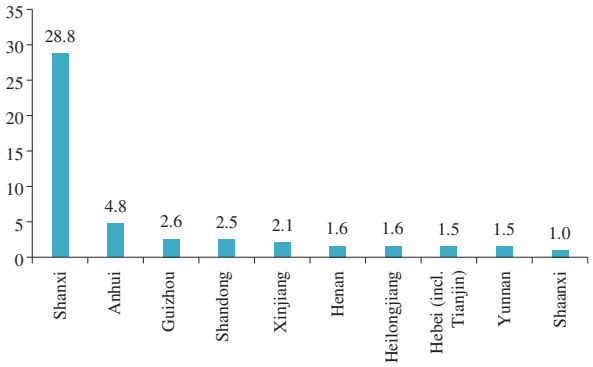
China has abundant coal reserves, but coking coal accounts for approximately a quarter of total coal reserves and is concentrated in few regions. Based on the 2022 China Mineral Resources Report, China had 207.9 Bt of coal reserves at the end of 2021 of which proven coking coal reserves accounted for 52.7 Bt.

According to the Fenwei Report, the top ten provinces with largest proven coking coal reserves were Shanxi, Anhui, Guizhou, Shandong, Xinjiang, Henan, Heilongjiang, Henan, Hebei, Yunnan and Shaanxi accounting for 91.2% of the proven coking coal reserves in China as of 2021. It also noted that Shanxi had the most coking coal reserves, accounting for 54.5% of the total minable coking coal reserves in China in 2021.

China coal reserve **Unit: BT**



2021-end top ten Chinese provinces with largest proven coking coal reserve **Unit: Bt**



Source: The Ministry of Natural Resources (MNR)

China's Structural Supply Side Reform

Since 2016, China's coal sector has experienced significant structural changes, driven by a focus on the environment, mine safety and the elimination of excess and outdated capacity. After intensive capacity reduction between 2016 and 2020, coking coal capacity surplus was significantly decreased in China. Fenwei estimates that policy driven capacity elimination will likely come to an end during 2023 and 2027, and some coking coal mines will naturally close due to resource exhaustion, low profitability or financial infeasibility. Furthermore, there is reduced interest in investing in new coal mines, especially as China aims to achieve "carbon peak" and "carbon neutrality". According to Fenwei, the period from 2023 to 2027 is expected to be the key period for peaking carbon emissions and the PRC coal industry policies are expected be tightened. Based on the construction progress of existing coal mines and mine conditions, coking coal capacity is expected to decrease by 45 Mt and newly added coking coal capacity will be 88 Mt, resulting in net capacity increase of 43 Mt from 2023 to 2027, which will be mainly in Shanxi, Heilongjiang, Yunnan and Guizhou provinces.

Under policies that supported coal supplies in 2021 and 2022, additional coal capacity was added and the effective coking coal capacity picked up overall during this period. The output of washed coking coal is expected to peak at 499.0 Mt in 2023, and then fall to 485.0 Mt in 2027.

The table below provides coal supply forecast from 2023 to 2027:

2023-2027 China strongly-caking coal output forecast

Unit: Mt

	2023E	2024E	2025E	2026E	2027E	CAGR 22-27
Raw coking coal	1,328.8	1,321.1	1,306.5	1,300.0	1,290.7	-0.4%
Washed coking coal	499.0	495.0	492.0	490.0	485.0	-0.3%
Raw strongly-caking coal	580.5	577.1	570.8	567.9	563.9	-0.4%
Primary coking coal	306.2	304.5	301.1	299.6	297.5	-0.4%
Fat coal	93.4	92.9	91.9	91.4	90.8	-0.4%
1/3 coking coal	180.8	179.8	177.8	176.9	175.6	-0.4%
Washed strongly-caking coal	332.1	328.0	322.2	319.1	315.4	-1.1%
Primary coking coal	178.4	175.9	172.6	170.9	168.8	-1.3%
Fat coal	53.5	52.8	51.9	51.4	50.8	-1.1%
1/3 coking coal	100.2	99.2	97.7	96.9	95.8	-0.8%

Source: Fenwei

China Structural Demand Side Reform

In China, between 2018 and 2022, coking coal demand increased at a CAGR of 1.7% from 519.5 Mt in 2018 to 556.2 Mt in 2022. The table below summarizes demand for different types of coking coal for the periods indicated:

2018-2022 China coking coal demand by type

Unit: Mt

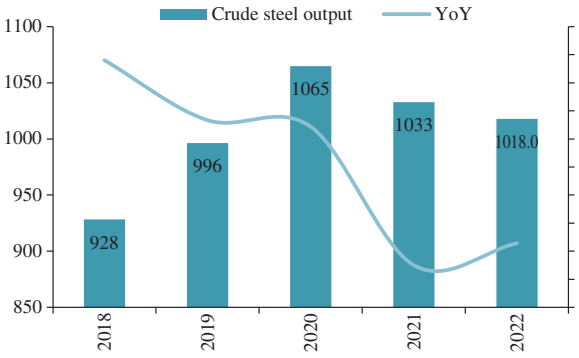
	2018	2019	2020	2021	2022	CAGR 18-22
Total demand	519.5	552.0	557.7	545.4	556.2	1.7%
Primary coking coal	168.6	179.4	181.5	177.8	181.6	1.9%
Fat coal	72.8	77.5	78.4	76.8	78.4	1.9%
1/3 coking coal	60.3	64.1	64.7	63.3	64.5	1.7%

Source: The National Bureau of Statistics (NBS), Fenwei

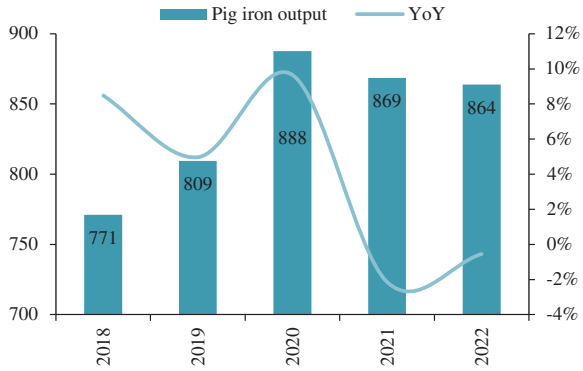
In China, demand for coking coal mainly comes from the steel industry. Coking coal demand is determined by pig iron and crude steel output, coke/iron ratio, coal use on a per tonne basis for coke output and coking coal blending ratios. During 2016 and 2018, China's steel industry completed capacity reduction goals outlined in the 13th Five Year Plan. In 2019, steel output maintained its growth but in 2021, restricted by the policy to compress crude steel output, the output of crude steel and pig iron both declined to 1,032.8 Mt and 868.6 Mt, respectively. In 2022, as COVID-19 pandemic-related restrictions and a sluggish real estate sector in China suppressed steel demand, crude steel and pig iron production continued to decrease to 1,018.0 Mt and 863.8 Mt, down 1.4% and 0.5% year-over-year, respectively. In the first half of 2023, crude steel production was 536 Mt.

The charts below illustrate the historical crude steel, pig iron and coke and semi-coke output in China for the periods indicated:

2018-2022 China crude steel output Unit: MT



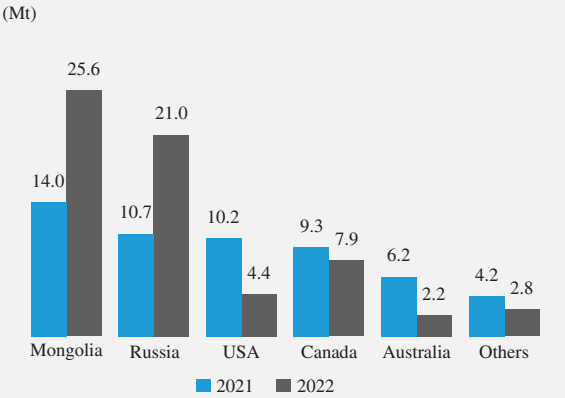
2018-2022 China pig iron output Unit: Mt



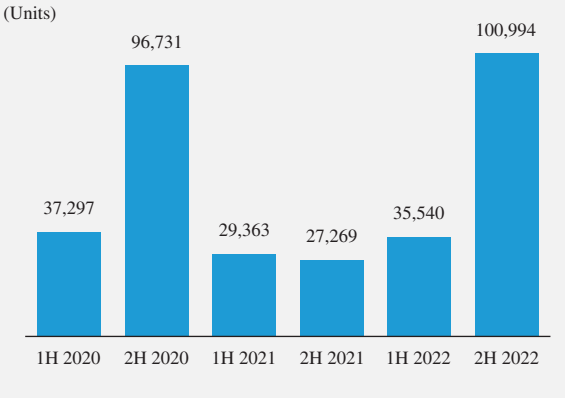
Source: The National Bureau of Statistics (NBS), Fenwei

According to Fenwei, China's steel demand is expected to resume growth in 2023, increasing by 0.8% compared to the contraction observed in 2022. PRC property sector support is expected to continue throughout 2023 enabling increased property sales and activities despite slow recovery created by liquidity pressures and bloated inventories within the market. However, Bloomberg Intelligence suggests a 5.0% decrease in the Chinese property sector demand in 2023. With increased COVID-19 outbreaks in the first half of 2023, construction pace is likely to remain slow regardless of the property rescue package push. China's crude steel production is projected to increase by 1.0% in 2023 in relation to better-than-expected demand. Steel prices could potentially increase in the second half of 2023 once COVID-19-induced effects fade in the first half of 2023. China's recent economic reopening suggests support on domestic coal prices and the price growth is estimated at 8.0% in 2023.

China Coking Coal Import[(1)]

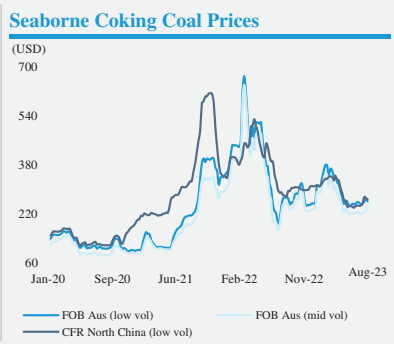


Total Number of Coal Trucks Crossing GS-GM Border



Source: Fenwei, Platts

(Mt)		2021	2022	1H2023
China crude steel	Production	1,033	1,013	536
	Consumption	973	948	494
China coke	Production	465	473	244
	Consumption	459	457	237
China coking coal	Production	490	494	249
	Consumption	545	556	292



Source: Fenwei, Platts

Against the backdrop of policy constraint to achieve carbon peak and carbon neutrality and falling steel demand, China's crude steel, pig iron and coke production is expected to show a downward trend, declining at a CAGR of 1.0%, 1.0% and 0.5% during 2022 and 2027, respectively. As coke output declines, coking coal demand is expected to also decrease at CAGR of 0.6% during 2022 and 2027. Fenwei estimates that China's demand for washed coking coal is to peak at 564.8 Mt in 2023 and then fall to 538.7 Mt in 2027.

The table below provides coal demand forecast for the periods indicated:

2023-2027 washed coking coal demand forecast

Unit: Mt

	2023E	2024E	2025E	2026E	2027E	CAGR 22-27
Crude steel	1,004.0	994.9	983.0	975.0	968.0	-1.0%
Pig iron	860.0	851.0	842.0	831.0	820.0	-1.0%
Coke	482.0	480.0	475.0	470.0	462.0	-0.5%
Met coke	440.4	439.9	436.4	432.9	426.4	-0.2%
Unit coal consumption	1.356	1.345	1.340	1.335	1.330	–
Washed coal demand	567.3	562.1	555.5	549.0	538.7	-0.6%
Demand for strongly-caking coal	331.4	328.7	325.2	321.8	316.1	-0.5%
Washed primary coking coal	185.5	184.1	182.2	180.3	177.2	-0.5%
Washed fat coal	80.1	79.5	78.7	77.8	76.5	-0.5%
Washed 1/3 coking coal	65.8	65.1	64.3	63.6	62.3	-0.7%

Source: Fenwei

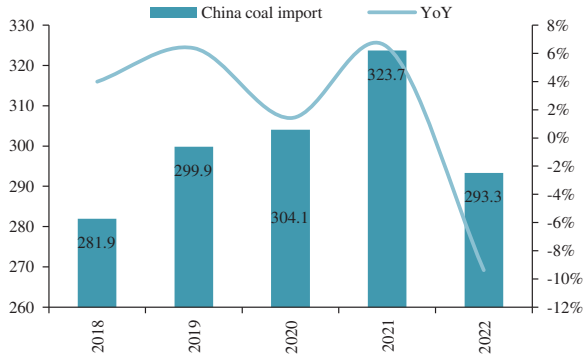
China Coking Coal Import Analysis

China's coal imports increased by 6.4% to 323.7 Mt in 2021 amid strong demand and tightened Chinese supply. However, coal imports fell by 9.4% to 293.3 Mt in 2022, due to multiple factors, such as Indonesia's coal export ban, high international coal prices due to the Russia-Ukraine war and the COVID-19 pandemic.

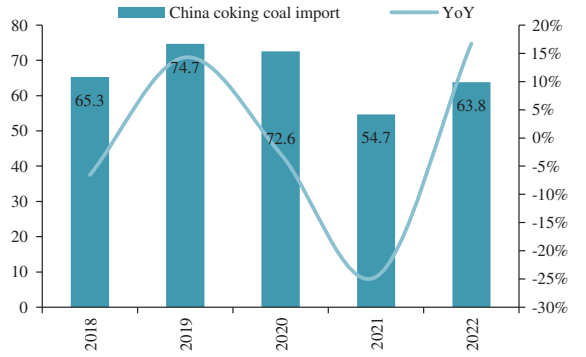
In terms of coking coal, owing to the import ban of Australian coal and low Mongolian coal clearance caused by pandemic prevention measures at the China-Mongolia border, China's coking coal import decreased by 24.6% to 54.7 Mt in 2021. However, China's coking coal imports rebounded by 16.7% to 63.8 Mt in 2022, as Mongolia-China border coal clearance improved steadily under subsided pandemic impact and more Russian coal was imported to China. For the first half of 2023, China's coking coal imports from Mongolia increased to 22.3 Mt as compared to 7.5 Mt over the same period in 2022, representing a period-to-period increase of 197.3%.

The chart below illustrates the coking coal imports by China for the periods indicated:

2018-2022 China coal import **Unit: MT**



2018-2022 China coking coal import **Unit: Mt**



Source: The General Administration of Customs (GAC), Fenwei

As Australian coal imports to China were unofficially banned from October 2020, China's imports of Australian coking coal dropped sharply. In 2022, the proportions of Canada and USA coking coal imported into China gradually decreased due to high prices, while the share of Russian coal increased as international sanctions led more import to the Chinese market. The share of Mongolia coal imports to China also rebounded as the pandemic impact faded and customs clearance gradually recovered.

The table below summarizes China's coking coal imports by origin for the periods indicated:

2018-2022 China coking coal import structure

Country	2018	2019	2020	2021	2022
Australia	43.9%	41.4%	48.7%	11.3%	3.4%
Mongolia	42.4%	45.2%	32.8%	25.7%	40.1%
Russia	6.8%	7.3%	9.3%	19.6%	32.9%
Canada	3.4%	4.0%	6.4%	16.9%	12.3%
USA	3.0%	1.5%	1.3%	18.7%	6.8%
Other	0.5%	0.5%	1.5%	7.8%	4.4%

Source: The General Administration of Customs (GAC), Fenwei

In 2023, Australian coal is expected to return to the Chinese market and Mongolian coal imports are expected to further increase. In addition, as new blast furnaces and coke ovens become operational in China, coking coal imports are estimated to remain high during the forecast period but begin to gradually decrease.

China Coking Coal Supply-Demand Dynamics

Starting in 2018, China's demand for washed coking coal slightly exceeded its supply. Due to the gradual degrading of Chinese coal quality, demand for imported high-quality coking coal, especially low-ash and low-sulfur HCC, will remain high. The COVID-19 pandemic had a great impact on coking coal supply, demand and logistics. Demand started to rebound following economic recovery and weakening impact of the pandemic. In 2020, washed coking coal supply totaled 556.8 Mt, and the demand reached 557.7 Mt, resulting in supply shortage of 0.9 Mt. In 2021, washed coking coal supply totaled 544.5 Mt, and the demand reached 545.4 Mt, resulting in supply shortage of 0.9 Mt. In 2022, washed coking coal supply totaled 557.1 Mt, and the demand reached 556.2 Mt, resulting in excess supply of 0.9 Mt.

The table below illustrates China's coking coal supply and demand dynamics for the periods indicated:

2018-2022 China coking coal supply-demand balance

Unit: Mt, %

	2018	2019	2020	2021	2022	CAGR 18-22
Raw coal output	1113.9	1188.3	1215.7	1254.1	1319.0	4.3%
Washed coal output	454.1	480.6	485.1	489.9	493.5	2.1%
Imports	64.9	74.5	72.6	54.7	63.8	-0.4%
Exports	1.1	1.4	0.9	0.1	0.3	-29.1%
Total washed supply	517.9	553.7	556.8	544.5	557.1	1.8%
Demand	519.5	552.0	557.7	545.4	556.2	1.7%
Gap	-1.6	1.7	-0.9	-0.9	0.9	

Source: Fenwei

The Influence of Australian Coal Import Resumption on China's Coking Coal Import Landscape

In the context of escalating global trade frictions, Sino-Australian relations were strained and dropped to a historical low point. Since May 2020, the clearance of Australian coal was tightened in China customs. In October, 2020, Australian coal import was unofficially restricted. Australia coking coal imported by China was mainly low-sulfur and low-ash hard coking coal. In November 2022, the leaders of China and Australia met on the sidelines of the G20 Summit in Indonesia, suggesting improving relations between the two countries. In December 2022, Australian Foreign Minister Penny Wong's visit to China was called an "ice breaking trip", once again sending out a positive signal. In March 2023, China lifted restrictions on Australian coal imports, ending trade restrictions that had been in place since 2020. The resumption of Australian coal import will reshape Chinese coking coal trade pattern and directly impact China's domestic coastal markets and seaborne prices. However, for Mongolian primary coking coal markets, the pressures may not be as direct due to the distance in target market regions as well as differences between seaborne and China's domestic coking coal price differentials.

Prior to the unofficial import restriction on Australian coal, China's imports of Australian coking coal reached 28.7 Mt in 2018, 30.9 Mt in 2019 and rose to 35.4 Mt in 2020, accounting for 43.9%, 41.4% and 48.7% of China's total import volume, respectively. The imports of Mongolia coking coal was slightly lower than Australia coal, at 27.7 Mt, 33.8 Mt and 23.8 Mt in 2018, 2019 and 2020 accounting for 42.4%, 45.2% and 32.8% of China's total imports, respectively. Since the resumption of coal imports from Australia, there has been significant increases in coal import volume from Australia to China compared to previous months. However, the volume of coal imported is significantly lower than before the downturn in diplomatic ties in mid-2020. Mongolia's reduction in import share in 2020 was mainly due to the restricted customs clearance due to the COVID-19 pandemic. Russia was the third largest supplier to China, at 4.4 Mt, 5.4 Mt and 6.7 Mt in 2018, 2019 and 2020, accounting for 6.8%, 7.3% and 9.3%, respectively. After the imposition of an unofficial import restriction on Australian coal, the market share of Australian coal import was overtaken by Russian, Canadian and North American coal exporters, while the share of coal from Mongolia showed a downward trend in 2020 and 2021 due to severe pandemic constraint at the border with China.

MONGOLIAN COKING COAL INDUSTRY OVERVIEW

Mongolian Coking Coal Resources

Mongolia is rich in coal resources and its coal reserves are evenly distributed throughout the country. Mongolia has 15 large coal fields and 300 coal beds, of which more than 200 coal deposits are being extracted. According to the Ministry of Mineral Resources and Energy of Mongolia, Mongolia had 33.3Bt of coal reserves as of 2021, with lignite ranking top, followed by bituminous and subbituminous coal.

The map below illustrates Mongolian coal resource distribution and how metamorphic ranks of Mongolian coal increase from the east side to the west side of Mongolia:

MONGOLIAN COAL RESOURCE DISTRIBUTION

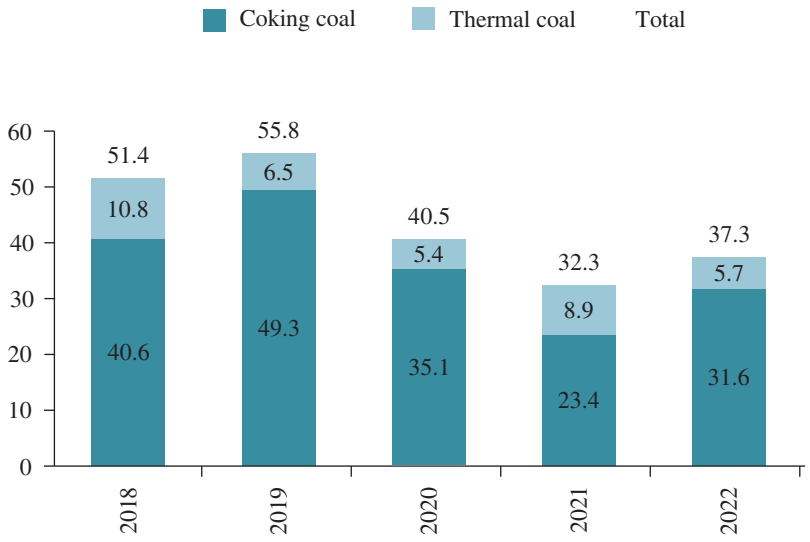
Source: The Ministry of Mineral Resources and Energy of Mongolia, Fenwei

Mongolian Coal Production

Driven by high demand in 2018 and 2019, China's coking coal import volume increased, and Mongolia's coal production achieved record highs during this period. In 2020 and 2021, due to the impact of strict COVID-19-related quarantine measures at the China-Mongolia border, customs clearance was suspended, and Mongolian coal exports declined significantly. As a result, some coal mines suspended operations for a prolonged period. As the impact of the pandemic subsided from 2022, and the customs clearance improved, the production of coal rebounded in Mongolia. According to the Mongolian National Bureau of Statistics, Mongolia's coal production reached 37.3 Mt in 2022, an increase of 15.4% compared to 2021, within which the production of coking coal was 31.6 Mt, an increase of 34.8% compared to 2021.

The chart below illustrates Mongolian raw coal production by coal type for the periods indicated:

2018-2022 Mongolia coal production **Unit: Mt**

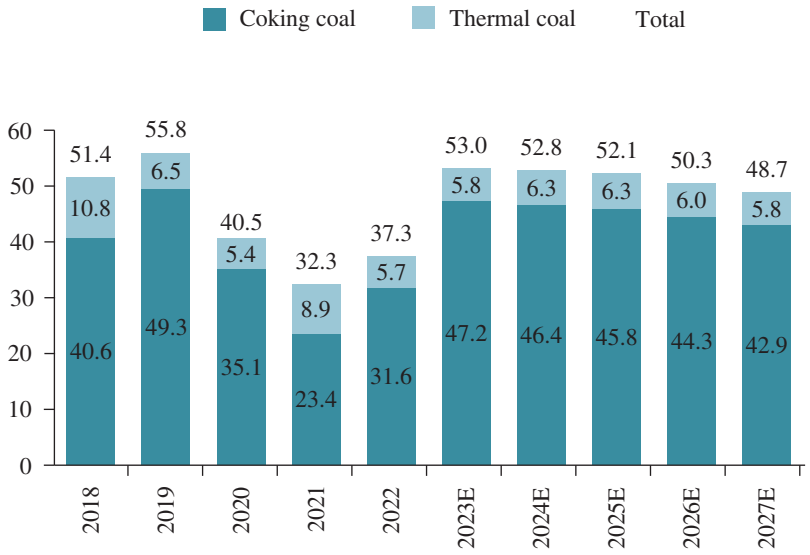


Source: Mongolia National Bureau of Statistics, Fenwei

In the future, Fenwei expects the improved customs clearance and infrastructure will boost Mongolian coal exports in the short term, and help Mongolian coking coal production rebound to approximately 53.0 Mt in 2023. Subsequently, affected by the decline in China's demand, production is expected to decline to 48.7 Mt in 2027.

The chart below illustrates Mongolian raw coal production by coal type for the periods indicated:

2023-2027 Mongolia coal production forecast **Unit: Mt**



Source: Mongolia National Bureau of Statistics, Fenwei

Mongolian Coal Transportation Infrastructure

In terms of transportation, Mongolian relies on road and railway to transport its coal to the target markets. Historically, the road transport has played the key role in transporting coal. Approximately 76% of Mongolian coal exported to China uses either the GS-GM route or the Shivee Khuren (Mongolia)-Ceke (China) route in 2022. Going forward, there is potential for railway to contribute to a significant portion of Mongolia's coal exports.

Mongolian coal mines have been transporting coal to the port by road through different routes. The roadway passage is "12 in and 7 out". Most of the Mongolian coal at the port is sold to China through truck transportation, and a small part is transferred from the supervised warehouse to GM or Temet station, and then via the Ganquan Railway to be transported westward to Inner Mongolia's Wuhai, Gansu and Xinjiang, and eastward to Inner Mongolia's Baotou, Hebei's Tangshan, and even to the farther Shandong and Jiangsu. It can reach Jining first on Jingbao Railway Line and then through Jitong line to the northeast Heilongjiang, Jilin and Liaoning. When the cross-border railway between Mongolia and China is opened to traffic, Mongolian coal can be transported directly by the railway to the target markets.

GS (approx. 10 km from the GM border checkpoint in China) is currently the largest border checkpoint in Mongolia for its coal exports, and it is designed to process up to 30 Mt coal exports per annum. TT, UHG and ETT export their coal to China through the GS border checkpoint by mainly relying on road transportation. The GM border checkpoint is connected with the Ganquan Railway, which is owned by the Shenhua Group in China. The border has sound supporting facilities, including processing park zones, coal import firms and customs supervision sites. Unmanned AGV was officially launched in August 2022. In the past five years, the freight from UHG to Tsagaan Khad remained stable, but the freight from Tsagaan Khad to GM has fluctuated greatly, mainly due to vehicle shortage caused by pandemic measures. The freight rates from Tsagaan Khad to GM was US$87.4 per tonne in 2022, down 13.7% compared to 2021.

$$\text{UHG} \xrightarrow{210\text{ km}} \text{Tsagaan Khad} \xrightarrow{30\text{ km}} \text{Gashuun Sukhait} \xrightarrow{10\text{ km}} \text{Ganqimaodu}$$

Mongolia completed the development of two major railways in 2022. The TT–GS railway commenced operation on September 9, 2022 and the Zuunbayan–Khangi railway commenced operations on November 25, 2022. After the cross-border section of the railways are completed they would be the second and third cross-border railways connecting Mongolia and China. The commissioning of these railways is expected to help increase export volume to China. In addition, the construction of the loop connecting the TT-GS railway to the UHG is ongoing. As the cross-border railway is not yet connected to GM port, a short-distance roadway transfer is needed to reach the Chinese port. Once the cross-border railway is completed and opened to traffic in the forecast period, Mongolia coal can reach GM port in China directly through railways, and transportation cost are expected to drop significantly as the short-distance roadway freight would no longer be required.

Mongolian Coal Exports to China

During 2020 and 2021, COVID-19 prevention and control measures constrained Mongolia coal's customs clearance to China and ports were frequently closed and hence Mongolia's coal export declined significantly. In 2022, with improved customs clearance at ports under eased pandemic control policies, Mongolian coal exports rebounded strongly to 31.2 Mt in 2022, increasing by 81.3% compared to 2021. For the first half of 2023, Mongolian coal exports reached 29.5 Mt. The table below sets out a breakdown of Mongolia's historical coal exports to China for the periods indicated:

2018-2022 MONGOLIA COAL EXPORTS TO CHINA BY TYPE

2018-2022 Mongolia coal exports by type

Unit: Mt

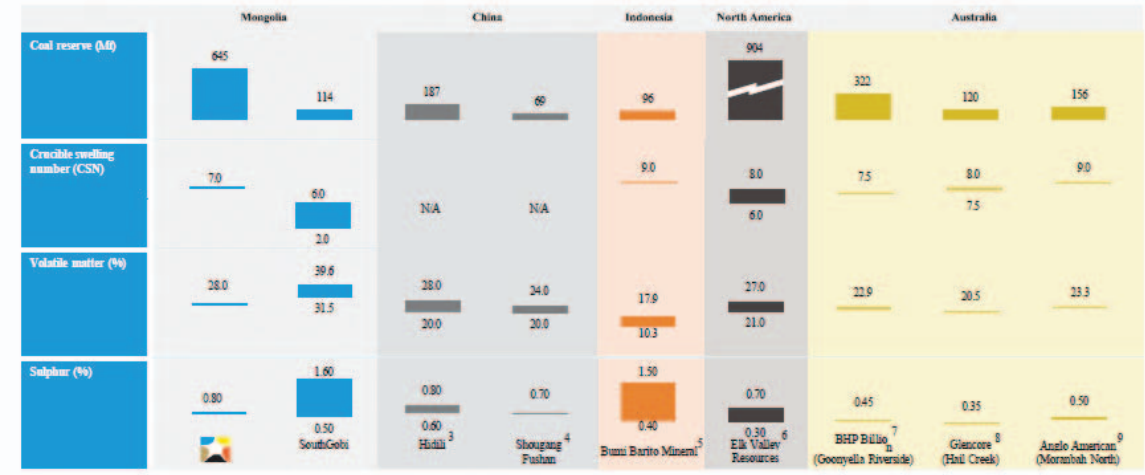
	2018	2019	2020	2021	2022	CAGR 18-22
Total	36.2	36.2	28.6	16.4	31.2	-3.7%
Thermal coal	8.5	2.4	4.8	2.4	5.5	-10.3%
Coking	27.7	33.8	23.8	14.0	25.6	-1.9%

Source: The National Bureau of Statistics, Fenwei

Compared to importing seaborne coal to China, Mongolian coal can be quickly transported to meet the demand from China. Mongolia's coal export to China is expected to reach 44.0 Mt in 2023. From 2023 to 2027, Mongolian coal exports are expected to remain at around 44-36 Mt with coking coal at 39-33 Mt and thermal coal at 5-3 Mt.

COMPETITIVE POSITIONING AND TARGET MARKETS FOR MMC COAL

MMC has one of the largest coking coal reserve base globally and its coal quality is on par with the best in the world:



Source:

(1) Reserves of 1 January 2023. CSN, volatile matter and sulfur for UHG mine

(2) Reserve includes Ovoot Tolgoi Mine (operating, resources as of 31 December 2016). CSN, volatile matter and sulfur only for the Ovoot Tolgoi mine

(3) Reserve as of 31 December 2020 from 2021 Annual Report

(4) Recoverable reserve as of 31 December 2021 from 2021 Annual Report

(5) Reserve as of 2022, from Wood Mackenzie includes stage 1 and 2 of the project

(6) Includes Fording River mine, Elkview mine, Greenhills mine, Line Creek mine and Cardinal River mine as of 31 December 2022

(7) Reserve as of 2022, from Wood Mackenzie

(8) Reserve as of 2022, from Wood Mackenzie

(9) Reserve as of 2022, from Wood Mackenzie

MMC Coal Quality Evaluation

MMC is currently operating two coal mines in the Umnugobi province. The UHG mine mainly produces HCC or primary coking coal (JM), and the BN mine produces SSCC or 1/3 coking coal (1/3 JM). The table below sets out the coal quality indicators and CCCS classifications:

UHG and BN coal quality indicators **Unit: %, mm**

Coal type	Moisture (M)	Ash (ad)	VM (daf)	Sulfur (ad)	G	Y	CSN	CSR
JM	9.0	11	28	0.85	75	14	–	–
1/3 JM (G65) . .	–	9.5	35	0.7	65	–	–	–

Source: MMC

UHG AND BN COAL PRODUCTS UNDER THE CHINESE COAL CLASSIFICATION STANDARD

China Coal Classification Standard **Unit: %, mm, MJkg**

			Indices						
Category		Symbol	No.	V_{daf}	$G_{R.I}$	Y	b	P_M	H_{daf}	$Q_{gr,maf}$
Anthracite	No. 1	WY_1	01	<3.5					<2	
	No. 2	WY_2	02	>3.5~6.5					>2~3	
	No. 3	WY_3	03	>6.5~10					>3	
Bituminous coal	Meagre coal	PM	11	>10~20	<5					
	Meagre lean coal	PS	12	>10~20	>5~20					
	Lean coal	SM	13	>10~20	>20~50					
			14		>50~65					
	Primary Coking coal	JM	15	>10~20	>65	<25	(<150)			
			24	>20~28	>50~65					
			25		>65	<25	<150			
	1/3 Coking coal	1/3 JM	35	>28~37	>65	<25	(<220)			
	Fat coal	FM	16	>10~20	(>85)	>25	(>150)			
			26	>20~28	(>150)					
			36	>28~37	(>220)					
	Gas fat coal	QF	46	>37	(>85)	>25	(>220)			
	Gas coal	QM	34	>28~37	>50~65					
			43	>37	>35~50					
			44		>50~65					
			45		>65	<25	(<220)			
	½ Medium caking coal	½ ZN	23	>20~28	>30~50					
			33	>28~37						
	Weak caking coal	RN	22	>20~28	>5~30					
			32	>28~37						
	Non-caking coal	BN	21	>20~28	<5					
			31	>28~37						
	Long flame coal	CY	41	>37	<5				>50	
			42		>5~35					
Lignite	No. 1	HM1	51	>37					<30	<24
	No. 2	HM2	52						>30~50	

Source: Chinese Coal Classification Standard (GB/T 5751-2009)

MMC's HCC has medium ash, low sulfur, mid-to-low volatile matter and strong caking property. MMC's HCC can generate plastic mass with proper heat stability when heated. When used separately, MMC's HCC is able to produce high-quality coke with large lumpiness, less cracks, high crushing strength and high HGI. The big expansion pressure during coking makes it hard for coke pushing, which requires gas coal and lean coal to be blended to improve oven environment and enhance coke quality. MMC's HCC helps enhance coke mechanical strength.

MMC's SSCC features low ash, low sulfur, mid-to-high volatile matter and medium caking quality. MMC's SSCC can produce high-quality coke with high strength and better fusibility. MMC's SSCC is a highly preferred blending coal, because it can improve coke quality with a flexible blending ratio. Overall, MMC is able to produce high-quality coke which features high strength and better fusibility.

A Quality Comparison With Rival Coals

MMC's HCC contains medium ash, low sulfur and high caking property. Compared to China's coal, MMC's HCC contains similar ash content and lower sulfur content, while having inferior qualities for volatile matter content (or "Vdaf"), which is the content of volatile substances in the combustion component. Compared to Australian coal, the ash and sulfur content of MMC's HCC are similar, while other indicators of MMC's HCC are inferior to Australian coal's. MMC's SSCC has low ash content and sulfur and medium coking property, similar to Shanxi Linfen 1/3 JM from China. Compared to Australian coal, the ash content of MMC's SSCC is slightly lower but is inferior. In terms of quality indicators and caking property, MMC HCC is close to JM in Inner Mongolia's Baotou area with a competitive edge due to low ash and sulfur content.

The table below compares the major quality indicators between MMC coal and their Chinese and Australian equivalent coals:

Quality comparison between MMC coals and major rival coals **Unit: %, mm**

Coal type	Origin	Ash (ad)	VM (daf)	Sulfur	G	Y
Primary coking coal	Mongolia MMC	11	28	0.85	75	–
	Baotou of Inner Mongolia	10.5	25	0.8	83	17
	Gujiao of Shanxi	10	21	1.3	83	15
	Wuhai of Inner Mongolia	10.5	26	1.1-1.3	88	16
	Australia Peak Downs	10.0	21	0.5	85	19
1/3 coking coal	Mongolia MMC(G65)	9.5	33	0.85	65	–
	Wuhai of Inner Mongolia	11.5	30	0.78	89	
	Linfen of Shanxi	10.5	32	1	80	17
	Australia Blackwater	10.5	35	0.8-1.2	75	12

Note: *We selected the JM from Tunlan Mine to represent Gujiao JM quality and the 1/3 JM from Hongyuan Mine to represent Shanxi Linfen 1/3 JM quality. The Australian HCC and SSCC qualities are used as benchmark imported coal qualities delivered to China's Jingtang Port.

Cost Comparison With Rival Coals

MMC's washed coal production cost is competitive because of shallow burial depth, low labor costs and moderate washed coal yield.

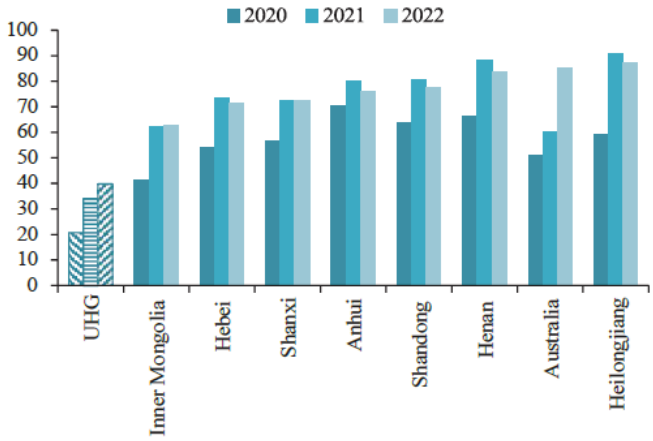
Among the main coking coal producing provinces in China, Heilongjiang, Henan and Shandong have higher raw coal production cost, due to long mining life, larger mining difficulty and high mine maintenance cost. The production costs are lower in Inner Mongolia, Hebei and Shanxi, as they have many

large mines with relatively better geological conditions, especially in Inner Mongolia, where open pit mining is adopted. In 2020, due to the impact of the COVID-19 pandemic, coal mines reduced input, laid off staff and cut salaries, and reduced its expenses. In 2021 and 2022, under tight domestic supply and high coal prices, coal mines increased investment, and labor cost, materials and resource taxes also rose, so the cost of coal mining was on the rise.

Compared to Mongolian coal in Inner Mongolia, Shanxi, Henan and Hebei coals have higher transportation costs. In addition, because Australian coal needs to be shipped to Jingtang Port first and then sold to various points of consumption, transportation costs are also high for Australian coal. As a result, UHG coal costs in the Inner Mongolia market are lower than those of the main Chinese coking coal producers and Australian producers. Inner Mongolia is the main target market region of MMC.

The graphs below shows comparison of the all-in cost for 2022:

Coal all-in cost comparison Unit: USD/t



Source: Fenwei

Note: UHG coal's all-in cost includes royalties.

Target Markets for UHG and BN Coals

Currently, MMC's coal is transported to GS by road, and once it has arrived at GM, it is railed to Wanshuiquan in Baotou by the Shenhua Ganquan Railway and transported either westward to Gansu, Inner Mongolia's Wuhai and/or Xinjiang, or eastward to Baotou, Tangshan, Shandong and/or Jiangsu. The map below illustrates such transportation options:

The primary target markets of Mongolian coking coal is the western parts of Inner Mongolia Autonomous Region and Tangshan city in Hebei province. In western Inner Mongolia, MMC coal products have logistical and cost advantages compared to other providers. The main target market of Australian coking coal and Shanxi coking coal is also Tangshan, Hebei province.

Inner Mongolia is rich in coking coal resources, and its coking coal output is on a slightly growing trend. However, the coke produced locally has high ash and sulfur content and does not meet the requirements of steel mills. In Hebei's Tangshan, there are currently no large-scale new or expanding mine projects, while existing coal mines are gradually becoming depleted. The coking coal resources are limited in Tangshan, and the existing coal mines will be gradually exhausted. Between 2023 and 2027, Tangshan is expected to have 7.5 to 9.4 Mt of primary coking coal gap and 2.9 to 3.6 Mt of 1/3 coking coal gap annually.

The table below sets out the forecasted demand and supply gap within the geographic locations and periods indicated:

2023-2027 WASHED COKING COAL SUPPLY-DEMAND GAP FORECAST

2023-2027 washed coking coal supply gap forecast **Unit: Mt**

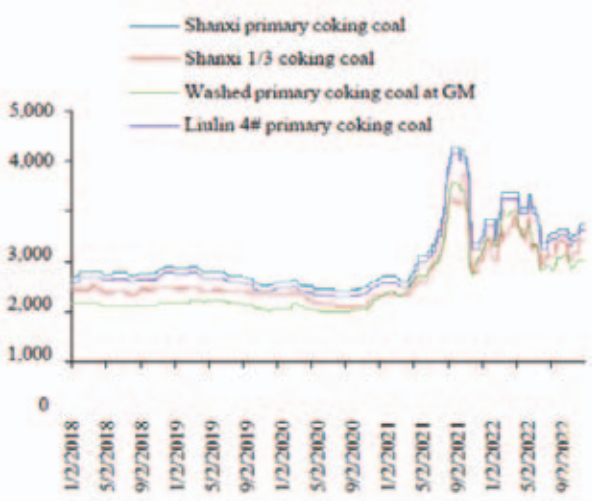
Supply gap		**2023E**	**2024E**	**2025E**	**2026E**	**2027E**
Washed JM	**Total**	12.2	11.5	11.0	10.6	10.2
	Inner Mongolia	2.6	2.6	2.6	2.6	2.6
	Hebei's Tangshan	9.4	8.8	8.2	7.8	7.5
	Gansu	0.2	0.2	0.2	0.2	0.2
Washed 1/3 JM	**Total**	9.3	9.1	8.9	8.7	8.6
	Inner Mongolia	4.6	4.6	4.6	4.7	4.7
	Hebei's Tangshan	3.6	3.4	3.2	3.0	2.9
	Gansu	1.1	1.1	1.1	1.1	1.1

Source: Fenwei

China Coking Coal Price

UHG's HCC and BN's SSCC are of similar quality as washed Shanxi primary coking coal, Shanxi 1/3 coking coal, washed primary coking coal at GM border and Liulin 4# primary coking coal. The historical prices for these are shown in the graph below:

Typical domestic coking coal prices with VAT Unit: yuan/t



Source: Fenwei

With the commissioning of new coke capacity in China, coke output is expected to remain high in the short term according to Fenwei. Crude steel production is expected to gradually fall from the peak reached in 2020, and coke demand is expected to weaken. As new coking coal capacity will be released under the supply guarantee policies in 2022, washed coking coal production is expected to keep growing in 2023, and start to decline later in the decade as demand falls. Owing to downward trend of demand and sufficient supply, China's coking coal market is expected to be well supplied during the forecast period. Under the constraints of carbon peak and carbon neutralization, the growth pace of overall coal consumption is expected to gradually slow down during the 14th Five Year Plan period. But along with the release of new coke making capacity, coke production is expected to continue increasing in 2023, and the demand for coking coal to rise accordingly. In the forecast period, due to loosening supply, coking coal prices are estimated to gradually fall to 2,150 yuan/t for Shanxi washed primary coking coal and 1,760 yuan/t for washed Shanxi 1/3 coking coal in Jingtang port by 2027.

The table below sets forth the price forecasts for Jingtang Shanxi washed HCC and Jingtang washed 1/3 coking coal for the periods indicated:

2023-2027 China coking coal price forecast **Unit: yuan/t**

	2022	2023E	2024E	2025E	2026E	2027E
Jingtang Shanxi washed HCC	2,832	2,620	2,443	2,297	2,200	2,150
Jingtang washed 1/3 coking coal/SSCC	2,331	2,140	1,990	1,870	1,800	1,760

Source: Fenwei

The saleable prices of MMC products at GM Border are expected to decrease slightly from 2023 to 2027. The price of MMC JM is expected to decline from 2,204 yuan/t in 2022 to 1,599 yuan/t in 2027 and while the price of 1/3 JM is expected to decline from 1,889 yuan/t in 2022 to 1,351 yuan/t in 2027. The table below sets forth the price forecasts for MMC washed coal at FOT GM for the periods indicated:

2023-2027 MMC coal price forecast at GM border with VAT **Unit: yuan/t**

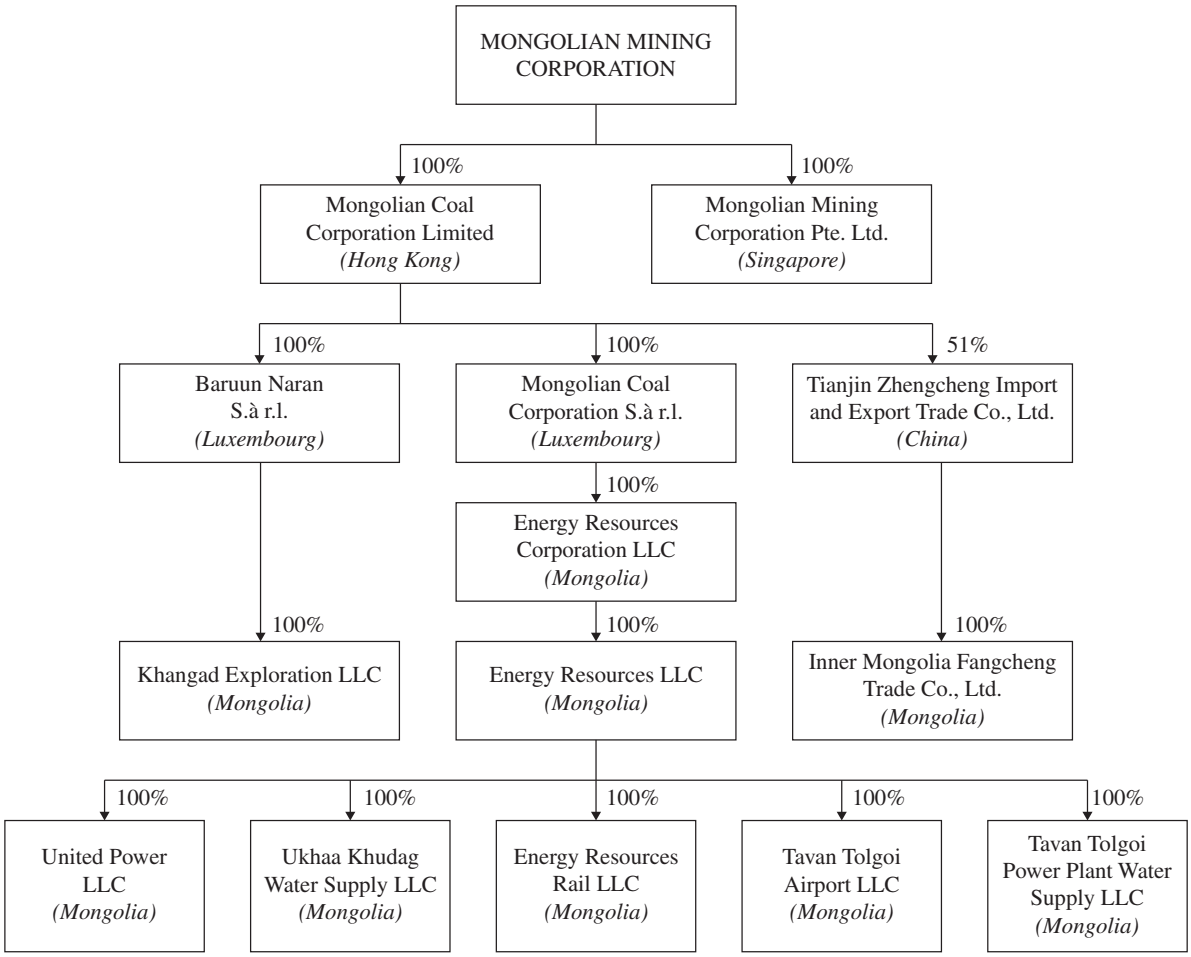
	2022	2023E	2024E	2025E	2026E	2027E
MMC-JM	2,204	2,007	1,848	1,716	1,637	1,599
MMC-1/3JM(G65)	1,889	1,700	1,557	1,442	1,382	1,351
MMC-6000Kcal/kg	1,106	956	868	815	781	757

Source: Fenwei

CORPORATE STRUCTURE AND HISTORY

CORPORATE STRUCTURE

As of June 30, 2023, our corporate structure is as follows:



HISTORY

We were incorporated in the Cayman Islands as an exempted company with limited liability on May 18, 2010 in anticipation of our initial public offering. We operate our business through our subsidiary companies in Mongolia, including ER LLC incorporated in Mongolia, Mongolian Coal Corporation Limited incorporated in Hong Kong, Mongolian Coal Corporation S.à r.l. incorporated in Luxembourg and Energy Resources Corporation LLC incorporated in Mongolia, each a direct or indirect wholly-owned subsidiary of the Company, we indirectly own 100% of ER LLC.

Our current corporate structure was substantially put in place in connection with our initial public offering in October 2010. The history of our and our subsidiaries predecessors dates back to 1999, when Mine Info LLC obtained exploration licenses to conduct exploration activities in the Tavan Tolgoi area of Mongolia. In 2002, Darkhankhaan Uul LLC obtained exploration licenses to conduct exploration activities in additional areas in the Tavan Tolgoi area of Mongolia.

ER LLC was incorporated in Mongolia in 2005, and was jointly owned by the shareholders of ER LLC and the shareholder of Darkhankhaan Uul LLC. On May 4, 2005, the shareholders of Energoresources LLC and Darkhankhaan Uul LLC transferred all six of their exploration licenses to ER LLC. In 2006, the exploration licenses of ER LLC were converted into mining licenses. On March 21, 2008, ER LLC entered into the Minerals License Transfer Agreement with the Government of Mongolia, pursuant to which we transferred five of our six mining licenses to the Government of Mongolia. The transfer of such mining licenses was completed on May 28, 2008. For details of the circumstances leading to the transfer of the mining licenses and details of our UHG mining license, see "Business – Our Location and Licenses".

We entered into a share purchase agreement with Quincunx (BVI) and its then parent company, Kerry Mining (Mongolia) Limited on May 31, 2011 to acquire Baruun Naran Limited (formerly named QGX Coal Limited) incorporated in Gibraltar, Baruun Naran S.à r.l (formerly named QGX Coal S.à r.l) incorporated in Luxembourg, and Khangad Exploration LLC. The acquisition was completed on June 1, 2011. Khangad Exploration LLC was incorporated in 2006 and holds a mining license to conduct mining activities in our BN deposit. On June 24, 2013, we were granted the THG mining license to cover another 8,340 hectares area contiguous to the BN mining license originally acquired.

In May 2017, we completed a debt restructuring involving the US$600,000,000 8.875% senior notes due 2017 issued by the Company ("2017 Notes"), pursuant to which we entered into a facility agreement, issued new shares, the Perpetual Securities and the 2022 Notes to our creditors.

In May 2019, we issued the 2024 Notes and completed a tender offer and consent solicitation for our 2022 Notes.

In July 2019, Enrestechnology LLC, one of our indirect subsidiaries, was merged into ER LLC.

In September 2020, we acquired 100% equity interest in Tavan Tolgoi Power Plant Water Supply LLC.

In April 2021, ER LLC entered into a joint venture agreement with CHN Energy Coal Coking Co., Ltd to establish a joint venture company, Guoneng Inner Mongolia Ganqimaodu International Energy Co., Ltd., in which ER and CECC will, respectively, hold 10% and 90% of equity interest. For more information, see "Business – Transportation and Logistics".

In November 2022, we incorporated Mongolian Mining Corporation Pte. Ltd. In December 2022, we completed a tender offer for our 2024 Notes.

In January 2023, we entered into the Investment Agreement with EM LLC and Erdene Resource Development Corporation to subscribe for securities in EM LLC. For more information, see "Business – EM Transaction".

Our other subsidiaries include:

- Ukhaa Khudag Water Supply LLC, which is responsible for the water exploration and supply of water to our UHG mine.
- United Power LLC, which is responsible for the construction and operation of the power plant.
- Tavan Tolgoi Airport LLC, which is responsible for the operation and management of the airport in Tsogttsetsii soum serving the miners' camp with several Mongolian commercial airlines.
- Energy Resources Rail LLC, which was incorporated for the then-ongoing implementation of construction of the base infrastructure of the UHG-GS paved road, which was subsequently transferred to the Government of Mongolia in 2013.
- Tianjin Zhengcheng Import and Export Trade Co., Ltd., a joint venture with a member of Risun Group which is responsible for joint transportation, sales and distribution of coal products in China.
- Inner Mongolia Fangcheng Trading Co., Ltd, a wholly-owned subsidiary of Tianjin Zhengcheng Import and Export Trade Co., Ltd, which is responsible for sales and distribution of coal products within Inner Mongolia, China.

Our other affiliates include:

- International Medical Center LLC, which is responsible for the construction and operation of a private general hospital.

- Gashuun Sukhait Rail LLC, a joint venture with certain other leading mining companies which is responsible for the GS-GM cross-border railway construction project.

- Gashuun Sukhait Auto Road LLC, a joint venture with certain other leading mining companies which is responsible for the operation and maintenance of UHG-GS paved road.

- Baruun Naran Gas LLC, which is responsible for a coal bed methane exploration project.

BUSINESS

OVERVIEW

We are a leading Asian coking coal producer engaged in the open-pit mining and processing of coking coal sourced from our UHG and BN deposits, located in the South Gobi Province of Mongolia. These deposits are adjacent to each other and strategically located approximately 250 km from the Sino-Mongolian border and approximately 600 km from Baotou, China, an important railway transportation hub providing access from Mongolia to the largest steel producing provinces in China, including Inner Mongolia, Hebei, Shandong and Jiangsu provinces. We have worked closely with a number of industry-leading experts, including Thiess and Sedgman, throughout the planning, development and operation of our business to develop integrated mining, processing, supporting infrastructure, transportation and logistics operations.

Our UHG mining license permits us to engage in coal mining activities on 2,960 hectares of land for an initial period of 30 years commencing from August 29, 2006. As of December 31, 2022, 570 Mt of JORC-compliant coal resources, and as of January 1, 2023, 365 Mt of JORC-compliant coal reserves have been identified within such area, respectively.Our BN mining license, comprising the BN mining license area of 4,482 hectares and the contiguous THG mining license area of 8,340 hectares, permits coal mining for an initial period of 30 years commencing from December 1, 2008, and June 24, 2013, respectively. Within the BN and THG mining license areas combined, a total of 500 Mt of JORC-compliant coal resources have been identified as of December 31, 2021, including 280 Mt of JORC-compliant coal reserves as of January 1, 2023. Our BN mine is located approximately 30 km by paved road southwest of our UHG mine, and its development, in integration with existing facilities at UHG, is yielding benefits through synergies achievable in terms of shared mining, processing and transportation infrastructure and marketing resources. BN mine produced 0.4 Mt ROM coal for 2022. For the years ended December 31, 2020, 2021 and 2022 and for the six months ended June 30, 2022 and 2023, we produced an aggregate of 7.7 Mt, 4.3 Mt, 5.7 Mt, 0.9 Mt and 8.0 Mt of ROM coal, respectively.

With a view to consistently producing high quality products, reducing product transportation costs and generating improved margins, we constructed and commissioned 15.0 Mtpa of ROM coal processing capacity onsite at the UHG mine. The CHPP, designed and constructed by Sedgman, comprises three near identical modules of ROM coal processing nameplate capacity of 5.0 Mtpa each.

Since the commencement of the CHPP operation, we have shifted our sales strategy from raw coal to washed coal, having sold only washed coal products from the beginning of the second quarter of 2012.

We have our own fleet of over 480 double-trailer trucks and also have support facilities to flexibly conduct shipments from UHG to TKH and further from TKH to GM. Currently, we conduct shipments using the approximately 240 km long UHG-TKH ("long haul") section solely with our own double-trailer trucks, while cross border shipments for exports using the approximately 20 km long TKH-GM ("short haul") section are undertaken by our own double-trailer trucks supplemented by third-party Chinese trucking contractors.

We are one of the largest coal producers and exporters in Mongolia. The total volume of coal export from Mongolia reached 16.1 Mt in 2021, 31.8 Mt in 2022, and amounted to 29.5 Mt in the first half of 2023. During each such period, our market share accounted for 7%, 13% and 15%, respectively, of the total volume of coal exported from Mongolia. For the years ended December 31, 2020, 2021 and 2022 and for the six months ended June 30, 2022 and 2023, we sold our hard coking coal at an average selling price of US$121.4 per tonne, US$150.6 per tonne, US$147.1 per tonne, US$141.3 per tonne and US$161.8 per tonne, respectively.

Our major shareholder, MCS Group, is one of the largest business conglomerates in Mongolia, operating leading companies in engineering, energy, communication, property, mining, fast-moving consumer goods, health, and hospitality industries. In 2022, we were included in the Top 5 Enterprise list of Mongolia by the Government of Mongolian and the Mongolian National Chamber of Commerce and industry for the 10th consecutive year.

Our revenue for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, was US$417.4 million, US$184.1 million, US$546.2 million, US$106.5 million and US$516.7 million, respectively. We recorded (loss)/profit for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, of US$29.6 million, US$(55.4) million, US$58.9 million, US$(32.3) million and US$136.5 million, respectively.

OUR COMPETITIVE STRENGTHS

Fully integrated operations and sole Mongolian washed coking coal exporter

We own two high quality coking coal mines in South Gobi Province, Mongolia, namely our UHG and BN mines. Our UHG and BN mines were commissioned in April 2009 and in February 2012, respectively. Located within approximately 30 km of each other, such close proximity allows us to achieve synergies through integrated operations due to the accessibility of the established infrastructure already in place, which was primarily constructed to facilitate the exploitation of the UHG deposit. We have partnered with Thiess, since the commencement of mining operations, as our mining contractor under a long-term alliance style contract, and work closely with them in all aspects of our coal mining operations at our UHG mine.

Our UHG mine had a total of 570 Mt of JORC-compliant measured, indicated and inferred coal resources as of December 31, 2022, and a total of 365 Mt of JORC-compliant proved and probable coal reserves as of January 1, 2023, according to the technical study completed by Glogex. Our BN mine had a total of 410 Mt of JORC-compliant measured, indicated and inferred coal resources as of December 31, 2022, a total of 280 Mt of JORC-compliant proved and probable coal reserves as of January 1, 2023, according to the technical study completed by Glogex.

We have one of the largest coking coal reserve bases in Asia Pacific. The table below presents our coking coal reserve and those of other coking coal producers in Asia and Australia:

	Proforma Reserves
	(Mt)
Mongolia	
Mongolian Mining Corporation[(1)]	645
South Gobi[(2)]	114
China	
Hidili[(3)]	187
Shougang Fushan[(4)]	69
Australia	
BHP (Goonyella Riverside)[(5)]	322
Glencore (Hail Creek)[(5)]	120
Anglo American (Moranbah North)[(5)]	156

Notes:

(1) Reserve as of January 1, 2023, from Glogex reserve statement as of January 1, 2023.

(2) Reserve as of December 31, 2016, from the South Gobi resources annual information form.

(3) Reserve as of December 31, 2020, from Hidili's 2021 annual report.

(4) Reserve as of December 31, 2021 from Shougang Fushan's 2021 annual report.

(5) Reserve as of December 31, 2022 from Wood Mackenzie.

With all necessary production infrastructure in place, we have been able to independently produce washed coal to meet the needs of customers and sell high-quality washed coal under our own brand. In particular, we differentiate from our peers through producing washed coal with a low sulfur content of 0.8%. The sale of washed coal not only guarantees a substantially higher price than raw coal, but also allows for cost savings with respect to saleable product transportation (washed coal weighs less than raw coal), lower (yield adjusted) royalty rates and VAT refunds on our washed coal sales. We engaged Sedgman, one of the world leaders in coal processing and material handling technology, to construct our CHPP with a three module design, each with a ROM coal feed nameplate processing capacity of 5.0 Mtpa. We commenced our CHPP Phase I and 2 operations in 2011 and 2012, respectively and reached 15 Mtpa capacity in Phase 3 in 2013. The availability of sufficient electricity and water onsite is fundamental to the value-add achieved through processing raw coal at the CHPP. We have our own 18 MW coal fired power plant that supplies nearly all of the electricity requirements at the UHG mine, including CHPP. The power plant uses circulating fluidized bed technology with air-cooling, significantly reducing water usage compared to traditional water-cooling systems. Our UHG mine site is connected to the Central Electricity Grid of Mongolia, providing an outlet for the sale of excess electricity generation and a back-up supply to the power plant. Furthermore, we also have 3x2 MW diesel power generators on site as back-up in case of a combined power plant and grid shortfall. Water required at the CHPP and to support other UHG mine site activities is supplied from a nearby underground aquifer. We benefit from the geological advantage of having Naimdain valley to access nearby water supply and have a license to extract water to meet our requirements.

Utilizing the paved road between UHG and GS, which has 18 Mtpa capacity, we transport our coal products using over 480 of our own double-trailer heavy haulage road trucks. In addition to the productivity advantages brought about by the paved road, the double-trailer truck fleet has proven to be cost effective and since 2013, having been solely responsible for the transportation of our coal products between UHG and TKH without utilizing third-party contract haulage. For coal exports, we utilize our own trucking fleet as well as third party contractors for transportation from a trans-shipping facility under the Group's management on the Mongolian side of the border for the short haul between TKH and GM. The border crossing facilities at the GS port were expanded in 2012 from 10 Mtpa capacity to approximately 25.0-30.0 Mtpa capacity.

During the first half of 2022, we transported 70 thousand tonnes of coal via the Zuunbayan railway. In addition, we expect further cost advantages from the completion of the cross-border section of the TT-GS railway and the Zuunbayan-Khangi railway for direct shipment to China. Tavantolgoi Railway LLC has completed the construction of a loop connecting the TT-GS railway to the UHG stockyard. Simultaneously, we built a designated stockyard at UHG. In February 2023, China's Mandula border crossing cleared customs in trial performance of importing coal from Mongolia's Tavan Tolgoi coal mine through railway and road combined shipments, completing the first batch of shipment through Zuunbayan Khangi line. Furthermore, we have developed a bonded terminal for the GS Terminal.

Strategic location with close proximity to end customers

We produce high-quality hard coking coal and semi-soft coking coal that are used by coke manufacturers and steel producers in China. We typically sell our coal products directly to end customers under 10-year agreements primarily with China-based iron and steel mills and coke plants. As of June 30, 2023, we have entered into long-term agreements directly with Chinese end customers, such as Baotou Iron & Steel Co., Ltd., China Energy Coal and Coking Co., Ltd, Shenhua Inner Mongolia Coal Coking Co., Ltd., Shanxi Coking Coal Group Co., Ltd., Gansu Jiu Steel Group Hong Xing Iron & Hainan Menkuang Mine International Trading Co., Ltd and others. In particular, our long-term cooperation agreement with China Energy Coal and Coking Co., Ltd and Baotou Iron & Steel Co. has strengthened our relationship with one of the largest coke producers and steel mills in Inner Mongolia in China. Compared to our local competitors in Mongolia, we are able to reach well diversified and strategic Chinese end customers directly instead of through coal traders, which provides more stable and predictable sales during industry cycles. For details on these agreements, see "Business – Customer Base".

We believe that the economic and regulatory environment in China, where a majority of our customers are located, contribute to a positive outlook for our business. Despite a recent slowdown, the growth of the Chinese economy has continued to outperform the global average for major economies, and is expected to achieve a growth rate of around 5% in 2023. China's large GDP base, coupled with such GDP growth levels, have helped sustain sizable infrastructure build-up and fixed asset investments in the country. Moreover, China is the world's largest steel producer. According to the World Steel Association, China produced 1,013 Mt of crude steel in 2022, representing 54% of the world's total crude steel production. Based on China's coal capacity and production forecast from 2023 to 2027, and China's demand for steel in the same period, Fenwei estimates there to be a shortage of coking coal supply for the period. In 2022, China imported 63.8 Mt of coking coal, of which 40% was sourced from Mongolia, making Mongolia China's largest supplier, according to Fenwei. Chinese demand for metallurgical coal is expected to remain stable. Since the reopening of the border in China and the phase-out of the "Zero COVID" policy, coal export volume from Mongolia to China has started to increase significantly.

We believe that we are strategically positioned to benefit from the Chinese steel industry's strong demand for coking coal. We are the closest coking coal exporter to the largest steel producing provinces in China, including Inner Mongolia, Hebei, Shandong and Jiangsu. Our UHG and BN mines are located approximately 240 km and 230 km from the GS border crossing, respectively. We are also located approximately 600 km from Baotou, China and 1,600 km from Hebei, China. In the first half and second half of 2021, the total number of trucks volume through the GS-GM border reached 29,363 and 27,269, respectively. The GS-GM border throughput increased slightly to 35,540 trucks in the first half of 2022. From the second half of 2022, China began to relax various pandemic related border restrictions, which further boosted export volume. The GS-GM border throughput increased to 100,994 trucks and 120,197 trucks for the second half of 2022 and the first half of 2023, respectively. In addition, through the railway from GM, we have gained access to China's large steel producing provinces and ports including Jingtang, Caofeidian and Tianjin. Moreover, Mongolia has completed two major railways in 2022, the Tavantolgoi-Gashuunsukhait railway and the Zuunbayan-Khangi railway. After the cross-border sections of the railways are completed, they will be the second and third cross-border railways connecting Mongolia and China. These railways create opportunities for us to reach additional ports of export for our products.

Our core customer base is located in Inner Mongolia. Although total crude steel production in Inner Mongolia decreased in 2022 due to the slow-down in Chinese real estate market, we expect growth will resume in 2023 as the Chinese economy starts to recover from the COVID-19 pandemic. Inner Mongolia is also less affected by more stringent changes in environmental policies, which are generally focused on reducing steel production in areas such as the Beijing-Tianjin-Hebei corridor to reduce air pollution by shifting steel and coking capacity from coastal cities to inland provinces such as Inner Mongolia. Beyond Inner Mongolia, given our infrastructure based on proximity, we are also able to capture growth in broader areas including Hebei, Tianjin, Shandong and Gansu provinces allowing the Company to obtain a more diversified customer base.

The further rationalization of China's coal supply is increasingly driven by environmental and safety concerns, and thus the supply of Mongolian coal imports is increasingly important to China. In particular, the Tavan Tolgoi basin is essential to China given the depletion of China's low sulfur coking coal reserves and continued focus on emission standards. Furthermore, Chinese customers are focused on higher quality coking coal, given higher blast furnace utilization and larger blast furnace builds. Such preference favors our coal products. Finally, the tension on importing Australian coking coal in China calls for import replacement from Mongolia. Considering China's continuous reliance on coal import, the demand for Mongolian coal is expected to rise substantially.

Furthermore, we have been exploring alternative channels to cater for customer demands. For example, in January 2023, the MSE organized the first ever coal spot trade on its platform. We voluntarily participated in the process and had successfully auctioned off 307 kt of coking coal through the MSE platform during the first half of 2023. We expect the sales volume through the MSE platform to account for a meaningful share of our sales volume going forward.

Industry leading, competitive cost structure

We have a competitive cost structure amongst our peers, demonstrating our industry leading cost efficiencies and competitive advantage. Our centralized, large scale operations with comprehensive infrastructure allows for significant cost competitiveness and increases the potential for further economies of scale.

We believe that we have one of the lowest mining and processing cash operating costs of production among coking coal producers. The majority of our coal deposits are close to the surface, which enables the development of lower cost open pit mines. Our centralized, one-pit operating model with robust infrastructure, including the 18 MW power plant, the CHPP and CHPP's water recycling facility, allows for significant cost advantages and increases the potential for further economies of scale. We also rely on our own fleet to transport coal to the Mongolian border, which helps to reduce our cash cost. Our low average strip ratio keeps our mine gate cash costs low. The stripping ratio of our UHG mine in 2022 was 5.3 bcm/t. Our mine gate cash cost was US$42.3, US$46.8, US$50.6, US$47.1 and US$48.6 per tonne for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, respectively. In addition, the growth of our mine gate cash cost declined year-over-year from approximately 11.0% in 2021 to approximately 8.0% in 2022, which is attributable to the reopening of Chinese border that led to increased production and sales volume in the second half of 2022, helping us achieve greater economies of scale. Given that all mine infrastructure is already in place, our mine gate cash cost is expected to be stable in the long term. Furthermore, the increase in our operations and improved throughput conditions at the GS-GM border has resulted in improvements in our unit costs. Our transportation cost associated with coal sold has also decreased in 2023 primarily because we sold most of our coal at TKH without utilizing third-party contract haulage as well as decrease in overall contractor tariffs. The short haul contractor tariffs have further lowered transportation costs with cross-border logistics improvements. We expect the expansion of rail transportation to stabilize transportation costs going forward. These characteristics enable us to optimize our operating cost and produce high quality washed coal at a low cost.

Our cost of production is lower than our principal competitors serving China, namely coking coal producers from China and Australia. Coking coal from China is predominantly produced from underground mines. In general, underground mining is significantly more capital intensive, costly and operationally challenging than open-pit mining. We have also prioritized cost control initiatives intended to enhance operational efficiency and productivity. For example, we had suspended our mining operations at both UHG and BN mines for certain periods during the COVID-19 pandemic, to preserve working capital. We also connected our power plant to the central grid to stabilize power plant operations and reduce electricity costs for coal processing from US$1.2 per ROMt in 2012 to US$0.6 per ROMt in 2022. Our CHPP employs water recycling technology by extracting water from fine tailings without exposure to evaporation normally experienced in more conventional recovery techniques such as the decanting of tailings dam, which doubles the rate of water recovery. As a result, we have achieved a more competitive cost structure, which we believe makes us more resilient to fluctuations in coal prices.

We believe that our infrastructure development is largely complete and do not expect significant capital expenditure projects in the future. We have completed the infrastructure development of our UHG deposit, and as a result of proximity, infrastructure integration and the use of contractors, we currently have no additional development capital expenditures planned for our BN deposit. Our maintenance capital expenditure is expected to be approximately US$5 million to US$10 million per year, thereby giving us greater financial flexibility while increasing our sales volume.

Room for further enhancement from rail transportation

Our mining operations are highly dependent on road and rail services in Mongolia and China. Mongolia has completed the development of two major railways in 2022, the Tavantolgoi-Gashuunsukhait railway and the Zuunbayan-Khangi railway. The commissioning of these railways is expected to help increase export volume to China. Tavantolgoi Railway LLC has completed the construction of the loop connecting the Tavantolgoi-Gashuunsukhait railway to the UHG stockyard. Simultaneously, we have built and completed a designated stockyard at our UHG mine in 2022, which can connect to the Tavan Tolgoi station. During the first half of 2023, we have arranged for approximately 250 kt of export shipments to China via the Zuunbayan-Khangi railway as a trial. In addition, both narrow and wide-gauge railways are expected to be built at the cross-border section of the GS-GM border checkpoint, which has a direct connection to the Chinese railway line.

In April 2021, we entered into a joint venture agreement with CHN Energy Coal Coking Co., Ltd, one of our largest customers to focus on improving warehouse facilities for coal storage and handling customs bonded stockyards located at the GM port in the PRC. This stockyard is located next to the China Shenhua railway line on the China side of the border, allowing direct access for further rail transportation in China after the completion of the cross-border section of the Tavantolgoi-Gashuunsukhait railway line is completed. In June 2023, Mongolia and China agreed to commence the construction of the GS-GM cross-border railway, with plans to commence operations in late 2024. By maximizing transportation and logistics efficiency through a strategic cooperation, we expect to be able to further expand our long-term relationships with our current end customer base and further diversify our revenue sources.

Clear pathway to diversification coupled with robust governance standards

We believe we have a clear pathway to further diversify our business operations and a plan to increase our mineral resources through acquisitions of companies with existing exploration rights and additional mining assets. For example, on January 10, 2023, we entered into an investment agreement with EM LLC and Erdene Resource Development Corporation to subscribe for securities for the total consideration of US$40 million in EM LLC. EM LLC holds two minerals exploitation special permits MV-021444 of 2,308.62 hectares area and MV-021547 of 4,668.64 hectares area, issued by the MRPAM on August 5, 2019 and March 4, 2020, respectively. We believe that this transaction will diversify our revenue sources and reduce our full dependency on coal. For more information, see also "Business – EM Transaction."

We believe that high corporate governance standards are essential in providing a framework for the Company to safeguard the interests of investors, enhance corporate value, formulate its business strategies and policies and strengthen its transparency and accountability. As a Company, we place strong emphasis on the benefits of having a diverse board of directors (the "Board") and believe that increasing the diversity of the Board is an essential element in maintaining the Company's competitive advantage. Since our initial public offering in 2010, we have built a strong compliance culture and our Company strictly adheres to the requirements under the Listing Rules of the Hong Kong Stock Exchange. We have introduced a comprehensive risk management and internal control framework with regular operational and technical risk checks. We perform stringent operational and technical risks checks on a regular basis. In establishing new third-party relationships, we conduct thorough due diligence on each counterparty's background, shareholding structure, incorporation status and any connection it may have with sanctioned entities. We have a robust set of anti-money laundering and anti-bribery/corruption policies and controls in place to strictly prohibit such unlawful activities. Moreover, all of our internal codes, systems and policies are in conformity with applicable legislation in Mongolia, including the Mongolian Law on Combating Money Laundering and Terrorism Financing enacted in 2013, the Law on Combating Proliferation of Weapons of Mass Destruction and the Terrorism enacted in 2019, the Law on Anti-corruption enacted in 2006, as well as the Criminal Code of Mongolia effective since 2002. We have also established a dedicated ESG management committee that is involved in assessing and addressing ESG related risk and to integrate ESG considerations into our business strategy and decision-making. To ensure that we share Company updates with our investors in a timely manner and to have their views and concerns appropriately addressed, we have a dedicated team that adheres to our internal investor communication policy.

In addition, we also have an experienced management team. Our directors and senior management include representatives of our shareholders and professionals who have extensive industry knowledge and experience in their respective industries, including mining operations, exploration, development, finance and marketing resources. The team has experience in successfully managing coal price cycles and the majority has been with us for more than 14 years. In particular, Mr. Odjargal Jambaljamts, our executive Director, chairman of the Board and executive chairman, has overseen the development of our business since our establishment. Dr. Battsengel Gotov, our executive Director and chief executive officer, has been with the Company since May 2008, and has served in various managerial positions within the MCS Group since 2004. Dr. Gotov was instrumental in transforming our UHG mine from a greenfield project into a fully integrated coal mining, processing, transportation and marketing platform. In April 2022, Dr. Gotov was appointed as the Chairman of the Mongolian National Mining Association. Building on extensive industry experience, our management team has demonstrated strong execution abilities to expand mine operations and infrastructure. Our management team has proven capable of effectively managing our operations while employing international mining practices and corporate governance standards.

OUR STRATEGIES

We intend to pursue the following key strategies to maintain and enhance our position as a leading Asian coking coal mining company.

Minimize operating cost and improve operating efficiency

We have implemented various measures aiming at reducing the total and unit cost of operation, including (i) eliminating third-party contractors for long-haul coal transportation, (ii) connecting the UHG power plant to the central energy grid to stabilize its operation and allow for sale of excess generating capacity, (iii) implementing water recycling technology such as the Belt Filter Press connected to CHPP which doubles the rate of water recovery and (iv) localizing staff to reduce trip and camp costs. In 2019, we won the Water Innovation Award by the International Finance Corporation for our initiatives in rainwater harvesting and increasing the rate of water recycling in the Gobi area.

Since November 2015, mining contractor fees have been linked with a market index representative of HCC sales prices, enabling us to reduce mining costs when coking coal prices remain low. Target and assessment of key performance indicators under our mining and blasting services contracts have been mutually negotiated to ensure that the objectives of both the contractor and the principal are aligned to achieve operational efficiencies and cost effectiveness and therefore the success of the overall business.

Following the re-evaluation of the geotechnical guidelines resulting from our increased geological knowledge, we have revised the Life-of-Mine planning ex-pit waste dump design assumptions to reduce the haulage distance of overburden mines and the required truck operating hours and therefore the relevant maintenance, fuel and labor costs. Continuous focus on cost minimization will improve our competitive cost curve to further respond to the current challenging market conditions.

Since the completion of the paved road between UHG and GS and the commencement of our double-trailer heavy haulage truck operation in 2011, we have focused on improving the productivity and efficiency of the long-haul operation to reduce the unit cost of coal transported.

We have adopted various measures to achieve increases in fleet productivity, including (i) limiting the number of trucks available to be utilized to meet planned transportation requirements, (ii) redesigning the stockpile layout at TKH to facilitate improved unloading efficiency, (iii) improving the number, design and interaction process of truck weighbridges, (iv) revising standard operating practices for wheel loader operation loading and unloading transportation truck trailers and (v) revising standard operating practices for stockpile loading and unloading at CHPP.

Continue to develop and diversify our long-term customer base and promote our own brand

We intend to continue to expand and diversify our customer base, and have identified, and will continue to identify, new customers for our incremental coal volumes. We seek to sell high-quality washed coal under our own brand directly to end-use customers, which we believe will significantly increase our market recognition, competitiveness and bargaining power. We typically sell our washed coal into China pursuant to long-term agreements with iron and steel mills and coke and chemical plants under our own brand. Even in connection with our sales to coal traders, we have made the identification of our actual end-use customers a priority. Starting from 2014, we have extended our sales channel to other locations in China in addition to GM to further penetrate China's coal market. Although we believe there is sufficient demand for our coking coal in China, once the cross-border section of the Tavantolgoi-Gashuunsukhait railway becomes operational, we can ship our coal further south to different target market regions and explore alternative markets.

In April 2021, we entered into a joint venture agreement with CHN Energy Coal Coking Co., Ltd, one of our largest customers to focus on improving warehouse facilities for coal storage and handling customs bonded stockyards located at the GM port in the PRC. By maximizing transportation and logistics efficiency through a strategic cooperation, we will be able to further expand long-term relationship with our current end customer base and further diversify our revenue sources.

Expand and diversify our business operations through acquisitions, investments and joint ventures

Where suitable opportunities arise, we may acquire or invest in companies or assets in the mining industry. For example, In January 2023, we announced our investment agreement with EM LLC and ERD. EM LLC is a Mongolian company principally engaged in the exploration of gold and other precious metals. For more details, see "Business – EM Transaction". Going forward, we may selectively pursue natural resources used in the steel making industry (in particular, coking coal and iron ore) especially those that we believe will enhance our revenue growth, operational efficiency and profitability. In addition, given the importance of transportation infrastructure and a sales network to our mining business, we may consider strategic investments and joint ventures that will enhance our existing logistics capabilities and product penetration in the TMR and new markets, thereby strengthening our leading position as Mongolia's largest producer and exporter of coal.

From time to time, the Parliament initiates a tender offer process to encourage coalfield developments and we may participate.

Continued strong commitment to safety, the environment and social responsibility

We operate with a goal of achieving zero harm to employees and the environment in which we operate. We have been and will continue to be, in compliance with applicable Mongolian legal requirements, while at the same time implementing best practices above and beyond legislative requirements to meet and exceed stakeholder expectations.

We strive to be an environmentally and socially responsible company and attach great importance to creating sustainable economic and social opportunities for the communities in which we operate. We seek to minimize the impact of our activities on the environment through carefully designing mining plans, in particular land rehabilitation and mining closure plans, and closely monitoring the effects of mining. We have invested in various community development programs that support the local community and preserve our cultural heritage. We have received numerous awards and recognitions as a result of our efforts. See "– Community Development" for more information.

We have adopted a vision towards achieving carbon neutrality and have put in place short, medium and long term strategies. In the short-term, we will continue to conduct assessment of current green-house gas emissions to evaluate risks associated with current emissions level and prepare list of action-steps going forward. In the mid-term, we will employ "avoid and reduce" strategy to refrain from unnecessary resource allocation. We also intend to increase energy efficiency and implement portfolio transition for sustainable alternatives such as other minerals. The recent EM Transaction also is an example of our sustainable transition. In the long-term, we will employ "adjust and replace" strategy to commence use of renewable energy for production, sourcing and transportation. We also plan to undertake carbon-offset measures to achieve carbon neutrality.

RECENT DEVELOPMENTS

EM Transaction

In January 2023, MMC announced that it has entered into an investment agreement with EM LLC and ERD, pursuant to which the Company agreed to subscribe for securities in EM LLC for the total consideration of US$40 million. The consideration is paid in three instalments subject to the terms and conditions of the investment agreement. At the first closing, which occurred in January 2023, EM LLC issued and MMC subscribed for a convertible promissory note in the aggregate principal amount of US$5.0 million in cash. At the second closing, which occurred in May 2023, EM LLC issued and MMC subscribed for second instalment note in the aggregate subscription amount of US$5.0 million in cash. At the third and final closing, which is expected to occur during the course of 2023, subject to completion of certain milestones, EM LLC shall issue to MMC or its assignee the third instalment shares in the amount of US$30.0 million. In addition, at the final closing, all the outstanding principal amount and accrued interest of the convertible notes shall be converted into shares of EM LLC, which coupled with the third installment shares, shall altogether represent 50% of the issued and outstanding share capital of EM LLC immediately after such conversion and calculated on a fully diluted basis. For more information, see "Business – EM Transaction"

COVID-19 Pandemic and Government Response

During the past three years, COVID-19 has spread globally and has led to significant global economic and financial disruptions, including an adverse impact on global supply chains, international trade and business activities. In response to the COVID-19 pandemic, the Parliament of Mongolia and the Mongolian Government took extensive legislative, economic, fiscal and preventive measures, which have been relatively effective in response to the COVID-19 pandemic. The effective period of the Law on Prevention from and Fight against Coronavirus (COVID-19) Pandemic and Mitigating its Social and Economic Impact expired on December 31, 2022. However, the economic effects of efforts to contain the disease have had a substantial adverse effect on the Mongolian economy. Mongolia's economic growth has been adversely affected, with GDP contracting by 4.6% in 2020, compared to growth of 5.6% in the preceding year. Since 2021, despite the occasional re-imposition of restrictive measures in response to a resurgence of cases, Mongolia has in general relaxed its restrictions gradually and officially opened up its air borders to all visitors in February 2022. Starting in December 2022 and during the periods thereafter, the Chinese government started to announce series of measures to reopen its borders and economy, and also to support businesses in their recovery. See "Risk Factors – Risks Relating to Our Business and Industry – Public health crises and pandemics/epidemics, such as the COVID-19 pandemic, may materially adversely affect our results of operations".

OUR LOCATION AND LICENSES

The following map shows the location of our UHG and BN deposits and our existing and proposed transportation infrastructure:

UHG Mine

Our UHG deposit is located in Tsogttsetsii soum of South Gobi Province, Mongolia's largest aimag by area with a population of approximately 78,000 residents divided into 15 soums. The mine is located approximately 540 km south of Ulaanbaatar and approximately 240 km from the Sino-Mongolian border. A small town site located approximately 7 km from our mine serves as an administrative and logistical center for our UHG mine.

The UHG mine sits within the Mining License MV-011952 area and is one of six separate deposits located in the Tavan Tolgoi coal formation, the others being the Borteeg, Bor Tolgoi, Eastern, Southwest and Sharteeg deposits. This license was issued to us on January 23, 2007 for a period of 30 years commencing from August 29, 2006, and is extendable twice, each time for another 20 years, subject to certain conditions. In 2007, we entered into a minerals license transfer agreement with the Government of Mongolia, pursuant to which the Mining License MV-011952 was exempted from inclusion in the Mineral Deposit of Strategic Importance list and we received guarantee that the license would not be terminated. See "Risk Factors – Risks Relating to our Business and Industry – The Government of Mongolia could determine that any one or more of our projects in Mongolia is a Mineral Deposit of Strategic Importance and could take an equity, production profit sharing or other interest in any of our projects".

BN Mine

The BN deposit is located approximately 30 km southwest of our UHG mine and 60 km east of Dalanzadgad, the capital of South Gobi Province. See "– Our Location and Licenses" for a map showing the location of our BN deposit.

The BN mining license covering an area of 4,482 hectares was obtained as part of the acquisition of the BN mine and remains valid for a period of 30 years from December 1, 2008. This license is also extendable twice, each for another 20 years, subject to certain conditions. After the acquisition of BN mine, we were granted the THG mining license on June 24, 2013, covering an area of another 8,340 hectares contiguous to the BN mining license.

Extraction of coal reserves from the BN mine benefits from potential synergies through integrated operations with the UHG mine. The BN mine is able to rely upon the existing processing and transportation infrastructure and also upgrade certain of its coal to HCC products where ROM feed blend includes UHG sourced coal.

We suspended our operations at the BN mine intermittently during 2020-2022, largely to manage cross-border throughput due to COVID-19 related restrictions then in effect. In October 2022, in connection with improved conditions for cross-border logistics from the second half of 2022, we resumed operations at the BN mine. See "Risk Factors – Risks Relating to our Business and Industry – Our mining operations from which we derive all of our operating cash flows and sales are currently concentrated at two mining sites."

Parliament Resolution No. 27, 2007 "On designation of some mineral deposit as Mineral Deposit of Strategic Importance" specifically states that, as one of the Mineral Deposits of Strategic Importance, the Tavan Tolgoi area shall constitute license areas held by Tavan Tolgoi JSC, ER LLC and Erdenes Tavan Tolgoi JSC. On October 3, 2018, the Government of Mongolia issued Resolution No. 300 "On defining the boundaries of some mineral deposits of strategic importance" by which boundary coordinates of the Tavan Tolgoi were defined and whereby the Government of Mongolia expanded the boundaries for Tavan Tolgoi by including the areas under the BN and THG mining licenses. The Company has not yet received any notification or letter from the Government with regards to the consequences or follow-up actions of the abovementioned resolution. As of the date of this Offering Memorandum, our BN and THG mining license areas have not been designated as a Mineral Deposit of Strategic Importance by the Parliament and were not included in the Strategic Deposit List or the Tier 2 Deposits List as delineated in the Mongolian Parliamentary Resolution No. 27 dated February 6, 2007, so they are not subject to regulations allowing the Government to assert equity or other interests in it. See "Risk Factors – Risks Relating to our Business and Industry – The Government of Mongolia could determine that any one or more of our projects in Mongolia is a Mineral Deposit of Strategic Importance and could take an equity, production, profit sharing or other interest in any of our projects".

COAL RESOURCES

UHG deposit

Subsequent to the grant of the UHG mining license, we have prepared four JORC compliant coal resource estimates. The most recent estimate of the JORC-compliant coal resource within the UHG deposit is as of December 31, 2021. The last statement update stated as at December 31, 2022 was made only on the basis of revised surface topography, to account for depletion as a result of mining activity between January 1, 2022 to December 31, 2022 and no further exploration data was incorporated.

Resources are divided in order of increasing geological confidence, into inferred, indicated, and measured categories. The most recent resource update performed in 2021 focused on improving the details and accuracy of the 3D coal seam model. As a result, the unclassified, inferred, and indicated coal resources were moved to the measured resource category, representing higher confidence level. The 2021 updated resource report includes new information gathered from 16,935 meters ("m") of drilling by 89 boreholes and 6,108 samples with laboratory analysis that were completed between October to December of 2020.

Exploration activities conducted in the process of preparing the four preceding JORC compliant coal resource estimates and used by us to prepare the structural and coal quality models supporting the latest coal resource estimate as at December 31, 2021, included:

- 1,645 individual boreholes drilled for 208,211m, including 116,709m of HQ-3 (63.1 millimeter ("mm") core, 96.0mm hole diameter) and 91,502m of 122mm diameter open hole drilling;

- 43,656 individual analytical samples collected and analyzed;

- 71 km of high resolution 2D seismic in-field measurements, collected by Polaris Seismic International Ltd ("Polaris") and analyzed by Velseis Processing Pty Ltd ("Velseis"); and

- results from large-diameter, bulk-sample drilling samples analyzed at the ALS Group laboratories in Ulaanbaatar.

Data derived from these exploration activities was used to prepare the structural and coal quality models, and subsequently the UHG mining license JORC Code coal resource estimate as of December 31, 2021.

Internal peer audit of this model was conducted by Mr. Lkhagva-Ochir Said, which confirmed compliance of our work carried out to update the UHG geological model, and thus the JORC Code coal resource estimate for the UHG mining license area. Since completion of the previous coal resource estimates in 2022, no further exploration data has been incorporated into structural or coal quality geological models.

The following table sets forth the UHG mining license area JORC Code coal resource by depth and category as of June 30, 2023. Based upon mine survey calculation, since January 1, 2023 to June 30, 2023, mine production has depleted the stated coal resource by approximately 10 Mt.

Total Coal Resource	**Resource Category (Mt)**				
Depth limit from topographic surface	**Measured**	**Indicated**	**Inferred**	**Total (M+I)**	**Total (M+I+I)**
Subcrop to Base Horizon of Weathering Elevation ("BHWE")	7	1	3	8	**11**
BHWE to 100m	62	4	13	66	**79**
From 100m to 200m	94	9	20	103	**123**
From 200m to 300m	133	6	14	130	**153**
From 300m to 400m	88	3	4	91	**95**
Below 400m	85	7	14	92	**106**
Sub-Total above 300m	296	20	50	316	**366**
Sub-Total below 300m	173	10	18	183	**201**
Total	469	30	68	499	**567**
Total (Rounded)	470	30	70	500	**570**

Notes:

(1) Technical information in the UHG coal resource estimation report has been compiled by Mr. Byambaa Barkhas, the Group's Chief Geologist of Geology and Geotechnical sub-section. Mr. Barkhas is a member of the Australasian Institute of Mining and Metallurgy (Member #318198) and has over 14 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code. Mr. Barkhas consents to the inclusion and the release of the matters based on this information in the form and context in which it appears. The estimates of the coal resource are considered to be a true reflection of the UHG coal resource as at December 31, 2022, and have been carried out in accordance with the principles and guidelines of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code.

(2) Mr. Lkhagva-Ochir Said is employed by the Group as Chief Operating Officer. Mr. Said is a member of the AusIMM (Member #316005) and has over 16 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code.

(3) Due to rounding, discrepancy may exist between sub-totals and totals. Rounding rules refer to Clause 25 of the JORC Code.

BN deposit

Following acquisition of the BN deposit, our exploration and geology department has been working to update the coal resource estimations previously prepared by Glogex for the BN and THG license areas. Such work included incorporating additional exploration data gained from an exploration drilling program conducted in 2014 and 2018, and applying the more stringent requirements of the Australian Guidelines for the Estimation and Classification of coal resources (2014). The most recent estimate of the JORC-compliant coal resource within the BN and THG deposit is as of December 31, 2021. The last statement update stated for BN and THG as at December 31, 2022 was made only the basis of revised surface topography, to account for depletion as a result of mining activity from October 1, 2022 to December 31, 2022, and no further exploration data was incorporated.

The 2021 resource update was done based on 8,335.4m of drilling data on the BN deposit. The drilling focused on the H pit mining boundary. 3,766 samples were collected and tested, confirming the coal quality and coal seam structure. As a result, the inferred and indicated coal resources were moved to the measured resource category, and the geological model was updated with improved accuracy. Moreover, based on 2018 exploration drilling result, the technical team improved the interpretation of the seam correlation between the BN and THG deposits and classified an indicated resource in THG resource estimation.

The coal resource stated as at December 31, 2021 incorporated additional exploration data gained from the exploration drilling program conducted in 2018. The following activities provided the basis for updating the structural and coal quality geological models underpinning the updated coal resource statement as at December 31, 2021:

- total of 135 exploration boreholes at BN, with a total of 36,875m drilled, of which 16,102m were HQ-3, 9,640m were PQ-3 (83.0 mm core, 122.6mm hole diameter) and 11,133m were 122mm diameter open boreholes;

- total of 32 exploration boreholes at THG, with a total of 9,970m drilling at THG, of which 5,900m were HQ-3, 3,610m were PQ-3 and 460m were 122mm open boreholes;

- total of 12,502 (BN) and 3,824 (THG) coal samples collected and analyzed; and

- total of 75 km of 2D seismic survey captured by Polaris over the BN mining license, and analyzed by Velseis.

Internal peer review was conducted by Mr. Lkhagva-Ochir Said, the Group's Chief Operating Officer. These peer reviews confirmed compliance of the Group's work to update the coal resource estimations in compliance with requirements of the JORC Code. Since completion of the previous coal resource estimate, no further resource exploration data has been incorporated into structural or coal quality geological models.

The following tables set forth the JORC (2012) coal resource for the BN and THG mining license areas by depth and category as of June 30, 2023, respectively. The figures in this table represents a calculation based upon in-situ density at an assumed 5% moisture basis.

Total Coal Resource for BN mining license	**Resource Category (Mt)**				
Depth limit from topographic surface	**Measured**	**Indicated**	**Inferred**	**Total (M+I)**	**Total (M+I+I)**
Subcrop to BHWE	7	1	1	8	**9**
BHWE to 100m	61	9	5	70	**75**
From 100m to 200m	88	12	8	100	**108**
From 200m to 300m	89	13	8	102	**110**
From 300m to 400m	87	16	9	103	**112**
Sub-Total above 300m	245	35	22	280	**302**
Sub-Total below 300m	87	16	9	103	**112**
Total	332	51	31	383	**414**
Total (Rounded)	330	50	30	380	**410**

Total Coal Resource for THG mining license	**Resource Category (Mt)**				
Depth limit from topographic surface	**Measured**	**Indicated**	**Inferred**	**Total (M+I)**	**Total (M+I+I)**
Subcrop to BHWE	–	1	0	1	**1**
BHWE to 100m	–	13	4	13	**17**
From 100m to 200m	–	18	4	18	**22**
From 200m to 300m	–	19	5	19	**24**
From 300m to 400m	–	16	9	16	**25**
Sub-Total above 300m	–	51	13	51	**64**
Sub-Total below 300m	–	16	9	16	**25**
Total	–	67	22	67	**89**
Total (Rounded)	–	70	20	70	**90**

Notes:

(1) Technical information in the BN and THG deposit coal resource estimation report has been compiled by Mr. Byambaa Barkhas, the Group's Chief Geologist of Geology and Geotechnical sub-section. Mr. Barkhas is a member of the AusIMM (Member #318198) and has over 14 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code. Mr. Barkhas consents to the inclusion and the release of the matters based on this information in the form and context in which it appears. The estimates of the coal resource are considered to be a true reflection of the BN and THG deposit coal resource as at December 31, 2022, and have been carried out in accordance with the principles and guidelines of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code.

(2) Mr. Lkhagva-Ochir Said is employed by the Group as Chief Operating Officer. Mr. Said is a member of the AusIMM (Member #316005) and has over 16 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code.

(3) Due to rounding, discrepancy may exist between sub-totals and totals. Rounding rules refer to Clause 25 of the JORC Code.

COAL RESERVES

Ukhaa Khudag (UHG) deposit

We engaged Glogex to prepare an updated JORC Code coal reserve statement as at January 1, 2023 for the UHG deposit. The process used was the same as that used to prepare the previous JORC (2012) coal reserve estimate, with the updated JORC Code coal reserve estimate again based on open cut, multi seam, truck and excavator mining methods. The last reserve statement was made on the basis of revised surface topography, to account for depletion as a result of mining activity between January 1, 2022 to January 1, 2023. As of January 1, 2023, the total marketable reserves for the UHG deposit was approximately 225 Mt.

Pit optimization software was used to generate a series of nested pit shells corresponding to varying revenue factors, simulating incrementally different economic scenarios as impacted by mining cost or coal price variance. The pit optimization algorithms used included:

- geotechnical constraints, including limitation of overall slope angles within the pit by sector, ex-pit dump offset from the LOM pit shell crest and maximum pit depth, with updates on basis of research and analyses made since timing of the previous JORC Code coal reserve estimate, as provided by Mr. John Latilla of AMC Consultants Pty Ltd ("AMC");

- washability curves on seam ply basis, as prepared by the Group's processing team for inclusion in the previous JORC Code coal reserve estimate, to individual coal seams based upon propensity for processing into coking and/or thermal products, with update made to reassign portion of Seam 0B and 0AU from thermal to coking coal production, based upon results observed during production trials in 2017;

- updated cost input assumptions, derived from recent historical operating performance at UHG mine on the basis of sustainable cost reductions made in response to difficult market conditions, and as forecast based upon negotiated reductions in cost for mining and blasting contractor services; and

- updated revenue input assumptions, derived from an updated market study prepared by Fenwei, which provided for medium to long term forecasting of expected Free-on-Transport ("FOT") pricing at UHG mine for hard coking, semi-soft coking and thermal coal products planned for production.

The run-of-mine ("ROM") raw coal tonnages resulting from the updated statement of the JORC Code coal reserve estimate for the UHG deposit as at January 1, 2023 based upon an as-received basis with 3.64% total moisture for coking coal and 2.68% for thermal coal types, are shown in the table below:

UHG Deposit

ROM Coal Reserve	**Reserve Category (Mt)**		
Coal Type	**Proved**	**Probable**	**Total**
Coking	336	10	346
Thermal	19	0	19
Total	355	10	365

Notes:

(1) The estimate of coal reserve presented above has been carried out in accordance with the JORC Code. Technical information in the UHG coal reserve estimation report has been compiled by Mr. Naranbaatar Lundeg, who is a member of the AusIMM (Member #326646). He is the General Director and Executive Consultant of Glogex. He holds a bachelor's degree of mining industrial management and a master's degree of business administration in the field of financial management. He has extensive experience in the mining industry, having worked with major mining companies and as a consultant for over 20 years. During this time, he has either managed or contributed significantly to numerous mining studies related to the estimation, pit optimization, mine planning, assessment, evaluation and economic extraction of coal in Mongolia. He has sufficient experience which is relevant to the style of mineralization and type of deposit under consideration and to the activity he is undertaking to qualify him as a Competent Person as defined under the JORC Code. Mr. Lundeg consents to the inclusion and the release of the matters based on this information in the form and context in which it appears.

(2) Due to rounding, discrepancy may exist between sub-totals and totals.

Baruun Naran (BN) deposit

Coal reserve statement for the BN deposit was prepared by Glogex with the resulting statement dated January 1, 2023. The LOM mining plan prepared to underpin the current JORC Code estimate for the BN deposit was based upon open cut, multi seam, truck and excavator mining methods. Pit optimization software was used to generate a series of nested pit shells corresponding to varying revenue factors, simulating incrementally different economic scenarios as impacted by operating cost and coal revenue variance. The last reserve statement was made on the basis of revised surface topography, to account for depletion as a result of mining activity between October 1, 2022 to January 1, 2023.

The pit optimization algorithms used included for implementation of the following:

- limitation of open pit depth to 360m from surface, and overall slope angle restrictions, based upon geotechnical advice received from Mr. John Latilla of AMC;

- categorization of coal seams for scheduling purposes on basis of propensity for coking or thermal coal production, based upon recommendations made by Mr. John Trygstad of Norwest Corporation;

- cost input assumptions based on stripping and blasting estimates derived from the current mining contractors;

- revenue input assumptions derived from an updated market study of the principal coking and thermal coal markets in China, completed by Fenwei.

The JORC Code coal reserve estimate for the BN deposit as of January 1, 2023 prepared on basis of the above is summarized in the table below, with tonnage estimation based on an as-received basis with 1.8% total moisture for coking coal and 2.62% for thermal coal types.

ROM Coal Reserve	**Reserve Category (Mt)**		
Coal Type	**Proved**	**Probable**	**Total**
Coking	246	23	269
Thermal	10	1	11
Total	256	24	280

Notes:

(1) The estimate of coal reserve presented above has been carried out in accordance with the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code. Technical information in the BN coal reserve estimation report has been compiled by Mr. Naranbaatar Lundeg, who is a member of the AusIMM (Member #326646). He is the General Director and Executive Consultant of Glogex. He holds a bachelor's degree of mining industrial management and a master's of business administration in the field of financial management. He has extensive experience in the mining industry, having worked with major mining companies and as a consultant for over 20 years. During this time, he has either managed or contributed significantly to numerous mining studies related to the estimation, pit optimization, mine planning, assessment, evaluation and economic extraction of coal in Mongolia. He has sufficient experience which is relevant to the style of mineralization and type of deposit under consideration and to the activity he is undertaking to qualify him as a Competent Person as defined under the JORC Code. Mr. Lundeg consents to the inclusion and the release of the matters based on this information in the form and context in which it appears.

(2) Due to rounding, discrepancy may exist between sub-totals and totals.

The last reserve statement was made on the basis of surface topography depletion due to mining activity from January 1, 2021 to January 1, 2023. As measured by mine survey, the stated BN ROM coal reserve has been depleted by 4.0 Mt.

COAL PRODUCTS

The coal in our UHG and BN deposits is Permian coal. After processing, a premium medium volatile hard coking coal is produced as the primary product and a low sulfur high energy content thermal coal is produced as the secondary by-product, known as middlings. Thermal coal is also available without processing from seams with lesser coking qualities.

The first, second and third modules of our CHPP, each with ROM coal nameplate processing capacity of 5.0 Mtpa, have been in operation since June 2011, February 2012 and July 2013, respectively. We are able to produce HCC, SSCC and thermal coal from our UHG and BN mines. The type of coal we produce will depend on the specific seam(s) being mined and blended in feed to CHPP. Our UHG deposit contains a significant amount of high quality thermal coal which we may mine and sell in the future depending on transportation costs and market prices. In response to the downturn due to measures related to COVID-19, we placed high priority on our liquidity position and took several measurements to enhance our liquidity position in addition to the temporary adjustment to our level of production. We entered into offtake agreements and were committed to sell certain portion of our existing washed coking coal inventory cumulated at the Sino-Mongolian border and collected cash proceeds as advance payment from our customers in 2021 and 2022.

We currently produce washed HCC from our UHG mine and produce both washed HCC and SSCC from our BN mine. We believe that our products are viewed by most consumers as high-quality coking coal and are readily used by coke manufacturers and steel producers both in China and abroad. The Chinese classification of coking coal differs from common international standard with many of the attributes for which we test omitted.

Extensive exploration and coal quality assessment indicate that our coal compares favorably with international coal. The HCC delivered to customers displays characteristically high CSN and lower sulfur content, both of which are desirable qualities.

MINING AND PROCESSING

We engage in open-pit mining at our UHG and BN deposits with primary overburden stripping and coal mining being handled by diesel hydraulic excavators and diesel mechanical trucks. The typical open-pit mining process begins with land clearing. We then strip the top soil from the area to be mined and the waste dump area. We remove the top 10 to 15 meters of soft waste materials without drill and blasting, depending on the hardness of the waste materials. A combination of conventional drilling and blasting techniques is then used to fragment the overburden, which is removed by excavators and rear dump trucks. Coal is loaded by excavators into rear-dump trucks and delivered directly to CHPP for processing or to temporary ROM stockpiles nearby. Mining operations are conducted through two 12-hour shifts, 7 days a week, 365 days a year, subject to weather conditions.

At the UHG mine, we cooperate with Thiess, a mining services provider, in all aspects of our coal mining operations under an alliance style contract, and since mid-2018 we have contracted with Vertex Mining Partners LLC ("Vertex"), a local contractor and a subsidiary of Hera Equipment LLC, a mining equipment dealer in Mongolia. In January 2009, the currently effective UHG Coal Mining Agreement was entered into with Leighton LLC, subsequently renamed as Thiess, and remains effective through December 31, 2023 under subsequent amendments (the "Thiess Agreement"), which are currently subject to negotiations. If we elect to terminate the Thiess Agreement earlier in order to continue operations as the owner miner after acquiring all remaining assets and inventories from Thiess at an agreed value, we can terminate the Thiess Agreement by providing a sufficient prior notice. If we advise Thiess to extend the Thiess Agreement at the end of the currently extended period, then Thiess shall consider this extension request and applicable terms of extension, in good faith. Our agreement with Vertex expires on June 30, 2024 and can be extended by 24 months by mutual agreement of the parties.

We supervise all mining activities at UHG while Thiess is in charge of and responsible for the readiness and management of maintenance of all equipment at the UHG mine. All operators and maintainers are employed by us, while Thiess trains our employees based on their standards. We have access to a wide range of mining services support from Thiess corporate resources, including review and optimization of short, medium and long-term designs and schedules, technical and operational studies, budgeting and cost estimation work. Substantially all of the mining related equipment used at our UHG mine is owned by Thiess. As one of the world's largest purchasers of mining equipment, Thiess is able to negotiate favorable terms with equipment manufacturers for not only the initial capital equipment purchases but also the ongoing spare parts required to maintain the equipment. The majority of the mining equipment supplied to UHG mine has been sourced from internationally recognized equipment manufacturers such as Caterpillar, Liebherr and Hitachi. Going forward, if we decide to purchase the equipment from Thiess, we may incur additional capital expenditures. We believe effective asset management is the backbone of our agreement with Thiess, and therefore require such equipment manufacturers to have sufficient local capacity of critical spares and skills in Tsogttsetsii soum or at least within Mongolia.

Thiess invoices are paid on a transparent, open book basis for the costs incurred in delivery of the contracted services, plus a contractor fee calculated based on the capital investment made to obtain the assets required to deliver the contracted services at the UHG mine. Such costs comprise costs related to employment of their personnel, corporate overhead, general materials and plant rates covering cost of asset operation and maintenance on a per utilized hour basis. The plant rates are developed to meet costs related to the depreciation, finance, insurance and maintenance over forecast asset lives based upon forecast asset utilizations. These costs are recorded as mining costs under our cost of revenue. See "Management's Discussion and Analysis of Financial Condition and Results of Operations – Factors Affecting Results of Operations and Financial Condition". Our contractual arrangement with Thiess allows us the flexibility to amend and renegotiate the agreement based on forecast variance to mining volumes, and allows us to continue benefiting from Thiess's investment in the equipment used at our UHG mine. See "Risk Factors – Risks Relating to Our Business and Industry – Our business depends substantially on the continuing efforts of our executive officers and our mining contractors and our ability and the ability of our mining contractors to attract and retain qualified technical personnel".

We manage and operate all mining activities and planning at BN mine through a local contractor, UARP LLC and since mid-2022, we have contracted with SG Coal Mining LLC. Our local contractors have the capability and equipment to move 10 million bcm of overburden annually. All employees and equipment are provided by the contractors and we handle supervision of the BN mine.

We engaged Sedgman to construct our CHPP with a three module design, each with a ROM coal nameplate processing capacity of 5.0 Mtpa and together providing a total nameplate capacity of 15.0 Mtpa ROM coal feed. In 2018, we engaged TAKRAF to construct an extension to the CHPP to increase the total capacity of the ROM coal feed, which is in the process of being commissioned.

Our CHPP is capable of operating in the harsh climate of Mongolia's South Gobi desert with extreme fluctuations in temperature. In response to the downturn in our sales during the COVID-19 pandemic, we have tailored the output of the CHPP to meet sales forecasts, reducing working capital and improving liquidity, by operating less mining fleet and each of the three CHPP modules intermittently. As of June 30, 2023, the CHPP processed a total of 6.8 Mt of ROM coal to produce a total of 3.0 Mt of washed coking coal products.

We have engaged local companies to provide "down-the-hole" blasting services, which include supply, delivery and initiation of explosive products at the UHG and BN mines to fragment overburden and coal prior to excavation. Both contracts are formulated under a 'schedule of rates' construct, which depends on the volume of explosive products used. Payment amounts are subject to achievement of key performance indicators measured against specified performance criteria for each blast loaded, tied and fired.

Our 18 MW coal fired power plant at the UHG mine site is used principally to provide the electricity required to operate the CHPP, as well as all other facilities at the UHG mine site. MCS International has been engaged to operate the power plant and provide electricity and heat distribution across the site and to third parties in the neighboring community. Our UHG mine site is also connected to the Central Electricity Grid of Mongolia, providing an outlet for the sale of excess electricity generated as well as a back-up supply to UHG site in the event of disruption to power plant electricity generation. In addition to this main electrical grid back-up, our diesel power generators operated prior to power plant construction remain on site, providing further electricity supply redundancy.

Water required in support of other UHG mine site activities is supplied from a nearby underground aquifer. The majority of water extracted is used at the CHPP to process coal. To achieve both cost efficiency and environmental benefit, the CHPP is designed to ensure optimum water use efficiency by recycling water. We also have a Belt Filter Press facility adjacent to the CHPP to further improve efficiency of water recycling used within the CHPP. The Belt Filter Press facility is able to decrease the amount of fresh water for coal processing by approximately 35%.

EM TRANSACTION

In January 2023, MMC announced that it has entered into an investment agreement with EM LLC and ERD, pursuant to which the Company agreed to subscribe for securities in EM LLC for the total consideration of US$40 million. The consideration is paid in three instalments subject to the terms and conditions of the investment agreement. At the first closing, which occurred in January 2023, EM LLC issued and MMC subscribed for a convertible promissory note in the aggregate principal amount of US$5.0 million in cash. At the second closing, which occurred in May 2023, EM LLC issued and MMC subscribed for second instalment note in the aggregate subscription amount of US$5.0 million in cash. At the third and final closing, which is expected to occur during the course of 2023, subject to completion of certain milestones, EM LLC shall issue to MMC or its assignee the third instalment shares in the amount of US30.0 million. In addition, at the final closing, all the outstanding principal amount and accrued interest of the convertible notes shall be converted into shares of EM LLC, which coupled with the third installment shares, shall altogether represent 50% of the issued and outstanding share capital of EM LLC immediately after such conversion and calculated on a fully diluted basis.

The parties have also entered into (i) a strategic alliance agreement to govern certain shareholders and management rights over EM LLC; and (ii) a net smelter return agreement to jointly develop the mineral assets and to govern the royalty arrangement.

EM LLC is a limited liability company established and existing under the laws of Mongolia and is principally engaged in the exploration of gold and other precious metals. Erdene Resource Development Corporation, or ERD, is a company incorporated under the federal laws of Canada, whose common shares are traded on the Toronto Stock Exchange and Mongolian Stock Exchange under the symbols ERD and ERDN. Upon the final closing of the transaction, subject to conditions of the investment agreement, MMC or its assignee is expected to hold a total of 50% equity interest in EM LLC.

EM LLC holds two minerals exploitation special permits MV-021444 of 2,308.62 hectares area and MV-021547 of 4,668.64 hectares area, both issued by the MRPAM on August 5, 2019 and March 4, 2020, respectively. EM LLC's wholly owned subsidiary, Leader Exploration LLC is a limited liability company established and existing under the laws of Mongolia and is principally engaged in the minerals exploration of gold and other precious metals. Leader Exploration LLC holds minerals exploration special permit XV-016057 of 1,780.20 hectares area as issued by MRPAM on February 16, 2015 and valid until February 15, 2024. All mining assets held by the EM LLC and Leader Exploration LLC are located in Bayankhongor

province in Mongolia. See also "Risk Factors – Risks Relating to Our Business and Industry – We may not be able to successfully complete or integrate our recent acquisitions or any potential future acquisitions or experience challenges in realizing expected benefits of each such acquisition, including the EM Transaction".

TRANSPORTATION AND LOGISTICS

In the past three years, due to various restrictions imposed as a result of the COVID-19 pandemic, we adopted different transportation and logistic strategies, which was further adjusted on an *ad hoc* basis to maintain compliance with relevant regulations whilst ensuring our coal products reached our customers. The daily throughput started to improve after prolonged periods of cross-border logistics issues and saw recovery back to pre-COVID-19 throughput levels from the second half of 2022. The throughput continued to remain strong throughout the first half of 2023 with total number of trucks crossing the border reaching 120,197 in the first half of 2023, a four-fold increase compared to the same period in 2022.

During the first half of 2023, we shipped all our coal products for exports to China by utilizing our trans-shipping facility at Tsagaan Khad ("TKH") and GS container terminal ("GS Terminal"), except the volume sold under ex-works ("EXW") UHG and free-carrier ("FCA") Khangi terms.

Coal was transported from UHG to TKH and from TKH to GS Terminal exclusively by our own trucking fleet. Coal was stockpiled at TKH and after export clearance by Mongolia Customs shipped further by trucks from TKH to GM. The transportation of coal from TKH to GM was performed by our own trucking fleet and by third party contractors while coal exported from GS Terminal was exported by third party contractors. In addition, the Group has been utilising the UHG rail terminal stockyard to run trail shipments to the Khangi Terminal for exports.

In general, we used two-step shipment for coal export transportation from the mine area to GM. The first step is around 240 km long-haul section from UHG to TKH, the trans-shipping yard on the Mongolian side of the border, and from TKH to GS Terminal exclusively by the Group's own trucking fleet. Washed coking and thermal coal produced at UHG are stacked underneath radial stackers upon exit from the CHPP. Afterwards, the coal is loaded by wheel loader into road trucks for onward transportation to the trans-shipping facility at TKH, which is referred to as the "long haul" section.

The second step is around 20 km cross border short-haul shipment between TKH and GM, the Chinese side of the Sino-Mongolian border crossing. At the TKH trans-shipping facility, coal is unloaded to stockpiles, from where it is reloaded by wheel loader into trucks for onward delivery to GM on the Chinese side of the border. This segment of transportation is referred to as the "short haul" section. During 2022, on this short-haul section, we utilized a combination of our own trucking fleet, third party contractors fleet, as well as the containerized GS terminal. We believe efficient operation of the border crossing facilities is critical to ensuring the productivity and efficiency of the short haul section. The improvement of border throughput in the second half of 2022 has allowed third party contractors' fee to decline, resulting in the overall transportation cost to decrease to US$26.9 per tonne for the year ended December 31, 2022 compared to US$37.8 per tonne for the year ended December 31, 2021. For the six months ended June 30, 2023, our overall transportation cost further decreased to US$13.1 per tonne compared to US$40.2 per tonne for the same period in 2022.

Besides the two-step shipment of coal, we also sold coal under ex-works ("EXW") UHG term, whereby the purchasers were responsible for managing further transportation and logistics, which accounted for 14.9% of our total sales in 2022.

The paved road used for hauling all our coal products from UHG to GS was completed in September 2011 and commenced operation in October 2011. This two-lane heavy-haul coal transport road bears an axle load of 18 tonnes, which allows our double-trailer trucks to carry around 130 tonnes of net payload on a single trip. Although ownership of such paved road was transferred to the Government of Mongolia for compensation in 2014, we have open access to the paved road for the transportation of coal mined from our UHG and BN mines. Pursuant to the Auto Road Use Agreement entered into with the Gashuun Sukhait

Auto Road LLC, we transport our coal through the paved road on a toll fee basis of MNT3,200, excluding VAT, per tonne of coal transported and the agreement is renewed on an annual basis. The paved road has improved productivity of long haul of trucking operations, decreased fuel consumption and reduced maintenance requirements, therefore enabling us to reduce the unit cost of coal transportation between UHG and TKH. The paved road connecting the UHG mine and the BN mine, which was completed in 2012, remains under our ownership, with the same fleet of double-trailer heavy haulage trucks facilitating haulage of ROM coal from the BN mine to the UHG mine.

As a result of the impact of the COVID-19 pandemic, coal export transportation was subject to various procedures and requirements set by Chinese Authorities in the past three years, which were enacted from time to time. During 2021, coal transportation and logistics operations via Gashuunsukhait-Ganqimaodu ("GS-GM") were significantly impacted by limitations imposed by the Chinese authorities due to COVID-19 from mid-March 2021 after reports of COVID-19 infection cases in Khanbogd soum adjacent to the border.

In order to secure export shipments while minimizing COVID-19 impact, in July 2021, the Government issued Resolution No. 185, to establish a custom bonded terminal for containerized shipments at key border checkpoints for coal exports under public-private-partnership principles. Accordingly, the Mongolian Customs General Administration and Border Protection General Administration allotted 30-hectare area at the Gashuunsukhait border checkpoint for the construction of a custom bonded terminal for containerized shipments ("GS Terminal"). The GS Terminal is designed to lessen human-to-human contact and lower the risk of cross-border infection transmission, thus allowing to increase coal exports.

We were assigned with the task to manage this project, with the construction successfully completed in September 2021 and subsequently the GS Terminal was commissioned by the relevant authorities on October 7, 2021. This project was 60%, 15% and 25% jointly financed by Erdenes Tavan Tolgoi JSC, Tavan Tolgoi JSC and us, respectively. The GS Terminal capacity utilization was agreed to be split among the companies in the same proportion and the ownership has been transferred to Border Port Special Administration.

Certain improvements were observed in October and November, unfortunately, restrictions on the number of coal-loaded trucks passing via GS-GM was imposed from December 2021 after the spread of omicron variant was reported by the World Health Organization. Border requirements started to slowly ease towards the end of the second quarter of 2022, allowing improvement in cross border throughput via GS-GM checkpoint, leading to gradual increase in coal export shipments as well. From the second half of 2022, China started to further relax various pandemic related border restrictions, which helped to increase export volume. On a macro level, Mongolian President and Chinese President met in Beijing, China in November 2022, and during these meetings, the two leaders agreed to substantially increase Mongolia's exports of mineral products, especially coal products, to China.

In April 2021, ER LLC entered into a joint venture agreement with CHN Energy Coal Coking Co., Ltd ("CECC"), an independent third party, and one of the Group's largest customer. Pursuant to the joint venture agreement, ER and CECC agreed to establish a joint venture company in Inner Mongolia which will own and operate Chiheng enclosed warehouse facility for coal storage and handling customs bonded stockyard located at the GM port in the PRC. The construction work for Chiheng stockyard, with annual coal storage and handling capacity of up to 15 Mt, was completed in July 2020. The facility has been commissioned by the relevant state authorities and is currently operational with additional capacity expansion plans currently in the development stage. ER and CECC will, respectively, hold 10% and 90% of equity interest in "Guoneng Inner Mongolia Ganqimaodu International Energy Co., Ltd". We believe that this investment will support our initiatives to improve logistics infrastructure providing access to the Chinese railway network to reach our customers in the PRC and beyond. By maximizing transportation and logistics efficiency through a strategic cooperation, we will be able to further expand long-term relationship with our current end-user customer base and further diversify our revenue sources.

Railroad Developments

Mongolia completed the development of two major railways in 2022. The Tavan Tolgoi-Gashuunsukhait railway commenced operations on September 9, 2022 and the Zuunbayan-Khangi railway commenced operations on November 25, 2022. After the cross-border sections of the railways are completed they would be the second and third cross-border railway connecting Mongolia and China. The TT-GS railway connects Tavan Tolgoi in southern Mongolia, an area rich in minerals, with GS-GM railroad on the border with China which is the main terminal for Mongolia's coal and copper exports. The railway is also connected to the Ulaanbaatar Tomor Zam railway network. The railway is expected to be capable of transporting 30 to 50 Mt of cargo per annum to the border with China, with the potential to boost mining exports to other regions through Chinese ports. The Zuunbayan-Khangi railway supports a key industrial facility at Sainshand in the northwest of Zuunbayan. This railway connects the east-west Tavan Tolgoi-Zuunbayan railway, which began trial operations on March 15, 2022, with the Khangi-Mandal border crossing point. The Tavan Tolgoi-Zuunbayan railway was the first major railway constructed entirely with domestic resources and, when it officially commences operations, it is expected to have capacity of transporting 15 Mt of cargo per annum. The Zuunbayan-Khangi is expected to increase Mongolia's export of coal, copper and iron ore from Mongolia's mineral-rich southern region by reducing by half the transport distance for freight. The Zuunbayan-Khangi railway, coupled with the TT-GS railway, are expected to significantly increase Mongolia's rail freight traffic capacity. The commissioning of these railways is expected to help increase export volume to China. Although we currently do not have any permanent agreement in place, we are exploring cooperation opportunities to utilize these railways for our coal exports to China. For example, Tavantolgoi Railway LLC has completed the construction of the loop connecting the Tavantolgoi-Gashuunsukhait railway to the UHG mine. Simultaneously, we have built and completed designated stockyard at our UHG mine in 2022 which can connect to the Tavan Tolgoi station. We have also agreed to complete a trial shipment on the Zuunbayan-Khangi railway for 0.5 Mt ROM coal in 2023. During the first half of 2023, we have arranged for approximately 250 kt of export shipments to China via the Zuunbayan-Khangi railway as a trial.

SUPPLIERS

We have established a network of local and international suppliers who provide us with contracting services, fuel, equipment and other ancillary materials and services. For the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2023, our five largest suppliers accounted for 57.8%, 55.4%, 53.4% and 56.5%, respectively, of our total purchases, while, Thiess, our largest supplier for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2023, accounted for 33.3%, 33.7%, 26.9% and 23.3%, respectively, of our total purchases for the same periods.

Our five largest suppliers for the six months ended June 30, 2023 were:

- *Thiess Mongolia LLC*. Thiess is our mining contractor at our UHG mine and assists in mine planning, training of mining personnel and the supervision of mining activities, and is responsible for sourcing a large proportion of the mining equipment used to mine our coal. See "– Mining and Processing" for further information on our relationship with Thiess.

- *Shunkhlai LLC.* Shunkhlai, a leading oil product importer and retailer in Mongolia, supplies us with fuel products including diesel fuel, lubricants and other types of fuel and provides other related services at the UHG and BN mine sites. See "Management's Discussion and Analysis of Financial Condition and Results of Operations – Factors Affecting Results of Operation and Financial Condition – Fuel Costs".

- *NIC LLC*. NIC, a leading oil product importer and retailer in Mongolia, supplies us with fuel products including diesel fuel, lubricants and other types of fuel and provides other related services at the UHG and BN mine sites. See "Management's Discussion and Analysis of Financial Condition and Results of Operations – Factors Affecting Results of Operation and Financial Condition – Fuel Costs".

- *Vertex Mining Partners LLC*. Vertex, a local contractor and a subsidiary of Hera Equipment LLC, a mining equipment dealer in Mongolia. One of our mining contractors at the UHG mine.

- *UARP LLC*. UARP, a local contractor, is one of our main contractors at BN mine. We manage and operate all mining activities and planning at BN mine through UARP LLC.

Our five largest suppliers in 2022 were:

- *Thiess Mongolia LLC*. Thiess is our mining contractor at our UHG mine and assists in mine planning, training of mining personnel and the supervision of mining activities, and is responsible for sourcing a large proportion of the mining equipment used to mine our coal. See "– Mining and Processing" for further information on our relationship with Thiess.

- *Shunkhlai LLC.* Shunkhlai, a leading oil product importer and retailer in Mongolia, supplies us with fuel products including diesel fuel, lubricants and other types of fuel and provides other related services at the UHG and BN mine sites. See "Management's Discussion and Analysis of Financial Condition and Results of Operations – Factors Affecting Results of Operation and Financial Condition – Fuel Costs".

- *NIC LLC*. NIC, a leading oil product importer and retailer in Mongolia, supplies us with fuel products including diesel fuel, lubricants and other types of fuel and provides other related services at the UHG and BN mine sites. See "Management's Discussion and Analysis of Financial Condition and Results of Operations – Factors Affecting Results of Operation and Financial Condition – Fuel Costs".

- *Wulate Zhongqi Pengteng Logistics Co., Ltd.* We have been engaged with Wulate Zhongqi Pengteng Logistics Co., Ltd since October 2021. It provides coal transportation services from TKH to GM border. Given the cross-border throughput limitation and stringent health checks, sanitation and preventive measures taken by the authorities, we have been engaging third party contractors to extend our capacity at the route from TKH to GM. With Wulate Zhongqi Pengteng Logistics Co., Ltd's transportation capacity, we were able to secure our export shipments.

- *Guo Hui international logistics LLC.* Guo Hui International Logistics LLC is also our coal transportation service provider on the short-haul section, TKH to GM. We have been engaged with them since January 2022 for export shipments. In addition to the coal transportation service engagement with Guo Hui International Logistics LLC, we also supply coal products to its' affiliate companies.

We recognize the value our operations bring to the local economy and encourage and develop local partnerships wherever possible. We follow ethical business practices in our purchasing and supply management and give priority to local businesses. In the past three years, we continued to cooperate with local suppliers and contractors that are based in Mongolia, including those in the South Gobi province. Local businesses are also supported through our Sustainable Livelihood Support Program. Suppliers are also required to adhere to our social and health, safety and environment ("HSE") policies and procedures when doing business with us.

CAPITAL EXPENDITURES

The following table sets forth our capital expenditures for the periods indicated:

	Year ended December 31,			Six months ended June 30,	
	2020	2021	2022	2022	2023
					(US$'000)
Capital Expenditures:					
CHPP	2,232	795	155	155	243
Investment in associate company	–	785	6,951	6,951	–
Others	5,748	10,764	4,189	1,467	8,821
Total	7,980	12,344	11,295	8,573	9,064

* Others mainly include equipment, appliances and light vehicles.

MARKETING AND SALES

Our primary activities are the mining and exploration of coal in Mongolia and the sale of coking coal. We typically sell our coal principally to end users, including iron and steel mills and coke and chemical plants, as well as coal traders. Our main target market is Inner Mongolia, Hebei, Gansu and Tianjin.

Our washed coking coal products were dispatched from Mongolia after export customs clearance to designated customs bonded yards at GM. Once import customs clearance and quality inspections were completed by relevant authorities at GM, washed coking coal products were sold to end-user customers under FOT GM terms. Middlings was exported and sold under Delivery-at-Place ("DAP") GM terms. Starting in 2021, due to disruptions in export logistics via GS-GM and in order to maintain stable sales operations, we adopted washed coking coal sales under additional alternative terms such as (i) EXW UHG; (ii) free carrier ("FCA") TKH; and (iii) DAP GM. We also entered into offtake agreements with our customers to presell our coal products to improve our liquidity position during the COVID-19 pandemic.

For the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, approximately 58.8%, 52.2%, 28.5%, 22.7% and 21.8% of our coal sales were made to coke plants, respectively, 30.6%, 19.1%, 5.4%, 4.5% and 10.8% to steel mills, respectively and 9.2%, 26.4%, 64.9%, 71.5% and 66.5% to coal traders, respectively. For the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2023, our total revenues were derived from 47, 55, 83, 54 and 78 customers, respectively. Our target market regions in China are Inner Mongolia, Gansu, Hebei, and Tianjin provinces. In addition, coal products are also supplied and sold to local customers located in Mongolia. We sell our coking coal into China pursuant to long-term cooperation and short term agreements with a diversified group of customers.

We enter into both long-term and short-term contracts with our customers. Our long-term contracts have terms of up to ten years with end-user customers. Our short-term contracts typically have terms of up to one year or the contract will continue until the total amount of product is fully supplied. The principal terms of our sales and purchase contracts with customers include, among others: (1) specified volumes, (2) contract prices linked to existing market prices which are subject to periodic review and (3) delivery to China for FOT GM, C&F, FOB end user destination delivery terms. Currently, the majority of our sales contracts have advance payments terms. For a description of our key customers, see "– Customer Base" below.

In January 2023, the MSE organized the first ever coal spot trade on its platform. We voluntarily participated in the process and successfully auctioned off 12,800 tonnes of washed hard coking coal through the MSE platform. For the six months ended June 30, 2023, the amount of coking coal sold through the MSE platform accounted for approximately 10.0% of our total sales volume and we expect the sales volume through the MSE platform to continue to account for a meaningful share of our sales volume going forward. The MSE is expected to standardize the process and encourage more coal sales over its platform going forward.

We recognize revenue when ownership of the coal has passed to the customer, which is typically upon delivery of the coal to the customer. We price our coal by adopting a netback calculation of the main benchmark products with similar quality and demand sourced from Baotou, Tangshan, other areas in Hebei and Shanxi provinces in China and Australian coal delivered to the east coast of China. For long-term agreements with DAP delivery term, we agree on annual target volumes and adjust prices monthly. For spot agreements with FOT or C&R delivery term, we adopt a netback calculation referring to the prevailing spot prices depending on customers' location.

With our CHPP, we believe we are able to produce washed coal at consistent quality levels. As a result, we are selling directly to end-use customers under our own brand. We believe this increases our average selling price and profitability compared to selling raw coal and enhances our market recognition and competitiveness. We remain committed to strengthening our relations with key end-user customers with an aim to boost our sales volumes back to pre-pandemic levels.

CUSTOMER BASE

The tables below set forth our top five customers by revenue for the periods indicated. All the customers in the tables below are located in China.

		Year ended June 30, 2023	
Customer	**Customer Type**	**Revenue**	**Percentage of Total Revenue**
		(in US$'000)	*%*
Global Coking Coal PTE. Ltd	Trader	123,449	23.9
Urad Middle Banner Agreeable to Commerce and Trade Co., Ltd	Trader	39,640	7.7
Kerry Mining (Hong Kong) Limited	Trader	38,545	7.5
Inner Mongolia Xingyongsheng Energy Co., Ltd	Trader	27,630	5.3
China Energy Coal Coking Co., Ltd	Coke plant	26,801	5.2
Total		256,065	49.6

		Six months ended June 30, 2022	
Customer	**Customer Type**	**Revenue**	**Percentage of Total Revenue**
		(in US$'000)	*%*
Fonte Energy Supply	Trader	24,800	23.3
Zhongqi Dongshunda Trading Co., Ltd.	Trader	19,471	18.3
Urat Middle Banner Huibin Trade Co., Ltd	Coke plant	13,219	12.4
Inner Mongolia Zhongchi Energy Co., Ltd	Coke plant	6,412	6.0
Inner Mongolia Huiteng Energy Co., Ltd	Coke plant	4,306	4.0
Total		68,208	64.0

Customer	Customer Type	Year ended December 31, 2022 Revenue	Percentage of Total Revenue
		(in US$'000)	*%*
1. Global Coking Coal Pte. Ltd	Trader	81,177	14.9
2. Zhongqi Dongshunda Trading Co., Ltd.	Trader	79,645	14.6
3. Inner Mongolia Tuxing Energy Co., Ltd.	Trader	40,093	7.3
4. Urat Middle Banner Huibin Trade Co., Ltd	Coke plant	31,570	5.8
5. Zhengcheng Weiye	Coke plant	30,320	5.5
Total		262,805	48.1

Customer	Customer Type	Year ended December 31, 2021 Revenue	Percentage of Total Revenue
		(in US$'000)	*%*
1. China Energy Coal Coking	Coke plant	30,699	16.7
2. Zhongqi Dongshunda Trading Co., Ltd	Trader	23,417	12.7
3. Inner Mongolia Hei Mao Coal Chemical Industry Co., Ltd	Coke plant	16,899	9.2
4. Shanxi Meitan	Coke plant	12,914	7.0
5. Jasn International Pte. Ltd	Trader	12,291	6.7
Total		96,220	52.3

Customer	Customer Type	Year ended December 31, 2020 Revenue	Percentage of Total Revenue
		(in US$'000)	*%*
1. China Energy Coal Coking	Coke plant	127,532	30.6
2. Wulate Zhongqi Fengda Trade Co., Ltd	Iron and steel mill	65,333	15.7
3. Zhongmeng (Tianjin) International Trading Co., Ltd	Coke plant	45,432	10.9
4. Jiayu Guan Tielong Coal Sales Co., Ltd	Iron and	40,596	9.7
5. Shanxi Meitan	steel mill Coke plant	38,874	9.3
Total		317,767	76.1

For the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, revenue from our single largest customer represented 30.6%, 16.7%, 14.9%, 23.3% and 23.9%, respectively, of our revenues for that year. For the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2022 and 2023, our five largest customers accounted for 76.1%, 52.3%, 48.1%, 64.0% and 49.6%, respectively, of our total revenues. During the years ended December 31, 2021 and 2022, due to continued disruptions in export logistics via GS-GM, we sold coal products under flexible terms by applying alternative delivery terms as well as to different types of customers, including traders, to sustain our sales volumes. We remain committed to strengthening our relationship with key end-user customers.

Quality and volumes for the coal are stipulated in our coal sales contracts. Our coal sales contracts contain provisions requiring us to deliver coal within certain ranges for specific coal characteristics such as total moisture, ash, volatile matter and sulfur content. Failure to meet these specifications can result in economic penalties, suspension or cancellation of shipments or ultimately termination of the agreements. Some of our contracts set out mechanisms for temporary reductions or delays in coal volumes in the event of a force majeure, including events such as fire, flood, war, conflict, military actions, quarantine, natural disaster, strikes, uprising, rioting, demonstration, epidemic, explosion, introduction of a ban or prohibition, or any other conditions beyond the control of any party.

ESG AND CARBON NEUTRALITY

We take pride in our strong commitment to ESG principles and have created a comprehensive and achievable ESG strategy to effectively contribute to the UN's Sustainable Development Goals. To combat global carbon emissions, we started to measure and track green-house gas emissions since 2017 and included scope three emissions since 2019. For the first half of 2023, the intensity of our green-house gas emissions was 3.10, and the scope 1 emission was 629,203 tonnes, the scope 2 emission was 7,934 tonnes and the scope 3 emission was 12,569,917 tonnes. We have assessed risks associated with current emissions level and produced a list of actions, including but not limited to, increasing energy efficiency and implementing portfolio transition for sustainable alternatives such as other minerals, commencing the use of renewable energy for production, sourcing, and mining fleet, and implementing carbon offset activities and establishment of carbon neutrality. We believe we are the first and the only coal producer in Mongolia measuring and reporting our carbon emissions on a periodic basis. To keep our investors informed, we have also adopted international and national standards to disclose climate and sustainability indicators. As a recognition of our efforts, we have received ratings of "A" and "D", respectively, from MSCI ESG Ratings and CDP Climate in 2022. We are also the first international company to publicly submit the TSM self-assessments through a subscription service independent of a national mining association and we plan to conduct external verification in 2024. We have completed the self-assessment process and achieved A or above level in various ESG protocols such as biodiversity conservation management, climate change, water stewardship and indigenous and community relationships, as shown in below table.

Protocols	Indicators	Score
Biodiversity Conversation Management	Commitment, accountability & communications and reporting	AAA
	Conservation planning and implementation	A
Climate Change	Facility climate change management and performance targets & reporting	A
Water Stewardship	Water governance, operational water management, reporting & performance	A
Energy Use & GHG Emissions Management	Management, reporting systems	A
	Performance targets	C
Safety & Health	Commitments and accountability	AAA
	Planning and implementation, training behavior and culture, performance	AA
	Monitoring and reporting	B
Indigenous and Community Relationships	COI identification, effective COI engagement and dialogue, community impact and benefit management COI response mechanism	A

On our social commitment, we continue to support and improve local communities in Mongolia. We have comprehensive community development programs to support overall livelihood, education and cooperation within local neighborhoods. To promote diversity and inclusion, we have in place policies such as flexible work arrangements for disabled persons and female employees with young children. In 2022, nearly one third of our employees in management position were female. Finally on governance, we have established a dedicated ESG management committee involved in assessing and addressing ESG related risk and to integrating ESG considerations into business strategy and decision-making. We have also adopted international and national standards for disclosure of climate and sustainability indicators published by MSCI ESG Ratings, CDP Disclosure Insight Action, Mongolian National Mining Association, Extractive Industries Transparency Initiative and International Finance Corporation. In the long term, we are committed to integrating sustainability into our daily operations and for capital allocation.

COMPETITION

We sell substantially all of the coal we produce into China. Competition in the Chinese coal industry is based on many factors including price, production capacity, coal quality and characteristics and transportation capability and costs. Most of our competition in coking coal comes from mines in central and western Shanxi, northeast Hebei, eastern Heilongjiang, Wuhai in Inner Mongolia and Muli in Qinghai. Some of our Chinese competitors may have lower transportation costs than we do due to their location. In addition, the Chinese coal market is highly fragmented and we face price competition from local coal producers that produce coal for significantly lower costs than us due to various factors, including their lower expenditure on safety and regulatory compliance. Outside of China, our main competition in the Chinese and other Asian coal markets comes from Australia, Canada, United States and Russia. For instance, in 2021, due to cross-border related restrictions from Mongolia and the unofficial ban on Australian coal, Russia overtook Mongolia and Australia as the largest exporter of coking coal to China. In 2022, coking coal imports to China from Mongolia surged by 82.9% compared to the 2021, as a result of improved cross-border throughput. As such, Mongolia remained as the main source for coking coal imports to China with 40.1% market share in 2022. Given the relationship between China and Australia has improved since mid-2022, we also expect increased competition from Australian exporters. Some of our international competitors may have greater coal production capacity as well as greater financial, marketing, distribution and other resources than we do and may benefit from more established brand names in international markets. We are also competing with domestic players in Mongolia, including Erdenes Tavan Tolgoi JSC and Tavan Tolgoi JSC.

We believe that our cost of production is lower than our principal competitors serving China, namely coking coal producers from China and Australia. Coking coal from China is predominantly produced from underground mines. In general, underground mining is significantly more capital intensive, costly and more operationally challenging than open-pit mining. See "Risk Factors – Risks Relating to Our Business and Industry – Coal markets are highly competitive and are affected by factors beyond our control".

QUALITY CONTROL

The ability to consistently produce high quality coal products meeting the specifications expected by customers is critical to the success of our business. Therefore, we have implemented numerous quality control measures during the planning and operation stages of the coal production chain, from exploration through delivery. One of the most critical measures is to sample and test both ROM and product coal at each key stage throughout the mining, processing and transportation stages of our operation, to provide guidance as to achieving and maintaining target specifications.

In recognition of the importance of quality control throughout the coal production chain from in-situ location to customer, we have established onsite laboratory service capabilities, including employee training on implementation of quality control systems. The laboratory facilities, operating at the UHG mine, primarily analyze raw coal and product coal, and also test water, air and soil qualities.

These facilities are accredited under national standards in parallel with international standard requirements, and coal quality related analysis work is performed under the relevant ISO standards. The latest laboratory audits were completed in October 2017 by competent independent bodies to assure standards and procedures being complied with, and we received quite positive feedback on our compliance with requirements and implementation of world leading practices.

PROPERTIES

As of June 30, 2023, our principal properties consisted of (i) land use and possession rights of 54 parcels of land in Mongolia, used for our mining operations and supporting infrastructure and (ii) plants and office buildings developed by us and leased properties such as office and equipment.

Pursuant to land use and possession certificates issued by the governor of South Gobi Province and relevant soums, we are permitted to use our 54 parcels of land to conduct our mining activities and to build and operate our CHPP, airport, camp, apartments, offices, workshops, customs-control office, water supply pipelines, power plants, power lines, hard paved roads and cellular communication antenna.

SnowHill Consultancy LLP, our legal advisors as to Mongolian law, has confirmed all of our land uses are in compliance with the relevant Mongolian laws and regulations.

SAFETY AND ENVIRONMENTAL MATTERS

We apply standards of industrial health and safety standards and work with Thiess to ensure that our mining activities are conducted in such a way as to provide a safe and healthy working environment while satisfying Mongolian legal requirements, industry best practices and customers' expectations. Our heavy machinery operators undergo an extensive on-site simulator training conducted by Thiess's personnel in order to minimize potential damage from equipment failure or accidents. We provide training and appropriate resources for our employees to work safely and effectively, and all of our employees have undertaken safety and hygiene training in compliance with Mongolian labor law. We have implemented an occupational health and safety policy that sets out standard approaches to risk minimization and operating procedures. We require our contractors and subcontractors to meet our occupational health and safety standards and policies. In addition, they are required to report all accidents and violations of occupational health and safety standards.

Exploration, development and production operations on mineral properties and transportation of mineral products are subject to numerous hazards. While we have not had any large scale accidents that materially affected our results of operations, from time to time we have experienced incidents that have resulted in injury or death to employees. In the three years ended December 31, 2022 and the six months ended June 30, 2023, four fatal traffic accidents involving the Group's staff occurred outside of the Group's premises and no accidents occurred in connection with operations. We fully cooperated with relevant authorities conducting the investigation process. Applicable insurance coverage and financial assistance were provided to the families in line with applicable law and internal regulations.

In 2022, we did not register any class 1 risks (defined as a fatality or injury that lead to permanent disability of an individual) in all workplaces. In the six months ended June 30, 2023, we registered two class 1 risks (traffic accidents that resulted in two fatalities). In addition, we implemented measures against risks that we identified, such as cleaning fuel tanks, removing contaminated soil, creating protected zones and others. We installed GPS systems in our coal trucks to monitor speed limits. We monitor employee work loads and rest time through our Mine2TL program. We also collaborate with local Government organizations and traffic police and conduct trainings for our coal truck drivers.

During the COVID-19 pandemic, we continued to take measures to protect the health, safety and well-being of our employees and their families. Despite the easing of restrictions across the country, preventive measures implemented organization-wide remained in effect between 2020 and 2021, including: (i) limiting personal meetings and interactions to the minimum extent possible; (ii) regular temperature checks and records; (iii) frequent sanitization and cleaning; (iv) providing personal protective gear, equipment and tools in line with job requirements; and (v) implementing other recommendations issued by health authorities in relation to workplace hygiene. We have maintained close cooperation with the local health and safety authorities, provided support in relevant areas and fully complied with the COVID-19 related standards and requirements, applied both locally and nationally.

Ensuring health, safety and environmental compliance is an integral component of our operations. Our integrated Health, Safety and Environment Management System ("HSE MS") helps to achieve the targets set out in our HSE policy. Our HSE MS is a Group-wide system that incorporates our HSE policies, objectives, mandatory requirements and effective practices to achieve our policy commitments and improve performances. These systems and processes provide our employees and contractors the necessary directions to practice safe work behaviors and make them accountable for the implementation of the HSE MS. Our environmental team continually upgrades the HSE MS and its accompanying elements and procedures and ensures that our activities in relevant fields comply with national legislations and international standards. The HSE MS has been developed to align with requirements under the international management system standards ISO 14001:2015 (Environmental management system standard). OHSAS 18001:2007 (Occupational health and safety management system standard) and ISO 45001:2018 (Occupational health and safety management system standard) which we adopted in 2022.

We became the first Mongolian mining company to introduce a comprehensive international management system consisting of these standards and was awarded the National Quality Award in 2018 by the Government of Mongolia for this achievement. The system covered international standards ISO 9001:2015 (quality management), ISO 14001:2015 (environmental management) and ISO 45001:2018 (occupational health and safety management). In 2021, we successfully passed another round of periodic surveillance audit by AFNOR Group, an international standardization and accreditation institution and a member of the International Organization for Standardization, for a successful implementation of IMS which includes ISO 45001:2018 on occupational health and safety management. The audit is a follow-up measure on our IMS implementation and performance, and signifies continuous improvement of our safety management systems and internal compliance since the launch of the IMS in 2018. Since four years have passed since the original certification was issued, we broadened the scope of our system implementation, and had our whole operations audited for re-certification in 2022.

We are committed to complying with Mongolian environmental laws, regulations and applicable international standards as part of our effort to minimize the adverse impact of our operations on the environment. No environmental incident was recorded in 2022 and in the first half of 2023. By carefully designing mining plans, conducting studies, implementing pollution control recommendations from internal and external sources, monitoring the effects of mining and carefully designing land rehabilitation and mine closure plans, we seek to minimize the impact of our activities on the environment. In compliance with the Law on Environmental Impact Assessment and Law on Environmental Protection and Minerals Law, we have in place an environmental management plan which is reviewed and approved by the Ministry of Environment and Tourism on an annual basis. As of the date of this Offering Memorandum, we have not been fined or subject to any penalties due to environmental noncompliance.

We have an environmental team who is responsible for the compliance of our activities with national laws, regulations and international requirements. Our environmental team conducts regular workplace inspections at the mine sites and performs corrective actions. We have also taken several measures to mitigate the socioeconomic impact of our mines, which include (a) improving local healthcare and educational facilities; (b) establishing monitoring programs to ensure that pit dewatering and other water sourcing for the mine does not adversely affect shallow groundwater sources that are used by herders; (c) implementing controls to verify contracts and adjust designs and behaviors to minimize risks of depleting shallow groundwater sources that are used by herders; and (d) developing and implementing action plans to provide compensation for herders affected by the mining activities and other infrastructure construction activities.

We have also implemented several measures to specifically mitigate various aspects of our mines and supporting infrastructure. During construction of our transportation infrastructure, we ensure that quarry rock and in-fill materials are sourced from areas that will not adversely affect cultural heritage and monitor contractors to ensure that they use appropriate quarry sites to exploit construction materials. In connection with our water supply project we have developed procedures for monitoring the levels of hand-dug shallow wells to assess if our use of water sources has any impact on wells used by herders near our UHG mining area.

COMMUNITY DEVELOPMENT

Our community development initiatives are aimed at supporting the long-term sustainability of the local communities where we operate. We have been carrying out dozens of long-term community development programs, focusing mainly on community education and healthcare, cultural heritage preservation, small and medium-sized enterprises and entrepreneurship development, environmental off-setting and employment generation. Many of Tsogttsetsii soum's permanent residents have direct involvement in one or more of our community development projects while all of the soum residents enjoy indirect benefits of the projects and initiatives. We have a Community Development Advisory Council based in Tsogttsetsii soum, which includes local representatives and serves as a platform for community engagement. The Community development programs are based on results of socio-economic baseline studies of impacted soums and herder households, and recommendations from our social and environmental management plans and public consultation events. We pioneered proactive engagement with local communities in the South Gobi region and organized the first public consultation and disclosure event among the communities prior to the commencement of our mining operations at both UHG and BN mines. The events have since been held annually, serving as a reliable platform for meaningful dialogue and ongoing cooperation with our host communities. In compliance with regulations, we have entered into agreements with local authorities on community development.

As one of the largest private employers both locally and nationally, we endeavor to provide employment opportunities to members of local communities. Our human resource policy targets to provide high value employment for local people and contribute to their personal development. As of June 30, 2023, approximately 35% of our total employees were residents of Tsogttsetsii, Bayan-Ovoo, Manlai, Dalanzadgad and Tsagaan-Ovoo soums of South Gobi Province.

We have completed several community infrastructure development projects in Tsogttsetsii soum, ranging from paved roads to housing projects for resettled employees. The soum residents and businesses enjoy access to our 24 hour electricity and filtered drinking water. In addition, we have built a paved road across the soum center in order to minimize dust generation therein. To mitigate adverse impacts associated with population influx to Tsogttsetsii soum and to support the local education sector, we built two secondary schools, a kindergarten and a dormitory complex jointly with the local government. These facilities contribute to improving the education quality in the isolated Gobi region and provide better access to education for children in the local community. As part of our efforts, we also arrange to regularly dispatch qualified mathematics professors from Ulaanbaatar soum to Tsogttsetsii soum to assist and collaborate with the local teachers. As the public quarantine and lockdown requirements were lifted, local schools in Tsogttsetsii soum resumed normal operations starting from the autumn of 2021. Accordingly, our local education support program was continued with a primary focus on the uninterrupted free-of-charge provision of online math program accesses to the local students.

As an official partner of the Mongolian Basketball Association, we support the 3x3 basketball national and professional teams in Mongolia with a long-term vision to build a resilient and young urban sports community. Through our Energy 3x3 Club, we support a total of three professional teams, providing them with an access to international and local tournaments, sports facilities and proper training and practice opportunities. Aspiring players are encouraged through a series of professional events where they can realize their potential and challenge themselves for the next level tournaments.

During 2022 and the six months ended June 30, 2023, we supplied free-of-charge 0.5 Mt and 0.2 Mt of middlings under EXW terms through ER to Tavan Tolgoi Tulsh LLC ("TTT") as a part of our commitment to socially responsible operations. TTT is a state-owned entity, designated for manufacturing and distributing coal briquettes to Ulaanbaatar residents under the Government's program to reduce air pollution and improve air quality during the winter heating season. In addition, we provided thermal coal to herdsmen and communities free of charge in the South Gobi province as support during the harsh winter and spring months.

EMPLOYEES

As of June 30, 2023, we had a total of 2,285 employees, of which 96% focused on operations and the remaining 4% served at our office headquarters. The total workforce of our contractors at our UHG and BN mines as of June 30, 2023 was approximately 4,830 personnel. The majority of our employees have signed employment contracts with us which provide, among other things, the employee's responsibilities, remuneration and grounds for termination of employment.

Employee Remuneration Policy

Our remuneration policy is designed to attract, retain and motivate highly skilled individuals to ensure the capability of our workforce to implement our business strategy. Key principles of the remuneration policy are to:

- set competitive rewards to attract, retain and motivate highly skilled people;
- provide detailed feedback to develop employees' skills and critically analyze employees' contributions;
- establish short-and long-term incentive programs, including the equity incentive plan;
- ensure remuneration planning continues to be integrated within our business planning process; and
- ensure total reward levels and performance targets are set at appropriate levels to reflect the competitive market in which we operate, the prevailing economic environment and the relevant performance of similar companies.

We seek to accomplish the above goals by conducting annual remuneration reviews which take into account individual performance, the economic environment and the unique requirement for certain employees to travel and spend time in Mongolia, particularly at mine sites and relevant job and industry comparisons. We value the contribution of both individuals and teams in achieving the goals and objectives of our business.

We adopted a share option scheme in September 2010 ("Share Option Scheme") which expired on October 13, 2020. No further Share Options could be granted under the Share Option Scheme, however, the provisions of the Share Option Scheme remain in force to the extent necessary to give effect to any Share Options granted or exercised thereunder or otherwise as may be required. As of December 31, 2022, all the outstanding 10,900,000 Share Options granted under the Share Option Scheme on May 8, 2017 have been exercised.

On June 16, 2021, the Company adopted a new share option scheme ("New Share Option Scheme"), in which the Board is authorized, at its discretion, to grant to eligible participants the options to subscribe for shares of the Company ("Share Options" or "Options") subject to the terms and conditions stipulated therein as incentives or rewards for their contributions to the Company. Under the New Share Option Scheme, a total of 102,918,678 shares of the Company, representing approximately 10% of the then issued share capital of the Company as at the date of the approval of the New Share Option Scheme, may be issued. On April 3, 2023, the Company granted 10,000,000 and 23,250,000 Share Options to a Director and employees, respectively, at the exercise price of HKD3.260 per share under the New Share Option Scheme.

Benefit Schemes

We maintain benefit schemes for our employees as required by relevant laws in Mongolia.

Injuries

For the year ended December 31, 2022 and for the six months ended June 30, 2023, within all operations under the management of Group, approximately 6.9 million and 5.9 million man-hours, respectively, were worked by employees, contractors and sub-contractors. During this period, three incidences of Lost Time Injury was recorded, resulting in an overall Lost Time Injury Frequency Rate of 0.43. The Group has adopted "Vision Zero" where we aim to create and maintain a culture of preventing accidents and injuries. See "Risk Factors – Risks Relating to our Business and Industry – Our mining activities are subject to operational risks, hazards and unexpected disruptions" and "Business – Safety and Environmental Matters".

INSURANCE

We maintain insurance coverage for our employees, officers and the Board. As of June 30, 2023, we have obtained insurance coverage from leading global insurers including Swiss Re, Starr, SCOR, Allied World Assurance and Transatlantic Re on property damage for our properties at the mine site. In addition, we have the following insurance coverage:

- heavy fleet and operators' liability insurance;
- motor and drivers' third-party liability insurance for us and our subsidiaries;
- personal accident and health insurance for our employees;
- truck insurance, truck driver's liability and personal accident insurance; and
- directors' and officers' liability insurance.

The insurance policies arranged by us do not cover liability or damage arising from acts of war and terrorism, and other customary exclusions from coverage.

Under our operating agreements with our mining contractors, the contractors are responsible for their own employees and they and their employees must also be covered by appropriate insurance, including insurance for property and vehicles, loss and damage and third-party claims.

See "Risk Factors – Risks Relating to our Business and Industry – Our insurance may not be adequate to cover losses or liabilities that may arise".

INTELLECTUAL PROPERTY

We own over 21 trademarks, including those related to our corporate logo and names, which are registered in Mongolia. We also own trademarks to three of our logos, " ", "" and "", which are registered in Hong Kong.

LEGAL PROCEEDINGS

We are not currently involved in any litigation, legal proceedings or regulatory actions which could be expected to have a material adverse effect on our business, results of operations or financial position.

REGULATIONS

MONGOLIAN LAWS AND REGULATIONS RELATING TO EXPLORATION FOR MINERALS AND MINING

Between July 1997 and August 25, 2006, Mongolian minerals policies and practices were governed by the 1997 Minerals Law. On July 8, 2006, the Parliament enacted the 2006 Minerals Law, superseding and replacing the 1997 Minerals Law.

Under the 1997 Minerals Law, exploration licenses were granted by the DGMC, a subordinate agency of Mineral Resources Agency of Mongolia ("MRAM"), which at the time was a subordinate agency of the former cabinet level Ministry of Industry and Trade. There has been a number of reforms in the regulatory and framework governing the mining industry since the 2006 Minerals Law. In 2016, the name of the MRAM was changed to the Mineral Resources and Petroleum Authority of Mongolia ("MRPAM") upon merging with the Petroleum Authority, and the name of the DGMC was changed to the Department of Cadaster.

Registration with the Department of Cadaster is the definitive record of the holders of minerals license rights under the 2006 Minerals Law. Pledges and transfers of exploration licenses must be registered with the Department of Cadaster to be effective. Pledges, transfers and certain other transactions are recorded on endorsement sheets that are separate from, but considered to be an integral part of, each exploration license certificate. The Department of Cadaster does not maintain records of other liens or encumbrances to which a license may be subject.

The minerals defined under the 2006 Minerals Law do not include water, oil, natural gas, radioactive minerals and common minerals, which are separately regulated by respective laws of the 2012 Law on Water, the 2014 Law on Petroleum, the 2009 Law on Nuclear Energy and the 2014 Law on Common Minerals. All subsequent references to minerals and licenses to explore or mine minerals will be limited to minerals other than water, oil, natural gas, radioactive minerals and common minerals, as so defined.

Common minerals, as defined by the 2014 Law on Common Minerals, include construction materials such as sand and gravel which do not contain coal. As of the date of this Offering Memorandum, we hold neither exploration nor mining license on commons minerals. However, if common materials such as sand and gravel may become necessary for any of our construction projects from time to time, we may decide to submit a request for respective exploration or mining licenses of the common minerals.

The Parliament of Mongolia adopted the Law on Mining Product Exchange on December 23, 2022 which came into force on June 30, 2023 to organize fair and transparent mining trade in Mongolia and to provide the opportunity to set real market prices, share commercial and contractual information with international market players and strengthen the competitiveness of Mongolia's mineral products. The new law defines the legal and organizational form of the mining product exchange, its specific functions and activities, sets standards and defines the types of trading, payments and negotiations and determines the rights and obligations of all participants of trading. On June 7, 2023, the Government of Mongolia issued Resolution No. 223 and resolved that fluoride, iron, and coal as types and categories of the commodities to be traded through the MSE commodities trading platform. As such, in line with the Law on Mining Commodity Exchange, wholly or partially state or local government-owned entities that undertake mining and export of these commodities are required to trade their products through the commodity exchange, whereas private entities are allowed to trade their mineral products through the commodity exchange on a voluntary basis.

The Government of Mongolia adopted the Regulation on online trading of coal by its Resolution No. 466 dated December 14, 2022 to temporarily regulate the online coal trades of coal exporting entities until the Law on Mining Product Exchange comes into force. The trial trading is organized via the MSE platform. An initial online trial coal auction was successfully carried out in January 2023 and 12,800 tonnes of washed hard coking coal from ER LLC were sold. For the six months ended June 30, 2023, the total amount of coking coal auctioned through the MSE platform accounted for approximately 10% of our total sales volume and we expect the sales volume through the platform to continue to account for approximately 5.0% to 10.0% on a monthly basis going forward.

Note that references to "mineral resources" and "mineral reserves" in this section entitled "Mongolian Laws and Regulations Relating to Exploration for Minerals and Mining" are not references to mineral resources and mineral reserves determined in accordance with the JORC Code.

Mongolian Exploration Licenses

The holder of an exploration license has rights to conduct exploration activities in the license area, to construct temporary structures within the license area related to its exploration activities, and if gaining access to its exploration license area requires passing over land which is owned or possessed by others, to traverse such land subject to terms and conditions negotiated with such owners or possessors. If a mineral resource is identified by exploration activities, the exploration license holder has the right to apply for a mining license for any part of the exploration license area. Pursuant to the 2006 Minerals Law, exploration licenses granted on or after August 26, 2006 have an initial term of three years. The holder of such an exploration license may apply for an extension of the license for three successive additional periods of three years each. Thus, the maximum period that an exploration license may be held by one or more holders is twelve years from the date of issue.

Each exploration license is subject to cancellation if applicable license fees are not paid on time or if the holder fails to comply with certain other requirements of the 2006 Minerals Law or other relevant laws. Only Mongolian legal entities are entitled to hold exploration licenses.

Annual fees are payable per hectare of exploration license area as follows:

Year	Annual fee per hectare
Initial term – Year 1	MNT145
Initial term – Year 2	MNT290
Initial term – Year 3	MNT435
First extension (3 years)	MNT1,450 each year
Second extension (3 years)	MNT2,175 each year
Third extension (3 years)	MNT7,250 each year

Exploration license holders must spend the following minimum amounts annually on exploration activities per hectare within the license area:

Year	Annual fee per hectare
Initial term – Year 1	No expenditure required
Initial term – Year 2	US$0.50
Initial term – Year 3	US$0.50
First extension (3 years)	US$1.00 each year
Second extension (3 years)	US$1.50 each year
Third extension (3 years)	US$10.00 each year

The tables above show the required annual fees and expenditure amounts for each of the first three years, as well as for the succeeding three years (i.e., the "first extension"), following three years (i.e., the "second extension") and the last three years (i.e., the "third extension"). There are no applicable fees or amounts due after the third extension since the exploration license will have expired.

Exploration license holders are also subject to various environmental protection obligations. Within 30 days of receiving an exploration license, the holder must prepare, and submit to the relevant authorities, an environmental protection and reclamation plan. Once the plan has been approved by the relevant authorities, the holder of the exploration license must deposit funds equal to 50% of its environmental protection budget for that particular year in a bank account established by the governing authority of the soum (district) in which the exploration license area is located. Holders of exploration licenses must also submit to relevant authorities an exploration plan and annual reports of exploration activities.

Reserves

In Mongolia, the tonnage and coal quality of a mineral reserve that has been defined by exploration activities must be recorded in official archives. Under the 2006 Minerals Law, a mining license holder must extract all of the mineral reserves that are within the license area. The purpose of this provision is to prevent "high-grading", but the net effect is to mandate mining practices that are not consistent with practices in countries where free market principles prevail and the concept of mining mineral reserves on an economically viable basis is recognized and understood. If the license holder practiced "high grading" of mineral reserves, the illegally acquired properties will be confiscated and a fine of MNT100,000 (for individuals) or MNT1,000,000 (for legal entities) will be imposed.

Mining Licenses

If a commercially viable mineral resource is defined within the license area of an exploration license, the holder of the exploration license is entitled to apply for a mining license covering the relevant portion of the license area defined by specific longitude and latitude coordinates in the mineral exploration license. A mining license holder has the right to conduct mining activities throughout the license area and to construct structures within the license area that are related to its mining activities. All such activities must be conducted in compliance with the 2006 Minerals Law and relevant Mongolian laws pertaining to health and safety, environment protection and reclamation. Mining licenses are granted by the MRPAM for an initial term of thirty years and are renewable for two successive periods of twenty years each based upon remaining reserves, for a maximum overall period of seventy years. Upon the expiration of a mining license, the license and the rights under such license revert to the Government of Mongolia. Only Mongolian legal entities are entitled to hold mining licenses. In the case of all minerals other than coal, limestone and minerals which can be used for industrial production, the per hectare annual license fee is MNT21,750. In the case of coal, limestone and minerals which can be used for industrial production, the per hectare annual license fee is MNT7,250. A mining license is subject to cancellation if applicable license fees are not paid on time or other requirements under the 2006 Minerals Law or other relevant laws are not satisfied.

To receive a mining license, an exploration license holder must submit an application to the MRPAM together with, among other documents, an environmental impact assessment and a resource report. Holders of mining licenses must also prepare environmental protection and reclamation plans and satisfy various reporting and security deposit requirements.

On October 18, 2022, the Head of the MRPAM approved the "Guideline on Submission, Delivery and Acceptance of Plan, Report and Information on Exploration and Mining Work and Operation for Processing Plants" by its Order No. A/121. This order includes the requirements in developing plans and reports for exploration and mining work and operation for processing plants and requires license holders to submit and deliver their annual plans, reports and information through an electronic system as specified within the guideline.

Local Government Approval of Exploration Licenses and Mining Licenses

Pursuant to the former Licensing Law of Mongolia (2001), the granting of each exploration license and mining license by the MRPAM used to be approved by the governor of the aimag (province) in which the relevant license area is located. However, with existence of the amendment to the 2006 Minerals Law dated November 10, 2017, starting from January 1, 2018, the MRPAM determined the overall boundaries of the areas where minerals exploration and mining license can be issued and informs the governor of the aimag (province) of the determined areas for the purpose of seeking the governor's response before actual tendering for licensing. The governor must, by collecting comments from the citizens' self-governing body of the relevant province, submit his/her response to the MRPAM within 45 days of its receipt of the determination of the areas from the MRPAM and his/her failure to respond within this timeframe will automatically signify the governor's acceptance of the MRPAM's proposal to include the area for tendering of licensing.

After collecting the governor's acceptance and the MMHI's comment, the Government shall approve the boundaries of the areas where minerals exploration and mining licenses can be granted.

When granting a mining license, procedure specified in granting exploration license shall be equally complied with except when an exploration license holder applies for a conversion of the exploration license to a mining license.

Relations with local administrative bodies

Under the Minerals Law, mining license holders are required to work with the local administrative bodies and conclude local cooperation agreements on the issues of environmental protection, mine exploitation, infrastructure development and job creation in relation to the mine-site development as well as to organize public forums on these issues.

On November 11, 2022, the Parliament approved amendments to the Minerals Law and the Law on Budget. According to the amendment to the Minerals Law, local cooperation agreements are to be disclosed publicly by the local administrative body for transparency purposes. The local administrative bodies are prohibited from demanding any donation and assistance not included within the local cooperation agreement from mining license holders. According to the amendments to the Law on Budget, donation and assistance provided by mining license holders to local administrative bodies under the local cooperation shall be a part of the local development fund, a fund for financing projects to promote local development.

Approval to Commence Mining Operations

Pursuant to the 2006 Minerals Law, before a mining license holder can bring a mine into production, the MMHI appoints a commission (the "Commission") to review and audit pre-mining requirements compliance by the mining license holder that proposes to commence operation. The Commission consists of the following members: (i) representatives of the Ministries in charge of geology and mining, environment and labor; (ii) representatives of MRPAM; (iii) representatives from the inspection agencies; and (iv) based on specification on the mine, representatives of respective aimag, city, soum and district of the Governor's office, state agency of the emergency management and mining requisite team. The Commission reviews to determine whether the license holder has all pre-mining requirements under the 2006 Minerals Law. It also reviews the following key documents (among others) to determine whether they have been prepared in compliance with applicable laws and regulations:

- a certified copy of the mining license;
- a feasibility study and mining plan complied with relevant Mongolian Law and reviewed by the relevant authority;
- the environmental impact assessment;
- the environmental management plan;
- any minerals sales agreement and any lease agreement relating to the mining assets;
- records on establishing and marking the boundary of the mining area; and
- any agreement on land and water usage.

In addition, the Commission makes an on-site inspection of the mine and relevant supporting facilities, such as electrical power generators, mining equipment, water supply facilities, maintenance shops and health and safety equipment.

Upon completion of its review of all relevant documentation and its on-site inspection, if all requirements have been satisfied, the Commission will issue an approval (signed by all of its members) approving the commencement of mining operations by the mining license holder. After the approval is issued, the mining license holder can commence mining.

According to a regulation, feasibility studies are expected to be updated on a five year basis. The updates of the feasibility studies of UHG mine and BN mine have been reviewed and approved by the MRPAM, respectively on November 24, 2017 and August 1, 2018. The update of the feasibility study of UHG mine has been reviewed by the Minerals Professional Council and is expected to be approved by the MRPAM within August 2023. In respect of the update of the feasibility study of BN mine, it is under review by the Minerals Professional Council and is expected to be approved by the MRPAM within 2023.

Deposits of Strategic Importance

Either the Government of Mongolia or the Parliament may initiate proposals to declare a mineral resource as a Mineral Deposit of Strategic Importance, but the Parliament must approve any such proposal. If a deposit is designated as a Mineral Deposit of Strategic Importance, the Government of Mongolia may acquire certain percentage of the equity stake of such deposit from the license holder on terms agreed by the Government of Mongolia and the license holder, depending on the Government's contributions to the exploration of the strategic deposits. Effective from February 18, 2015, in lieu of the abovementioned right to acquire certain equity interest, upon approval of the Parliament, the Government may agree with the license holder on imposing special royalty of up to 5% in addition to the base and progressive royalties applicable to all mining licenses since the amendment made on February 18, 2015 to the 2006 Minerals Law. A deposit is a Mineral Deposit of Strategic Importance if (i) it may potentially impact the national security of Mongolia, or the economic and social development of the country, or (ii) it may generate or has the potential to generate a revenue more than 5% of Mongolia's GDP in any given year.

Pursuant to the Parliament Resolution No. 27 dated February 6, 2007, the Parliament has published the Strategic Deposits List, which identifies 16 deposits as Mineral Deposits of Strategic Importance (the "Strategic Deposits List") as of September 30, 2022. This resolution also identifies a further 39 deposits in the Tier 2 Deposits List (the "Tier 2 Deposits List") and instructs the Government of Mongolia to further evaluate such deposits and determine if one or more of these deposits should be recommended by the Government of Mongolia to the Parliament for designation as a Mineral Deposit of Strategic Importance. In addition to the deposits on the Strategic Deposits List and the Tier 2 Deposits List, Parliament may at any time designate other deposits that are not currently on either list to be Mineral Deposits of Strategic Importance. The Government of Mongolia is not obligated to complete negotiation with the relevant license holders and finalize the status of all deposits currently identified as Mineral Deposits of Strategic Importance.

On January 23, 2015, the Parliament added gold deposit named Gatsuurt as 16th mineral deposit of Strategic Importance, which is located in Selenge aimag of Mongolia. The 16 Mineral Deposits of Strategic Importance specified by Parliament in the Strategic Deposits List have no defined "edges". They each consist of concentrations of mineralization in a general area that is identified only by a name and not by a set of specific coordinates. License areas, on the other hand, are precisely defined by specific coordinates. Thus, it is not feasible to definitively determine whether or not any given license area is within or overlaps a Mineral Deposit of Strategic Importance.

As of the date of this Offering Memorandum, the Government of Mongolia defined the boundary coordinates of 8 Mineral Deposits of Strategic Importance in total. On April 4, 2017, the Government of Mongolian issued Resolution No. 109 "On defining the boundaries of Gatsuurt gold deposit" and on October 3, 2018, issued Resolution No. 300 "On defining the boundaries of some mineral deposits of strategic importance" for defining boundary coordinates of the other 7 Mineral Deposits of Strategic Importance. Under Resolution No. 300, the Government of Mongolia defined boundary coordinates of Tavan Tolgoi and expanded boundary coordinates for Tavan Tolgoi by including areas under the BN and THG mining licenses. The Company has not yet received any notification or letter from the Government with regards to the consequences or follow-up actions of the abovementioned resolution. Since, only Parliament has sole power to designate deposits as Mineral Deposit of Strategic Importance, as of the date of this Offering Memorandum, our BN and THG mining license area have not been designated as a Mineral Deposit of Strategic Importance by the Parliament and they are not included in the Strategic Deposit List or the Tier 2 Deposits List as it delineated in the Mongolian Parliamentary Resolution No. 27 dated February 6, 2007.

State Participation in Mineral Deposits of Strategic Importance

The 2006 Minerals Law provides that the Government of Mongolia may acquire up to 50% equity interest if the relevant exploration is state financed, such as funded from the State Budget or up to 34% equity interest, if the relevant exploration is privately financed. The terms and conditions of such participation are subject to negotiation between the Government of Mongolia and the license holder and may not necessarily adhere to the 50% or 34% limitations. The 2006 Minerals Law does not provide any guidelines as to the form such negotiations should take. Effective from February 18, 2015, in lieu of the

abovementioned right to acquire certain equity interest, upon approval of the Parliament, the Government may agree with the license holder on imposing special royalty of up to 5% in addition to the base and progressive royalties applicable to all mining licenses since the amendment made on February 18, 2015 to the 2006 Minerals Law.

In addition, on July 1, 2014, the Parliament resolved to refuse taking any equity interest in copper and molybdenum deposit named 'Tsagaan suvarga', which was included in the list of Mineral Deposit with Strategic Importance back in 2007 by the Parliament.

The 2006 Minerals Law further provides that any company which holds a Mineral Deposit of Strategic Importance is required to list at least 10% of its shares on the Mongolian Stock Exchange. To our knowledge, this provision has not yet been enforced with respect to any of those companies with deposits on the Strategic Deposit List, including us, and it is not clear whether the provision would be enforced in the future.

Tax Stabilization Certificate

Pursuant to the Law on Investment adopted on October 3, 2013, on August 13, 2015 the Company, through its wholly owned subsidiary ER LLC, received the Tax Stabilization Certificate from the National Development Agency (formerly known as Mongolian Investments Department or Invest Mongolia Agency), the Government agency responsible for implementation of state policy on investment. Under this Tax Stabilization Certificate, the four core taxes i.e., corporate income tax, custom duty, VAT and royalty are stabilized for a period of 24 years, effective from the initial investment period in 2009 until April 17, 2033. For detailed information with respect to investment regulations, see "– Mongolian Laws Relating to Business Entities with Foreign Investment" below.

Royalties

A base royalty at the rate of 5% is payable in respect of the sales price of all products extracted pursuant to a mining license (other than domestically sold coal and construction minerals) that are sold, shipped for sale, or otherwise used. Part of the royalty goes to the central treasury, while the remaining part goes to local governments. The base royalty rate for domestically sold coal and construction minerals is 2.5%, whereas the rate for international exports of these materials is 5%.

An additional progressive royalty rate, which is calculated based on the degree to which coal is processed is also payable. The level of the progressive royalty rate depends on the level of processing of coal and is set forth in the table below.

Raw Coal Progressive Royalty Rate		**Processed Coal Progressive Royalty Rate**	
Price Range	**Progressive Royalty**	**Price Range**	**Progressive Royalty**
(US$/tonne)	*%*	*(US$/tonne)*	*%*
0-25	–	00-100	–
25-50	1.00	100-130	1.00
50-75	2.00	130-160	1.50
75-100	3.00	160-190	2.00
100-125	4.00	190-210	2.50
125+	5.00	210+	3.00

In addition to the abovementioned base and progressive royalty rates, effective from February 18, 2015, in lieu of the Government's right to acquire certain equity interest up to 50% equity interest in Mineral Deposits with Strategic Importance, if the relevant exploration is state financed or up to 34% equity interest in such deposit, if the relevant exploration is privately financed, upon approval of the Parliament, the Government may agree with the license holder on imposing special royalty of up to 5% in addition to the base and progressive royalties applicable to all mining licenses.

Sales and Transfers of Exploration Licenses and Mining Licenses

In accordance with the 2006 Minerals Law, the holder of an exploration license may not sell the license itself. The holder may, however, sell the underlying "original materials and reports on prospecting and exploration work" (the "license area data") in respect of the license. Upon completion of the sale of the license area data, and payment of applicable taxes (evidenced by a document showing payment of such tax), the holder may transfer the license, but for no consideration.

In accordance with the 2006 Minerals Law, the holder of a mining license may not sell the license itself. The holder may, however, sell "the mine, together with its machinery, equipment and documents" that is located within the relevant license area. Upon completion of the sale of the mine, and payment of applicable taxes (evidenced by a document showing payment of such tax), the holder may transfer the license, but for no consideration.

Law on Subsoil was adopted on November 29, 1988. In addition to the 2006 Minerals Law, the Law on Subsoil regulates issues regarding use and protection of subsoil. As in the Constitution of Mongolia, Article 3 of the Law on Subsoil provides that the subsoil is owned by the country or the whole nation.

The Law on Subsoil contains provisions that grant power to the State Great Hural, the Government of Mongolia, the Ministries of Geology, Nature and Environment and local authorities to protect and regulate the use of subsoil. In addition to mining and geological exploration, subsoil may be used for building facilities underground including burying of oil, gas, other poisonous substances and industrial waste or waste water drainage system. Local authorities shall provide permits to use the subsoil depending on the nature of the project. Article 19 of the Law on Subsoil provides that the subsoil shall be allocated for use for 30 years extendable for another 20 years.

Chapter 3 of the Law on Subsoil provides requirements and procedures regarding development of design and building facilities underground and plants that would be used for mining of minerals. Even though Article 10.2 of the Law on Subsoil provides that issues regarding exploration and mining of minerals from the subsoil shall be regulated by the 2006 Minerals Law, Chapter 4 of the Law on Subsoil regulates the procedures for using the subsoil for purposes of mining of minerals and it deals with the procedures for the entity to mine the subsoil, and requirements of the legal entity during the mining operations, including effective and full use of the deposit and imposing obligations not to selectively mine not to damage the neighboring deposits and general requirements for rehabilitation, ensuring safety of the employees and the population in the area (Article 32.8).

The Law on Subsoil also regulates issues related to the safety, use and protection of the subsoil, maintenance and registration of minerals reserve deposits and monitoring of the use and protection of subsoil and geological studies conducted in the subsoil.

Mongolian Laws Relating to Additional Permits

Effective from January 1, 2023, the Law on Permits preceding the Law on Special Permits for Business Activities (2001) provides for governing relations regarding granting, suspending and revoking all licenses and permits required for business activities that may have an impact on the public interest, human health, environment and national safety or that may require certain conditions and qualification. The Law on Permits aims to reduce the burden of licensing process for businesses that was previously regulated under several different regulations of various authorities and regulate all licenses and permits under one legislation.

Unless otherwise provided by the law specifically, a license will be granted for at least 5 years, and a permit for at least 3 years. The Law on Permits does not apply to licenses or permissions that are specifically regulated by separate law, such as land rights, mineral licenses etc. In case the license is revoked or the application for a license is denied, the applicant cannot re-apply within six months.

Article 8 of the Law on Permits lists the type of business activities that require licenses or permits by each field and the corresponding state authorities to grant such licenses or permits and the following mining related activities are required to be licensed in mining and heavy industry field.

License	Authority for licensing
8.1. constructing a pipeline for the sale of petroleum	Government
8.2. engaging in industrial and technological park activities	Government
8.3. using subsoil for the protective burial of toxic substances having a special effect on the health of the population, livestock, wildlife, and the environment	Government
8.4. engaging in wholesale and retail trade of all types of fuel	State administrative agency in charge of petroleum issues
8.5. importing of all types of fuel	State administrative agency in charge of petroleum issues
8.6. engaging in production of petroleum products	State administrative agency in charge of petroleum issues
8.7. exploring or mining petroleum or unconventional oil	State administrative agency in charge of petroleum issues
8.8. manufacture, import, and use of pyrotechnics for exhibition purposes	State administrative agency in charge of geology and mining
8.9. carrying out blasting for industrial purposes	State administrative agency in charge of geology and mining
8.10. Import, export and manufacture of explosives and explosives for industrial purposes	State administrative agency in charge of geology and mining
8.14. minerals exploration	State administrative agency in charge of geology and mining
8.15. minerals mining	State administrative agency in charge of geology and mining
8.16. use of radioactive minerals	State administrative agency in charge of geology and mining
8.17. land rehabilitation after using radioactive minerals	State administrative agency in charge of geology and mining
8.18. Importing, exporting, transporting and burying radioactive minerals	State administrative agency in charge of geology and mining
8.19. exploring radioactive minerals	State administrative agency in charge of geology and mining
8.28. using the subsoil for purposes other than mineral extraction	Governor of respective province or capital city
8.29. using commonly distributed minerals	Governor of respective province or capital city
8.30. exploring commonly distributed minerals	Governor of respective province or capital city

The Law on Water approved on May 17, 2012 and the purpose of this law is to govern issues regarding proper use of water and water bed area protection and rehabilitation. As provided for in the Law on Water, any citizens, legal entity or organization must obtain the right to use the water by entering into an agreement and obtaining the permission. The agreement to use water must be entered for a term of up to ten years and as long as the user complied with its obligations the agreement can be extended for another five years. For the mineral deposits with strategic importance, the law even allows to grant water utilization permits equal to the minerals license terms. However in practice, since implementation of the 2012 Law on Water, the water use permits have always been granted for one year, subject for annual renewal.

The Law on Energy was adopted on February 1, 2001. The purpose of this law is to govern the issues regarding production, transmission, distribution, dispatching coordination and services using energy reserves and construction of energy infrastructure and use of energy.

On December 22, 2009, United Power LLC, a subsidiary of the Company, obtained a special license for construction of power plant at the Ukhaa Khudag soum in South Gobi Province. Accordingly, the Company constructed 3x6 MW on site power plant in 2011. The power plant is now fully operational and meets all the power consumption need of the Ukhaa Khudag coking coal mine. Since the commencement of the operation of the power plant, we faced issue as to how to utilize the power plant. As the Company has no special permits required for operating the power plant, we entered into the Power System Operation and Maintenance Agreement with MCS International LLC. MCS International LLC and its subsidiaries hold such special permits required for operating the power plant at the area where the power plant is located.

According to the Law on Energy, scope of license is limited to certain territory. Therefore, only one legal entity may hold a license to conduct energy related activities in relation to a particular source of energy within the territory specified in the relevant permit.

The revised Law on Construction was approved on February 5, 2016. The purpose of this law is to govern the issues regarding conduct of construction activities, production of construction material, and executing, supervising and commissioning construction works. As defined in this law the "building and facilities" shall mean apartments, civil, industrial, energy, communication, water and petroleum purpose buildings, and facilities such as water channel, dams and shields and the engineering networks thereof.

Law on Poisonous Chemicals and Dangerous Substances was adopted on May 25, 2006. As provided in this law, special permits must be obtained in order to import, transport and use chemical and dangerous substances by the ministry in charge of environment. The Company obtains special permit to import, transport and use certain types of chemical elements and harmful substances that being used for coal mining from the Ministry of Environment and Tourism in accordance with the Law on Permits.

LIST OF OTHER APPLICABLE MONGOLIAN LAWS

- Law on Auto Road was adopted on May 11, 2017.
- The Law on Auto Transportation was adopted on June 4, 1999.
- The Law on Traffic Safety was adopted on July 8, 2015.
- The Law on Civil Aviation was adopted on January 21, 1999.
- The Law on using Air Space for Aviation was adopted on May 30, 2003.
- The Law on Custom was adopted on May 20, 2008.
- The Law on Waste was adopted on May 12, 2017.
- The Law on Border was adopted on December 28, 2016.
- The Law on Communication was adopted on October 18, 2001.
- The Law on Radio Wave was adopted on June 4, 1999.
- The Law on Urban and Rural Water Supply Sanitation Sewerage Uses was adopted on October 6, 2011.

MONGOLIAN LAWS AND REGULATIONS RELATING TO LABOR, HEALTH AND SAFETY

The Mongolian Labor Law (2021) ("Labor Law") and the Labor Safety and Sanitary Law (2008) ("Labor Safety Law") contain provisions of general application in relation to labor, health and safety.

Labor legislation in Mongolia includes the Law on Setting up Minimum Labor Wage (2010) according to which the National Trilateral Committee of Labor and Social Consensus shall set the minimum labor wage, and the minimum labor wage. Most recently, on May 4, 2022, the minimum labor wage was set at MNT550,000 effective from January 1, 2023.

The Labor Law was approved on July 2, 2021 and became effective from January 1, 2022. The Labor Law provides general provisions and detailed provisions regarding collective bargaining and contract, detailed clauses regarding independent contract and provisions regarding the grounds for terminating employment agreement, provisions governing wage and allocation of wages including overtime, holiday and after hours wages or day-off time, provisions regarding home-based or remote work, long term shifts in mining sector, provisions regarding the labor condition, safety and health standards, the labor of women, juveniles, disabled and senior citizen's and foreign citizens in Mongolian entities. The Labor Law also provides framework for collective labor interest dispute resolution by a labor mediator or through labor arbitration.

The new law provides that employees should not work more than 56 hours per week and the maximum overtime per day should not exceed four hours, while it also introduces requirements for roster shifts which is applicable to mining industry. The duration of the working time is 14 days as well as the rest and recreation period shall be 14 days. Also, travel time of an employee on roster shifts is counted as working hours.

In the new Labor Law, matters related to labor and occupational and health safety is stated to be regulated by the Law on Labor Safety. An employer is responsible for maintaining a safe working environment that meets applicable safety and sanitation requirements. Furthermore, if the nature of an employee's work requires so, the employer must provide special work garments and arrange for such employees to receive regular, preventative health examinations related to their work. Mining companies must create a special department, or appoint an officer, dedicated to overseeing matters of safety and sanitation. The Ministry of Social Welfare and Labor is responsible for adopting regulations governing labor safety and sanitation.

The Labor Law and the Labor Safety Law provide that in the event of an industrial accident the employer, at its own expense, must immediately transport injured employees to a hospital and take steps to eliminate any causes of harm created by the accident. Employers are obligated to investigate and report all industrial accidents. Regardless of whether an employee was covered by insurance for injuries sustained during an industrial accident, the employer must reimburse the employee in an amount determined as a percentage of the average salary of the employee. If the employee died as a result of the accident, the employer must reimburse the employee's family in an amount equal to or more than the deceased employee's average compensation for 36 months. Reimbursement under these provisions of the Labor Law and Labor Safety Law do not affect the employee's entitlement to pensions or other benefits under social insurance or other laws.

If a company's activities are proven to have an adverse impact on the health and safety of its employees, the authorized official may take steps to force the company to remedy the breaches. If the company fails to remedy such breaches, it may be ordered to wholly or partially suspend business activities until the labor safety and sanitation requirements are satisfied. Additionally, failing to comply with labor safety and sanitation regulations, causing or concealing an industrial accident, or failing to pay requisite compensation for an industrial accident, may result in the imposition of administrative fines. In extreme cases, criminal sanctions may be imposed for violating the applicable Labor Law provisions.

On June 22, 2023, the "Collective (Tariff) Agreement of the Geology, Mining and Heavy Industry Sector" for 2023 to 2024 was executed by the relevant representatives of the state, trade union and employers of the sector industry replacing its previous version adopted in 2021. The minimum monthly wage of employees working in the mining sector is increased to MNT1,100,000, while the national minimum wage is MNT550,000 set by the National Trilateral Committee of Labor and Social Consensus. The Group does not expect any impact on its financial position from this requirement as its existing internal remuneration policies sufficiently cover the newly adopted minimum monthly wage requirements.

The 2006 Minerals Law provides that local administrative and self-governing bodies are responsible for monitoring compliance with respect to health and safety regulations for workers and local residents. A mining license holder must carry out activities that ensure (i) safety for the citizens of the relevant soum or district and (ii) labor safety and proper sanitary conditions for its employees.

If a license holder is found to have continually violated mining operation safety regulations, its license(s) may be suspended by a State inspector, and if the deficiencies are not eliminated within this period, the license(s) may be revoked upon the State inspector's proposal to the authority which granted the license. If a mining license holder causes serious damage to human health through failure to implement safety rules and appropriate technical standards while using toxic chemicals and substances, its license may be revoked. Criminal sanctions may also be imposed for violating the health and safety provisions of the 2006 Minerals Law, in extreme cases.

Under the Law on Subsoil (1988), a special mining rescue unit was established by the Government of Mongolia, and mine operators are required to pay fees to support and maintain the services of this unit. Also under this law, the Ministry of Environment and Tourism of Mongolia and the MMHI are responsible for ensuring compliance with applicable safety rules and standards while conducting subsoil related activities. If a mine operator is not in compliance with these safety rules and standards, it may be ordered to suspend its activities.

The Fire Safety Law (2015) requires companies to observe fire prevention and extinguishing regulations, norms and standards and to train employees in firefighting skills.

Specific provisions of the regulations implemented by the Ministry of Labor and Social Welfare pursuant to the Labor Law, the Labor Safety Law may be amended and supplemented from time to time, govern:

- the air quality structure and permitted levels of poisonous gas in the atmosphere;
- fire prevention measures; permitted levels of dust in the atmosphere;
- provision of amenity rooms for mine operating personnel, medical and first-aid care, and a clean water supply;
- establishment of ancillary facilities for the health and welfare of mine operating personnel; and
- compliance with radiation safety norms and permitted levels of radioactive exposure.

Mine operators, as well as all employees working at a mine site, are responsible for complying with these regulations. A breach of the regulations, regardless of whether or not it results in an industrial accident, may result in disciplinary, administrative or criminal liability depending on the severity of the breach.

Law on Workforce Migration was adopted on December 24, 2021 and became effective on July 1, 2022 to determine the relationship, management and organization of workforce migration from Mongolia to a foreign country and from a foreign country to Mongolia on basis of national labor market data, in a unified and comprehensive manner in order to protect human rights and legitimate interests. The Law states that the total term of a foreign employee's continuous work permit in Mongolia shall be not more than five years. Business entity, organization or individual citizens shall pay a fee equal to two times of the minimum monthly wage for employing a foreign citizen in Mongolia and that fee is per month per each foreign citizen.

The Government of Mongolia enacts a resolution on the number and percentage of foreign workers to be employed in Mongolia by the economic activity sectors annually within October 1 of each year. This quota is calculated proportionally to the number of internal employees of the Mongolian entities that want to hire foreign workers. The quota for 2023 for mining sector has been determined as 8000 foreign employees. According to New Revival Policy (2021) adopted by the Parliament of Mongolia, it has been directed that there shall be no limits on the number of foreign workers to be set for a company in private sector. However, in mining sector, under amendment to the Minerals Law dated November 11, 2022, mining

license holders shall comply with the workforce quota requirement set by the Minerals Law which obliged them to employee the citizens of Mongolia, and up to 10 percent of the employees may be foreign citizens and at least 5 percent of the employees must be citizens of soum and district where the mining activities are carried out.

A Collective Bargaining Agreement in Mining and Heavy Industry for 2023 and 2024 has been entered into by and between the Ministry of Mining and Heavy Industry, the Trade Union of the Mining and Heavy Industries and the Mining Association as the representative of mining employers. This agreement provides certain regulations for working conditions and work safety, salary and allowances, professional and social matters of the employees working in geology, mining and heavy industries. Having an equal enforcement to the regulations under the Labor Law, this agreement provides regulations creating more benefits and incentives to the mining sector employees.

MONGOLIAN LAWS RELATING TO COAL EXPORT REQUIREMENTS

A Mongolian mining company holding a valid mining license that extracts and processes coal has the right to export and sell the coal on the international market. There is no additional export license required. There are, however, certain requirements that must be complied with and procedures that must be followed in order to lawfully export coal.

First, a coal mining company must pay the appropriate royalty (See "Regulation – Mongolian Laws and Regulations Relating to Exploration for Minerals and Mining – Royalties") and obtain a document evidencing such payment from the relevant tax office. Under the 2006 Minerals Law, the royalty rate is based on the sales value, which in turn in case of exported minerals is directly defined by the MRPAM's regularly announced monthly average international market price rate, which is sourced only from the widely accepted as a definitive source of reliable information concerning the coal market in China. This source is defined by the Government Resolution No. 81, dated February 1, 2016 in accordance with the 2006 Minerals Law. Besides, the 2006 Minerals Law provides second option on defining sales value based on actual sales contract price, if it is impossible to define sales price based on international market price. In the past, due to serious market instability incurred in 2014 in coal market, the Government accepted use of sales contract price for the calculation of royalty in 2014 from April 1, 2014 up to January 1, 2015. The procedure on defining royalty based on contract price is approved by the Government Resolution No. 465, dated December 25, 2019. As of the date of this Offering Memorandum, the royalty is defined based on the Government's announced international market price. Coal is not subject to Mongolian export tax.

Second, the coal producer/exporter must obtain a certificate of origin from the Mongolian Chamber of Commerce and Industry in respect of the Group's coal being exported. This certificate of origin certifies that the source of the coal is from within Mongolia.

Finally, the producer/exporter must obtain a certificate from Custom's Central Laboratory certifying that the coal to be shipped is properly classified. It will be classified in accordance with a rule approved by Mongolian National Centre of Standardization and Measurement. On July 4, 2022, the Head of the Agency for Standardization and Metrology issued Order No. C/28 and approved MNS 6457:2022 "Coal and Coal Product Classification", the national standard defining different types of coal based on their quality specifications, replacing its previous version adopted in 2014.

In order to complete the coal export process, the coal producer/exporter must present the three aforementioned documents, along with the following additional documents, to the customs authority at the border crossing:

- a copy of the producer's mining license (to establish that the coal has been extracted and processed by a duly authorized Mongolian entity);
- a copy of the coal sales contract;
- a copy of the shipping contract; and
- other standard commercial shipping documentation.

On October 5, 2022, the Government of Mongolia issued Resolution No. 362 regarding measures to be taken to increase foreign exchange reserves in view of ensuring transparency and efficiency of mineral trade. The Government of Mongolia instructed to take the following measures in order to create customs and tax automatic collection system and improve customs control: (i) to create a system for determining the origin of products by the end of 2022 and make electronic payment receipts for all processes such as extraction, processing, and transportation of minerals, register all contracts related to these activities in the unified tax system; (ii) from January 1, 2023, to carry out mineral export activities through the electronic system created under the resolution, export activities will be restricted to be exported if they are not registered in the electronic system; and (iii) to put automatic customs clearance system in operation.

On April 17, 2023, the Minister of Finance issued Order No. A/89 whereby the "Procedures for registering goods, products, and minerals in the unified database at each stage of production, trade, export, and import" was approved. Pursuantly, producers, sellers and exporters of commodities are required to register their respective agreements, including sale and purchase agreement, foreign trade agreement, service agreement and other relevant agreements with the unified tax database at each stage of extraction, sale, and export.

In order to increase the volume of mineral exports and actual foreign exchange earnings, the Government of Mongolia instructed respective government bodies to take optimum measures to organize railway transport and export of minerals through border ports.

In addition, the Government of Mongolia instructed Minister of Mining and Heavy Industry and Minister of Road and Transportation Development to take measures in relation with stated owned entities, to (i) shift sales terms of minerals from ex-works ("EXW") mine term to delivery-at-place ("DAP") border point terms as general measures applicable to minerals exporting entities; (ii) transfer granting rights of border crossing transportation multi-permits of type-C ("C permit") to coal mining entities.

On December 30, 2022, the Head of the Border Authority issued Order No. A/34 and adopted a "Temporary Procedure on Regulating Transportation at Gashuunsukhait Border Point". The procedure was approved with regards to opening ordinary operation of the land ports from PRC from January 8, 2023, by lifting strict zero-COVID policy requirements, such as isolation of export import truck drivers in segregated teams and having strict COVID-19 infection testing control. Also, starting from January 2023, National Center for the Auto-Transportation, state owned factory, passed its right to grant C permits to respective coal mining entities.

MONGOLIAN LAWS RELATING TO BORROWING AND LENDING ACTIVITIES AMONG LEGAL PERSONS

The Civil Code of Mongolia allows citizens, legal bodies and organizations to borrow money or other property in two ways: from other citizens, legal bodies or organizations or from banks or financial institutions. Article 281.1 of the Civil Code regulates the regular loan relationship between legal bodies while Article 451.1 of Civil Code regulates loan relation between legal bodies and banks or financial institutions. There is no restriction in the laws and legislation of Mongolia on borrowing from any individual, who might be considered connected persons of the borrower, but special decision making requirements defined by the 2011 Company Law pertains to contracts that involve conflict of interest.

Parliament adopted the Law on Regulating Money Lending Activities on November 4, 2022, and effected from March 1, 2023. The law requires individuals or legal entities engaged in the activity of money lending for the purpose of permanent and profit making purposes to be registered with relevant state authorities. According to this law, money lending activities shall be under the Financial Regulatory Commission's supervision and there shall be a maximum interest rate for loans to be determined by Money Lending Policy Council of the Financial Regulatory Commission.

MONGOLIAN LAWS AND REGULATIONS RELATING TO LAND TENURE

Land Tenure

Land tenure in Mongolia is divided into: (i) ownership rights; (ii) possession rights; and (iii) use rights. Only Mongolian citizens can own land. Mongolian citizens, organizations and legal entities that are not deemed to be a business entity with foreign investment ("BEFI") are entitled to possess land, which entitles them to pledge their interest and to transfer or lease it, all subject to approval by relevant authorities. BEFIs may only acquire use rights over land, which may not be transferred, pledged or leased.

Land possession and land use rights are evidenced by certificates issued by the local government authority in the city, aimag (province) or soum (district) in which the relevant property is located. Such certificates are issued in conjunction with a document that provides for the term of the land possession or land use rights and the requirements for maintaining such rights in good standing, most notably the payment of recurring fees to the local government (together a "Land Use or Possession Certificate").

To engage in mining activities the license holder, if it is a BEFI, must acquire land use rights to the relevant land area. Under the Land Law of Mongolia enacted on June 7, 2002, and effective from January 1, 2003, as the same may be amended and supplemented from time to time (the "Land Law") and the Law on Investment (2013), land use rights can be granted for a period of up to sixty (60) years, although in practice Land Use Certificates are typically issued for shorter terms. The Land Law provides that renewals may be made once or more than once, but that the maximum term of any renewal may not exceed a period of forty (40) years.

Land Use or Possession Certificates are issued for a specific number of years and for a specific purpose stated in the relevant land use or possession agreement, and are usually renewable if the holder has complied with relevant requirements. Land possession and land use rights are subject to revocation by the issuing authority if the holder fails to comply with (i) applicable provisions of the Land Law, (ii) the terms of the relevant Land Use or Possession Certificate (most notably failure to make timely payment of recurring land use fees), or (iii) applicable environmental protection obligations.

A mining license holder must enter into either a land possession or land use or possession agreement with relevant land owners, possessors, or the governing authorities of soums and districts and obtain the Land Use or Possession Certificate.

An exploration license is also not a real property interest and does not convey either land possession or land use rights to the holder. But it is not clear whether an exploration license holder must obtain a Land Use or Possession Certificate before conducting minerals exploration activities. The 2006 Minerals Law does not specifically provide that such holders must obtain such Land Use or Possession Certificates.

The mining license will be issued at first for 30 years and is extendable two times for 20 years each. All minerals in the ground are owned by the Government of Mongolia on behalf of the people of Mongolia. The holder of a mining license is entitled to extract and sell the minerals located within the land area covered by the license, and is eligible to hold them for up to a maximum of 70 years so long as it complies with all applicable legal requirements. We may sell minerals extracted from the relevant license area, subject to the payment of applicable royalties and income taxes.

Government Resolution No. 302, dated September 30, 2009, states that the term of land use for a foreign investment enterprise holding a mining license relating to a Mineral Deposit of Strategic Importance shall be 30 years, extendable for 20 years.

Land Use for Special Needs

The Land Law provides that land can be taken for special needs by the relevant local government body for the purpose of turning the land into: (i) specially protected areas; (ii) lands allocated for ensuring national defense and security; (iii) land granted to foreign diplomatic and consular offices and representative offices of international organizations; (iv) sites reserved for conducting scientific and technological tests and experiments; (v) permanent environment and weather prediction and observation sites; (vi) pastures and hayfields; (vii) areas designated for oil exploration pursuant to production sharing agreements; and (viii) free trade zones. Pursuant to the 2006 Minerals Law, the MRPAM may revoke a license on the grounds that the exploration or a mining area has been designated as special needs territory and the license holder has been fully compensated. Mongolia's 2013 Investment Law provides that the property of an investor, including both foreign and domestic, may be expropriated exclusively for public purposes or interests and only in accordance with due process of law with payment of full compensation. The 2006 Minerals Law further provides that a government agency which has issued a decision to take the land for special needs shall be obligated to compensate the license holder within one year. If the parties fail to reach an agreement, the amount of compensation shall be determined based on an adequate compensation amount determined by an authorized independent body. The 2006 Minerals Law provides that disputes relating to compensation shall be decided by a court.

MONGOLIAN LAWS RELATING TO BUSINESS ENTITIES

The Company Law approved in October 6, 2011 provides governance requirements for all companies. The Company Law provides general and detailed provisions regarding the legal status of a company and its establishment including, but not limited to, reorganization and liquidation, share capital of a company, dividends and transfer of a company's property, company's management and responsibilities of a company's authorized officials, and the provisions of major transactions or conflict-of-interest transactions.

Pursuant to Article 6.5 of the Company Law, controlled and subsidiary companies shall not be liable for the debts of its parent company and, unless otherwise provided by law and by an agreement, the parent company shall not be liable for debts of its controlled and subsidiary companies.

MONGOLIAN LAWS RELATING TO BUSINESS ENTITIES WITH FOREIGN INVESTMENT

In order to encourage foreign direct investment into Mongolia, especially in the mining and mineral processing sector, the Government of Mongolia implemented a number of initiatives to ensure a stable and supportive legal environment for foreign investment. This was deliberately considered to restore confidence of international investors in Mongolia. As part of immediate steps taken in this regard, on October 3, 2013 the Parliament approved the Law on Investment.

The Law on Investment is a comprehensive piece of legislation intended to encourage investment into Mongolia, by providing certainty on taxation and other key regulatory aspects for new investments. It is aimed to attract and maintain investors' interest in key business sectors within Mongolia.

The Law on Investment provides certainties on the stability of the legal environment, and overall protection of investment for both foreign and domestic investors under non-discriminatory treatment of their interests. One of the key components of the new legislation is the introduction of a clear regime of tax stabilization for investors for defined periods of time. Under the Law on Investment, the following four major taxes can be stabilized for qualifying project investment for five to 18 years:

(a) Corporate income tax;

(b) Customs tax;

(c) VAT; and

(d) Royalty on mineral resources.

The periods of stabilization available depend upon the size of the investment made, its location and the industrial sector. The period of stabilization can be multiplied by 1.5 times for projects with total investment of more than MNT500 billion, which have significant importance for long term sustainable socioeconomic development and produce import substitutions with potential to generate export revenue.

Stabilization regime under the Law on Investment is granted and documented by a certificate of stabilization issued by the Ministry of Economy and Development, in charge of investment affairs.

In addition, the Law on Investment also allows investors an option to apply and enter into an investment agreement with the Government of Mongolia for projects with investment over MNT500 billion.

Under the Law on Investment, the following business sectors are classified as strategically important to the country:

(a) Mining;

(b) Banking and finance; and

(c) Media and Communications.

The Ministry of Economy and Development is in charge of implementing the Law on Investment and approving foreign investments by state owned enterprises in accordance with the Law on Investment. The Law on Investment does not require approval for foreign investments by private entities in sectors of strategic importance. However, investment by foreign state owned enterprises where the investment exceeds one third of total equity of an entity operating in strategically important sectors is subject to mandatory approval of the Ministry of Economy and Development.

ER LLC, which holds UHG mining license, submitted its applications for available tax stabilization certificates on February 24, 2014 and, it was granted the Tax Stabilization Certificate from the National Development Agency, the former agency in charge of investment, on August 13, 2015, under which the core four taxes, namely, corporate income tax, customs duty, VAT and royalty are stabilized for a period of 24 years, effective from the initial investment period in 2009 until April 17, 2033.

Under the Law on Investment, where twenty-five percent (25%) or more of the paid-in-capital of a Mongolian company is contributed from foreign sources and where each foreign shareholders' equity contribution is no less than US$100,000, such company is deemed to be a BEFI. BEFIs are registered with the State Legal Entity Agency through same procedure as domestic entities.

MONGOLIAN LAWS RELATING TO PAYMENTS FOR GOODS AND SERVICES IN LOCAL CURRENCY

The Law on Implementing Payments in National Banknotes enacted in 2009 provides that (i) all posted tariffs and contracts between two parties within the territory of Mongolia must be stated in Togrog; (ii) all payments made between two parties within the territory of Mongolia must be made in Togrog; and (iii) parties within the territory of Mongolia are prohibited from including an adjustment mechanism in the terms of a contract that adjusts the agreed Togrog price based on changes in foreign exchange rates. The Law of Mongolia on Implementing Payments in National Banknotes does not prohibit an offshore party and a Mongolian party from transacting in the currency of their choice, nor does the law prohibit a Mongolian party from paying into an offshore account or being paid in an offshore account in foreign currency.

Penalties for non-compliance with the Law of Mongolia on Implementing Payments in National Banknotes include confiscation of the proceeds of an illegal payment by the State, other administrative fines and revocation of a non-complying business's operating license.

MONGOLIAN LAWS RELATING TO AUDITING

According to Article 10.1 of the Law on Auditing (2015), certain business entities and organizations are subject to financial audit, including entities obliged for compliance with the international accounting standards, entities which issue consolidated financial reports, foreign invested business entities and organizations, and funds and entities obliged for mandatory auditing under the international treaties to which Mongolia is a party. Such entities and organizations shall procure so that their financial reports are confirmed by an auditing organization which is incorporated and registered in Mongolia. In case of a failure to appoint such auditing organization, the maximum penalty imposed will be approximately US$300. If such failure causes loss for users of their financial reports, the accountable officer shall be responsible for compensation.

SINO-MONGOLIAN BILATERAL TREATIES

There are several bilateral agreements between Mongolia and China.

Sino-Mongolian Border Railroad Agreement: The agreement has been entered between the Ministry of Infrastructure Development of Mongolia and Ministry of Railroad of China on October 17, 1955 in Ulaanbaatar, Mongolia. The agreement only has a few provisions such as traffic conditions of trains, procedure on arrangement of the cargo and transportation plans, telegraphic and telephone communication between the two parties, the adherence to the time schedule, terms and procedures to use the opposites of the border stations, constructions of roads and stations, staying of railroad employees in the other parties territory, procedure for serving trains interchange operations, traffic interruption, maintenance of rolling stock and railway, procedures during accident and breakdown issues regarding passenger transportation cargo transportation, responsibilities of the parties for any damages the transportation of spare parts material communication issues. The agreement also has a number of rules and procedures mainly for coordinating train traffic Zamyn-Uud and Erlian border stations, procedure on maintaining a log book on both sides, procedures on mutual warning on traffic and other necessary events, and procedures on passing for employees from both sides and their staying on the other territory of the other side. The agreement also has numerous forms for notification and log maintenance.

The Agreement between the Governments of China and Mongolia for the Avoidance of Double Taxation and the Prevention of Fiscal Evasion with Respect to Taxes on Income was signed on July 29, 1991 and came into force on January 1, 1993.

The Agreement on Friendly Relations and Cooperation between Mongolia and China was signed on April 29, 1994 and ratified by the State Great Hural on July 4, 1994.

The Intergovernmental Agreement between Mongolian Government and the Government of China on Protection and Use of Border Area Water which was signed on April 29, 1994 was ratified by the State Great Hural on January 3, 1995.

On June 9, 2006, the State Great Hural ratified Intergovernmental Agreement signed between the Government of Mongolia and the Government of China on November 28, 2005 titled 'General Loan Agreement' regarding usage of export soft loan for the amount of US$300 million.

The Intergovernmental Agreement between the Governments of China and Mongolia on Auto Transportation was signed on June 16, 2011 and approved by the Government on August 24, 2011.

On August 8, 2022, the Ministry of Road and Transport Development, the Ministry of Finance of Mongolia and the National Development and Reform Commission of the PRC finalized a memorandum of understanding on the connection of the GS-GM border points by railway and signed a long-term coal supply agreement with China. The commissioning ceremony of the Tavantolgoi-Gashuunsukhait ("TT-GS") railway was held on September 9, 2022.

MONGOLIAN AIR POLLUTION LAWS

On June 24, 2010, the State Great Hural adopted the Air Pollution Fee Law, which imposes fees on entities that pollute, including persons engaged in raw coal mining, producers and importers of organic absorbent, users of auto vehicles and self-moving equipment, holders of licenses to use significant and stationary sources of air pollution and citizens, business entities and organizations using sources of air pollution.

The fee for extracting raw coal is between MNT1 to 2 per kilogram of coal and for producing and importing organic absorbent between MNT10 to 30 per kilogram of organic absorbent. The fee for emission of carbon dioxide by auto vehicles and self-moving equipment that emit more than 120 grams of carbon dioxide per km per year is between MNT1,800 and 9,500 per year per vehicle/equipment, based on the amount of emissions. The fee for waste of significant and stationary sources of air pollution is between MNT1 to 10 per kilogram of waste. Exemptions from fees exist where raw coal is highly processed and new fuel is produced that meets standard requirements. Business entities and organizations extracting raw coal for ensuring national security and protecting public interest and producing power may be exempt from the fee subject to regulations adopted by the Government.

Based upon the range of MNT1 to 2 defined by the 2010 Air Pollution Fee Law, the Government of Mongolia published Resolution No. 273 on October 20, 2010 and specifically defined the air pollution fee for the coal mining industry to be MNT1 for every kilogram of raw coal mined.

The Government of Mongolia is entitled to approve the procedure for air pollution fees discounts and exemptions and the list of entities to be waived or discounted from air pollution fees that extract raw coal. The procedure was adopted by the Government Resolution No. 139 on April 25, 2012 and amended in 2020. Entities shall submit requests for discount or exemption to the relevant taxation department within the first quarter of the following year. The list of entities may be reviewed and updated annually.

CERTAIN MONGOLIAN TAX LAWS

This section does not purport to be a comprehensive description of the Mongolian tax system.

Mongolian tax law sets forth a general structure of taxation but in many circumstances fails to provide clear or detailed guidance as to how the general provisions contained in the law are to be applied to specific transactions. This lack of detailed guidance may lead to inconsistent implementation of the law by the tax authorities.

On March 22, 2019, the Parliament of Mongolia adopted certain amendments to taxation related laws with effect from January 1, 2020, including revisions to the General Taxation Law, the Corporate Income Tax Law and Personal Income Tax Laws. The General Law on Taxation provides the overall structure of the tax regime and the general rights and obligations of taxpayers and the taxation authorities.

Under the Corporate Income Tax Law and the Personal Income Tax Law, ultimate holders of the Mongolia companies holding exploration and mining licenses are defined and the laws impose 10% taxation on right holding entity for indirect transfer and sale of the exploration and mining licenses by its ultimate holder. The Law on VAT was approved on July 9, 2015, effected from January 1, 2016.

A summary of the principal tax legislation that may affect the operations of the Company and its subsidiaries in Mongolia is as follows:

- The general income tax rate applicable to business entities with Mongolian source income is 10% on the first MNT6 billion of taxable income and 25% on amounts in excess thereof. These rates are applicable to operating and certain other types of income (e.g., capital gains on the sale of shares and equipment). Other types of income (e.g., capital gains on the sale of real property, interest, royalty and dividend income) are subject to other, varying rates of income tax.

- Taxable operating income of a Mongolian business entity is determined by taking into account operating income received less permitted deductions. However, Mongolian tax law does not always permit all items of expense incurred in the furtherance of the business purpose of the enterprise (as such concept would be understood in more developed jurisdictions) to be fully deducted when determining taxable operating income.

- Corporate Income Tax Law has been amended to allow for operating losses accumulated by companies regardless of sector to be carried forward and deducted from taxable income for a period of four years following the year in which the loss was incurred. The loss carry-forward deduction can be applied to 50% of the taxable income calculated in the relevant tax year. However, Resolution No. 287 of the Government of Mongolia (2009) still in effect and the carry-forward period applicable to any particular mining company is four to eight years after taking into consideration the investment made by such company in its mining operations.

- In the absence of a tax treaty, (i) dividend income received from a business entity that is registered and operates in Mongolia; (ii) loan interest from a guarantee, royalty income and interest from finance lease; (iii) rental income from tangible and intangible asset lease; and (iv) income resulting from goods sold and services provided within Mongolia, received by a non-resident legal entity from a Mongolian source are subject to Mongolian income tax rate of 20% that is withheld by the payer. The Mongolian legal entity making such payments is obligated to withhold the Mongolian income tax from such payments. Mongolia has signed double taxation treaties with 35 countries, out of which four have been terminated and 26 treaties are in force or ratified. Such treaties provide for lower rates of taxation in certain circumstances.

- The General Tax Law defines the ultimate holder as "a person or a legal entity who holds 30 (thirty) or more percent of shares, shareholding and voting rights of such a license holder and/or land right holder solely or through its affiliates, or who exercises voting rights through representation, or has the right to receive dividends" and Mongolian tax applies to any offshore share sales within the companies indirectly holding the local mining company, triggering ultimate holder change.

- A VAT at a rate of 10% is payable in respect of all goods sold, work performed and services provided within Mongolia. VAT is also payable in respect of goods imported into Mongolia and in respect of certain service fee payments made by Mongolian taxpayers to non-resident service providers. If a legal entity is registered as a value-added taxpayer, it can obtain credits for such tax paid to its suppliers of goods and services and can use such credits to offset value-added, or other, taxes owed in Mongolia. However, the Law on VAT provides certain conditions which can limit the ability of a legal entity to register as a value-added taxpayer. Pursuant to the Law on VAT, exported "finished mineral products" are zero-rated. The Law on VAT entitles the Government of Mongolia to determine types of "finished mineral products". On December 21, 2015, the Government of Mongolia issued Resolution No. 502 on the List of Final Mining Products, whereby washed and processed coal, briquette and compressed coal generated from the coal and similar solid fuel, coal coke and semi-coke, and lignite coke and semi-coke are defined as final mining products. As of general principle, any VAT paid by a producer of mineral products cannot be claimed back, i.e., the producer is deemed to be the end-user and must bear the burden of VAT paid to produce such product. Only finished products that are exported are, however, zero-rated and VAT paid to produce such products may be claimed back.

- Equipment and other goods imported into Mongolia are also subject to an import duty, generally at the rate of 5%. The import duty is defined by the Parliament Resolution 27, dated June 3, 1999. On July 9, 2015, the Parliament provided discretion to the Government to set actual rate of import duties of the certain Mongolia rich certain agriculture and mining products such as meat, seed and dairy products along with resource rich mineral products such as salt, limestone and cement up to 15% or 20%. On August 17, 2015, the Government issued Resolution No. 332 and defined import duty rate for abovementioned Mongolia rich goods mainly up to 15% or 20%. An additional excise tax is payable on the importation of petroleum products and some motor vehicles. It should be noted that value-added tax is also imposed on them.

- Mongolian employers are required to withhold income tax and social insurance fees owed by their employees from salaries payable to such employees, and to make an additional employer payment to the Mongolian social insurance fund. These rules also apply to independent contractors. Payments to the social insurance fund are to be made in respect of all salary, bonus and benefit payments (e.g., housing and transportation allowances) received by the individual. Employees must pay 12.5% of such total compensation package (to be withheld by the employer), but such percentage will be applied to a maximum compensation amount which is adjusted annually but which is currently set at MNT5,500,000 per month (i.e., income in excess of this amount is not subject to the 12.5% assessment). The employer must pay an additional 13.5-15.5% (15.5% in respect of employees engaged in dangerous occupations, such as mining) and such percentage is applied to all compensation paid to the employee with no maximum amount limitation.

- On October 5, 2022, the Government of Mongolia issued Resolution No. 362 regarding measures to be taken to increase foreign exchange reserves in view of ensuring transparency and efficiency of mineral trade. Under the Government Resolution, all processes such as extraction, processing, and transportation of minerals shall be traced by electronic payment receipts and all contracts related to these activities shall be registered in the unified tax system. Starting from January 1, 2023, export activities are restricted to be exported if they are not registered in such electronic system.

- On June 21, 2023, the Government of Mongolia issued Resolution No. 244 and extended the effective period of the special import tax rate of zero percent on diesel fuel imported via all border ports for a period from July 1, 2023 to January 1, 2025.

DIRECTORS AND MANAGEMENT

GENERAL

The Board consists of eight Directors, comprising two executive Directors, three non-executive Directors and three independent non-executive Directors. The Board oversees the Group's businesses, strategic decisions and performance and takes decisions objectively in the best interests of the Company.

The principal functions and duties conferred on our Board include:

- convening Shareholders' general meetings and reporting our Board's work at Shareholders' general meetings;
- implementing the resolutions passed by our Shareholders in general meetings;
- deciding our business plans and investment plans;
- preparing our annual financial budgets and final reports;
- formulating the proposals for profit distributions, recovery of losses and for the increase or reduction of our authorized share capital; and
- exercising other powers, functions and duties conferred by our Shareholders in general meetings.

The following table provides information about our Directors and other senior managers of our Company.

Name	Age	Position
Board of Directors		
Odjargal Jambaljamts	58	Executive Director and Chairman of the Board
Battsengel Gotov	51	Executive Director and Chief Executive Officer
Od Jambaljamts	59	Non-executive Director
Enkhtuvshin Gombo	52	Non-executive Director
Myagmarjav Ganbyamba	38	Non-executive Director
Khashchuluun Chuluundorj	57	Independent non-executive Director
Unenbat Jigjid	61	Independent non-executive Director
Chan Tze Ching, Ignatius	66	Independent non-executive Director
Senior Management		
Oyunbat Lkhagvatsend	46	President and Deputy Chief Executive Officer – Development & Growth
Enkhbat Dorjpalam	41	President and Deputy Chief Executive Officer – Coal & Energy
Ulemj Baskhuu	44	Executive Vice President and Chief Financial Officer
Uurtsaikh Dorjgotov	59	Executive Vice President and Chief Legal Counsel
Tuvshinbayar Tagarvaa	49	Vice President and Chief Marketing Officer
Lkhagva-Ochir Said	39	Vice President and Chief Operating Officer
Bayarmaa Bazar	57	Vice President and Chief Audit Executive

EXECUTIVE DIRECTORS

Odjargal Jambaljamts is an executive Director and Chairman of the Board of the Company. Mr. Jambaljamts was appointed as executive Director of the Company in May 2010. Mr. Jambaljamts is also the Chairman of the Nomination Committee and member of the Remuneration Committee. From 1993 to the present, Mr. Jambaljamts has been the Chairman of MCS Holding LLC and was appointed as the Chairman of MCS Group in 2017. Mr. Jambaljamts was a director of Starain Limited from January 2011 until August 2017, MCS Global Limited and MCS (Mongolia) Limited from 2012 until 2017, Novel International Investment Limited from March 2012 until October 2019, Novel Holdings Group Limited from March 2012 until January 2021, and MCS Mining Group Limited from July 2012 until January 2021, respectively. Mr. Jambaljamts is the brother of Mr. Od Jambaljamts, a non-executive Director and controlling shareholder of the Company. From 1989 to 1991, Mr. Jambaljamts was an automation engineer at the Energy Authority of Ulaanbaatar, Mongolia. From 1992 to 1993, he was an economist at the Hydropower LLC for the Project of Egiin River. Mr. Jambaljamts was awarded a bachelor's degree in cybernetics of electrical system by the Kiev Polytechnic Institute, Ukraine, and holds his master's degree in business administration from the Maastricht School of Management, Ulaanbaatar, Mongolia.

Battsengel Gotov is an executive Director and Chief Executive Officer of the Company. Dr. Gotov was appointed as executive Director of the Company in May 2010. Dr. Gotov joined the Group in May 2008 as the Chief Executive Officer of ER LLC. Since 2004, Dr. Gotov has served at various managerial positions in the MCS Group. From 1996 to 2000, Dr. Gotov was an assistant professor at Comenius University in Bratislava. He moved to the University of Cologne, Germany in September 2000 as a research fellow sponsored by the Alexander von Humboldt Foundation. He stayed at the University of Cologne, Germany from September 2000 until October 2003 as a postdoctoral fellow. Dr. Gotov has been a board member of the Mongolian National Mining Association since 2010. He was appointed a member of the Mineral Resources Policy Council in October 2014. In April 2022, Dr. Gotov was appointed as Chairman of the Mongolian National Mining Association and the President and Chairman of the Mongolian Basketball Association. Dr. Gotov was awarded a master's degree in science and a PhD in organic chemistry by the Comenius University, Slovakia.

NON-EXECUTIVE DIRECTORS

Od Jambaljamts is a non-executive Director of the Company. Mr. Jambaljamts was appointed a non-executive Director of the Company in July 2012. He is also a member of the ESG Committee. Mr. Jambaljamts is the president of MCS Group and a director of a number of subsidiaries within the MCS Group, and a member of the board of MCS Mongolia LLC, a controlling shareholder of the Company. He also works as the Honorary Council General of Denmark. Mr. Jambaljamts has over 20 years of experience in both private and public sectors and has extensive experience in working with companies in a diversity of fields. Mr. Jambaljamts is the brother of Mr. Odjargal Jambaljamts, the Chairman of the Board, an executive Director and a controlling shareholder of the Company. Mr. Jambaljamts was a director of MCS Global Limited and MCS (Mongolia) Limited from 2012 to 2017, MCS Mining Group Limited from July 2012 to January 2021, and Trimunkh Limited from July 2011 to March 2020, respectively. Mr. Jambaljamts was awarded a bachelor's degree in International Relations by the Institute for International Relations, Moscow, Russia in 1988 and master's degree in arts majoring in foreign affairs by the University of Oxford, United Kingdom in 1993. Mr. Jambaljamts was awarded the Honorary Labor Medal of Mongolia in 1997, and awarded with the Polestar medal of Mongolia twice.

Enkhtuvshin Gombo is a non-executive Director of the Company. Ms. Gombo was appointed a non-executive Director of the Company in September 2017. She is also a member of the Audit Committee. Ms. Gombo is the vice president and a director of the Finance Department of MCS Holding LLC, and a member of the board of MCS Mongolia LLC, a controlling shareholder of the Company. Ms. Gombo joined MCS Holding LLC in 2003 as a financial analyst, and was subsequently appointed as the head of the Planning Unit under the Finance Department in 2006. Ms. Gombo became the vice president and director of the Finance Department of MCS Holding LLC in 2008. In addition, Ms. Gombo has previously served as a non-executive Director and a member of the Audit Committee for the period from the initial public offering of the Company on October 13, 2010 to October 12, 2014. Ms. Gombo was awarded a bachelor's degree in Banking and Finance by the Economics College of Mongolia in 1994. In 1997, she was awarded a master's degree in International Banking and Finance at Birmingham University Business School, Birmingham, United Kingdom.

Myagmarjav Ganbyamba is a non-executive Director of the Company. Mr. Ganbyamba was appointed as a non-executive Director of the Company in January 2022. He is a member of the ESG Committee. Mr. Ganbyamba is the chief executive officer of MCS Investment LLC and MCS Ventures LLC, respectively. Mr. Ganbyamba joined the MCS Group in 2005 as a financial analyst of Interpress and Anun LLC, and worked as a financial analyst to the MCS Holding LLC from 2007 to 2009 and to the Company from 2009 to 2010, respectively. Mr. Ganbyamba served as the deputy chief executive officer of Goyo LLC from 2012 to 2013, and subsequently served as the vice president and chief financial officer of Unitel Group from 2013 to 2020. Mr. Ganbyamba was awarded a bachelor's degree in Financial Management from the Mongolian University of Science and Technology in 2006, and awarded a master's degree in Financial Management by the Keller Graduate School of Management, DeVry University in California, United States in 2012. Mr. Ganbyamba is also a Chartered Financial Analyst.

INDEPENDENT NON-EXECUTIVE DIRECTORS

Dr. Khashchuluun Chuluundorj is an independent non-executive Director of the Company. Dr. Chuluundorj was appointed as an independent non-executive Director of the Company in January 2016. Dr. Chuluundorj is also the Chairman of the Remuneration Committee and a member of the Audit Committee and Nomination Committee. He was awarded a bachelor's degree in economics from the Moscow State University, Russia, in 1989, a master's degree in economics from the Graduate School of Economics, Yokohama City University, Japan, in 1996 and a PhD in international economics from the Graduate School of Economics, Keio University, Japan, in 2003. Dr. Chuluundorj is a Professor at the Department of Economics of the National University of Mongolia, and a member of the Academic Council of the National University of Mongolia. He has served as an executive director of the Mongolian Oil Shale Association since 2012. From 2009 to 2012, he served as the Chairman of National Development and Innovation Committee of Mongolia, a government agency in charge of national development strategy and investment policy. Dr. Chuluundorj managed government efforts on the introduction of private-public partnership concept and private sector support policies. As one of the leading economists of the country, he managed government efforts to adopt economic and development policies and legislation in wide range of fields and hugely contributed in successful implementation of major economic development programs in Mongolia. Dr. Khashchuluun Chuluundorj was appointed as a member of board of directors of Mongolian Investment Rating Agency in December 2021.

Unenbat Jigjid is an independent non-executive Director of the Company. Mr. Jigjid was appointed an independent non-executive Director of the Company in September 2010. Mr. Jigjid is the Chairman of the ESG Committee and member of the Audit Committee, Nomination Committee and Remuneration Committee. From 1990 to 2000, Mr. Jigjid held various positions in the Bank of Mongolia, including economist, senior economist, director of the monetary policy department and governor. From 2000 to 2006, Mr. Jigjid was the executive director of the Mongolian Bankers Association. Mr. Jigjid was a director of Resources Investment Capital from October 2010 to November 2013. Mr. Jigjid has been an executive director of the Corporate Governance Development Center in Mongolia since 2009 and was appointed Head of the Center in March 2015. From October 2010, Mr. Jigjid serves as a director of Golomt Bank of Mongolia. He has been the board member of Open Society Forum in Mongolia since March 2011. In April 2013, Mr. Jigjid was appointed an independent non-executive director of APU JSC, a company listed on the Mongolian Stock Exchange. Mr. Jigjid was appointed as a member of the board of International Bank for Economic Cooperation in October 2022. Mr. Jigjid was awarded a master's degree in economics by the Moscow Institute of Economics and Statistics, Russia, and a master's degree in international affairs by Columbia University, United States.

Chan Tze Ching, ***Ignatius*** is an independent non-executive Director of the Company. Mr. Chan was appointed an independent non-executive Director of the Company in September 2010. He is the Chairman of the Audit Committee and member of the ESG Committee. From 1980 to 2007, Mr. Chan held various positions in Citigroup, including management associate, country treasurer and head of sales and trading, head of corporate banking business for Hong Kong, country officer for Taiwan, chief operating officer for Greater China, country officer for Hong Kong and head of corporate and investment banking business for Greater China. Mr. Chan served as a member of the board of directors of the Community Chest of Hong Kong from September 1999 to June 2020. From November 2012 to June 2014, Mr. Chan was appointed

an independent non-executive director of Larry Jewelry International Company Limited, the shares of which are listed on the Hong Kong Stock Exchange. From March 2011 to June 2016, Mr. Chan was a member of the Sponsorship and Development Fund of the Open University of Hong Kong. In 2008, he was the deputy chief executive of the Bank of China (Hong Kong) Limited. Mr. Chan was appointed a senior advisor of The Bank of East Asia Limited in March 2009. He was also appointed as a member of the Council of Hong Kong Red Cross from April 2010 to August 2022, senior advisor of CVC Capital Partners Limited from November 2010 to October 2021, member of the Executive Committee of the Investor Education Centre (IEC) of the Securities and Futures Commission from October 2012 to October 2018, member of the Hong Kong Tourism Board from April 2013 to March 2019 and Deputy Chairman of Council of the Hong Kong Polytechnic University from April 2013 to December 2015, and Board Adviser of Hong Kong New Territories General Chamber of Commerce since May 2013. He was also an Honorary Advisory Vice President of The Hong Kong Institute of Bankers for the period from February 2011 to December 2016. Mr. Chan was appointed a Member of the Standing Commission on Civil Service Salaries and Conditions of Service of the Government of the Hong Kong Special Administrative Region for the period from January 1, 2014 to December 31, 2019, and a member of the Standing Committee on Judicial Salaries and Conditions of Service from January 2017 to December 2022. Mr. Chan was appointed a member of the Financial Reporting Council (FRC) for the period from December 2014 to September 2020. Mr. Chan was a member of the Disciplinary Appeals Committee of the Hong Kong Securities Clearing Company Limited from December 2009 to April 2021 and an independent non-executive director of Hong Kong Exchanges and Clearing Limited from April 2009 to April 2021, the shares of which are listed on the Stock Exchange. He served as a non-executive director of Rizal Commercial Banking Corporation, the shares of which are listed on the Philippines Stock Exchange from November 2011 to June 2019. Mr. Chan was appointed a non-independent non-executive director of Affin Holdings Berhad, the shares of which are listed on Bursa Malaysia from August 2013 to August 2016. In April 2022, Mr. Chan was appointed as a member of the Hospital Governing Committee of Hong Kong Red Cross Blood Transfusion Service and Chairman in April 2023. Mr. Chan was awarded bachelor's and master's degrees in business administration by the University of Hawaii, United States, and is a Certified Public Accountant with the American Institute of Certified Public Accountants.

SENIOR MANAGEMENT

Oyunbat Lkhagvatsend is the President and Deputy Chief Executive Officer – Development & Growth of the Company. Mr. Lkhagvatsend was appointed the Deputy Chief Executive Officer of the Company in May 2013. He served as the Chief Executive Officer of Energy Resources Rail LLC from February 2011 to February 2023. Mr. Lkhagvatsend has nearly 18 years of experience in the business sector of Mongolia, holding senior positions in various businesses in the country. From 2003 to 2005, Mr. Lkhagvatsend was the chief executive officer of Newcom Group and was responsible for strategy planning and business development. From May 2005 to December 2006, he was the president and chief executive officer of Eznis Airways and was in charge of strategy planning, project management and other corporate affairs. He joined the Group in July 2008 as the chief executive officer of Energy Resources Rail LLC and was responsible for overall business strategy and planning. Mr. Lkhagvatsend was awarded a bachelor's degree in law by the National University of Mongolia, Mongolia. He also underwent executive trainings held by the Michigan Business School, United States, in 2004.

Enkhbat Dorjpalam is the President and Deputy Chief Executive Officer – Coal & Energy of the Company. Mr. Dorjpalam joined the Group as the deputy chief executive officer in February 2023. Mr. Dorjpalam is primarily responsible for leading and overseeing the Group's coal mining, processing, transportation, sales and marketing operations. Since 2004, Mr. Dorjpalam served in various managerial positions within the MCS Group companies, including the Chief Executive Officer of Unitel Group from 2017 to 2022. He was awarded a bachelor's degree in telecommunication engineering from the Mongolian University of Science and Technology, and holds his master's degree from the National Academy of Governance, Mongolia.

Ulemj Baskhuu is the Executive Vice President and Chief Financial Officer of the Company. Ms. Baskhuu was appointed the Company's Chief Financial Officer responsible for the overall financial management, liquidity, asset management and investor relations of the Company in August 2013. Ms. Baskhuu joined the Group as vice president responsible for investment of Energy Resources Rail LLC in December 2008. Ms. Baskhuu has worked for major banks and held various senior positions such as director of Financial Institutions at the Trade and Development Bank of Mongolia and head of investment banking at Khan Bank. Ms. Baskhuu was awarded a bachelor's degree in business administration from the Mercer University, United States.

Uurtsaikh Dorjgotov is the Executive Vice President and Chief Legal Counsel of the Company. Ms. Dorjgotov joined the Group in December 2009. Prior to joining the Company, Ms. Dorjgotov was the director of the legal and administration department and chief legal counsel of MCS Holding LLC. She also worked for six years on the USAID-funded Mongolia Privatization Program of Barents Group of Bearing Point, Inc. as in-house lawyer and for nine years at the Prosecutor General Office of Mongolia as a supervising prosecutor. Ms. Dorjgotov was awarded a master's degree (LLM) by the University of Waikato, New Zealand, and also a diploma of lawyer by the University of Irkutsk, Russia.

Tuvshinbayar Tagarvaa is the Vice President and Chief Marketing Officer of the Company. Mr. Tagarvaa was appointed as the Company's Chief Marketing Officer in April 2017. Since 2003, Mr. Tagarvaa served at various managerial positions within the MCS Group and joined the Group in February 2011 as an Executive General Manager for Transportation and Logistics which was instrumental in the successful implementation of the Company's efforts to improve efficiency and cost of transportation and logistics while ensuring a stable supply of coal products exported by the Company. Mr. Tagarvaa holds a bachelor's degree and a master's degree in business administration from the Institute of Finance and Economics of Mongolia.

Lkhagva-Ochir Said is the Vice President and Chief Operating Officer of the Company. Mr. Said joined the Group in February 2009. Mr. Said was appointed as the Company's Acting Chief Operating Officer in April 2023. Since 2009, Mr. Said served at various managerial positions within the Group, including Executive General Manager of Mining and Processing, General Manager of Technical Services and Senior Geologist. He holds a bachelor's and master's degree in geological engineering from the Mongolian University of Science and Technology.

Bayarmaa Bazar is the Vice President and Chief Audit Executive of the Company. Ms. Bazar joined ER LLC in 2009 and served as an Executive General Manager for numerous infrastructure and business projects of the Company. Prior to joining the Company, Ms. Bazar held responsible positions at various subsidiaries of MCS Group. With over 15 years of experience in project management and related fields, Ms. Bazar has been involved in several national-level projects including the government treasury system and rural VSAT network. Ms. Bazar holds a bachelor's degree in economic data processing from the Engineering and Economics Institute of Kharkiv, Ukraine, and a master of commerce degree in information systems from the Curtin University of Technology, Australia.

COMPANY SECRETARY

Cheung Yuet Fan was appointed Secretary of our Company in October 2017. Ms. Cheung is a director of the corporate services of Tricor Services Limited. The Company engaged Tricor as external service provider and appointed Ms. Cheung as the Company Secretary in October 2017. She is a Chartered Secretary, a Chartered Governance Professional and a Fellow of both The Hong Kong Chartered Governance Institute and The Chartered Governance Institute. Before joining the Tricor Group, Ms. Cheung has worked in the Company Secretarial Department of Deloitte Touche Tohmatsu in Hong Kong and in various Hong Kong listed companies in the role of company secretary and corporate governance areas. Ms. Cheung has more than 30 years of experience in the company secretarial field and has been providing corporate services to both multi-national companies and listed companies in Hong Kong. Ms. Cheung obtained a Bachelor of Arts degree in Accountancy from City Polytechnic of Hong Kong (now known as City University of Hong Kong).

BOARD PRACTICES

In the absence of extraordinary events, it is the practice of the Board to meet at least four times a year. At such meeting, our Directors conduct, among other things, an operational review of our business.

BOARD COMMITTEES

The Board has established four committees, namely, the Audit Committee, Nomination Committee, Remuneration Committee and Environmental, Social and Governance Committee, for overseeing particular aspects of the Company's affairs.

Audit Committee

The Board has established an Audit Committee, which operates under a charter approved by the Board. It is the Board's responsibility to ensure that an effective internal control framework exists within the Company. This includes internal controls to deal with both the effectiveness and efficiency of significant business processes, safeguarding of assets, maintenance of proper accounting records, and reliability of financial information as well as non-financial considerations such as benchmarking of operational key performance indicators. The Board has delegated the responsibility for the initial establishment and maintenance of a framework of internal controls and ethical standards for our management to the Audit Committee.

The Audit Committee comprises four members, including one independent non-executive Director who possesses the appropriate professional qualifications or accounting or related financial management expertise. There are three independent non-executive Directors, namely Mr. Chan Tze Ching, Ignatius (chairman), Dr. Khashchuluun Chuluundorj and Mr. Unenbat Jigjid, and one non-executive Director, namely Ms. Enkhtuvshin Gombo in the Audit Committee.

Nomination Committee

The Nomination Committee of the Board is responsible for reviewing the structure, size and composition of the Board and to make recommendations on proposed changes to the Board. The Nomination Committee is also responsible for developing and formulating relevant procedures for nomination and appointment of directors and to identify suitable candidates for appointment as directors. The Nomination Committee assesses the independence of the independent non-executive Directors and making recommendations to the Board on appointment or re-appointment of and the succession planning of the Board.

Our Nomination Committee currently comprises three members, with a majority of independent non-executive Directors. The members are Mr. Odjargal Jambaljamts (chairman), executive Director, and Dr. Khashchuluun Chuluundorj and Mr. Unenbat Jigjid, independent non-executive Directors.

Remuneration Committee

The Remuneration Committee of the Board is responsible for determining and reviewing compensation arrangements for our Directors, the chief executive officer and the senior management. The Remuneration Committee assesses the appropriateness of the nature and amount of emoluments of such officers on a periodic basis by reference to relevant employment market conditions with the overall objective of ensuring maximum shareholder benefit from the retention of a high quality board and executive team. To assist in achieving these objectives, the Remuneration Committee considers the nature and amount of executive Directors' and senior executives' emoluments with reference to our Company's financial and operational performance. All senior executives have the opportunity to qualify for participation in the Share Option Scheme, which currently provides incentives where specified criteria are met.

Our Remuneration Committee currently comprises three members, with a majority of independent non-executive Directors. The members are Dr. Khashchuluun Chuluundorj (chairman) and Mr. Unenbat Jigjid, being independent non-executive Directors, and Mr. Odjargal Jambaljamts, executive Director.

Environmental, Social and Governance Committee

The Environmental, Social and Governance Committee was established by the Board in August 2019 in replacement of the Corporate Governance Committee. The ESG Committee is primarily responsible for reviewing the Company's ESG vision, strategy, policies and practices and make relevant recommendations to the Board; reviewing the Company's risk assessment and its impact on health, safety, environment and society; and reviewing the compliance with the ESG Reporting Guide contained in the Listing Rules.

Our Environmental, Social and Governance Committee comprises five members with a majority of independent non-executive Directors. The members are Mr. Unenbat Jigjid (chairman), Dr. Khashchuluun Chuluundorj and Mr. Chan Tze Ching, Ignatius, being independent non-executive Directors, and Mr. Od Jambaljamts and Mr. Myagmarjav Ganbyamba, being non-executive Directors.

PRINCIPAL SHAREHOLDERS

As of June 30, 2023, so far as known to any Director or chief executive of the Company, shareholders (other than a Director or chief executive of the Company) who had an interest or short position in the shares or underlying shares of the Company as recorded in the register required to be kept pursuant to section 336 of the SFO were as follows:

Name of substantial shareholder	Capacity/ Nature of interest	Number of Shares	Approximate percentage of shareholdings in our Company
MCS Mining Group LLC (Note 1)	Beneficial owner	323,492,188 (L)	31.03%
MCS Mongolia LLC (Note 1)	Interest of controlled corporation	323,492,188 (L)	31.03%
Ms. Batmunkh Dashdeleg (Note 1)	Interest of spouse	369,656,942 (L)	35.46%
Ms. Munkhsuren Surenkhuu (Note 1)	Interest of spouse	350,068,414 (L)	33.58%
Kerry Mining (UHG) Limited ("KMUHG") (Note 2)	Beneficial owner	75,000,000 (L)	7.19%
Kerry Mining (Mongolia) Limited ("KMM") (Note 2)	Interest of controlled corporation	75,000,000 (L)	7.19%
Fexos Limited ("Fexos") (Note 2)	Interest of controlled corporation	75,000,000 (L)	7.19%
Kerry Holdings Limited ("KHL") (Note 2)	Interest of controlled corporation	75,000,000 (L)	7.19%
Kerry Group Limited ("KGL") (Note 2)	Interest of controlled corporation	82,821,187 (L)	7.94%

(L) – Long position

(1) MCS Mining Group LLC is wholly-owned by MCS Mongolia LLC. MCS Mongolia LLC is owned as to approximately 58.02% by Mr. Odjargal Jambaljamts, and approximately 30.58% by Mr. Od Jambaljamts. MCS Mining Group LLC holds 323,492,188 shares in the Company. Mr. Odjargal Jambaljamts and Mr. Od Jambaljamts directly hold 46,164,754 shares and 26,576,226 shares, respectively, in the Company. Ms. Batmunkh Dashdeleg is the spouse of Mr. Odjargal Jambaljamts, and Ms. Munkhsuren Surenkhuu is the spouse of Mr. Od Jambaljamts.

(2) (a) KMUHG is a direct wholly-owned subsidiary of KMM which in turn is approximately 59.04% owned by Fexos. Fexos is a direct wholly-owned subsidiary of KHL which in turn is a direct wholly-owned subsidiary of KGL. Accordingly, KMM, Fexos, KHL and KGL were deemed to be interested in the 75,000,000 shares of the Company that KMUHG was interested (b) Alpha Model Limited ("AML") holds 7,821,187 shares in the Company and AML is a direct wholly-owned subsidiary of KGL. Accordingly, KGL was deemed to be interested in the 7,821,187 shares of the Company that AML was interested.

Save as disclosed above, as of June 30, 2023, the Company has not been notified by any person (other than the Directors or chief executive of the Company) who had interests or short position in the shares or underlying shares of the Company.

RELATED PARTY TRANSACTIONS

We and our subsidiaries engage in a broad range of related party transactions with our subsidiaries and affiliates, some of which are material to our operations. The following is a summary of material transactions we have engaged in with our direct and indirect shareholders, affiliates of our shareholders and other related parties, including those in which we or our management have a significant equity interest. We believe each of these arrangements as described below have been entered into based on agreements on arm's length terms or on terms that we believe have been at least as favorable to us as similar transactions with non-related parties. For a further discussion of related party transactions, see Notes 32 and 23, respectively, to our financial statements as of and for the years ended December 31, 2020, 2021 and 2022 and the six months ended June 30, 2023 included elsewhere in this Offering Memorandum.

ANCILLARY SERVICES

For the years ended December 31, 2020, 2021, 2022 and for the six months ended June 30, 2023, we recorded ancillary services payments to M Armor LLC, Uniservice Solution LLC, MCS International LLC, MCS and its affiliates of US$13.8 million, US$13.5 million, US$14.4 million and US$9.2 million, respectively. Ancillary services represent expenditures for support services such as cleaning and canteen expense, power and heat generation and distribution and management fees. The service charges are based on comparable or prevailing market rates, as applicable.

LEASE OF PROPERTY, PLANT AND EQUIPMENT

For the years ended December 31, 2020, 2021, 2022 and for the six months ended June 30, 2023, we recorded lease of property, plant and equipment to MCS and its affiliates of US$0.2 million, US$0.2 million, US$0.2 million and US$0.1 million, respectively. Lease of property, plant and equipment represents rental paid or payable in respect of properties and office equipment leased from Shangri-La Ulaanbaatar LLC, MCS and its affiliates. Rental charges are based on comparable or prevailing market rates, as applicable.

PURCHASE OF PROPERTY AND GOODS

For the years ended December 31, 2020, 2021, 2022 and for the six months ended June 30, 2023, we recorded purchase of property goods from MCS and its affiliates of nil, US$0.1 million, US$0.3 million and US$0.2 million, respectively.

SALES OF PROPERTY

For the years ended December 31, 2020, 2021, 2022 and for the six months ended June 30, 2023, we recorded sales of property to MCS and its affiliates of US$0.3 million, nil, US$6.0 thousand and nil, respectively.

SALES OF GOODS

For the years ended December 31, 2020, 2021, 2022 and for the six months ended June 30, 2023, we recorded sales of coal to Risun Supply Management Co., Ltd of nil, US$7.5 million, US$6.1 million and nil, respectively.

DESCRIPTION OF OTHER MATERIAL INDEBTEDNESS AND PERPETUAL SECURITIES

Set forth below is a summary of the material terms and conditions of our 2024 Notes and Perpetual Securities. As of June 30, 2023, we had a principal amount of US$343.2 million with a carrying amount of US$341.6 million outstanding under the 2024 Notes and a principal amount of US$142.5 million with a carrying amount of US$55.5 million outstanding under the Perpetual Securities.

2024 NOTES

On April 15, 2019, Mongolian Mining Corporation and ER LLC, as co-issuers, entered into an indenture (the "2024 Notes Indenture") pursuant to which we issued the 2024 Notes with a principal amount of US$440.0 million (the "2024 Notes"). As of June 30, 2023, we had an outstanding principal amount of US$343.2 million with a carrying amount of US$341.6 million. Since June 30, 2023, we have repurchased a principal amount of 2024 Notes of US$8.0 million of the 2024 Notes on the open market. As of the date of this Offering Memorandum, a principal amount of US$335.2 million of the 2024 Notes were outstanding.

Concurrently with this offering, ER LLC and we commenced an offer to exchange any and all of the outstanding Reg S Notes, upon the terms and subject to the Minimum Acceptance Amount (as defined in the Exchange Offer Memorandum) and other conditions set forth in the Exchange Offer Memorandum. We cannot assure you as to the amount of Reg S Notes that may be tendered for exchange in the Exchange Offer or that the Exchange Offer will be consummated at all. For the avoidance of doubt, the consummation of this Offering is not a condition to the Exchange Offer. This Offering Memorandum is neither an offer to exchange nor a solicitation of an offer to sell, buy or exchange the Reg S Notes. Any offer to exchange the Reg S Notes will be made solely on the terms and subject to the conditions set forth in the Exchange Offer Memorandum that will be directed to eligible holders of the 2024 Notes.

Guarantee

The obligations pursuant to the 2024 Notes are guaranteed by Mongolian Coal Corporation Limited, Mongolian Coal Corporation S.à r.l., Energy Resources Corporation LLC, Energy, Resources Rail LLC, Tavan Tolgoi Airport LLC, United Power LLC, Enrestechnology LLC, Ukhaa Khudag Water Supply LLC, Baruun Naran S.à r.l. and Khangad Exploration LLC. Each of the Subsidiary Guarantors has jointly and severally guaranteed the due and punctual payment of the principal of, premium, if any, and interest on, and all other amounts payable under, the 2024 Notes.

Interest

The 2024 Notes bear an interest rate of 9.25% per annum payable semi-annually in arrears.

Covenants

Subject to certain conditions and exceptions, the 2024 Notes Indenture contains certain covenants, restricting us and each of the related restricted subsidiaries from, among other things:

- incurring or guaranteeing additional indebtedness and issuing disqualified or preferred stock;
- declaring dividends on the capital stock or purchasing or redeeming capital stock;
- making investments or other specified restricted payments;
- issuing or selling capital stock of the related restricted subsidiaries;
- guaranteeing indebtedness of the related restricted subsidiaries;

- selling assets;
- creating liens;
- entering into sale and leaseback transactions;
- entering into agreements that restrict the related restricted subsidiaries' ability to pay dividends, transfer assets or make intercompany loans;
- entering into transactions with shareholders or affiliates;
- effecting a consolidation or merger; and
- engaging in any business other than permitted business.

Event of Default

The 2024 Notes Indenture contains certain customary events of default, including default in the payment of principal, or of any premium, on the 2024 Notes, when such payments become due, default in payment of interest which continues for 30 days, breaches of covenants, insolvency and other events of default specified in the 2024 Notes Indenture. If an event of default occurs and is continuing, the trustee under the 2024 Notes Indenture or the holders of at least 25% of the outstanding 2024 Notes may declare the principal of the 2024 Notes plus any premium and any accrued and unpaid interest to be immediately due and payable.

Change of Control Triggering Event

Upon the occurrence of certain Change of Control Triggering Events, we will make an offer to repurchase all outstanding 2024 Notes at a purchase price equal to 101% of their principal amount plus any accrued and unpaid interest that has not been paid as of (but not including) the redemption date on the 2024 Notes.

Maturity and Redemption

The maturity date of the 2024 Notes is April 15, 2024.

At any time and from time to time on or after April 15, 2022, we may at our option redeem the 2024 Notes, in whole or in part, at a redemption price equal to the percentage of principal amount set forth below, plus accrued and unpaid interest, if any, on the 2024 Notes redeemed, to (but not including) the applicable redemption date, if redeemed during the 12-month period commencing on April 15 of any year set forth below:

Period	Redemption Period
2022	104.625%
2023	102.313%

At any time and from time to time prior to April 15, 2022, we may at our option redeem the 2024 Notes, in whole or in part, at a redemption price equal to 100% of the principal amount of the Notes plus the applicable premium as of, and accrued and unpaid interest on the 2024 Notes redeemed, if any, to (but not including), the redemption date. Neither the trustee nor any of the agents shall be responsible for calculating or verifying the applicable premium.

Additionally, if we or a Subsidiary Guarantor under the 2024 Notes Indenture would become obligated to pay certain additional amounts as a result of certain changes in specified tax law, we may redeem the 2024 Notes at a redemption price equal to 100% of the principal amount of the 2024 Notes, plus any accrued and unpaid interest, subject to certain exceptions.

PERPETUAL SECURITIES

On May 4, 2017, we entered into the Perpetual Securities Indenture pursuant to which we issued US$195.0 million in aggregate principal amount of the Perpetual Securities, booked at its fair value of US$75,897,000. As of June 30, 2023, the outstanding principal amount of the Perpetual Securities was US$142.5 million with a carrying amount of US$55.5 million.

Interest

Distribution payments can be deferred at the discretion of the Company.

The Perpetual Securities bear an interest rate of 10% and is subject to 1% step-up annually starting in April 1, 2024, with total rate capped at 15%.

Event of Default

The Perpetual Securities Indenture contains the following events of default: (i) an order being made or an effective resolution being passed for the Winding-Up (as defined in the Perpetual Securities Indenture) of the Company; (ii) the sale of the Company's business as part of a scheme procedure; or (iii) the Company failing to make payment in respect of the Perpetual Securities for a period of 15 business days or more after the date on which such payment is due (although failure to pay a distribution validly deferred in accordance with the Perpetual Securities Indenture shall not constitute an event of default. If an event of default occurs and is continuing, the trustee under the Perpetual Securities Indenture or the holders of at least 25% of the outstanding Perpetual Securities may declare the principal of the Perpetual Securities plus any premium and any accrued and unpaid interest to be immediately due and payable.

Maturity and Redemption

The Perpetual Securities have no fixed maturity. Subject to compliance with relevant covenant requirements, the Perpetual Securities are redeemable at the Company's option at a purchase price equal to 100% of their principal amount plus any accrued and unpaid interest.

DESCRIPTION OF THE NOTES

For purposes of this "Description of the Notes," the term "Company" refers only to Mongolian Mining Corporation, a company incorporated with limited liability under the laws of the Cayman Islands, and any successor obligor on the Notes, and not to any of its Subsidiaries and the term "Co-Issuer" refers only to Energy Resources LLC, a limited liability company established under the laws of Mongolia, and any successor co-obligor on the Notes, and not to any of its Subsidiaries. Each Subsidiary of the Company which guarantees the Notes is referred to as a "Subsidiary Guarantor," and each such guarantee is referred to as a "Subsidiary Guarantee."

The Notes are to be issued under an indenture (the "Indenture"), to be dated as of the Original Issue Date, among the Company, the Co-Issuer (together with the Company, the "Issuers" and each, an "Issuer"), the initial Subsidiary Guarantors, as guarantors, and The Bank of New York Mellon, London Branch as trustee (the "Trustee", which expression shall include any successor trustee). The Issuers will be jointly and severally liable for all obligations under the Notes.

The following is a summary of certain provisions of the Indenture, the Notes and the Subsidiary Guarantees. This summary does not purport to be complete and is qualified in its entirety by reference to all of the provisions of the Indenture, the Notes and the Subsidiary Guarantees. It does not restate those agreements in their entirety. Whenever particular sections or defined terms of the Indenture not otherwise defined herein are referred to, such sections or defined terms are incorporated herein by reference. Copies of the Indenture will be available to Holders (following prior written request and satisfactory proof of holding) on or after the Original Issue Date during normal office hours (between 9:00 am and 3:00 pm (local time) Monday to Friday, excluding public holidays) at the corporate trust office of the Trustee or provided by the Trustee via email to the relevant Holder, in each case, provided the Trustee has been supplied with the relevant documents by the Company.

BRIEF DESCRIPTION OF THE NOTES

The Notes are:

- general obligations of the Issuers;
- effectively subordinated to secured obligations of the Issuers, to the extent of the value of the assets serving as security therefor;
- senior in right of payment to any existing and future obligations of the Issuers expressly subordinated in right of payment to the Notes;
- at least *pari passu* in right of payment with all other unsecured, unsubordinated Indebtedness of the Issuers (subject to any priority rights of such unsubordinated Indebtedness pursuant to applicable law);
- guaranteed by the Subsidiary Guarantors on an unsubordinated basis, subject to the limitations described below under the caption "– The Subsidiary Guarantees" and in "Risk Factors – Risks Relating to the Notes and the Subsidiary Guarantees"; and
- effectively subordinated to all existing and future obligations of any Subsidiaries of the Company other than the Co-Issuer and the Subsidiary Guarantors.

The Notes will mature on September 13, 2026, unless earlier redeemed or repurchased by the Issuers pursuant to the terms thereof and the Indenture.

The Indenture allows additional Notes to be issued from time to time (the "Additional Notes"), subject to certain limitations described under "– Further Issues." Unless the context requires otherwise, references to the "Notes" for all purposes of the Indenture and this "Description of the Notes" include any Additional Notes that are actually issued. The Notes will bear interest at 12.50% per annum from the Original Issue Date or from the most recent interest payment date to which interest has been paid or duly provided for, payable semi-annually in arrears on March 13 and September 13 of each year (each an "Interest Payment Date"), commencing March 13, 2024.

Interest on the Notes will be paid to Holders of record at the close of business on February 26 and August 29 immediately preceding an Interest Payment Date (each, a "Record Date"), notwithstanding any transfer, exchange or cancellation thereof after a Record Date and prior to the immediately following Interest Payment Date. In any case in which the date of the payment of principal of or premium (if any) or interest on the Notes (including any payment to be made on any date fixed for redemption or purchase of any Note) is not a Business Day in the relevant place of payment, then payment of principal or premium (if any) or interest need not be made in such place on such date but may be made on the next succeeding Business Day in such place. Any payment made on such Business Day shall have the same force and effect as if made on the date on which such payment is due, and no interest on the Notes shall accrue for the period after such date. Interest on the Notes will be calculated on the basis of a 360 day year comprised of twelve 30-day months. So long as the Notes are held in global form, each payment in respect of the Global Note will be made to the person shown as the holder of the Notes in the Register at the close of business (of the relevant clearing system) on the Clearing System Business Day before the due date for such payments, where "Clearing System Business Day" means a weekday (Monday to Friday, inclusive) except December 25 and January 1.

The Notes will be issued only in fully registered form, without coupons, in denominations of US$125,000 and integral multiples of US$1,000 in excess thereof. No service charge will be made for any registration of transfer or exchange of Notes, but the Issuers may require payment of a sum sufficient to cover any transfer tax or other similar governmental charge payable in connection therewith.

All payments on the Notes will be made in U.S. dollars by the Issuers at the office or agency of the Issuers maintained for that purpose (which initially will be the corporate trust administration office of the Paying Agent, currently located at 160 Queen Victoria Street, London, EC4V 4LA, United Kingdom, Attention: Global Corporate Trust – Project Akela, with a copy to: The Bank of New York Mellon, Singapore Branch, located at One Temasek Avenue, #02-01 Millenia Tower, Singapore 039192, Facsimile: +65 6883 0338, Email: Ctsingaporegcs@bnymellon.com, Attention: Global Corporate Trust – Project Akela), and the Notes may be presented for registration of transfer or exchange at such office or agency; *provided* that, at the option of the Issuers, payment of interest may be made by wire transfer. Interest payable on the Notes held through Euroclear or Clearstream will be available to Euroclear or Clearstream participants (as defined herein) on the Business Day following payment thereof.

So long as and to the extent that the Notes are represented by the global notes and such global notes are held by Euroclear or Clearstream, payment of the principal of, premium, if any, and interest on the Notes held through Euroclear or Clearstream will be credited to the respective accounts of the Holders of the Notes with Euroclear and Clearstream. See "– Book-Entry; Delivery and Form."

So long as and to the extent that the Notes are represented by the global notes and such global notes are held by Euroclear or Clearstream, the transfer and exchange of beneficial interests in the Notes shall be made pursuant to the policies and procedures of Euroclear and Clearstream.

THE SUBSIDIARY GUARANTEES

On the Original Issue Date, the Co-Issuer and all of the Company's other Subsidiaries, other than Singapore EM HoldCo, will be Restricted Subsidiaries. Singapore EM Holdco will be an Unrestricted Subsidiary on the Original Issue Date, and upon consummation of the EM Transaction, each of EM LLC and its Subsidiaries (if any), to the extent they become Subsidiaries of the Company, will be an Unrestricted Subsidiary. Further, under the circumstances described below under the caption "– Certain Covenants – Designation of Restricted and Unrestricted Subsidiaries", the Company will be permitted to designate certain of its other Subsidiaries (other than the Co-Issuer) as "Unrestricted Subsidiaries". The Company's Unrestricted Subsidiaries will generally not be subject to the restrictive covenants in the Indenture and will not guarantee the Notes.

On the Original Issue Date, the initial Subsidiary Guarantors will consist of Mongolian Coal Corporation Limited, Mongolian Coal Corporation S.à r.l., Energy Resources Corporation LLC, Tavan Tolgoi Airport LLC, United Power LLC, Ukhaa Khudag Water Supply LLC, Baruun Naran S.à r.l. and Khangad Exploration LLC. Tianjin Zhengcheng Import and Export Trade Co., Ltd., Inner Mongolia Fangcheng Trade Co., Ltd., Energy Resources Rail LLC and Tavan Tolgoi Power Plant Water Supply LLC will not guarantee the Notes, and accordingly, such entities and any future Restricted Subsidiaries of the Company that do not become Subsidiary Guarantors are collectively referred to herein as the "Non-Guarantor Restricted Subsidiaries."

The Company may at its option at any time cause any Restricted Subsidiary to become a Subsidiary Guarantor by causing such Restricted Subsidiary to execute and deliver to the Trustee a supplemental indenture to the Indenture pursuant to which such Restricted Subsidiary will guarantee the payment of the Notes.

Although the Indenture contains limitations on the amount of additional Indebtedness that Non-Guarantor Restricted Subsidiaries may incur, the amount of such additional Indebtedness could be substantial. In the event of a bankruptcy, liquidation or reorganization of any Non-Guarantor Restricted Subsidiary, the Non-Guarantor Restricted Subsidiary will pay the holders of its debt and its trade creditors before it will be able to distribute any of its assets to the Company. See "Risk Factors – Risks Relating to the Notes and the Subsidiary Guarantees – Payments with respect to the Notes are structurally subordinated to liabilities, contingent liabilities and obligations of our subsidiaries that do not guarantee the Notes."

As of June 30, 2023,

- the Company and its consolidated subsidiaries had US$343.2 million principal amount of consolidated indebtedness outstanding, none of which was secured;
- the Non-Guarantor Restricted Subsidiaries did not have any indebtedness outstanding; and
- the Company and its consolidated subsidiaries had US$6.8 million of capital commitments.

On May 4, 2017, the Company entered into an indenture pursuant to which it issued US$195.0 million in aggregate principal amount of the Perpetual Securities. As of June 30, 2023, the Company had US$142.5 million principal amount of Perpetual Securities outstanding, booked at its carrying amount of US$55.5 million.

In addition, the Non-Guarantor Restricted Subsidiaries accounted for 8.5% and (0.2)% of the Company's consolidated net revenue and the Company's consolidated EBITDA, respectively, for the six months ended June 30, 2023, and 0.8% of the Company's consolidated total assets as of June 30, 2023.

The Subsidiary Guarantee of each Subsidiary Guarantor:

- is a general obligation of such Subsidiary Guarantor;
- is effectively subordinated to secured obligations of such Subsidiary Guarantor, to the extent of the value of the assets serving as security therefor;
- is senior in right of payment to all future obligations of such Subsidiary Guarantor expressly subordinated in right of payment to such Subsidiary Guarantee;
- ranks at least *pari passu* with all other unsecured, unsubordinated Indebtedness of such Subsidiary Guarantor (subject to any priority rights of such unsecured, unsubordinated Indebtedness pursuant to applicable law); and
- is effectively subordinated to all existing and future obligations of any Subsidiaries of the Company other than the Co-Issuer and the Subsidiary Guarantors.

The Company will cause each of its future Wholly Owned Restricted Subsidiaries which, directly or indirectly, own any mining deposits or reserves or any mining license, as soon as practicable but in any event within five days after becoming a Restricted Subsidiary, to execute and deliver to the Trustee a supplemental indenture to the Indenture pursuant to which such Restricted Subsidiary will guarantee the payment of the Notes. Notwithstanding the foregoing, the Company will not be obligated to cause any Restricted Subsidiary to guarantee the Notes to the extent such guarantee could reasonably be expected to give rise to or result in any conflict with or violation of applicable law (or risk of personal or criminal liability for the officers, directors, managers or shareholders of such Restricted Subsidiary). For the avoidance of doubt, the Company shall not be obligated to cause any member of EM Group to guarantee the Notes except in the event that each member of EM Group becomes a Wholly Owned Restricted Subsidiary. Each Subsidiary of the Company that guarantees the Notes after the Original Issue Date is referred to as a "Future Subsidiary Guarantor" and, upon execution of the applicable supplemental indenture to the Indenture, will be a "Subsidiary Guarantor."

Under the Indenture, and any supplemental indenture to the Indenture, as applicable, each of the Subsidiary Guarantors will jointly and severally guarantee the due and punctual payment of the principal of, premium, if any, and interest on, and all other amounts payable under, the Notes and the Indenture, subject to the limitations set forth herein. The Subsidiary Guarantors will (1) agree that their obligations under the Subsidiary Guarantees will be enforceable irrespective of any invalidity, irregularity or unenforceability of the Notes or the Indenture and (2) waive their right to require the Trustee to pursue or exhaust its legal or equitable remedies against the Issuers prior to exercising its rights under the Subsidiary Guarantees. Moreover, if at any time any amount paid under a Note or the Indenture is rescinded or must otherwise be restored, the rights of the Holders under the Subsidiary Guarantees will be reinstated with respect to such payments as though such payments had not been made. All payments under the Subsidiary Guarantees are required to be made in U.S. dollars.

Under the Indenture and any supplemental indenture to the Indenture, as applicable, each Subsidiary Guarantee will be limited to an amount not to exceed the maximum amount that can be guaranteed by the applicable Subsidiary Guarantor without rendering the Subsidiary Guarantee, as it relates to such Subsidiary Guarantor, voidable under applicable law relating to fraudulent conveyance, fraudulent transfer, financial assistance, corporate benefit, capital maintenance or similar laws affecting the rights of creditors generally. In respect of any Subsidiary Guarantor incorporated under the laws of Luxembourg (each, a "Luxembourg Subsidiary Guarantor"), the maximum liability of such Luxembourg Subsidiary Guarantor will be limited so that the maximum amount payable by it under the Notes or the Indenture, shall at no time exceed the Maximum Amount notwithstanding any provision of the Notes or the Indenture. Any Subsidiary Guarantee of any Subsidiary Guarantor may include specific provisions limiting such guarantee to the extent such guarantee could reasonably be expected to give rise to or result in any conflict with or violation of applicable law (or risk of personal or criminal liability for the officers, directors, managers or shareholders of such Restricted Subsidiary). By virtue of these limitations, a Subsidiary Guarantor's obligations under its Subsidiary Guarantee could be significantly less than amounts payable with respect to the Notes, or a Subsidiary Guarantor may effectively have no obligation under its Subsidiary Guarantee. If a Subsidiary Guarantee were to be rendered voidable, it could be subordinated by a court to all other indebtedness (including guarantees and other contingent liabilities) of the applicable Subsidiary Guarantor and, depending on the amount of such indebtedness, a Subsidiary Guarantor's liability on its Subsidiary Guarantee could be reduced to zero.

The obligations of each Subsidiary Guarantor under its respective Subsidiary Guarantee may be limited, or possibly invalid, under applicable laws. See "Risk Factors – Risks Relating to the Notes and the Subsidiary Guarantees – The Subsidiary Guarantees may be challenged under applicable bankruptcy or fraudulent transfer, insolvency or similar laws which could impair the enforceability of the Subsidiary Guarantees."

Release of the Subsidiary Guarantees

A Subsidiary Guarantee given by a Subsidiary Guarantor may be released in certain circumstances, including:

- upon repayment in full of the Notes;

- upon a defeasance or satisfaction and discharge as described under "– Defeasance – Defeasance and Discharge"; or "– Satisfaction and Discharge";

- upon the designation by the Company of a Subsidiary Guarantor as an Unrestricted Subsidiary in compliance with the terms of the Indenture;

- upon the sale of Capital Stock of a Subsidiary Guarantor in compliance with the terms of the Indenture (including the covenants described under the captions "– Certain Covenants – Limitation on Sales and Issuances of Capital Stock in Restricted Subsidiaries," "– Certain Covenants – Limitation on Asset Sales," and "– Consolidation, Mergers and Sale of Assets") resulting in such Subsidiary Guarantor no longer being a Wholly Owned Restricted Subsidiary, so long as (1) the proceeds from such sale are used for the purposes permitted or required by the Indenture; (2) if such Subsidiary Guarantor is no longer a Restricted Subsidiary upon such sale, such Subsidiary Guarantor is simultaneously released from its obligations in respect of any of the Company's other Indebtedness or any Indebtedness of any other Restricted Subsidiary and neither the Company or any Restricted Subsidiary guarantees or provides credit support for any Indebtedness of such Subsidiary Guarantor upon such sale, unless the Company or such Restricted Subsidiary could have incurred the Indebtedness represented by such guarantee or credit support under the Indenture on the date of such release after giving pro forma effect to such sale and release and (3) if such Subsidiary Guarantor remains a Restricted Subsidiary upon such sale, any outstanding Indebtedness of such Subsidiary Guarantor for money borrowed which is owed to any Person other than the Company or any Restricted Subsidiary is repaid in full prior to the release of the Subsidiary Guarantee of such Subsidiary Guarantor, unless such Subsidiary Guarantor could have incurred such Indebtedness under the Indenture as a Restricted Subsidiary that is not a Subsidiary Guarantor on the date of such release after giving pro forma effect to such sale and release;

- upon the merger or consolidation of any Subsidiary Guarantor with and into the Company, the Co-Issuer or a Wholly Owned Subsidiary Guarantor (or a Wholly Owned Restricted Subsidiary that becomes a Subsidiary Guarantor concurrently with the transaction) that is the surviving Person in such merger or consolidation, or upon the liquidation, winding up, dissolution or reorganization of such Subsidiary Guarantor following the transfer of all or substantially all of its assets to the Company, the Co-Issuer or a Wholly Owned Subsidiary Guarantor (or a Wholly Owned Restricted Subsidiary that becomes a Subsidiary Guarantor concurrently with the transaction); or

- as described under "– Amendments and Waivers."

No release of a Subsidiary Guarantor from its Subsidiary Guarantee shall be effective against the Trustee or the Holders until the Company has delivered to the Trustee an Officers' Certificate stating that all requirements relating to such release have been complied with and that such release is not prohibited by the terms of the Indenture.

FURTHER ISSUES

Subject to the covenants described below, the Issuers may, from time to time, without notice to or the consent of the Holders, create and issue Additional Notes having the same terms and conditions as the Notes (including the benefit of the Subsidiary Guarantees) in all respects (or in all respects except for the issue date, issue price and the date and/or amount of the first payment of interest on them and, to the extent necessary, certain temporary securities law transfer restrictions) (a "Further Issue") so that such Additional Notes may be consolidated and form a single class with the previously outstanding Notes and vote together as one class on all matters with respect to the Notes; *provided* that the issuance of any such Additional Notes shall then be permitted under the "– Certain Covenants – Limitation on Indebtedness" covenant described below and the other provisions of the Indenture. In connection with any such issuance of Additional Notes, the Issuers shall deliver an Officers' Certificate to the Trustee directing the Trustee to authenticate and deliver Additional Notes in an aggregate principal amount specified therein and the Trustee, in accordance with such Officers' Certificate, shall authenticate and deliver such Additional Notes.

In addition, the issuance of any Additional Notes by the Issuers will be subject to the following conditions:

(1) the Additional Notes shall be secured and guaranteed under the Indenture and the Subsidiary Guarantees to the same extent and on the same basis as the Notes outstanding on the date the Additional Notes are issued; and

(2) the Issuers shall have delivered to the Trustee an Officers' Certificate, in form and substance satisfactory to the Trustee, confirming that the issuance of the Additional Notes complies with the Indenture and is permitted by the Indenture.

OPTIONAL REDEMPTION

At any time and from time to time on or after September 13, 2025, the Issuers may at their option redeem the Notes, in whole or in part, at a redemption price equal to 106.25% of the principal amount of the Notes, plus accrued and unpaid interest, if any, on the Notes redeemed, to (but not including) the applicable redemption date.

At any time and from time to time prior to September 13, 2025, the Issuers may at their option redeem the Notes, in whole or in part, at a redemption price equal to 100% of the principal amount of the Notes plus the Applicable Premium as of, and accrued and unpaid interest on the Notes redeemed, if any, to (but not including), the redemption date. Neither the Trustee nor any of the Agents shall be responsible for calculating or verifying the Applicable Premium.

In addition, at any time and from time to time prior to September 13, 2025, the Issuers may at their option redeem up to 35% of the aggregate principal amount of the Notes with the Net Cash Proceeds of one or more sales of Common Stock of the Company in an Equity Offering at a redemption price of 112.50% of the principal amount of the Notes, plus accrued and unpaid interest on the Notes redeemed, if any, to (but not including) the redemption date; *provided* that at least 65% of the aggregate principal amount of the Notes issued on the Original Issue Date remains outstanding after each such redemption and any such redemption takes place within 60 days after the closing of the related Equity Offering.

In connection with any Change of Control Offer (as defined below) or any other tender offer to purchase all of the Notes for cash at a purchase price not less than par ("Cash Tender Offer"), if Holders of not less than 90.0% of the aggregate principal amount of the then outstanding Notes validly tender and do not validly withdraw such Notes in such Change of Control Offer or Cash Tender Offer and the Issuers purchase, or any third party making such Change of Control Offer or Cash Tender Offer in lieu of the Issuers purchases, all of the Notes validly tendered and not validly withdrawn by such Holders, the Issuers or such third party will have the right upon notice, given not more than 60 days following such purchase date, to redeem all Notes that remain outstanding following such purchase at a price equal to the price paid to each other Holder in such Change of Control Offer or Cash Tender Offer, *plus*, to the extent not included in the Change of Control Offer or Cash Tender Offer payment, accrued and unpaid interest, if any, thereon, to (but not including), the redemption date.

The Issuers will give not less than 10 days' nor more than 30 days' notice of any redemption to the Holders and the Trustee. If fewer than all of the Notes are to be redeemed at any time, Notes for redemption will be selected as follows:

- if the Notes are listed on any securities exchange, in compliance with the requirements of the principal securities exchange on which the Notes are then listed or if the Notes are held through the clearing systems, in compliance with the requirements of the applicable clearing systems; or

- if the Notes are not listed on any securities exchange or held through clearing systems, on a *pro rata* basis, by lot or by such other method as the Trustee in its sole discretion shall determine unless otherwise required by applicable law.

However, no Note of US$125,000 in principal amount or less shall be redeemed in part. If any Note is to be redeemed in part only, the notice of redemption relating to such Note will state the portion of the principal amount to be redeemed. In the case of Certificated Notes, a new Note in principal amount equal to the unredeemed portion will be issued upon cancellation of the original Note. On and after the redemption date, interest will cease to accrue on Notes or portions of them called for redemption.

REPURCHASE OF NOTES UPON A CHANGE OF CONTROL TRIGGERING EVENT

Not later than 30 days following a Change of Control Triggering Event, the Issuers will make an Offer to Purchase all outstanding Notes (a "Change of Control Offer") at a purchase price equal to 101% of the principal amount thereof plus accrued and unpaid interest, if any, to (but not including) the Offer to Purchase Payment Date.

The Issuers have agreed in the Indenture that they will timely repay all Indebtedness or obtain consents as necessary under, or terminate, agreements or instruments that would otherwise prohibit a Change of Control Offer required to be made pursuant to the Indenture. Notwithstanding this agreement of the Issuers, it is important to note that if the Issuers are unable to repay (or cause to be repaid) all of the Indebtedness, if any, that would prohibit repurchase of the Notes or are unable to obtain the requisite consents of the holders of such Indebtedness, or terminate any agreements or instruments that would otherwise prohibit a Change of Control Offer, they would continue to be prohibited from purchasing the Notes. In that case, the failure by the Issuers to purchase tendered Notes would constitute an Event of Default under the Indenture.

Certain of the events constituting a Change of Control under the Notes will also constitute an event of default under certain other debt instruments of the Issuers or their Subsidiaries. Future debt of the Issuers may also (i) prohibit the Issuers from purchasing Notes in the event of a Change of Control, (ii) provide that a Change of Control is a default or (iii) require repurchase of such debt upon a Change of Control. Moreover, the exercise by the Holders of their right to require the Issuers to purchase the Notes could cause a default under other Indebtedness, even if the Change of Control itself does not, due to the financial effect of the purchase on the Issuers. The ability of the Issuers to pay cash to the Holders following the occurrence of a Change of Control Triggering Event may be limited by the Issuers' then existing financial resources. There can be no assurance that sufficient funds will be available when necessary to make the required purchase of the Notes. See "Risk Factors – Risks Relating to the Notes and the Subsidiary Guarantees – The Issuers may not be able to repurchase the Notes upon a Change of Control Triggering Event."

The definition of Change of Control includes a phrase "all or substantially all" as used with respect to the assets of the Company. No precise definition of the phrase has been established under applicable law, and the phrase will likely be interpreted under applicable law of the relevant jurisdictions based on particular facts and circumstances. Accordingly, there may be a degree of uncertainty as to the ability of a Holder to require the Issuers to repurchase such Holder's Notes as a result of a sale of less than all the assets of the Company to another person or group.

Notwithstanding the above, the Issuers will not be required to make a Change of Control Offer following a Change of Control Triggering Event if a third party makes the Change of Control Offer in the same manner, at the same times and otherwise in compliance with the requirements set forth in the Indenture applicable to a Change of Control Offer made by the Issuers and purchases all Notes validly tendered and not withdrawn under such Change of Control Offer.

Except as described above with respect to a Change of Control Triggering Event, the Indenture does not contain provisions that permit the Holders to require that the Issuers purchase or redeem the Notes in the event of a takeover, recapitalization or similar transaction.

The Trustee shall not be required to take any steps to ascertain whether a Change of Control Triggering Event or any event which could lead to a Change of Control Triggering Event has occurred and shall not be liable to any person for any failure to do so.

NO MANDATORY REDEMPTION OR SINKING FUND

There will be no mandatory redemption or sinking fund payments for the Notes.

ADDITIONAL AMOUNTS

All payments of principal of, and premium (if any) and interest on, the Notes or under the Subsidiary Guarantees by or on behalf of either Issuer, a Surviving Person (as defined under the caption "Consolidation, Merger and Sale of Assets") or a Subsidiary Guarantor will be made without withholding or deduction for, or on account of, any present or future taxes, duties, assessments or governmental charges of whatever nature imposed or levied by or within any jurisdiction in which either Issuer, a Surviving Person or an applicable Subsidiary Guarantor is organized or resident for tax purposes or any jurisdiction from or through which such payments are made (or any political subdivision or taxing authority thereof or therein) (each, as applicable, a "Relevant Jurisdiction"), unless such withholding or deduction is required by law or by regulation or governmental policy having the force of law. In the event that any such withholding or deduction is so required, the Issuers, a Surviving Person or the applicable Subsidiary Guarantor, as the case may be, will pay such additional amounts ("Additional Amounts") as will result in receipt by the Holder of each Note of such amounts payable under the Notes or the Subsidiary Guarantees as would have been received by such Holder had no such withholding or deduction been required, except that no Additional Amounts shall be payable:

(a) for or on account of:

    (i) any tax, duty, assessment or other governmental charge that would not have been imposed but for:

        (A) the existence of any present or former connection between the Holder or beneficial owner of such Note and the Relevant Jurisdiction other than merely holding such Note or the receipt of payments thereunder or under a Subsidiary Guarantee, as the case may be, including, without limitation, such Holder or beneficial owner being or having been a national, domiciliary or resident of such Relevant Jurisdiction or treated as a resident thereof or being or having been physically present or engaged in a trade or business therein or having or having had a permanent establishment therein;

(B) the presentation of such Note (in cases in which presentation is required) more than 30 days after the later of the date on which the payment of the principal of, premium, if any, and interest on, such Note became due and payable pursuant to the terms thereof or was made or duly provided for, except to the extent that the Holder thereof would have been entitled to such Additional Amounts if it had presented such Note for payment on any date within such 30 day period;

(C) the failure of the Holder or beneficial owner to comply with a timely request of the Issuers, a Surviving Person or any Subsidiary Guarantor addressed to the Holder to provide information concerning such Holder's or beneficial owner's nationality, residence, identity or connection with any Relevant Jurisdiction, if and to the extent that due and timely compliance with such request would have reduced or eliminated any withholding or deduction as to which Additional Amounts would have otherwise been payable to the Holder; or

(D) the presentation of such Note (in cases in which presentation is required) for payment in the Relevant Jurisdiction, unless such Note could not have been presented for payment elsewhere;

(ii) any estate, inheritance, gift, sale, transfer, personal property or similar tax, assessment or other governmental charge;

(iii) any tax, assessment, collection, withholding or deduction required by sections 1471 through 1474 of the U.S. Internal Revenue Code of 1986, as amended ("FATCA"), any current or future Treasury regulations or rulings promulgated thereunder, any law, regulation or other official guidance with respect to FATCA, any intergovernmental agreement between the United States and any other jurisdiction to implement FATCA or any law, regulation or other official guidance in such other jurisdiction which gives effect to such agreement, or any agreement with the U.S. Internal Revenue Service under FATCA;

(iv) any tax, duty, assessment or other governmental charge which is payable other than by deduction or withholding from payments of principal of or interest or any premium on the Notes or payments under the Subsidiary Guarantees;

(v) any combination of taxes, duties, assessments or other governmental charges referred to in the preceding clauses (i), (ii), (iii) or (iv); or

(b) to a Holder that is a fiduciary, partnership or person other than the sole beneficial owner of any payment, to the extent that such payment would be required to be included for tax purposes in the income under the laws of a Relevant Jurisdiction of a beneficiary or settlor with respect to the fiduciary, or a member of that partnership or a beneficial owner who would not have been entitled to such Additional Amounts had that beneficiary, settlor, member or beneficial owner been the Holder thereof.

As a result of these provisions, there are circumstances in which taxes, duties, assessment or other governmental charges could be withheld or deducted but Additional Amounts would not be payable to some or all Holders of Notes.

At least 30 days prior to the first date on which any payment under or with respect to the Notes is due and payable (unless the obligation to pay Additional Amounts arises after the 30th day prior to such date), and either Issuer, a Surviving Person or any Subsidiary Guarantor becomes obligated to pay Additional Amounts with respect to such payment, the Issuers will deliver to the Trustee an Officers' Certificate stating that fact that such Additional Amounts will be payable and the amounts to be paid and will set forth such other information necessary to enable the Paying Agent to pay such Additional Amounts to the Holders on such payment date. The Issuers will deliver to the Trustee an Officers' Certificate 30 days prior to any subsequent payment date if there has been a change in the matters set forth in the previously furnished certificate (unless the change occurred after the 30th day prior to such date).

Whenever there is mentioned in any context the payment of principal, premium or interest in respect of any Note or any Subsidiary Guarantee, such mention shall be deemed to include payment of Additional Amounts provided for in the Indenture to the extent that, in such context, Additional Amounts are, were or would be payable in respect thereof.

REDEMPTION FOR TAX REASONS

The Notes may be redeemed, at the option of the Issuers or a Surviving Person (as defined under the caption "– Consolidation, Merger and Sale of Assets"), as a whole but not in part, upon giving not less than 30 days' nor more than 60 days' notice to the Holders (which notice shall be irrevocable), at a redemption price equal to 100% of the principal amount thereof, together with accrued and unpaid interest (including any Additional Amounts), if any, to the date fixed by the Issuers or the Surviving Person, as the case may be, for redemption (the "Tax Redemption Date") if, as a result of:

(1) any change in, or amendment to, the laws (or any regulations or rulings promulgated thereunder) of the jurisdiction in which either Issuer or a Surviving Person is organized or resident for tax purposes (or any political subdivision or taxing authority thereof or therein) (a "Relevant Taxing Jurisdiction") affecting taxation; or

(2) any change in, or amendment to the existing official position, or the stating of an official position, regarding the application or interpretation of such laws, regulations or rulings (including a holding, judgment or order by a court of competent jurisdiction),

which change or amendment becomes effective on or after (i) the Original Issue Date (other than in the circumstances described in (ii) immediately below) or (ii) with respect to a Surviving Person organized or resident for tax purposes in a jurisdiction that was not a Relevant Taxing Jurisdiction prior to the date on which the Surviving Person becomes a Surviving Person, the date such Surviving Person becomes a Surviving Person with respect to any payment due or to become due under the Notes or the Indenture, either Issuer or such Surviving Person is, or on the next Interest Payment Date would be, required to pay Additional Amounts, and such requirement cannot be avoided by the taking of reasonable measures by the Issuers or such Surviving Person; *provided* that no such notice of redemption shall be given earlier than 90 days prior to the earliest date on which the Issuers or such Surviving Person would be obligated to pay such Additional Amounts if a payment in respect of the Notes were then due.

Prior to the giving of any notice of redemption of the Notes pursuant to the foregoing, the Issuers or a Surviving Person, as the case may be, will deliver to the Trustee at least 10 days but not more than 60 days before the Tax Redemption Date:

(1) an Officers' Certificate stating that such change or amendment referred to in the prior paragraph has occurred, describing the facts related thereto and stating that such requirement cannot be avoided by the Issuers or such Surviving Person, as the case may be, by taking reasonable measures available to it; and

(2) an Opinion of Counsel or an opinion of a tax consultant, in either case, of recognized standing with respect to tax matters of the Relevant Taxing Jurisdiction, stating that the requirement to pay such Additional Amounts results from such change or amendment referred to in the prior paragraph.

The Trustee shall accept and conclusively rely on such certificate and opinion as sufficient evidence of the satisfaction of the conditions precedent described above, in which event it shall be conclusive and binding on the Holders. The Trustee will not be responsible for any loss occasioned by acting in reliance on such certificate and opinion. The Trustee is not obligated to investigate or verify any information in such certificate and opinion.

Any Notes that are redeemed will be cancelled.

OPEN MARKET PURCHASES AND CANCELLATION OF NOTES

The Issuers may purchase Notes in the open market or by tender or by any other means at any price, so long as such acquisition does not otherwise violate the terms of the Indenture; *provided* that all Notes redeemed or repurchased by the Issuers or any of its affiliates may not be reissued or resold.

CERTAIN COVENANTS

Set forth below are summaries of certain covenants contained in the Indenture.

Limitation on Indebtedness

(a) The Company will not, and will not permit any Restricted Subsidiary to, Incur any Indebtedness (including Acquired Indebtedness); provided that the Company, the Co-Issuer and any Subsidiary Guarantor or any Finance Subsidiary may Incur Indebtedness (including Acquired Indebtedness) and any Non-Guarantor Restricted Subsidiary may Incur Permitted Subsidiary Indebtedness (including Acquired Indebtedness) if, after giving effect to the Incurrence of such Indebtedness or Permitted Subsidiary Indebtedness, as applicable, and the receipt and application of the proceeds therefrom, the Leverage Ratio would be positive but less than 3.5 to 1.0. Notwithstanding the foregoing, the Company will not permit any Restricted Subsidiary to Incur any Disqualified Stock (other than Disqualified Stock held by the Company, the Co-Issuer, a Subsidiary Guarantor or a Finance Subsidiary, so long as it is so held).

(b) Notwithstanding the foregoing, the Company and, to the extent provided below, any Restricted Subsidiary, may Incur each and all of the following ("Permitted Indebtedness"):

(1) Indebtedness under the Notes (excluding any Additional Notes of the Issuers) and each Subsidiary Guarantee;

(2) Indebtedness of the Company or any Restricted Subsidiary outstanding on the Original Issue Date excluding Indebtedness permitted under clause (b)(3) of this covenant;

(3) Indebtedness of the Company or any Restricted Subsidiary owed to the Company or any Restricted Subsidiary; *provided* that (x) any event which results in any such Restricted Subsidiary ceasing to be a Restricted Subsidiary or any subsequent transfer of such Indebtedness (other than to the Company or any Restricted Subsidiary) shall be deemed, in each case, to constitute an Incurrence of such Indebtedness not permitted by this clause (b)(3), and (y) if the Company, the Co-Issuer or any Subsidiary Guarantor is the obligor on such Indebtedness (and such Indebtedness is not owed to the Company, the Co-Issuer, a Subsidiary Guarantor or a Finance Subsidiary), such Indebtedness must be unsecured and expressly be subordinated in right of payment to the Notes, in the case of the Company or the Co-Issuer, or the Subsidiary Guarantee of such Subsidiary Guarantor, in the case of a Subsidiary Guarantor;

(4) Indebtedness ("Permitted Refinancing Indebtedness") issued in exchange for, or the net proceeds of which are used, to refinance, refund, replace, exchange, renew, repay, defease, discharge or extend (collectively, "refinance" and "refinances" and "refinanced" shall have a correlative meaning), then outstanding Indebtedness (or Indebtedness repaid substantially concurrently with but in any case before the Incurrence of such Permitted Refinancing Indebtedness) Incurred under clause (a) or clause (b)(1), (b)(2), (b)(4), (b)(6), (b)(12), (b)(14), (b)(15) and (b)(16) of this covenant and any refinancings thereof in an amount not to exceed the amount so refinanced (plus premiums, accrued interest, fees and expenses); provided that (A) Indebtedness the proceeds of which are used to refinance the Notes or Indebtedness that is pari passu with, or subordinated in right of payment to, the Notes or a Subsidiary Guarantee shall only be permitted under this clause (b)(4) if (x) in case the Notes are refinanced in part or the Indebtedness to be refinanced is pari passu with the Notes or a Subsidiary Guarantee, such new Indebtedness, by its terms or by the terms of any agreement or instrument pursuant

to which such new Indebtedness is issued or remains outstanding, is expressly made pari passu with, or subordinate in right of payment to, the remaining Notes or such Subsidiary Guarantee or (y) in case the Indebtedness to be refinanced is subordinated in right of payment to the Notes or a Subsidiary Guarantee, such new Indebtedness, by its terms or by the terms of any agreement or instrument pursuant to which such new Indebtedness is issued or remains outstanding, is expressly made subordinate in right of payment to the Notes or such Subsidiary Guarantee at least to the extent that the Indebtedness to be refinanced is subordinated to the Notes or such Subsidiary Guarantee; *provided* that this clause (y) shall not apply to the refinancing of any Existing Perpetual Securities; (B) such new Indebtedness, determined as of the date of Incurrence of such new Indebtedness, does not mature prior to the earlier of the final maturity date of the Notes and the Stated Maturity of the Indebtedness to be refinanced, and the Average Life of such new Indebtedness is at least equal to the remaining Average Life of the Indebtedness to be refinanced or more than 180 days after the final maturity date of the Notes (*provided* that with respect to the refinancing of any Existing Perpetual Securities, such new Indebtedness, determined as of the date of Incurrence of such new Indebtedness, does not mature prior to the final maturity date of the Notes and the Average Life of such new Indebtedness is more than 180 days after the final maturity date of the Notes) and (C) in no event may Indebtedness of the Company, the Co-Issuer or any Subsidiary Guarantor be refinanced pursuant to this clause (b)(4) by means of any Indebtedness of any Restricted Subsidiary that is not a Subsidiary Guarantor;

(5) Indebtedness Incurred by the Company or any Restricted Subsidiary pursuant to Hedging Obligations designed solely to protect the Company or any Restricted Subsidiary from fluctuations in interest rates, currencies or the price of commodities and not for speculation;

(6) Indebtedness Incurred by the Company or any Restricted Subsidiary (A) representing Capitalized Lease Obligations or (B) for the purpose of financing (i) all or any part of the purchase price of real or personal property, assets or equipment to be used in the ordinary course of business by the Company or a Restricted Subsidiary in the Permitted Business, including any such purchase through the acquisition of Capital Stock of any Person that owns such real or personal property, assets or equipment which will, upon such acquisition, become a Restricted Subsidiary or (ii) all or any part of the purchase price or the cost of development, construction or improvement of real or personal property, assets or equipment to be used in the ordinary course of business by the Company or a Restricted Subsidiary in the Permitted Business; *provided, however*, that in each case (A) the aggregate principal amount of such Indebtedness shall not exceed such purchase price or cost, (B) such Indebtedness shall be Incurred no later than 180 days after the acquisition of such property, asset or equipment or completion of such development, construction or improvement, and (C) on the date of the Incurrence of such Indebtedness and after giving effect thereto, the aggregate principal amount outstanding of all such Indebtedness (including Capitalized Lease Obligations) permitted by this clause (b)(6) (together with refinancings thereof, but excluding any guarantee Incurred under such clause to the extent the amount of such guarantee is otherwise reflected in such aggregate principal amount) plus (ii) the aggregate principal amount outstanding of all Indebtedness Incurred under clauses (b)(14) and (b)(15) hereof (together with refinancings thereof, but excluding any guarantee Incurred under such clause to the extent the amount of such guarantee is otherwise reflected in such aggregate principal amount) does not exceed 7.5% of Total Assets;

(7) Indebtedness Incurred by the Company or any Restricted Subsidiary with respect to workers' compensation claims or claims arising under similar legislation, or in connection with self insurance obligations or similar requirements, or bid, performance or surety bonds (in each case other than for an obligation for borrowed money);

(8) Indebtedness Incurred by the Company or any Restricted Subsidiary constituting reimbursement obligations with respect to letters of credit or trade guarantees, performance and surety bonds and similar instruments issued in the ordinary course of business to the extent that such letters of credit or trade guarantees, performance and surety bonds and similar instruments are not drawn upon or, if drawn upon, to the extent such drawing is reimbursed no later than the 30 days following receipt by the Company or such Restricted Subsidiary, as applicable, of a demand for reimbursement;

(9) Indebtedness of the Company or any Restricted Subsidiary arising from agreements providing for indemnification, adjustment of purchase price, earn-out or other similar obligations, or from guarantees or letters of credit, surety bonds or performance bonds securing any obligation of the Company or any Restricted Subsidiary pursuant to such agreements, in any case, Incurred in connection with the disposition of any business, assets or Restricted Subsidiary (other than guarantees of Indebtedness Incurred by any Person acquiring all or any portion of such business, assets or Restricted Subsidiary for the purpose of financing such acquisition); *provided* that the maximum aggregate liability in respect of all such Indebtedness shall at no time exceed the gross proceeds actually received by the Company or any Restricted Subsidiary from the disposition of such business, assets or Restricted Subsidiary;

(10) Indebtedness of the Company or any Restricted Subsidiary arising from the honoring by a bank or other financial institution of a check, draft or similar instrument drawn against insufficient funds in the ordinary course of business; *provided, however*, that such Indebtedness is extinguished within five Business Days of Incurrence;

(11) guarantees by the Company or any Restricted Subsidiary of Indebtedness of the Company or any Restricted Subsidiary that was permitted to be Incurred by another provision of this covenant; *provided* that if the Indebtedness being guaranteed is subordinated to or *pari passu* with the Notes or a Subsidiary Guarantee, then the guarantee shall be subordinated or *pari passu,* as applicable, to the same extent as the Indebtedness guaranteed;

(12) Indebtedness of the Company or any Restricted Subsidiary in an aggregate principal amount outstanding at any time (together with refinancings thereof) not to exceed US$35.0 million (or the Dollar Equivalent thereof);

(13) Indebtedness of a Finance Subsidiary that is guaranteed by the Company to the extent the Company is permitted to Incur such Indebtedness under this covenant and (ii) any guarantee by a Subsidiary Guarantor of any Indebtedness of a Finance Subsidiary so guaranteed by the Company;

(14) Acquired Indebtedness of any Restricted Subsidiary Incurred and outstanding on the date on which such Restricted Subsidiary became a Restricted Subsidiary; *provided*, *however*, that on the date of the Incurrence of such Indebtedness and after giving effect thereto, the aggregate principal amount outstanding of all such Indebtedness permitted by this clause (b)(14) (together with refinancings thereof, but excluding any guarantee Incurred under such clause to the extent the amount of such guarantee is otherwise reflected in such aggregate principal amount) plus (ii) the aggregate principal amount outstanding of all Indebtedness Incurred under clauses (b)(6) and (b)(15) hereof (together with refinancings thereof, but excluding any guarantee Incurred under such clause to the extent the amount of such guarantee is otherwise reflected in such aggregate principal amount) does not exceed 7.5% of Total Assets;

(15) Indebtedness Incurred by the Company or any Restricted Subsidiary constituting a guarantee of any Indebtedness of any Person; *provided*, *however*, that on the date of the Incurrence of such Indebtedness and after giving effect thereto, the aggregate principal amount outstanding of all such Indebtedness permitted by this clause (b)(15) (together with refinancings thereof, but excluding any guarantee Incurred under such clause to the extent the amount of such guarantee is otherwise reflected in such aggregate principal amount) plus (ii) the aggregate

principal amount outstanding of all Indebtedness Incurred under clauses (b)(6) and (b)(14) hereof (together with refinancings thereof, but excluding any guarantee Incurred under such clause to the extent the amount of such guarantee is otherwise reflected in such aggregate principal amount) does not exceed 7.5% of Total Assets;

(16) Indebtedness of the Company or any Restricted Subsidiary with a maturity of 18 months or less used by the Company or any Restricted Subsidiary for working capital; *provided* that the aggregate principal amount outstanding of all such Indebtedness permitted by this clause (b)(16) (together with refinancings thereto) does not exceed US$50.0 million (or the Dollar Equivalent thereof);

(17) Indebtedness constituting a Subordinated Shareholder Loan; and

(18) Indebtedness Incurred by the Company or any Restricted Subsidiary constituting a guarantee of any Indebtedness of any member of EM Group and, upon designation of the EM Group members as Restricted Subsidiaries, any Indebtedness of the EM Group; *provided, however,* that the aggregate principal amount outstanding of all such Indebtedness permitted by this clause (b)(18) (together with refinancings thereof, but excluding any guarantee Incurred under such clause to the extent the amount of such guarantee is otherwise reflected in such aggregate principal amount) does not exceed US$50.0 million (or the Dollar Equivalent thereof).

(c) For purposes of determining compliance with this "Limitation on Indebtedness" covenant, in the event that an item of Indebtedness meets the criteria of more than one of the types of Indebtedness described above, including under the proviso in the first sentence of clause (a) of this covenant, the Company, in its sole discretion, shall classify (and divide) and from time to time may reclassify (and divide), such item of Indebtedness.

(d) For purposes of determining compliance with any U.S. dollar denominated restriction on the Incurrence of Indebtedness under this "Limitation on Indebtedness" covenant, the Dollar Equivalent principal amount of Indebtedness denominated in a foreign currency shall be calculated based on the relevant currency exchange rate in effect on the date such Indebtedness was Incurred, in the case of term Indebtedness, or first committed, in the case of revolving credit Indebtedness; provided that if such Indebtedness is Incurred to refinance other Indebtedness denominated in a foreign currency, and such refinancing would cause the applicable U.S. dollar-denominated restriction to be exceeded if calculated at the relevant currency exchange rate in effect on the date of such refinancing, such U.S. dollar-denominated restriction shall be deemed not to have been exceeded so long as the principal amount of such refinancing Indebtedness does not exceed the principal amount of such Indebtedness being refinanced. Notwithstanding any other provision of this covenant, the maximum amount of Indebtedness that may be Incurred pursuant to this covenant shall not be deemed to be exceeded solely as a result of fluctuations in the exchange rates of currencies. The principal amount of any Indebtedness Incurred to refinance other Indebtedness, if Incurred in a different currency from the Indebtedness being refinanced, shall be calculated based on the currency exchange rate applicable to the currencies in which such refinancing Indebtedness is denominated that is in effect on the date of such refinancing.

Limitation on Restricted Payments

The Company will not, and will not permit any Restricted Subsidiary to, directly or indirectly (the payments or any other actions described in clauses (a) through (d) below being collectively referred to as "Restricted Payments"):

(a) declare or pay any dividend or make any distribution on or with respect to the Company's or any Restricted Subsidiary's Capital Stock (other than dividends or distributions payable solely in shares of the Company's or any Restricted Subsidiary's Capital Stock (other than Disqualified Stock or Preferred Stock) or in options, warrants or other rights to acquire shares of such Capital Stock) held by Persons other than the Company or any Restricted Subsidiary;

(b) purchase, call for redemption or redeem, retire or otherwise acquire for value any shares of Capital Stock (including options, warrants or other rights to acquire such shares of Capital Stock) of the Company, any Restricted Subsidiary or any direct or indirect parent of the Company held by any Persons other than the Company or any Restricted Subsidiary;

(c) make any voluntary or optional principal payment, or voluntary or optional redemption, repurchase, defeasance, or other acquisition or retirement for value, of Subordinated Indebtedness (excluding any intercompany Indebtedness between or among the Company and any Restricted Subsidiary); or

(d) make any Investment, other than a Permitted Investment;

if, at the time of, and after giving effect to, the proposed Restricted Payment:

(A) a Default has occurred and is continuing or would occur as a result of such Restricted Payment;

(B) the Company could not Incur at least US$1.00 of Indebtedness under the proviso in the first sentence of clause (a) of the covenant described under the caption "– Limitation on Indebtedness"; or

(C) such Restricted Payment, together with the aggregate amount of all Restricted Payments made by the Company and its Restricted Subsidiaries after the Measurement Date, shall exceed the sum (without duplication) of:

(i) 50% of the aggregate amount of the Consolidated Net Income of the Company (or, if the Consolidated Net Income is a loss, minus 100% of the amount of such loss) accrued on a cumulative basis during the period (taken as one accounting period) beginning on the Measurement Date and ending on the last day of the Company's most recently ended semiannual fiscal period for which consolidated financial statements of the Company (which the Company shall use its reasonable best efforts to compile in a timely manner) are available (which may include internal consolidated financial statements); plus

(ii) 100% of the aggregate Net Cash Proceeds received by the Company after the Measurement Date as a capital contribution to its common equity or from the issuance and sale of its Capital Stock (other than Disqualified Stock) to a Person who is not a Subsidiary of the Company, including any such Net Cash Proceeds received upon (x) the conversion of any Indebtedness (other than Subordinated Indebtedness) of the Company into Capital Stock (other than Disqualified Stock) of the Company, or (y) the exercise by a Person who is not a Subsidiary of the Company of any options, warrants or other rights to acquire Capital Stock of the Company (other than Disqualified Stock), in each case after deducting the amount of any such Net Cash Proceeds used to redeem, repurchase, defease or otherwise acquire or retire for value any Subordinated Indebtedness or Capital Stock of the Company; plus

(iii) an amount equal to the net reduction in Investments (other than reductions in Permitted Investments) that were made after the Measurement Date in any Person resulting from (w) payments of interest on Indebtedness, dividends or repayments of loans or advances by such Person, in each case, to the Company or any Restricted Subsidiary (except, in each case, to the extent any such payment or proceeds are included in the calculation of Consolidated Net Income), (x) the unconditional release of a guarantee provided by the Company or any Restricted Subsidiary after the Measurement Date of an obligation of another Person, (y) the net cash proceeds from the sale of any such Investment (except to the extent such proceeds are included in the calculation of Consolidated Net Income) or (z) from redesignations of Unrestricted Subsidiaries as Restricted Subsidiaries, not to exceed, in each case, the amount of Investments made by the Company or a Restricted Subsidiary after the Measurement Date in any such Person; plus

(iv) the amount by which Indebtedness of the Company or any Restricted Subsidiary is reduced on the Company's consolidated statement of financial position upon the conversion or exchange (other than by a Subsidiary of the Company) subsequent to the Measurement Date of any Indebtedness of the Company or any Restricted Subsidiary convertible or exchangeable into Capital Stock (other than Disqualified Stock) of the Company (less the amount of any cash, or the Fair Market Value of any other property, distributed by the Company or any Restricted Subsidiary upon such conversion or exchange).

The foregoing provision shall not be violated by reason of:

(1) the payment of any dividend or redemption of any Capital Stock within 60 days after the related date of declaration or call for redemption if, at said date of declaration or call for redemption, such payment or redemption would comply with the preceding paragraph;

(2) the redemption, repurchase, defeasance or other acquisition or retirement for value of Subordinated Indebtedness of the Company, the Co-Issuer or any Subsidiary Guarantor with the Net Cash Proceeds of, or in exchange for, a substantially concurrent Incurrence of Permitted Refinancing Indebtedness;

(3) the redemption, repurchase or other acquisition of Capital Stock of the Company, the Co-Issuer or any Subsidiary Guarantor (or options, warrants or other rights to acquire such Capital Stock) in exchange for, or out of the Net Cash Proceeds of a substantially concurrent capital contribution or sale (other than to a Subsidiary of the Company) of, shares of Capital Stock (other than Disqualified Stock) of the Company (or options, warrants or other rights to acquire such Capital Stock); *provided* that the amount of any such Net Cash Proceeds that are utilized for any such Restricted Payment will be excluded from clause (C)(ii) of the preceding paragraph;

(4) the redemption, repurchase, defeasance or other acquisition or retirement for value of Subordinated Indebtedness of the Company, the Co-Issuer or any Subsidiary Guarantor in exchange for, or out of the Net Cash Proceeds of, a substantially concurrent capital contribution or sale (other than to a Subsidiary of the Company) of, shares of Capital Stock (other than Disqualified Stock) of the Company (or options, warrants or other rights to acquire such Capital Stock); *provided* that the amount of any such Net Cash Proceeds that are utilized for any such Restricted Payment will be excluded from clause (C)(ii) of the preceding paragraph;

(5) (x) the payment of any dividends or distributions declared, paid or made by a Restricted Subsidiary payable or (y) the redemption, repurchase, defeasance or other acquisition by a Restricted Subsidiary of any shares of its Capital Stock (including options, warrants or other rights to acquire such shares of Capital Stock), in each case on a pro rata basis or on a basis more favorable to the Company, to (or by) all holders of any class of Capital Stock of such Restricted Subsidiary, a majority of which is held, directly or indirectly through Restricted Subsidiaries, by the Company;

(6) a Permitted Investment under clause (1) of the definition thereof in the Capital Stock of a Restricted Subsidiary held by another shareholder which Investment increases the proportion of the Capital Stock of such Restricted Subsidiary held, directly or indirectly, by the Company;

(7) the repurchase, redemption or other acquisition or retirement for value of any Capital Stock (including options, warrants or other rights to acquire such shares of Capital Stock) of the Company or any Restricted Subsidiary held by an employee benefit plan of the Company or any Restricted Subsidiary, any current or former officer, director, consultant, or employee of the Company or any Restricted Subsidiary (or permitted transferees, authorized representatives, estates or heirs of any of the foregoing), *provided* that the aggregate price paid for all such repurchased, redeemed, acquired or retired Capital Stock may not exceed US$1.0 million (or the Dollar Equivalent using the Original Issue Date as the date of determination) in any twelvemonth period;

(8) any purchase, repurchase, redemption, defeasance or other acquisition or retirement for value of Disqualified Stock of the Company or Preferred Stock of a Restricted Subsidiary made by exchange for or out of the Net Cash Proceeds of the substantially concurrent sale of Disqualified Stock of the Company or Preferred Stock of a Restricted Subsidiary, as the case may be, that, in each case, is permitted to be incurred pursuant to the covenant described under "– Limitation on Indebtedness" and that in each case constitutes Permitted Refinancing Indebtedness; *provided* that the amount of any such Net Cash Proceeds that are utilized for any such Restricted Payment will be excluded from clause (C) of the preceding paragraph;

(9) repurchases of Capital Stock deemed to occur upon the exercise of stock options if such Capital Stock represents a portion of the exercise price thereof;

(10) cash payments in lieu of the issuance of fractional shares in connection with the exercise of warrants, options or other securities convertible into or exchangeable for Capital Stock of the Company; *provided* that the amount of payments made pursuant to this clause does not exceed US$2.0 million (or the Dollar Equivalent thereof) in any calendar year;

(11) any Restricted Payment in an aggregate amount, taken together with all other Restricted Payments made in reliance on this clause (11), not to exceed US$10.0 million (or the Dollar Equivalent thereof); or

(12) any repayment, purchase, repurchase, redemption, defeasance or other acquisition or retirement for value of any Existing Perpetual Securities, *provided that* (i) immediately after giving pro forma effect thereto, the Company could Incur at least US$1.00 of Indebtedness under the proviso in the first sentence of clause (a) of the covenant described under the caption "– Limitation on Indebtedness," or (ii) the aggregate consideration paid to repay, purchase, redeem, defease or otherwise acquire or retire for value Existing Perpetual Securities pursuant to this clause (12) shall not exceed US$50.0 million (or the Dollar Equivalent thereof);

provided that, in the case of clause (2), (3), (4), (8) or (12) above, no Default shall have occurred and be continuing or would occur as a consequence of the actions or payments set forth therein.

Each Restricted Payment permitted pursuant to clause (1) (but only to the extent that dividends are paid to Persons other than the Company or a Restricted Subsidiary) of the preceding paragraph made after the Original Issue Date shall be included in calculating whether the conditions of clause (C) of the first paragraph of this "– Limitation on Restricted Payments" covenant have been met with respect to any subsequent Restricted Payments, and Restricted Payments pursuant to such other clauses or under clause (1) (to the extent paid to the Company or a Restricted Subsidiary) of the preceding paragraph shall not be so included.

The amount of any Restricted Payments (other than cash) will be the Fair Market Value on the date of the Restricted Payment of the asset(s) or securities proposed to be transferred or issued by the Company or the Restricted Subsidiary, as the case may be, pursuant to the Restricted Payment. The value of any assets or securities that are required to be valued by this covenant will be the Fair Market Value. The Board of Directors' determination of the Fair Market Value of a Restricted Payment or any such assets or securities must be based upon an opinion or appraisal issued by an accounting, appraisal or investment banking firm of recognized international standing if the Fair Market Value exceeds US$10.0 million (or the Dollar Equivalent thereof).

Not later than the date of making any Restricted Payment in excess of US$10.0 million (or the Dollar Equivalent thereof), the Company will deliver to the Trustee an Officers' Certificate stating that such Restricted Payment is permitted and setting forth the basis upon which the calculations required by this "Limitation on Restricted Payments" covenant were computed, together with a copy of any fairness opinion or appraisal required by the Indenture.

As of June 30, 2023, the total amount available for Restricted Payments pursuant to clause (C) of the first paragraph of this "– Limitation on Restricted Payments" covenant would have been approximately US$135.0 million.

Limitation on Dividend and Other Payment Restrictions Affecting Restricted Subsidiaries

(a) Except as provided below, the Company will not, and will not permit any Restricted Subsidiary to, create or otherwise cause or permit to exist or become effective any encumbrance or restriction on the ability of any Restricted Subsidiary to:

(1) pay dividends or make any other distributions on any Capital Stock of such Restricted Subsidiary owned by the Company or any other Restricted Subsidiary;

(2) pay any Indebtedness or other obligation owed to the Company or any other Restricted Subsidiary;

(3) make loans or advances to the Company or any other Restricted Subsidiary; or

(4) sell, lease or transfer any of its property or assets to the Company or any other Restricted Subsidiary,

provided that it being understood that (i) the priority of any Preferred Stock in receiving dividends or liquidating distributions prior to dividends or liquidating distributions being paid on Common Stock; (ii) the subordination of loans or advances made to the Company or any Restricted Subsidiary to other Indebtedness Incurred by the Company or any Restricted Subsidiary; and (iii) the provisions contained in documentation governing Indebtedness requiring transactions between or among the Company and any Restricted Subsidiary or between or among any Restricted Subsidiary to be on fair and reasonable terms or on an arm's length basis, in each case, shall not be deemed to constitute such an encumbrance or restriction.

(b) The provisions of paragraph (a) do not apply to any encumbrances or restrictions:

(1) existing in agreements as in effect on the Original Issue Date, or in the Notes, the Subsidiary Guarantees, the Indenture and any extensions, refinancings, renewals or replacements of any of the foregoing agreements; provided that the encumbrances and restrictions in any such extension, refinancing, renewal or replacement, taken as a whole, are no more restrictive in any material respect than those encumbrances or restrictions that are then in effect and that are being extended, refinanced, renewed or replaced;

(2) existing under or by reason of applicable law, rule, regulation, license, concession, approval, decree or order issued by any government or any agency thereof;

(3) with respect to any Person or the property or assets of such Person acquired by the Company or any Restricted Subsidiary, existing at the time of such acquisition and not incurred in contemplation thereof, which encumbrances or restrictions are not applicable to any Person or the property or assets of any Person other than such Person or the property or assets of such Person so acquired, and any extensions, refinancings, renewals or replacements thereof; provided that the encumbrances and restrictions in any such extension, refinancing, renewal or replacement, taken as a whole, are no more restrictive in any material respect than those encumbrances or restrictions that are then in effect and that are being extended, refinanced, renewed or replaced;

(4) that otherwise would be prohibited by the provision described in clause (a)(4) of this covenant if they arise, or are agreed to in the ordinary course of business, and that (x) restrict in a customary manner the subletting, assignment or transfer of any property or asset that is subject to a lease or license, (y) exist by virtue of any Lien on, or agreement to transfer, option or similar right with respect to any property or assets of the Company or any Restricted Subsidiary not otherwise prohibited by the Indenture or (z) do not relate to any Indebtedness, and that do not, individually or in the aggregate, detract from the value of property or assets of the Company or any Restricted Subsidiary in any manner material to the Company or any Restricted Subsidiary;

(5) with respect to a Restricted Subsidiary and imposed pursuant to an agreement that has been entered into for the sale or disposition of all or substantially all of the Capital Stock of, or property and assets of, such Restricted Subsidiary that is permitted by the "– Limitation on Sales and Issuances of Capital Stock in Restricted Subsidiaries," "– Limitation on Indebtedness" and "– Limitation on Asset Sales" covenants;

(6) with respect to any Restricted Subsidiary and imposed pursuant to an agreement that has been entered into for the Incurrence of Indebtedness permitted to be Incurred under the "Limitation on Indebtedness" covenant if, as determined by the Board of Directors, such encumbrances or restrictions (x) are customary for such types of agreements and (y) would not, at the time agreed to, be expected to materially and adversely affect the ability of the Issuers to make required payments on the Notes and any extensions, refinancings, renewals or replacements of any of the foregoing agreements; *provided* that the encumbrances and restrictions in any such extension, refinancing, renewal or replacement, taken as a whole, are no more restrictive in any material respect than those encumbrances or restrictions that are then in effect and that are being extended, refinanced, renewed or replaced;

(7) restrictions on cash or other deposits or net worth imposed by customers under contracts entered into in the ordinary course of business;

(8) existing in customary provisions in joint venture agreements and other similar agreements entered into in the ordinary course of business, to the extent such encumbrance or restriction relates to the activities or assets of a party to such joint venture and if, as determined by the Board of Directors, (A) the encumbrances or restrictions are customary for a joint venture or similar agreement of that type and (B) the encumbrances or restrictions would not, at the time agreed to, be expected to materially and adversely affect the ability of the Issuers to make the required payments on the Notes; or

(9) customary provisions contained in agreements evidencing Liens incurred in accordance with the "Limitation on Liens" covenant.

Limitation on Sales and Issuances of Capital Stock in Restricted Subsidiaries

The Company will not sell, and will not permit any Restricted Subsidiary, directly or indirectly, to issue or sell, any shares of Capital Stock of a Restricted Subsidiary (including options, warrants or other rights to purchase shares of such Capital Stock) except:

(1) to the Company or a Restricted Subsidiary;

(2) to the extent such Capital Stock represents director's qualifying shares or is required by applicable law to be held by a Person other than the Company or a Restricted Subsidiary;

(3) the sale of all of the shares of Capital Stock of a Restricted Subsidiary if made in accordance with, the "– Limitation on Asset Sales" covenant;

(4) the issuance or sale of Capital Stock of a Restricted Subsidiary (which remains a Restricted Subsidiary after any such issuance or sale); *provided* that the Company or such Restricted Subsidiary applies the Net Cash Proceeds of such issuance or sale, to the extent required, in accordance with the "– Limitation on Asset Sales" covenant; and

(5) the issuance or sale of Capital Stock of a Restricted Subsidiary that does not remain a Restricted Subsidiary after such issuance or sale; *provided* that (a) the transaction complies with the "– Limitation on Restricted Payments" covenant and (b) the Company applies the Net Cash Proceeds of such issuance or sale, to the extent required, in accordance with the "– Limitation on Asset Sales" covenant.

Notwithstanding the foregoing, a Restricted Subsidiary may issue Common Stock to its shareholders on a pro rata basis or on a basis more favorable to the Company and its Restricted Subsidiaries.

Limitation on Issuances of Guarantees by Restricted Subsidiaries

The Company will not permit any Restricted Subsidiary (other than the Co-Issuer) which is not a Subsidiary Guarantor, directly or indirectly, to guarantee any Indebtedness ("Guaranteed Indebtedness") of the Company, the Co-Issuer or any other Subsidiary Guarantor, unless (1) such Restricted Subsidiary, as soon as practicable but in any event within five days thereafter, executes and delivers a supplemental indenture to the Indenture providing for an unsubordinated Subsidiary Guarantee of payment of the Notes by such Restricted Subsidiary, whereupon it shall become a "Subsidiary Guarantor" and (2) such Restricted Subsidiary waives and will not in any manner whatsoever claim, or take the benefit or advantage of, any rights of reimbursement, indemnity or subrogation or any other rights against the Company or any other Restricted Subsidiary as a result of any payment by such Restricted Subsidiary under its Subsidiary Guarantee until the Notes have been paid in full.

If the Guaranteed Indebtedness (A) ranks *pari passu* in right of payment with the Notes or any Subsidiary Guarantee, then the guarantee of such Guaranteed Indebtedness shall rank *pari passu* in right of payment with, or subordinated to, the Subsidiary Guarantee or (B) is subordinated in right of payment to the Notes or any Subsidiary Guarantee, then the guarantee of such Guaranteed Indebtedness shall be subordinated in right of payment to the Subsidiary Guarantee at least to the extent that the Guaranteed Indebtedness is subordinated to the Notes or the Subsidiary Guarantee.

Limitation on Transactions with Shareholders and Affiliates

The Company will not, and will not permit any Restricted Subsidiary to, directly or indirectly, enter into, renew or extend any transaction or arrangement (including, without limitation, the purchase, sale, lease or exchange of property or assets, or the rendering of any service) with (a) any holder (or any Affiliate of such holder) of 10% or more of any class of Capital Stock of the Company or (b) with any Affiliate of the Company (each an "Affiliate Transaction"), unless:

(1) the Affiliate Transaction is on terms that are no less favorable to the Company or the relevant Restricted Subsidiary than those that would have been obtained in a comparable arm's-length transaction by the Company or the relevant Restricted Subsidiary with a Person that is not such a holder or an Affiliate of the Company; and

(2) the Company delivers to the Trustee:

    (A) with respect to any Affiliate Transaction or series of related Affiliate Transactions involving aggregate consideration in excess of US$5.0 million (or the Dollar Equivalent thereof), a Board Resolution set forth in an Officers' Certificate certifying that such Affiliate Transaction complies with this covenant and such Affiliate Transaction has been approved by a majority of the disinterested members of the Board of Directors; and

    (B) with respect to any Affiliate Transaction or series of related Affiliate Transactions involving aggregate consideration in excess of US$15.0 million (or the Dollar Equivalent thereof), in addition to the Board Resolution required in clause (2)(A) above, an opinion issued by an accounting, appraisal or investment banking firm of recognized international standing as to the fairness to the Company or such Restricted Subsidiary of such Affiliate Transaction from a financial point of view.

The foregoing limitation does not limit, and shall not apply to:

(1) any employment or compensation agreement (whether based in cash or securities), officer or director indemnification agreement, severance or termination agreement or any similar arrangement entered into by the Company or any Restricted Subsidiary with their respective officers, directors or employees and payments pursuant thereto, including the payment of reasonable fees and reimbursement of expenses, in each case in the ordinary course of business;

(2) transactions between or among the Company and any Wholly Owned Restricted Subsidiary or between or among Wholly Owned Restricted Subsidiaries;

(3) any Restricted Payment (other than a Permitted Investment) not prohibited by the "– Limitation on Restricted Payments" covenant;

(4) any sale of Capital Stock (other than Disqualified Stock) of the Company;

(5) the payment of compensation to officers and directors of the Company or any Restricted Subsidiary pursuant to an employee stock or share option scheme, so long as such scheme is in compliance with the listing rules of The Stock Exchange of Hong Kong Limited;

(6) transactions with a Person (other than an Unrestricted Subsidiary of the Company) that is an Affiliate of the Company solely because the Company, directly or indirectly, owns Capital Stock in, or controls, such Person or solely because the Company or one of its Subsidiaries has the right to designate one or more members of the Board of Directors or similar governing body of such Person;

(7) loans or advances to officers, directors or employees in the ordinary course of business not to exceed US$5.0 million (or the Dollar Equivalent thereof) at any one time outstanding; and

(8) any agreement between any Person and an Affiliate of such Person existing at the time such Person is acquired by or merged into the Company or any of its Restricted Subsidiaries; provided that such agreement was not entered into in contemplation of such acquisition or merger.

In addition, the requirements of clause (2) of the first paragraph of this covenant shall not apply to (i) any Permitted Investment (other than a Permitted Investment of the type described in clause (1)(b) of the definition of "Permitted Investment"), (ii) transactions pursuant to agreements in effect on the Original Issue Date and described in this Offering Memorandum, or any amendment or modification or replacement thereof, so long as such amendment, modification or replacement is not materially more disadvantageous to the Company and its Restricted Subsidiaries than the original agreement in effect on the Original Issue Date, (iii) transactions with customers, clients, suppliers, contractors, other service providers or purchasers and sellers of goods and services or lessors or lessees, (iv) any transaction between or among the Company and any Restricted Subsidiary that is not a Wholly Owned Restricted Subsidiary and (v) transactions between or among the Company and Restricted Subsidiaries on the one hand and any member of EM Group on the other hand; *provided* that (a) in the case of clauses (iii) and (v), such transaction is entered into in the ordinary course of business and (b) in the case of clause (iv) none of the other shareholders or other partners of or in such Restricted Subsidiary is a Person described in clauses (a) or (b) of the first paragraph of this covenant (other than by reason of such shareholder or partner being an officer or director of such Restricted Subsidiary).

Limitation on Liens

The Company will not, and will not permit any Restricted Subsidiary to, directly or indirectly, incur, assume or permit to exist any Lien of any nature whatsoever on any of its assets or properties of any kind, whether owned at the Original Issue Date or thereafter acquired, except Permitted Liens, unless the Notes are secured equally and ratably with (or, if the obligation or liability to be secured by such Lien is subordinated in right of payment to the Notes, prior to) the obligation or liability secured by such Lien, for so long as such obligation or liability is secured by such Lien.

Limitation on Sale and Leaseback Transactions

The Company will not, and will not permit any Restricted Subsidiary to, enter into any Sale and Leaseback Transaction; *provided* that the Company or any Restricted Subsidiary may enter into a Sale and Leaseback Transaction if:

(a) the Company or any Restricted Subsidiary could have (1) Incurred Indebtedness in an amount equal to the Attributable Indebtedness relating to such Sale and Leaseback Transaction under the covenant described under the caption "– Limitation on Indebtedness" and (2) incurred a Lien to secure such Indebtedness pursuant to the covenant described under the caption "– Limitation on Liens," in which case, the corresponding Indebtedness and Lien will be deemed incurred pursuant to those provisions;

(b) the gross cash proceeds of that Sale and Leaseback Transaction are at least equal to the Fair Market Value of the property that is the subject of such Sale and Leaseback Transaction; and

(c) the transfer of assets in that Sale and Leaseback Transaction is permitted by, and the Company applies to the extent required the proceeds of such transaction in compliance with, the covenant described under the caption "– Limitation on Asset Sales."

Limitation on Asset Sales

The Company will not, and will not permit any Restricted Subsidiary to, consummate any Asset Sale, unless:

(a) no Default shall have occurred and be continuing or would occur as a result of such Asset Sale;

(b) the consideration received by the Company or such Restricted Subsidiary, as the case may be, is at least equal to the Fair Market Value of the assets sold or disposed of (determined on the date of the contractual agreement for the Asset Sale);

(c) at least 75% of the consideration received consists of cash, Temporary Cash Investments or Replacement Assets; provided that in the case of an Asset Sale in which the Company or such Restricted Subsidiary receives Replacement Assets involving aggregate consideration in excess of US$15.0 million (or the Dollar Equivalent thereof), the Company shall deliver to the Trustee an opinion as to the fairness to the Company or such Restricted Subsidiary of such Asset Sale from a financial point of view issued by an accounting, appraisal or investment banking firm of recognized international standing. For purposes of this provision, each of the following will be deemed to be cash:

    (A) any liabilities, as shown on the Company's most recent consolidated statement of financial position, of the Company or any Restricted Subsidiary (other than contingent liabilities and liabilities that are by their terms subordinated to the Notes or any Subsidiary Guarantee) that are assumed by the transferee of any such assets pursuant to a customary assumption, assignment, novation or similar agreement that releases the Company or such Restricted Subsidiary from further liability; and

    (B) any securities, notes or other obligations received by the Company or any Restricted Subsidiary from such transferee that are promptly, but in any event within 60 days of closing, converted by the Company or such Restricted Subsidiary into cash, to the extent of the cash received in that conversion.

Within 360 days after the receipt of any Net Cash Proceeds from an Asset Sale, the Company or any Restricted Subsidiary may apply such Net Cash Proceeds to:

(1) permanently repay Senior Indebtedness of the Company or any Restricted Subsidiary or any Indebtedness of a Restricted Subsidiary that was secured by the assets that were the subject of such Asset Sale (and, if such Senior Indebtedness repaid is revolving credit Indebtedness, to correspondingly reduce commitments with respect thereto) in each case owing to a Person other than the Company or a Restricted Subsidiary; or

(2) develop or acquire Replacement Assets; *provided* that this clause (2) shall be satisfied if the Company or Restricted Subsidiary (i) enters into a definitive agreement committing to invest the relevant amount in Replacement Assets within 360 days of the receipt of such Net Cash Proceeds and (ii) actually invests such amount in Replacement Assets within 270 days after the 360 day period.

Any Net Cash Proceeds from Asset Sales that are not applied or invested as provided in clauses (1) and (2) in the immediately preceding paragraph will constitute "Excess Proceeds." Pending the final application of any such Net Cash Proceeds, the Company may temporarily reduce revolving credit borrowings or otherwise invest such Net Cash Proceeds in any manner that is not prohibited by the terms of the Indenture.

Excess proceeds of less than US$15.0 million (or the Dollar Equivalent thereof) will be carried forward and accumulated. When accumulated Excess Proceeds equals to or exceeds US$15.0 million (or the Dollar Equivalent thereof), within 10 days thereof, the Issuers shall make an Offer to Purchase Notes having a principal amount equal to:

(i) accumulated Excess Proceeds, multiplied by

(ii) a fraction (x) the numerator of which is equal to the outstanding principal amount of the Notes and (y) the denominator of which is equal to the outstanding principal amount of the Notes and all pari passu Indebtedness similarly required to be repaid, redeemed or tendered for in connection with the Asset Sale, rounded down to the nearest US$1,000. The offer price in any Offer to Purchase will be equal to 100% of the principal amount plus accrued and unpaid interest to the date of purchase, and will be payable in cash.

If any Excess Proceeds remain after the consummation of an Offer to Purchase, the Company or any Restricted Subsidiary may use such Excess Proceeds for any purpose not otherwise prohibited by the Indenture. If the aggregate principal amount of Notes and any other *pari passu* Indebtedness tendered into (or required to be prepaid or redeemed in connection with) such Offer to Purchase exceeds the amount of Excess Proceeds, the Notes and such other *pari passu* Indebtedness will be purchased on a *pro rata* basis based on the principal amount of Notes and such *pari passu* Indebtedness tendered (or required to be prepaid or redeemed) (with such adjustments as may be deemed appropriate by the Issuers so that only Notes in denominations of US$125,000, or an integral multiple of US$1,000 in excess thereof, will be purchased). Upon completion of any each Offer to Purchase, the amount of Excess Proceeds will be reset at zero.

Limitation on the Company's Business Activities

The Company will not, and will not permit any Restricted Subsidiary to, directly or indirectly, engage in any business other than a Permitted Business; *provided, however*, that the Company or any Restricted Subsidiary may own Capital Stock of an Unrestricted Subsidiary or joint venture or other entity that is engaged in a business other than a Permitted Business as long as any Investment therein was not prohibited when made by the covenant under the caption "– Limitation on Restricted Payments."

Maintenance of Insurance

The Company will, and will cause each Restricted Subsidiary, to maintain insurance with reputable and financially sound carriers against such risks and in such amounts as is customarily carried by similar companies engaged in similar business to the Permitted Business in the jurisdictions in which the Company or such Restricted Subsidiary conducts its businesses, including, without limitation, property and casualty insurance.

Use of Proceeds

The Company will not, and will not permit any Restricted Subsidiary to, use the net proceeds from the sale of the Notes on the Original Issue Date, in any amount, for any purpose other than (a) in the approximate amounts and for the purposes specified under the caption "Use of Proceeds" in this Offering Memorandum (it being understood that the use of proceeds may be reallocated as specified in "Use of Proceeds") and (b) pending the application of all of such net proceeds in such manner, to invest the portion of such net proceeds not yet so applied in cash or Temporary Cash Investments.

Designation of Restricted and Unrestricted Subsidiaries

The Board of Directors may designate any Restricted Subsidiary (other than the Co-Issuer) to be an Unrestricted Subsidiary; *provided* that (a) no Default shall have occurred and be continuing at the time of or after giving effect to such designation; (b) neither the Company nor any Restricted Subsidiary guarantees or provides credit support for the Indebtedness of such Restricted Subsidiary; (c) such

Restricted Subsidiary has no outstanding Indebtedness that could trigger a cross-default to the Indebtedness of the Company or any other Restricted Subsidiary; (d) such Restricted Subsidiary does not own any Disqualified Stock of the Company or Disqualified or Preferred Stock of another Restricted Subsidiary or hold any Indebtedness, or any Lien on any property, of the Company or any Restricted Subsidiary, if such Disqualified or Preferred Stock or Indebtedness could not be Incurred under the covenant described under the caption "– Limitation on Indebtedness" or such Lien would violate the covenant described under the caption "– Limitation on Liens"; (e) such Restricted Subsidiary does not own any Voting Stock of another Restricted Subsidiary, and all of its Subsidiaries are Unrestricted Subsidiaries or are being concurrently designated as Unrestricted Subsidiaries in accordance with this paragraph; and (f) the Investment deemed to have been made thereby in such newly designated Unrestricted Subsidiary and each other newly designated Unrestricted Subsidiary being concurrently redesignated would be permitted to be made by the covenant described under the caption "Limitation on Restricted Payments".

The Board of Directors may designate any Unrestricted Subsidiary to be a Restricted Subsidiary; *provided* that (a) no Default shall have occurred and be continuing at the time of or after giving effect to such designation; (b) any Indebtedness of such Unrestricted Subsidiary outstanding at the time of such designation which will be deemed to have been Incurred by such newly designated Restricted Subsidiary as a result of such designation would be permitted to be Incurred by the covenant described under the caption "Limitation on Indebtedness"; (c) any Lien on the property of such Unrestricted Subsidiary at the time of such designation which will be deemed to have been Incurred by such newly designated Restricted Subsidiary as a result of such designation would be permitted to be Incurred by the covenant described under the caption "– Limitation on Liens"; (d) such Unrestricted Subsidiary is not a Subsidiary of another Unrestricted Subsidiary (that is not concurrently being designated as a Restricted Subsidiary); and (e) if such Restricted Subsidiary is a Wholly Owned Subsidiary which, directly or indirectly, own any mining deposits or reserves or any mining license, such Restricted Subsidiary shall upon such designation execute and deliver to the Trustee a supplemental indenture to the Indenture by which such Restricted Subsidiary shall become a Subsidiary Guarantor. Notwithstanding the foregoing, the Company will not be obligated to cause any Restricted Subsidiary to guarantee the Notes to the extent such guarantee could reasonably be expected to give rise to or result in any conflict with or violation of applicable law (or risk of personal or criminal liability for the officers, directors, managers or shareholders of such Restricted Subsidiary).

Notwithstanding the provisions of this covenant "Designation of Restricted and Unrestricted Subsidiaries," in no event shall the Co-Issuer be designated as an Unrestricted Subsidiary so long as the Notes are outstanding.

All designations must be evidenced by a Board Resolution and an Officers' Certificate delivered to the Trustee certifying compliance with the provisions set forth above, as applicable.

Government Approvals and Licenses; Compliance with Law

The Company will, and will cause each Restricted Subsidiary to, (a) obtain and maintain in full force and effect all governmental approvals, authorizations, consents, permits, concessions and licenses as are necessary to engage in the Permitted Business, (b) preserve and maintain good and valid title to its properties and assets (including mining and land-use rights) free and clear of any Liens other than Permitted Liens and (c) comply with all laws, regulations, orders, judgments and decrees of any governmental body, except to the extent that failure so to obtain, maintain, preserve and comply would not reasonably be expected to have a material adverse effect on (1) the business, results of operations or prospects of the Company and its Restricted Subsidiaries, taken as a whole, or (2) the ability of any Issuer or any Subsidiary Guarantor to perform its obligations under the Notes, the relevant Subsidiary Guarantee or the Indenture.

Anti-Layering

The Issuers will not, and will not permit any Subsidiary Guarantor to, Incur any Indebtedness if such Indebtedness is contractually subordinated in right of payment to any other Indebtedness of either Issuer or such Subsidiary Guarantor, as the case may be, unless such Indebtedness is also contractually subordinated in right of payment to the Notes or the applicable Subsidiary Guarantee, on substantially identical terms. This covenant does not apply to distinctions between categories of Indebtedness that exist by reason of any Liens or guarantees securing or in favor of some but not all of such Indebtedness or securing on a junior priority basis.

Suspension of Certain Covenants

If, on any date following the date of the Indenture, the Notes have an Investment Grade Rating from both of the Rating Agencies and no Default or Event of Default has occurred and is continuing (a "Suspension Event"), then, beginning on that day and continuing until such time, if any, at which the Notes cease to have an Investment Grade Rating from either of the Rating Agencies, the provisions of the Indenture summarized under the following captions will be suspended:

(1) "– Certain Covenants – Limitation on Indebtedness";

(2) "– Certain Covenants – Limitation on Restricted Payments";

(3) "– Certain Covenants – Limitation on Dividend and Other Payment Restrictions Affecting Restricted Subsidiaries";

(4) "– Certain Covenants – Limitation on Sales and Issuances of Capital Stock in Restricted Subsidiaries";

(5) "– Certain Covenants – Limitation on Issuances of Guarantees by Restricted Subsidiaries";

(6) "– Certain Covenants – Limitation on Sale and Leaseback Transactions";

(7) "– Certain Covenants – Limitation on Asset Sales"; and

(8) "– Certain Covenants – Limitation on the Company's Business Activities."

During any period that the foregoing covenants have been suspended, the Board of Directors may not designate any Restricted Subsidiary as an Unrestricted Subsidiary pursuant to the covenant described under the caption "– Certain Covenants – Designation of Restricted and Unrestricted Subsidiaries" or the definition of "Unrestricted Subsidiary."

Such covenants will be reinstituted and apply according to their terms as of and from the first day on which a Suspension Event ceases to be in effect. Such covenants will not, however, be of any effect with regard to actions of the Company or any Restricted Subsidiary properly taken in compliance with the provisions of the Indenture during the continuance of the Suspension Event and, following reinstatement, (1) the calculations under the covenant described under the caption "– Certain Covenants – Limitation on Restricted Payments" will be made as if such covenant had been in effect since the date of the Indenture except that no Default will be deemed to have occurred solely by reason of a Restricted Payment made while that covenant was suspended and (2) all Indebtedness incurred during the Suspension Period will be classified to have been incurred or issued pursuant to clause (b)(2) of the covenant described under the caption "– Certain Covenants – Limitation on Indebtedness." Upon the occurrence of a Suspension Period, the amount of Excess Proceeds shall be reset at zero. There can be no assurance that the Notes will ever achieve an Investment Grade Rating or that, if achieved, any such rating will be maintained.

Provision of Financial Statements and Reports

(a) So long as any of the Notes remain outstanding, the Company will furnish to the Trustee and furnish to the Holders upon request, as soon as they are available but in any event not more than 10 calendar days after they are filed with The Stock Exchange of Hong Kong Limited or any other securities exchange on which the Company's ordinary shares are at any time listed for trading, true and correct copies of any financial or other report in the English language filed with such exchange; provided that, if at any time the ordinary shares of the Company cease to be listed for trading on a recognized securities exchange, the Company will file with the Trustee and furnish to the Holders:

(1) as soon as they are available, but in any event within 90 calendar days after the end of each fiscal year of the Company, annual reports containing, and in a level of detail that is comparable in all material respects to that included in this Offering Memorandum, the following information: (i) audited consolidated financial statements comprising consolidated statement of financial position of the Company of the end of the two most recent fiscal years and consolidated statement of profit or loss, consolidated statement of profit or loss and other comprehensive income, consolidated statement of changes in equity and consolidated cash flow statement of the Company for the two most recent fiscal years, including complete footnotes to such financial statements and the audit report of a member firm of an internationally recognized firm of independent accountants on the financial statements; (ii) an operating and financial review of the audited financial statements, including a discussion of the results of operations, financial condition, Consolidated Adjusted EBITDA (as presented in this Offering Memorandum) and liquidity and capital resources of the Company, and a discussion of material recent developments and material commitments and contingencies and critical accounting policies; and (iii) description of the business, management and shareholders of the Company (on a consolidated basis);

(2) as soon as they are available, but in any event within 60 calendar days after the end of the first semi-annual fiscal period of the Company, semi-annual reports of the Company containing the following information: (i) an unaudited condensed consolidated financial statements comprising consolidated statement of financial position as of the end of such semi-annual period and consolidated statement of profit or loss, consolidated statement of profit or loss and other comprehensive income, consolidated statement of changes in equity and condensed consolidated cash flow statement of the Company for the most recent semi-annual fiscal period ending on the consolidated statement of financial position date, and the comparable prior year period, together with condensed footnote disclosure, reviewed by a member firm of an internationally recognized firm of independent accountants together with the review report thereon; and (ii) an operating and financial review of the unaudited financial statements, including a discussion of the results of operations, financial condition, Consolidated Adjusted EBITDA (as presented in this Offering Memorandum) and liquidity and capital resources of the Company, and a discussion of material recent developments and material changes in commitments and contingencies and critical accounting policies since the most recent annual report; and

(3) promptly after the occurrence of (i) any Material Acquisition or Disposition or restructuring, (ii) any senior executive officer changes at the Company or change in auditors of the Company or (iii) any other material event not in the ordinary course of business, solely with respect to this sub-clause (iii), that the Company announces publicly, a report containing a description of such event.

(b) In addition, so long as any of the Notes remain outstanding, the Company will provide to the Trustee (1) within 120 days after the close of each fiscal year, an Officers' Certificate stating the Leverage Ratio with respect to the two most recent semi-annual fiscal periods and showing in reasonable detail the calculation of the Leverage Ratio, including the arithmetic computations of each component of the Leverage Ratio, together with a certificate from the Company's external auditors verifying the accuracy and arithmetic computation; (2) as soon as possible and in any event within 10 days after

the Company and/or the Co-Issuer becomes aware or should reasonably become aware of the occurrence of a Default, an Officers' Certificate setting forth the details of such Default or default, and the action which the Issuers propose to take with respect thereto; and (3) within 10 Business Days of any request by the Trustee, an officer's certificate of the Company, stating whether or not to the knowledge of the signer thereof the Company is in default in the performance and observance of any of the terms, provisions and conditions under the Indenture (without regard to any period of grace or requirement of notice provided thereunder) and if the Company shall be in default specifying all such defaults and the nature and status thereof of which the signer may have knowledge.

(c) Delivery of the above reports and other documents to the Trustee is for informational purposes only and the Trustee's receipt of such reports will not constitute constructive notice of any information contained therein or determinable from information contained therein, including our compliance with any covenant in the Indenture (as to which the Trustee is entitled to rely exclusively on officer's certificates).

EVENTS OF DEFAULT

The following events will be defined as "Events of Default" in the Indenture:

(a) default in the payment of principal of (or premium, if any, on) the Notes when the same becomes due and payable at maturity, upon acceleration, redemption or otherwise;

(b) default in the payment of interest on any Note when the same becomes due and payable, and such default continues for a period of 30 consecutive days;

(c) (x) default in the performance or breach of the provisions of the covenants described under the caption "– Consolidation, Merger and Sale of Assets," or (y) the failure by the Issuers to make or consummate an Offer to Purchase in the manner described under the captions "– Repurchase of Notes upon a Change of Control Triggering Event" or "– Certain Covenants – Limitation on Asset Sales";

(d) the Company, the Co-Issuer or any other Restricted Subsidiary defaults in the performance of or breaches any other covenant or agreement in the Indenture or under the Notes (other than a default specified in clause (a), (b) or (c) above) and such default or breach continues for a period of 30 consecutive days after written notice of such default or breach to either Issuer by the Trustee or the Holders of 25% or more in aggregate principal amount of the Notes;

(e) there occurs with respect to any Indebtedness of the Company or any Restricted Subsidiary having an outstanding principal amount of US$15.0 million (or the Dollar Equivalent thereof) or more in the aggregate for all such Indebtedness of all such Persons, whether such Indebtedness now exists or shall hereafter be created, (1) an event of default that has caused the holder thereof to declare such Indebtedness to be due and payable prior to its Stated Maturity and/or (2) a failure to pay principal of, or interest or premium on, such Indebtedness when the same becomes due (subject to the applicable grace period in the relevant documents);

(f) one or more final judgments or orders for the payment of money are rendered against the Company or any Restricted Subsidiary and are not paid or discharged, and there is a period of 60 consecutive days following entry of the final judgment or order that causes the aggregate amount for all such final judgments or orders outstanding and not paid or discharged against all such Persons to exceed US$15.0 million (or the Dollar Equivalent thereof) (in excess of amounts which the Company's insurance carriers have agreed to pay under applicable policies) during which a stay of enforcement, by reason of a pending appeal or otherwise, is not in effect;

(g) an involuntary case or other proceeding is commenced against any Issuer or any Significant Subsidiary (or any group of Restricted Subsidiaries that together would constitute a Significant Subsidiary) with respect to it or its debts under any applicable bankruptcy, insolvency or other similar law now or hereafter in effect seeking the appointment of a receiver, liquidator, assignee, custodian, trustee, sequestrator or similar official of any Issuer or any Significant Subsidiary (or any group of Restricted Subsidiaries that together would constitute a Significant Subsidiary) or for any substantial part of the property and assets of any Issuer or any Significant Subsidiary (or any group of Restricted Subsidiaries that together would constitute a Significant Subsidiary) and such involuntary case or other proceeding remains undismissed and unstayed for a period of 60 consecutive days; or an order for relief is entered against any Issuer or any Significant Subsidiary (or any group of Restricted Subsidiaries that together would constitute a Significant Subsidiary) under any applicable bankruptcy, insolvency or other similar law as now or hereafter in effect;

(h) any Issuer or any Significant Subsidiary (or any group of Restricted Subsidiaries that together would constitute a Significant Subsidiary) (1) commences a voluntary case under any applicable bankruptcy, insolvency or other similar law now or hereafter in effect, or consents to the entry of an order for relief in an involuntary case under any such law, (2) consents to the appointment of or taking possession by a receiver, liquidator, assignee, custodian, trustee, sequestrator or similar official of any Issuer or any Significant Subsidiary (or any group of Restricted Subsidiaries that together would constitute a Significant Subsidiary), or for all or substantially all of the property and assets of any Issuer or any Significant Subsidiary (or any group of Restricted Subsidiaries that together would constitute a Significant Subsidiary), or (3) effects any general assignment for the benefit of creditors (other than, in the case of clauses (2) or (3) only, in connection with a solvent liquidation or restructuring of a Significant Subsidiary in the ordinary course of business that shall result in the net assets of such Significant Subsidiary being transferred to or otherwise vested in the Company or any Restricted Subsidiary on a pro rata basis or on a basis more favorable to the Company);

(i) (a) the entity holding the mining license in relation to the Ukhaa Khudag mine ceases to be, directly or indirectly a Wholly Owned Restricted Subsidiary, the Co-Issuer or a Subsidiary Guarantor or (b) the mining license for the Ukhaa Khudag mine ceases to be valid and effective or wholly owned by the Company, the Co-Issuer or a Subsidiary Guarantor; or

(j) any Subsidiary Guarantor denies or disaffirms its obligations under its Subsidiary Guarantee or, except as permitted by the Indenture, any Subsidiary Guarantee is determined to be unenforceable or invalid or shall for any reason cease to be in full force and effect.

If an Event of Default (other than an Event of Default specified in clause (g) or (h) above) occurs and is continuing under the Indenture, the Trustee in its sole discretion or the Holders of at least 25% in aggregate principal amount of the Notes, then outstanding, by written notice to the Issuers (and to the Trustee if such notice is given by the Holders), may, and the Trustee at the request of such Holders (subject to being indemnified and/or secured and/or pre-funded to its satisfaction) shall, declare the principal of, premium, if any, and accrued and unpaid interest on the Notes to be immediately due and payable. Upon a declaration of acceleration, such principal of, premium, if any, and accrued and unpaid interest shall be immediately due and payable. If an Event of Default specified in clause (g) or (h) above occurs with respect to any Issuer or any Significant Subsidiary (or any group of Restricted Subsidiaries that together would constitute a Significant Subsidiary), the principal of, premium, if any, and accrued and unpaid interest on the Notes then outstanding shall automatically become and be immediately due and payable without any declaration or other act on the part of the Trustee or any Holder.

The Holders of at least 50% in principal amount of the outstanding Notes by written notice to the Issuers and to the Trustee may on behalf of all Holders waive all past defaults and rescind and annul a declaration of acceleration and its consequences if:

(x) all existing Events of Default, other than the non-payment of the principal of, premium, if any, and interest on the Notes that have become due solely by such declaration of acceleration, have been cured or waived; and

(y) the rescission would not conflict with any judgment or decree of a court of competent jurisdiction.

Upon such waiver, the Default will cease to exist, and any Event of Default arising therefrom will be deemed to have been cured, but no such waiver will extend to any subsequent or other Default or impair any right consequent thereon.

If an Event of Default occurs and is continuing, the Trustee may (but shall not be obligated to) pursue, in its own name or as trustee of an express trust, any available remedy by proceeding at law or in equity to collect the payment of principal of and interest on the Notes or to enforce the performance of any provision of the Notes or the Indenture. The Trustee may maintain a proceeding even if it does not possess any of the Notes or does not produce any of them in the proceeding.

The Holders of at least 50% in aggregate principal amount of the outstanding Notes may direct the time, method and place of conducting any proceeding for any remedy available to the Trustee or exercising any trust or power conferred on the Trustee. However, the Trustee may refuse to follow any direction that is unclear, conflicting or equivocal, conflicts with law or the Indenture that may involve the Trustee in personal liability, or that the Trustee determines in good faith may be unduly prejudicial to the rights of Holders not joining in the giving of such direction and may take any other action it deems proper that is not inconsistent with any such direction received from Holders. In addition, the Trustee will not be required to expend its own funds in following each direction if it does not believe that reimbursement or satisfactory indemnification and/or security and/or pre-funding is assured to it.

A Holder may not institute any proceeding, judicial or otherwise, with respect to the Indenture or the Notes, or for the appointment of a receiver or trustee, or for any other remedy under the Indenture or the Notes unless:

(1) the Holder has previously given the Trustee written notice of a continuing Event of Default;

(2) the Holders of at least 25% in aggregate principal amount of outstanding Notes make a written request to the Trustee to pursue the remedy;

(3) such Holder or Holders provide the Trustee indemnity and/or security and/or pre-funding satisfactory to the Trustee against any costs, liability or expense to be incurred in compliance with such request;

(4) the Trustee does not comply with the request within 60 days after receipt of the request and the indemnity and/or security and/or pre-funding; and

(5) during such 60-day period, the Holders of at least 50% in aggregate principal amount of the outstanding Notes do not give the Trustee a direction that is inconsistent with the request.

However, such limitations do not apply to the right of any Holder to receive payment of the principal of, premium, if any, or interest, and any Additional Amounts, if any, on, such Note or to bring suit for the enforcement of any such payment, on or after the due date expressed in the Notes, which right shall not be impaired or affected without the consent of the Holder.

Two Officers of the Company must certify to the Trustee in writing, on or before a date not more than 120 days after the end of each fiscal year, that a review has been conducted of the activities of the Company and its Restricted Subsidiaries and the Company's and its Restricted Subsidiaries' performance under the Indenture and the Notes and that the Company and its Restricted Subsidiaries have fulfilled all obligations thereunder, or, if there has been a default in the fulfillment of any such obligation, specifying each such default and the nature and status thereof. The Issuers will also be obligated to notify the Trustee in writing of any default or defaults in the performance of any covenants or agreements under the Indenture. See "– Provision of Financial Statements and Reports."

Neither the Trustee nor any Agent is obligated to do anything to ascertain whether any Event of Default or Default has occurred or is continuing and will not be responsible to the Holders or any other person for any loss arising from any failure by it to do so, and each of the Trustee and the Agents may assume that no such event has occurred and that the Issuers and the Subsidiary Guarantors are performing all of their obligations under the Indenture and the Notes unless the Trustee or the Agent, as the case may be, has received written notice of the occurrence of such event or facts establishing that a Default or an Event of Default has occurred or that the Issuers or the Subsidiary Guarantors are not performing all of their obligations under the Indenture and/or the Notes. The Trustee is entitled to rely on any Opinion of Counsel or Officers' Certificate regarding whether an Event of Default has occurred.

CONSOLIDATION, MERGER AND SALE OF ASSETS

Neither the Company nor the Co-Issuer will consolidate with, merge with or into another Person, permit any Person to merge with or into it, or sell, convey, transfer, lease or otherwise dispose of all or substantially all of its and its Restricted Subsidiaries' properties and assets (computed on a consolidated basis) to another Person (as an entirety or substantially an entirety in one transaction or a series of related transactions), unless:

(a) either the Company or the Co-Issuer (as applicable) shall be the continuing Person, or the Person (if other than it) formed by such consolidation or merger, or with or into which the Company or the Co-Issuer (as applicable) consolidated or merged, or that acquired or leased such property and assets (the "Surviving Person") shall be (x) a corporation organized and validly existing under the laws of the Cayman Islands, the British Virgin Islands, Luxembourg, Mongolia or Hong Kong or any jurisdiction thereof and (y) shall expressly assume, by a supplemental indenture to the Indenture, executed and delivered to the Trustee, all the obligations of the Company or the Co-Issuer (as applicable) under the Indenture and the Notes, including the obligation to pay Additional Amounts with respect to any jurisdiction in which it is organized or resident for tax purposes, or from or through which payment is made, and the Indenture and the Notes shall remain in full force and effect;

(b) immediately after giving effect to such transaction, no Default shall have occurred and be continuing;

(c) immediately after giving effect to such transaction on a pro forma basis, the Company or the Surviving Person, as the case may be, could Incur at least US$1.00 of Indebtedness under the proviso in the first sentence of clause (a) of the covenant described under the caption "– Certain Covenants – Limitation on Indebtedness";

(d) the Company or the Co-Issuer (as applicable) delivers to the Trustee (1) an Officers' Certificate (attaching the arithmetic computations to demonstrate compliance with clause (c)) and (2) an Opinion of Counsel, in each case stating that such consolidation, merger or transfer and such supplemental indenture complies with this provision and that all conditions precedent provided for in the Indenture relating to such transaction have been complied with;

(e) each Subsidiary Guarantor, unless such Subsidiary Guarantor is the Person with which the Company or the Co-Issuer has entered into a transaction described under this covenant, shall execute and deliver a supplemental indenture to the Indenture confirming that its Subsidiary Guarantee shall apply to the obligations of the Company, the Co-Issuer or the Surviving Person in accordance with the Notes and the Indenture; and

(f) no Rating Decline shall have occurred.

No Subsidiary Guarantor will consolidate with or merge with or into another Person, permit any Person to merge with or into it, or sell, convey, transfer, lease or otherwise dispose of all or substantially all of its and its Restricted Subsidiaries' properties and assets (computed on a consolidated basis) (as an entirety or substantially an entirety in one transaction or a series of related transactions) to another Person (other than the Company, the Co-Issuer or another Subsidiary Guarantor), unless:

(A) such Subsidiary Guarantor shall be the continuing Person, or the Person (if other than it) formed by such consolidation or merger or that acquired or leased such property and assets shall be the Company, the Co-Issuer or another Subsidiary Guarantor or shall become a Subsidiary Guarantor concurrently with the transaction;

(B) immediately after giving effect to such transaction, no Default shall have occurred and be continuing;

(C) immediately after giving effect to such transaction on a pro forma basis, the Company could Incur at least US$l.00 of Indebtedness under the proviso in the first sentence of clause (a) of the covenant described under the caption "– Certain Covenants – Limitation on Indebtedness";

(D) the Company delivers to the Trustee (1) an Officers' Certificate (attaching the arithmetic computations to demonstrate compliance with clause (C)) and (2) an Opinion of Counsel, in each case stating that such consolidation, merger or transfer and the relevant supplemental indenture complies with this provision and that all conditions precedent provided for in the Indenture relating to such transaction have been complied with; and

(E) no Rating Decline shall have occurred,

provided that this paragraph shall not apply to (1) any sale or other disposition that complies with the "Limitation on Asset Sales" covenant or any Subsidiary Guarantor whose Subsidiary Guarantee is unconditionally released in accordance with the provisions described under "The Subsidiary Guarantees – Release of the Subsidiary Guarantees" and (2) a consolidation or merger of any Subsidiary Guarantor with and into the Company, the Co-Issuer or any other Subsidiary Guarantor, so long as the Company, the Co-Issuer or such Subsidiary Guarantor survives such consolidation or merger.

Nothing in the Indenture will prevent any Restricted Subsidiary that is not a Subsidiary Guarantor from consolidating with, merging into or transferring all or substantially all of its properties and assets to the Company, the Co-Issuer, a Subsidiary Guarantor or any other Restricted Subsidiary. The Company or the Co-Issuer (as applicable) may consolidate or otherwise combine with or merge into an Affiliate incorporated or organized for the purpose of changing the legal domicile of the Company or the Co-Issuer, reincorporating the Company or the Co-Issuer in another jurisdiction in compliance with clause (a)(x) of the first paragraph under this "– Consolidation, Merger and Sale of Assets" covenant or changing the legal form of the Company or the Co-Issuer.

Although there is a limited body of case law interpreting the phrase "substantially all," there is no precise established definition of the phrase under applicable law. Accordingly, in certain circumstances there may be a degree of uncertainty as to whether a particular transaction would involve "all or substantially all" of the property or assets of a Person.

The foregoing provisions would not necessarily afford Holders protection in the event of highly leveraged or other transactions involving the Company, the Co-Issuer or the Subsidiary Guarantors that may adversely affect Holders.

NO PAYMENTS FOR CONSENTS

The Issuers will not, and shall not permit any of their Subsidiaries to, directly or indirectly, pay or cause to be paid any consideration, whether by way of interest, fee or otherwise, to any Holder for or as an inducement to any consent, waiver or amendment of any of the terms or provisions of the Indenture or the Notes unless such consideration is offered to be paid and is paid to all Holders that consent, waive or agree to amend such term or provision within the time period set forth in the solicitation documents relating to such consent, waiver or amendment.

Notwithstanding the foregoing, in any offer or payment of consideration for, or as an inducement to, any consent, waiver or amendment of any of the terms or provisions of the Indenture or the Notes, the Company and any of its Restricted Subsidiaries may exclude (a) in connection with an exchange offer, holders or beneficial owners of the Notes that are not "qualified institutional buyers" as defined in Rule 144A under the Securities Act, and (b) in connection with any consent, waiver or amendment, holders or beneficial owners of the Notes in any jurisdiction where the inclusion of such holders or beneficial owners would require the Company or any of its Restricted Subsidiaries to (i) file a registration statement, prospectus or similar document or subject the Company or any of its Restricted Subsidiaries to ongoing periodic reporting or similar requirements under any securities laws (including but not limited to, the United States federal securities laws and the laws of the European Union or its member states), (ii) qualify as a foreign corporation or other entity as a dealer in securities in such jurisdiction if it is not otherwise required to so qualify, (iii) generally consent to service of process in any such jurisdiction or (iv) subject the Company or any of its Restricted Subsidiaries to taxation in any such jurisdiction if it is not otherwise so subject, or the solicitation of such consent, waiver or amendment from, or the granting of such consent or waiver, or the approval of such amendment by, holders or beneficial owners in such jurisdiction would be unlawful, in each case as determined by the Company in its sole discretion.

DEFEASANCE

Defeasance and Discharge

The Indenture will provide that the Issuers will be deemed to have paid and will be discharged from any and all obligations in respect of the Notes on the 183rd day after the deposit referred to below, and the provisions of the Indenture will no longer be in effect with respect to the Notes (except for, among other matters, certain obligations to register the transfer or exchange of the Notes, to replace stolen, lost or mutilated Notes, to maintain paying agencies and to hold monies for payment in trust) if, among other things:

(a) the Issuers have (1) deposited with the Trustee (or another entity designated by the Trustee for such purpose), in trust, money and/or U.S. Government Obligations or any combination thereof that through the payment of interest and principal in respect thereof in accordance with their terms will provide money in an amount sufficient to pay the principal of, premium, if any, and accrued interest on the Notes on the Stated Maturity of such payments in accordance with the terms of the Indenture and the Notes and (2) delivered to the Trustee an Opinion of Counsel or a certificate of an internationally recognized firm of independent auditors to the effect that the amount deposited by the Issuers is sufficient to provide payment for the principal of, premium, if any, and accrued interest on, the Notes on the Stated Maturity of such payment in accordance with the terms of the Indenture;

(b) the Issuers have delivered to the Trustee an Opinion of Counsel of recognized international standing to the effect that the creation of the defeasance trust does not violate the U.S. Investment Company Act of 1940, as amended, and after the passage of 123 days following the deposit, the trust fund will not be subject to the effect of Section 547 of the United States Bankruptcy Code or Section 15 of the New York Debtor and Creditor Law; and

(c) immediately after giving effect to such deposit on a pro forma basis, no Event of Default, or event that after the giving of notice or lapse of time or both would become an Event of Default, shall have occurred and be continuing on the date of such deposit or during the period ending on the 183rd day after the date of such deposit, and such defeasance shall not result in a breach or violation of or constitute a default under, any other agreement or instrument to which the Company or any Restricted Subsidiary is a party or by which the Company or any Restricted Subsidiary is bound.

In the case of either discharge or defeasance, each of the Subsidiary Guarantees will terminate.

Defeasance of Certain Covenants

The Indenture further will provide that the provisions of the Indenture will no longer be in effect with respect to clauses (c), (d)(1) and (f) under the first paragraph and clauses (C), (D)(1) and (E) under the second paragraph under "Consolidation, Merger and Sale of Assets" and all the covenants described herein under "– Certain Covenants," other than as described under "– Certain Covenants – Government Approvals and Licenses; Compliance with Law" and "– Certain Covenants – Anti-Layering," clause (c) under "Events of Default" with respect to such clauses (c), (d)(1) and (f) under the first paragraph and clauses (C), (D)(1) and (E) under the second paragraph under "Consolidation, Merger and Sale of Assets" and with respect to the other events set forth in such clause, clause (d) under "Events of Default" with respect to such other covenants and clauses (e) and (f) under "Events of Default" shall be deemed not to be Events of Default upon, among other things, the deposit with the Trustee (or another entity designated by the Trustee for such purpose), in trust, of money, U.S. Government Obligations or a combination thereof that through the payment of interest and principal in respect thereof in accordance with their terms will provide money in an amount sufficient to pay the principal of, premium, if any, and accrued interest on the Notes on the Stated Maturity of such payments in accordance with the terms of the Indenture and the Notes, the satisfaction of the provisions described in clause (b)(2) of the preceding paragraph.

Defeasance and Certain Other Events of Default

In the event the Issuers exercise their option to omit compliance with certain covenants and provisions of the Indenture as described in the immediately preceding paragraph and the Notes are declared due and payable because of the occurrence of an Event of Default that remains applicable, the amount of money and/or U.S. Government Obligations on deposit with the Trustee will be sufficient to pay amounts due on the Notes at the time of their Stated Maturity but may not be sufficient to pay amounts due on the Notes at the time of the acceleration resulting from such Event of Default. However, the Issuers and the Subsidiary Guarantors will remain liable for such payments.

AMENDMENTS AND WAIVERS

Amendments Without Consent of Holders

The Indenture, the Notes or the Subsidiary Guarantees may be amended, without the consent of any Holder, to:

(a) cure any ambiguity, defect, omission or inconsistency in the Indenture, the Notes or any Subsidiary Guarantee;

(b) comply with the provisions described under "Consolidation, Merger and Sale of Assets";

(c) evidence and provide for the acceptance of appointment by a successor Trustee;

(d) add any Subsidiary Guarantor or any Subsidiary Guarantee or release any Subsidiary Guarantor from any Subsidiary Guarantee as provided or permitted by the terms of the Indenture;

(e) provide for the issuance of Additional Notes in accordance with the limitations set forth in the Indenture;

(f) add collateral to secure the Notes or any Subsidiary Guarantee and create or register Liens on such collateral;

(g) in any other case where a supplemental indenture to the Indenture is required or permitted to be entered into pursuant to the provisions of the Indenture without the consent of any Holder;

(h) effect any changes to the Indenture in a manner necessary to comply with the procedures of Euroclear, Clearstream or any other applicable securities depositary or clearing system;

(i) make any other change that, in the good faith opinion of the Board of Directors, does not materially and adversely affect the rights of any Holder;

(j) conform the text of the Indenture, the Notes or the Subsidiary Guarantees to any provision of this "Description of the Notes" to the extent that such provision in this "Description of the Notes" was intended to be a verbatim recitation of a provision in the Indenture, the Notes or the Subsidiary Guarantees; or

(k) to make any other change that would provide any additional rights or benefits to the Holders.

Any such amendment or supplement provided above under this caption "Amendments and Waivers" that imposes any obligation upon the Trustee or adversely affects the rights of the Trustee in its individual capacity will become effective only with the consent of the Trustee.

Amendments With Consent of Holders

Amendments of the Indenture, the Notes or the Subsidiary Guarantees may be made by the Issuers, the Subsidiary Guarantors and the Trustee with the consent of the Holders of not less than 50% in aggregate principal amount of the outstanding Notes, and the holders of not less than 50% in principal amount of the outstanding Notes may waive future compliance by the Issuers with any provision of the Indenture, the Notes or the Subsidiary Guarantees; *provided, however*, that no such modification, amendment or waiver may, without the consent of each Holder affected thereby:

(a) change the Stated Maturity of the principal of, or any installment of interest on, any Note;

(b) reduce the principal amount of, or premium, if any, or interest on, any Note;

(c) change the currency, time or place of payment of principal of, or premium, if any, or interest on, any Note;

(d) impair the right to institute suit for the enforcement of any payment on or after the Stated Maturity (or, in the case of a redemption, on or after the redemption date) of any Note or any Subsidiary Guarantee;

(e) reduce the above stated percentage of outstanding Notes the consent of whose Holders is necessary to modify or amend the Indenture;

(f) waive a default in the payment of principal of, premium, if any, or interest on the Notes;

(g) release any Subsidiary Guarantor from its Subsidiary Guarantee, except as provided in the Indenture;

(h) reduce the percentage or aggregate principal amount of outstanding Notes the consent of whose Holders is necessary for waiver of compliance with certain provisions of the Indenture or for waiver of certain defaults;

(i) amend, change or modify any Subsidiary Guarantee in a manner that adversely affects the Holders, except as permitted by the Indenture;

(j) reduce the amount payable upon a Change of Control Offer or an Offer to Purchase with the Excess Proceeds from any Asset Sale or change the time or manner by which a Change of Control Offer or an Offer to Purchase with the Excess Proceeds from any Asset Sale may be made or by which the Notes must be repurchased pursuant to a Change of Control Offer or an Offer to Purchase with the Excess Proceeds from any Asset Sale, unless such amendment, waiver or modification shall be in effect prior to the occurrence of a Change of Control or the event giving rise to the repurchase of the Notes under "– Limitation on Asset Sales";

(k) change the redemption date or the redemption price of the Notes from that stated under "Optional Redemption" or "– Redemption for Tax Reasons";

(l) amend, change or modify the obligation of the Issuers or any Subsidiary Guarantor to pay Additional Amounts; or

(m) amend, change or modify any provision of the Indenture or the related definitions to contractually subordinate in right of payment the Notes or any Subsidiary Guarantee to any other Indebtedness of any Issuer or any Subsidiary Guarantor (for the avoidance of doubt, the Notes and the Subsidiary Guarantees will not be contractually subordinated in right of payment to any other Indebtedness of any Issuer or any Subsidiary Guarantor solely by virtue of being unsecured or by virtue of being secured on a junior priority basis).

SATISFACTION AND DISCHARGE

The Indenture will be discharged and will cease to be of further effect as to the Notes issued thereunder, when either:

(a) all Notes theretofore authenticated and delivered, except lost, stolen or destroyed Notes which have been replaced or paid and Notes for whose payment money has theretofore been deposited in trust, have been delivered to the Trustee for cancellation; or

(b) (1) all Notes not theretofore delivered to such Trustee for cancellation have become due and payable by reason of the making of a notice of redemption or otherwise, will become due and payable within one year or are to be called for redemption within one year under arrangements satisfactory to the Trustee for the giving of notice of redemption by the Trustee in the name, and at the expense, of the Issuers and the Issuers have or any Subsidiary Guarantor has irrevocably deposited or caused to be deposited with such Trustee as trust funds in trust solely for the benefit of the Holders, cash in U.S. dollars, U.S. Government Obligations, or a combination thereof, in such amounts as will be sufficient without consideration of any reinvestment of interest to pay and discharge the entire indebtedness on Notes not theretofore delivered to the Trustee for cancellation for principal, premium, if any, and accrued interest to the date of maturity or redemption;

(2) no Default or Event of Default (other than that resulting from borrowing funds to be applied to make such deposit and any similar and simultaneous deposit relating to other Indebtedness and, in each case, the granting of Liens in connection therewith) with respect to the Indenture or the Notes issued thereunder shall have occurred and be continuing on the date of such deposit or shall occur as a result of such deposit and such deposit will not result in a breach or violation of, or constitute a default under the Credit Facilities or any other material agreement or instrument (other than the Indenture or the Notes) to which any Issuer or any Subsidiary Guarantor is a party or by which any Issuer or any Subsidiary Guarantor is bound (other than that resulting from borrowing funds to be applied to make such deposit and any similar and simultaneous deposit relating to other Indebtedness and, in each case, the granting of Liens in connection therewith);

(3) the Issuers have paid or caused to be paid all sums payable by them under the Indenture; and

(4) the Issuers have delivered irrevocable instructions to the Trustee under the Indenture to apply the deposited money toward the payment of the Notes at maturity or the redemption date, as the case may be.

In addition, the Issuers must deliver an Officers' Certificate and an Opinion of Counsel to the Trustee stating that all conditions precedent to satisfaction and discharge have been satisfied.

UNCLAIMED MONEY

Claims against the Issuers or any Subsidiary Guarantor for the payment of principal of, premium, if any, or interest, on the Notes will become void unless presentation for payment is made as required in the Indenture within a period of six years.

NO PERSONAL LIABILITY OF INCORPORATORS, STOCKHOLDERS, MEMBERS, OFFICERS, DIRECTORS OR EMPLOYEES

No recourse for the payment of the principal of, premium, if any, or interest on any of the Notes or for any claim based thereon or otherwise in respect thereof, and no recourse under or upon any obligation, covenant or agreement of any Issuer or any of the Subsidiary Guarantors in the Indenture, or in any of the Notes or the Subsidiary Guarantees or because of the creation of any Indebtedness represented thereby, shall be had against any incorporator, stockholder, member, officer, director, employee or controlling person of any Issuer or any of the Subsidiary Guarantors or of any successor Person thereof. Each Holder, by accepting the Notes, waives and releases all such liability. The waiver and release are part of the consideration for the issuance of the Notes and the Subsidiary Guarantees. Such waiver may not be effective to waive liabilities under any applicable law.

CONCERNING THE TRUSTEE AND THE PAYING AGENT

The Bank of New York Mellon, London Branch is to be appointed as Trustee under the Indenture and The Bank of New York Mellon, SA/NV, Dublin Branch as registrar ("Registrar") and transfer agent ("Transfer Agent") and The Bank of New York Mellon, London Branch is to be appointed as paying agent (the "Paying Agent") with regard to the Notes. Except during the continuance of a Default, the Trustee will not be liable, except for the performance of such duties as are specifically set forth in the Indenture and no implied covenant or obligation shall be read into the Indenture and the Notes against the Trustee. If an Event of Default has occurred and is continuing, the Trustee will use the same degree of care and skill in its exercise of the rights and powers vested in it under the Indenture as a prudent person would exercise under the circumstances in the conduct of such person's own affairs.

The Trustee will be under no obligation to exercise any rights or powers conferred under the Indenture for the benefit of the Holders unless such Holders have offered to the Trustee indemnity and/or security and/or pre-funding satisfactory to the Trustee against any loss, liability or expense.

The Indenture contains limitations on the rights of the Trustee, should it become a creditor of any Issuer or any of the Subsidiary Guarantors, to obtain payment of claims in certain cases or to realize on certain property received by it in respect of any such claims, as security or otherwise.

Neither the Trustee nor the Paying Agent shall be responsible for the performance by any other person appointed by the Issuers in relation to the Notes and, unless notified in writing to the contrary, shall assume that the same are being duly performed. Neither the Trustee nor the Paying Agent shall be liable to any Holder or any other person for any action taken by the Holders, the Trustee or the Paying Agent or in accordance with the instructions of the Holders. Both the Trustee and the Paying Agent shall be entitled to rely on any written direction of the Holders which has been duly given by the Holders in accordance with the Indenture. Neither the Trustee nor the Paying Agent shall be deemed to have knowledge of any event unless it has been actually notified of such event or have actual knowledge thereof. The Trustee is entitled to rely on all instructions, notices, declarations, calculations and certifications received pursuant to the Indenture without investigating the accuracy, authenticity and validity of these instructions, notices, declarations, calculations and certifications. Pursuant to the terms of the Indenture or the Notes, the Issuers or the Subsidiary Guarantors will reimburse the Trustee for all properly incurred expenses.

The Trustee is permitted to engage in other transactions with the Issuers and its Affiliates and shall not be obligated to account for any profits therefrom and no Trustee and no director or officer of any corporation being a Trustee hereof shall by reason of the fiduciary position of such Trustee be in any way precluded from making any contracts or entering into any transactions in the ordinary course of business with the Issuers, or any person or body corporate directly or indirectly associated with the Issuers, or from accepting the trusteeship of any other debenture stock, debentures or securities of the Issuers or any person or body corporate directly or indirectly associated with the Issuers, and neither the Trustee nor any such director or officer shall be accountable to the Holders, the Issuers, or any person or body corporate directly or indirectly associated with the Issuers, for any profit, fees, commissions, interest, discounts or share of brokerage earned, arising or resulting from any such contracts or transactions and the Trustee and any such director or officer shall also be at liberty to retain the same for its or his own benefit.

BOOK-ENTRY; DELIVERY AND FORM

The Notes will be represented by one or more global notes in registered form without interest coupons attached (the "Global Note"). On the Original Issue Date, the Global Note will be deposited with a common depositary and registered in the name of the common depositary or its nominee for the accounts of Euroclear and Clearstream.

Global Note

Ownership of beneficial interests in the Global Note (the "book-entry interests") will be limited to persons that have accounts with Euroclear and/or Clearstream or persons that may hold interests through such participants. Book-entry interests will be shown on, and transfers thereof will be effected only through, records maintained in book-entry form by Euroclear and Clearstream and their participants.

Except as set forth below under "– Individual Definitive Notes," the book-entry interests will not be held in definitive form. Instead, Euroclear and/or Clearstream will credit on their respective book-entry registration and transfer systems a participant's account with the interest beneficially owned by such participant. The laws of some jurisdictions may require that certain purchasers of securities take physical delivery of such securities in definitive form. The foregoing limitations may impair the ability to own, transfer or pledge book-entry interests.

So long as the Notes are held in global form, the common depositary for Euroclear and/or Clearstream (or its nominee) will be considered the sole holder of the Global Note for all purposes under the Indenture and "holders" of book-entry interests will not be considered the owners or "Holders" of Notes for any purpose. As such, participants must rely on the procedures of Euroclear and Clearstream and indirect participants must rely on the procedures of the participants through which they own book-entry interests in order to transfer their interests in the Notes or to exercise any rights of Holders under the Indenture.

None of the Issuers, the Subsidiary Guarantors, the Trustee, the Agents or any of their respective agents will have any responsibility or be liable for any aspect of the records relating to the book-entry interests. The Notes are not issuable in bearer form.

Payments on the Global Note

Payments of any amounts owing in respect of the Global Note (including principal, premium, interest and Additional Amounts) will be made to the Paying Agent in U.S. dollars by wire transfer. The Paying Agent will, in turn, make such payments to the common depositary for Euroclear and Clearstream, which will distribute such payments to participants in accordance with the procedures of Euroclear and Clearstream, respectively. The Issuers will make payments of all such amounts without deduction or withholding for, or on account of, any present or future taxes, duties, assessments or governmental charges of whatever nature, except as may be required by law and as described under "– Additional Amounts."

Under the terms of the Indenture, the Issuers, the Trustee and the Agents will treat the registered holder of the Global Note (i.e., the common depositary or its nominee) as the owner thereof for the purpose of receiving payments and for all other purposes. Consequently, none of the Issuers, the Subsidiary Guarantors, the Trustee, the Agents or any of their respective agents has or will have any responsibility or liability for:

- any aspect of the records of Euroclear, Clearstream or any participant or indirect participant relating to or payments made on account of a book-entry interest, for any such payments made by Euroclear, Clearstream or any participant or indirect participants, or for maintaining, supervising or reviewing any of the records of Euroclear, Clearstream or any participant or indirect participant relating to or payments made on account of a book-entry interest; or

- any action or failure to take any action by Euroclear, Clearstream or any participant or indirect participant.

Payments by participants to owners of book-entry interests held through participants are the responsibility of such participants.

Redemption of Global Note

In the event any Global Note, or any portion thereof, is redeemed, the common depositary will distribute the amount received by it in respect of the Global Note so redeemed to Euroclear and/or Clearstream, as applicable, who will distribute such amount to the holders of the book-entry interests in such Global Note. The redemption price payable in connection with the redemption of such book-entry interests will be equal to the amount received by the common depositary, Euroclear or Clearstream, as applicable, in connection with the redemption of such Global Note (or any portion thereof). The Issuers understand that under existing practices of Euroclear and Clearstream, if fewer than all of the Notes are to be redeemed at any time, Euroclear and Clearstream will credit their respective participants' accounts on a proportionate basis (with adjustments to prevent fractions) or by lot or on such other basis as they deem fair and appropriate; *provided*, *however*, that no book-entry interest of US$125,000 principal amount, or less, as the case may be, will be redeemed in part.

Action by Owners of Book-Entry Interests

Euroclear and Clearstream have advised that they will take any action permitted to be taken by a Holder of Notes only at the direction of one or more participants to whose account the book-entry interests in the Global Note are credited and only in respect of such portion of the aggregate principal amount of Notes as to which such participant or participants has or have given such direction. Euroclear and Clearstream will not exercise any discretion in the granting of consents, waivers or the taking of any other action in respect of the Global Note.

Transfers

Transfers between participants in Euroclear and Clearstream will be effected in accordance with Euroclear and Clearstream's rules and will be settled in immediately available funds. If a Holder requires physical delivery of individual definitive notes for any reason, including to sell the Notes to persons in jurisdictions which require physical delivery of such securities or to pledge such securities, such Holder must transfer its interest in the Global Note in accordance with the normal procedures of Euroclear and Clearstream and in accordance with the provisions of the Indenture.

Book-entry interests in the Global Note will be subject to the restrictions on transfer discussed under "Transfer Restrictions."

Any book-entry interest in a Global Note that is transferred to a person who takes delivery in the form of a book-entry interest in another Global Note will, upon transfer, cease to be a book-entry interest in the first-mentioned Global Note and become a book-entry interest in the other Global Note and, accordingly, will thereafter be subject to all transfer restrictions, if any, and other procedures applicable to book-entry interests in such other Global Note for as long as it retains such a book-entry interest.

Global Clearance and Settlement Under the Book-Entry System

Book-entry interests owned through Euroclear or Clearstream accounts will follow the settlement procedures applicable. Book-entry interests will be credited to the securities custody accounts of Euroclear and Clearstream holders on the business day following the settlement date against payment for value on the settlement date.

The book-entry interests will trade through participants of Euroclear or Clearstream, and will settle in same-day funds. Since the purchaser determines the place of delivery, it is important to establish at the time of trading of any book-entry interests where both the purchaser's and seller's accounts are located to ensure that settlement can be made on the desired value date.

Information Concerning Euroclear and Clearstream

The Issuers understand as follows with respect to Euroclear and Clearstream:

Euroclear and Clearstream hold securities for participating organizations and facilitate the clearance and settlement of securities transactions between their respective participants through electronic book-entry changes in accounts of such participants. Euroclear and Clearstream provide to their participants, among other things, services for safekeeping, administration, clearance and settlement of internationally traded securities and securities lending and borrowing. Euroclear and Clearstream interface with domestic securities markets. Euroclear and Clearstream participants are financial institutions, such as underwriters, securities brokers and dealers, banks and trust companies, and certain other organizations. Indirect access to Euroclear or Clearstream is also available to others such as banks, brokers, dealers and trust companies that clear through or maintain a custodian relationship with a Euroclear or Clearstream participant, either directly or indirectly.

Although the foregoing sets out the procedures of Euroclear and Clearstream in order to facilitate the original issue and subsequent transfers of interests in the Notes among participants of Euroclear and Clearstream, neither Euroclear nor Clearstream is under any obligation to perform or continue to perform such procedures, and such procedures may be discontinued at any time.

None of the Issuers, the Subsidiary Guarantors, the Trustee, the Agents or any of their respective agents will have responsibility for the performance of Euroclear or Clearstream or their respective participants of their respective obligations under the rules and procedures governing their operations, including, without limitation, rules and procedures relating to book-entry interests.

Individual Definitive Notes

If (1) the common depositary or any successor to the common depositary is at any time unwilling or unable to continue as a depositary for the reasons described in the Indenture and a successor depositary is not appointed within 90 days, (2) either Euroclear or Clearstream, or a successor clearing system is closed for business for a continuous period of 14 days (other than by reason of holidays, statutory or otherwise) or announces an intention to permanently cease business or does in fact do so, or (3) any of the Notes has become immediately due and payable in accordance with "– Events of Default" and the Issuers have received a written request from a Holder, the Issuers will issue individual definitive notes in registered form in exchange for the Global Note. Upon receipt of such notice from the common depositary or the Trustee, as the case may be, the Issuers will use their best efforts to make arrangements with the common depositary for the exchange of interests in the Global Note for individual definitive notes and cause the requested individual definitive notes to be executed and delivered to the Registrar in sufficient quantities and authenticated by or on behalf of the Registrar for delivery to Holders. Persons exchanging interests in a Global Note for individual definitive notes will be required to provide the Registrar, through the relevant clearing system, with written instruction and other information required by the Issuers and the Registrar to complete, execute and deliver such individual definitive notes. In all cases, individual definitive notes delivered in exchange for any Global Note or beneficial interests therein will be registered in the names, and issued in any approved denominations, requested by the relevant clearing system.

Individual definitive notes will not be eligible for clearing and settlement through Euroclear or Clearstream.

NOTICES

All notices or demands required or permitted by the terms of the Notes or the Indenture to be given to or by the Holders are required to be in writing and may be given or served by being sent by prepaid courier or by being deposited, first-class postage prepaid (if intended for the Issuers or any Subsidiary Guarantor) addressed to the Issuers or such Subsidiary Guarantor at the registered office of Issuers; or (if intended for the Trustee) addressed to the Trustee at the corporate trust office of the Trustee; and (if intended for any Holder) addressed to such Holder at such Holder's last address as it appears in the Note register.

Any such notice or demand will be deemed to have been sufficiently given or served when so sent or deposited and, if to the Holders, when delivered in accordance with the applicable rules and procedures of Euroclear or Clearstream, as the case may be. Any such notice will be deemed to have been delivered on the day such notice is delivered to Euroclear or Clearstream, as the case may be, or if by mail, when so sent or deposited.

CONSENT TO JURISDICTION; SERVICE OF PROCESS

Each of the Issuers and the Subsidiary Guarantors will irrevocably (i) submit to the non-exclusive jurisdiction of any U.S. federal or New York state court located in the Borough of Manhattan, The City of New York in connection with any suit, action or proceeding arising out of, or relating to, the Notes, any Subsidiary Guarantee, the Indenture or any transaction contemplated thereby and (ii) designate and appoint Law Debenture Corporate Services Inc., currently at 400 Madison Avenue, Suite 4D, 4th Floor, New York, NY 10017, for receipt of service of process in any such suit, action or proceeding.

GOVERNING LAW

Each of the Notes, the Subsidiary Guarantees and the Indenture provides that such instrument will be governed by, and construed in accordance with, the laws of the State of New York.

DEFINITIONS

Set forth below are defined terms used in the covenants and other provisions of the Indenture. Reference is made to the Indenture for other capitalized terms used in this "Description of the Notes" for which no definition is provided.

"*Acquired Indebtedness*" means Indebtedness of a Person existing at the time such Person becomes a Restricted Subsidiary or Indebtedness of a Restricted Subsidiary assumed in connection with an Asset Acquisition by such Restricted Subsidiary, whether or not Incurred in connection with, or in contemplation of, the Person merging with or into or becoming a Restricted Subsidiary.

"*Adjusted Treasury Rate*" means, with respect to any redemption date, (i) the yield, under the heading which represents the average for the immediately preceding week, appearing in the most recently published statistical release designated "H.15(519)" or any successor publication which is published weekly by the Board of Governors of the Federal Reserve System and which establishes yields on actively traded United States Treasury securities adjusted to constant maturity under "Treasury Constant Maturities," for the maturity corresponding to the Comparable Treasury Issue (if no maturity is within three (3) months before or after September 13, 2025, yields for the two published maturities most closely corresponding to the Comparable Treasury Issue shall be determined and the Adjusted Treasury Rate shall be interpolated or extrapolated from such yields on a straight line basis, rounding to the nearest month) or (ii) if such release (or any successor release) is not published during the week preceding the calculation date or does not contain such yields, the rate per year equal to the semi-annual equivalent yield to maturity of the Comparable Treasury Issue, assuming a price for the Comparable Treasury Issue (expressed as a percentage of its principal amount) equal to the Comparable Treasury Price for such redemption date, in each case calculated on the third Business Day immediately preceding the redemption date.

"*Affiliate*" means, with respect to any Person, any other Person (i) directly or indirectly controlling, controlled by, or under direct or indirect common control with, such Person, (ii) who is a director or officer of such Person or any Subsidiary of such Person or of any Person referred to in clause (i) of this definition or (iii) who is a spouse or any person cohabiting as a spouse, child or step-child, parent or step-parent, brother, sister, step-brother or step-sister, parent-in-law, grandchild, grandparent, uncle, aunt, nephew and niece of a Person described in clause (i) or (ii). For purposes of this definition, "control" (including, with correlative meanings, the terms "controlling," "controlled by" and "under common control with"), as applied to any Person, means the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of such Person, whether through the ownership of voting securities, by contract or otherwise.

"*Agent*" means any Registrar, Paying Agent and Transfer Agent.

"*Applicable Premium*" means with respect to a Note at any redemption date, the greater of (i) 1.00% of the principal amount of such Note and (ii) the excess of (A) the present value at such redemption date of the redemption price of such Note on September 13, 2025 (such redemption price being described in the first paragraph in the "– Optional Redemption" section exclusive of any accrued interest), plus all required remaining scheduled interest payments due on such Note through September 13, 2025 (but excluding accrued and unpaid interest to the redemption date), computed using a discount rate equal to the Adjusted Treasury Rate plus 50 basis points, over (B) the principal amount of such Note on such redemption date.

"*Asset Acquisition*" means (1) an Investment by the Company or any Restricted Subsidiary in any other Person pursuant to which such Person shall become a Restricted Subsidiary or shall be merged into or consolidated with the Company or any Restricted Subsidiary or (2) an acquisition by the Company or any Restricted Subsidiary of the property and assets of any Person other than the Company or any Restricted Subsidiary that constitute substantially all of a division or line of business of such Person.

"*Asset Disposition*" means the sale or other disposition by the Company or any Restricted Subsidiary (other than to the Company or another Restricted Subsidiary) of (1) all or substantially all of the Capital Stock of any Restricted Subsidiary or (2) all or substantially all of the assets that constitute a division or line of business of the Company or any Restricted Subsidiary.

"*Asset Sale*" means any sale, transfer or other disposition of any assets (including by way of merger, consolidation or Sale and Leaseback Transaction and including any sale or issuance of Capital Stock by a Restricted Subsidiary) in one transaction or a series of related transactions by the Company or any Restricted Subsidiary to any Person; *provided* that "Asset Sale" shall not include:

(a) sales, transfers or other dispositions of inventory, receivables and other current assets in the ordinary course of business;

(b) sales, transfers or other dispositions of assets constituting a Permitted Investment or Restricted Payment permitted to be made under the covenant described under the caption "– Certain Covenants – Limitation on Restricted Payments";

(c) sales, transfers or other dispositions of assets with a Fair Market Value not in excess of US$5.0 million (or the Dollar Equivalent thereof) in any transaction or series of related transactions;

(d) any sale, transfer, assignment or other disposition of any property or equipment that has become damaged, worn out, obsolete or otherwise unsuitable for use in connection with the business of the Company or its Restricted Subsidiaries;

(e) any transfer, assignment or other disposition deemed to occur in connection with creating or granting any Permitted Lien;

(f) sales or other dispositions of cash or Temporary Cash Investments;

(g) any transfer, termination, unwinding or other disposition of Hedging Obligations;

(h) a transaction covered by the covenant under the caption "– Consolidation, Merger and Sale of Assets";

(i) any sale, transfer or other disposition of any assets by the Company or any Restricted Subsidiary, including the sale or issuance by the Company or any Restricted Subsidiary of any Capital Stock of any Restricted Subsidiary, to the Company or any other Restricted Subsidiary;

(j) transfers resulting from any casualty or condemnation of property;

(k) disposition of Investment in joint ventures to the extent required by or made pursuant to buy/sell arrangements between the joint venture parties; provided that any cash, Temporary Cash Investment or other consideration received must be applied in compliance with the covenant described under the caption "– Limitation on Asset Sales";

(l) any surrender or waiver of contract rights or settlement, release, recovery on or surrender of contract, tort or other claims in the ordinary course of business; and

(m) any sale, transfer or other disposition of any assets, including Capital Stock, of any Unrestricted Subsidiary or any member of the EM Group to another Person, *provided* that any Net Cash Proceeds from any such sale, transfer or other disposition shall be applied in accordance with the covenant described under the caption "– Limitation on Asset Sales."

"*Attributable Indebtedness*" means, in respect of a Sale and Leaseback Transaction, at the time of determination, the present value, discounted at the interest rate implicit in such Sale and Leaseback Transaction, of the total obligations of the lessee for rental payments during the remaining term of the lease in such Sale and Leaseback Transaction, including any period for which such lease has been extended or may, at the option of the lessor, be extended; *provided*, however, that if such Sale and Leaseback Transaction results in Capitalized Lease Obligations, the amount of Indebtedness represented thereby will be determined in accordance with the definition of "Capitalized Lease Obligations."

"*Average Life*" means, at any date of determination with respect to any Indebtedness, the quotient obtained by dividing (1) the sum of the products of (a) the number of years from such date of determination to the dates of each successive scheduled principal payment of such Indebtedness and (b) the amount of such principal payment by (2) the sum of all such principal payments.

"*Board of Directors*" means the board of directors elected or appointed by the stockholders of the Company to manage the business of the Company or any committee of such board duly authorized to take the action purported to be taken by such committee.

"*Board Resolution*" means any resolution of the Board of Directors taking an action which it is authorized to take and adopted at a meeting duly called and held at which a quorum of disinterested members (if so required) was present and acting throughout or adopted by written resolution executed by the requisite members of the Board of Directors.

"*Business Day*" means any day which is not a Saturday, Sunday, legal holiday or other day on which banking institutions in The City of New York, London or Hong Kong (or in any other place in which payments on the Notes are to be made) are authorized by law or governmental regulation to close.

"*Capital Stock*" means, with respect to any Person, any and all shares, interests, participations or other equivalents (however designated, whether voting or non-voting) in equity of such Person, whether outstanding on the Original Issue Date or issued thereafter, including, without limitation, all Common Stock and Preferred Stock, but excluding debt securities convertible into such equity.

"*Capitalized Lease*" means, with respect to any Person, any finance lease of any property (whether real, personal or mixed) which, in conformity with IFRS, is required to be capitalized on the statement of financial position of such Person.

"*Capitalized Lease Obligations*" means the present value of minimum lease payments under a Capitalized Lease measured in conformity with IFRS.

"*Change of Control*" means the occurrence of one or more of the following events:

(1) the direct or indirect sale, transfer, conveyance or other disposition (other than by way of merger or consolidation), in one or a series of related transactions, of all or substantially all of the properties or assets of the Company and its Restricted Subsidiaries, taken as a whole, to any "person" (within the meaning of Section 13(d) of the U.S. Securities Exchange Act of 1934, as amended (the "Exchange Act")), other than one or more Permitted Holders;

(2) the Company consolidates with, or merges with or into, any Person (other than one or more Permitted Holders), or any Person consolidates with, or merges with or into, the Company, in any such event pursuant to a transaction in which any of the outstanding Voting Stock of the Company or such other Person is converted into or exchanged for cash, securities or other property, other than any such transaction where the Voting Stock of the Company outstanding immediately prior to such transaction is converted into or exchanged for (or continues as) Voting Stock (other than Disqualified Stock) of the surviving or transferee Person constituting a majority of the outstanding shares of Voting Stock of such surviving or transferee Person (immediately after giving effect to such issuance);

(3) any Person other than the Permitted Holders becomes the beneficial owner of 30% or more of the total voting power of the Voting Stock of the Company;

(4) individuals who on the Original Issue Date constituted the Board of Directors (together with any new directors whose nomination or election was approved by a vote of at least a majority of the members of the Board of Directors then in office who were members of the Board of Directors on the Original Issue Date or whose nomination or election was previously so approved) cease for any reason to constitute a majority of the members of the Board of Directors then in office; or

(5) the adoption of a plan relating to the liquidation or dissolution of the Company or the Co-Issuer.

"*Change of Control Triggering Event*" means the occurrence of both a Change of Control and Rating Decline.

"*Clearstream*" means Clearstream Banking S.A.

"*Commodity Agreement*" means any spot, forward contract, commodity swap agreement, commodity option agreement, commodity price protection or other similar agreement or arrangement designed to protect against fluctuations in commodity prices.

"*Common Stock*" means, with respect to any Person, any and all shares, interests or other participations in, and other equivalents (however designated and whether voting or non-voting) of such Person's common stock or ordinary shares, whether or not outstanding on the Original Issue Date, and include, without limitation, all series and classes of such common stock or ordinary shares.

"*Comparable Treasury Issue*" means the U.S. Treasury security having a maturity comparable to September 13, 2025 that would be utilized, at the time of selection and in accordance with customary financial practice, in pricing new issues of corporate debt securities of comparable maturity to September 13, 2025.

"*Comparable Treasury Price*" means, with respect to any redemption date, if clause (ii) of the Adjusted Treasury Rate is applicable, the average of three, or such lesser number as is obtained by the Issuers, Reference Treasury Dealer Quotations for such redemption date.

"*Consolidated EBITDA*" means, for any period, Consolidated Net Income for such period plus, to the extent such amount was deducted in calculating such Consolidated Net Income:

(1) Consolidated Interest Expense;

(2) income taxes (other than income taxes attributable to extraordinary and non-recurring gains or losses or sales of assets); and

(3) depreciation expense, amortization expense and all other non-cash items reducing Consolidated Net Income (other than non-cash items in a period which reflect cash expenses paid or to be paid in another period), less all non-cash items increasing Consolidated Net Income (other than accrual of revenues in the ordinary course of business),

all as determined on a consolidated basis for the Company and its Restricted Subsidiaries in conformity with IFRS; *provided* that if any Restricted Subsidiary is not a Wholly Owned Restricted Subsidiary, Consolidated EBITDA shall be reduced (to the extent not otherwise reduced in accordance with IFRS) by an amount equal to (A) the amount of the Consolidated Net Income attributable to such Restricted Subsidiary multiplied by (B) the percentage ownership interest in the income of such Restricted Subsidiary not owned on the last day of such period by the Company or any Restricted Subsidiary.

"*Consolidated Interest Expense*" means, for any period, the amount that would be included in gross finance costs/interest expense on a consolidated statement of comprehensive income prepared in accordance with IFRS for such period of the Company and its Restricted Subsidiaries, plus, to the extent not included in such gross interest expense, and to the extent incurred, accrued or payable during such period by the Company and its Restricted Subsidiaries, without duplication, (i) interest expense attributable to Capitalized Lease Obligations and imputed interest with respect to Attributable Indebtedness, (ii) amortization of debt issuance costs and original issue discount expense and non-cash interest payments in respect of any Indebtedness, (iii) the interest portion of any deferred payment obligation, (iv) all commissions, discounts and other fees and charges with respect to letters of credit or similar instruments issued for financing purposes or in respect of any Indebtedness, (v) the net costs associated with Hedging Obligations (including the amortization of fees), (vi) interest accruing on Indebtedness of any other Person that is guaranteed by the Company or any Restricted Subsidiary proportionate to the extent that such Indebtedness is guaranteed or secured by a Lien on assets of the Company or any Restricted Subsidiary, (vii) any capitalized interest and (viii) all other non-cash interest expense; *provided* that interest expense attributable to interest on any Indebtedness bearing a floating interest rate will be computed on a pro forma basis as if the rate in effect on the date of determination had been the applicable rate for the entire relevant period; and *provided further* that, for the avoidance of doubt, distributions incurred, accrued or payments on any perpetual securities that would not be included in gross finance costs/interest expense on a consolidated statement of comprehensive income prepared in accordance with IFRS of the Company and its Restricted Subsidiaries, including but not limited to the Existing Perpetual Securities, shall not be included in the calculation of Consolidated Interest Expense.

"*Consolidated Net Income*" means, with respect to any specified Person for any period, the aggregate of the consolidated profit attributable to the equity shareholders of such Person for such period, on a consolidated basis, determined in conformity with IFRS; *provided* that the following items shall be excluded in computing Consolidated Net Income (without duplication):

(1) the net income (or loss) of any Person that is not a Restricted Subsidiary or that is accounted for by the equity method of accounting, except to the extent of the amount of net income actually paid in cash to, or the amount of loss actually funded in cash by, the specified Person or a Restricted Subsidiary of the Person during such period;

(2) the net income (or loss) of any Person accrued prior to the date it becomes a Restricted Subsidiary or is merged into or consolidated with the Company or any Restricted Subsidiary or all or substantially all of the property and assets of such Person are acquired by the Company or any Restricted Subsidiary;

(3) the net income (but not loss) of any Restricted Subsidiary (other than the Co-Issuer or a Subsidiary Guarantor) to the extent that the declaration or payment of dividends or similar distributions by such Restricted Subsidiary of such net income is not at the time permitted by the operation of the terms of its charter, articles of association or other similar constitutive documents, or any agreement, instrument, judgment, decree, order, statute, rule or governmental regulation applicable to such Restricted Subsidiary;

(4) the cumulative effect of a change in accounting principles;

(5) any net after-tax gains realized on the sale or other disposition of (A) any property or assets of the Company or any Restricted Subsidiary which is not sold in the ordinary course of business or (B) any Capital Stock of any Person (including any gains by the Company realized on sales of Capital Stock of the Company or any Restricted Subsidiary);

(6) any non-cash expense, loss, income or gain relating to any change in fair value of convertible securities issued by the Company;

(7) any non-cash expense, loss, income or gain relating to any change in fair value of share options and other equity based compensation;

(8) any translation gains or losses due solely to fluctuations in currency values and related tax effects; and

(9) any net after-tax extraordinary or non-recurring gains or (solely for the purposes of calculating Consolidated EBITDA) losses.

"*Credit Facilities*" means one or more debt facilities or commercial paper facilities or indentures or trust deeds or note purchase agreements or Capitalized Lease Obligations, in each case, with banks or other institutional lenders or investors providing for revolving credit loans, term loans, receivables financing (including through the sale of receivables to such lenders or to other entities formed to borrow from such lenders against such receivables), letters of credit, bonds, notes, debentures or other corporate debt instruments or other financing, in each case, as amended, extended, restated, modified, supplemented, renewed, refunded, replaced or refinanced (whether upon or after termination or otherwise) (including by means of sales of debt securities to institutional investors) in whole or in part from time to time by one or more credit agreements, debt facilities or other agreement without limitation as to the identity of the lenders or investors, or the maturity, terms, conditions, covenants or other provisions thereof.

"*Currency Agreement*" means any foreign exchange forward contract, currency swap agreement, currency hedge agreement, currency option agreement or other similar agreement or arrangement designed to protect against fluctuations in foreign exchange rates.

"*Default*" means any event that is, or after notice or passage of time or both would be, an Event of Default.

"*Disqualified Stock*" means any class or series of Capital Stock of any Person that by its terms or otherwise is (1) required to be redeemed prior to the Stated Maturity of the Notes, (2) redeemable at the option of the holder of such class or series of Capital Stock at any time prior to the Stated Maturity of the Notes or (3) convertible into or exchangeable for Capital Stock referred to in clause (1) or (2) above or Indebtedness having a scheduled maturity prior to the Stated Maturity of the Notes; *provided* that any Capital Stock that would not constitute Disqualified Stock but for provisions thereof giving holders thereof the right to require such Person to repurchase or redeem such Capital Stock upon the occurrence of an "asset sale" or "change of control" occurring prior to the Stated Maturity of the Notes shall not constitute Disqualified Stock if (a) the "asset sale" or "change of control" provisions applicable to such Capital Stock are no more favorable to the holders of such Capital Stock than the provisions contained in "– Certain Covenants – Limitation on Asset Sales" and "Repurchase of Notes upon a Change of Control Triggering Event" covenants and such Capital Stock specifically provides that such Person will not repurchase or redeem any such stock pursuant to such provision prior to the Issuers' repurchase of the Notes as are required to be repurchased pursuant to the "– Certain Covenants – Limitation on Asset Sales" and "Repurchase of Notes upon a Change of Control Triggering Event" covenants or (b) if the terms of such Capital Stock provide that such Person may not repurchase or redeem such Capital Stock pursuant to such provision unless such repurchase or redemption complies with the covenant described under "– Certain Covenants – Limitation on Restricted Payments."

"*Dollar Equivalent*" means, with respect to any monetary amount in a currency other than U.S. dollars, at any time for the determination thereof, the amount of U.S. dollars obtained by converting such foreign currency involved in such computation into U.S. dollars at the base rate for the purchase of U.S. dollars with the applicable foreign currency as quoted by the Federal Reserve Bank of New York on the date of determination.

"*EM Group*" means EM LLC, Singapore EM HoldCo or any other entity formed to hold the investment by the Company in EM LLC and their respective successors and subsidiaries.

"*EM LLC*" means Erdene Mongol LLC, a limited liability company incorporated in Mongolia, which is expected to become a Subsidiary of the Company upon consummation of the EM Transaction.

"*EM Transaction*" means the investment by the Company in EM LLC with details of such investment disclosed in the EM Transaction Announcement.

"*EM Transaction Announcement*" means an announcement dated January 11, 2023 filed by the Company with The Stock Exchange of Hong Kong Limited.

"*Equity Offering*" means (i) any underwritten primary public offering or private placement of Common Stock of the Company after the Original Issue Date to any Person other than a Wholly Owned Restricted Subsidiary or any Permitted Holder or (ii) any secondary public offering or secondary private placement of Common Stock of the Company beneficially owned by a Permitted Holder after the Original Issue Date, the net proceeds therefrom are contributed to the common equity capital of the Company; *provided* that the aggregate gross cash proceeds received by the Company from such transaction shall be no less than US$20.0 million (or the Dollar Equivalent thereof).

"*Euroclear*" means Euroclear Bank S.A./N.V., as operator of the Euroclear System.

"*Existing Perpetual Securities*" means the subordinated perpetual securities issued by the Company pursuant to an indenture dated May 4, 2017 and entered into between, among others, the Company and The Bank of New York Mellon as trustee and any refinancings thereof.

"*Fair Market Value*" means the price that would be paid in an arm's-length transaction between an informed and willing seller under no compulsion to sell and an informed and willing buyer under no compulsion to buy, as determined in good faith by the Board of Directors, whose determination shall be conclusive if evidenced by a Board Resolution.

"*Finance Subsidiary*" means any Person who is Wholly Owned by the Company and who does not engage in any business activity except (1) the Incurrence of Indebtedness to Persons other than the Company or any Restricted Subsidiary from time to time to finance the operations of the Company and/or any Restricted Subsidiary, (2) the ownership of shares of another Finance Subsidiary, (3) activity related to the establishment or maintenance of that Person's corporate existence, and (4) any other activity in connection with or incidental to activities referred to in clauses (1), (2) or (3).

"*Fitch*" means Fitch Ratings Ltd. or any successor to the rating agency business thereof.

"*Guarantee*" means any obligation, contingent or otherwise, of any Person directly or indirectly guaranteeing any Indebtedness or other obligation of any other Person and, without limiting the generality of the foregoing, any obligation, direct or indirect, contingent or otherwise, of such Person (1) to purchase or pay (or advance or supply funds for the purchase or payment of) such Indebtedness or other obligation of such other Person (whether arising by virtue of partnership arrangements, or by agreements to keep-well, to purchase assets, goods, securities or services, to take-or-pay, or to maintain financial statement conditions or otherwise) or (2) entered into for purposes of assuring in any other manner the obligee of such Indebtedness or other obligation of the payment thereof or to protect such obligee against loss in respect thereof (in whole or in part); *provided* that the term "guarantee" shall not include endorsements for collection or deposit in the ordinary course of business. The term "guarantee" used as a verb has a corresponding meaning.

"*Hedging Obligation*" of any Person means the obligations of such Person pursuant to any Commodity Agreement, Currency Agreement or Interest Rate Agreement.

"*Holder*" means the Person in whose name a Note is registered in the Note register.

"*IFRS*" means International Financial Reporting Standards as in effect from time to time. All computations contained or referred to in the Indenture, to the extent applicable, shall be computed in conformity with IFRS applied on a consistent basis.

"*Incur*" means, with respect to any Indebtedness or Capital Stock, to incur, create, issue, assume, guarantee or otherwise become liable for or with respect to, or become responsible for, the payment of, contingently or otherwise, such Indebtedness or Capital Stock; *provided* that (1) any Indebtedness and Capital Stock of a Person existing at the time such Person becomes a Restricted Subsidiary (or fails to meet the qualifications necessary to remain an Unrestricted Subsidiary) will be deemed to be Incurred by such Restricted Subsidiary at the time it becomes a Restricted Subsidiary and (2) the accretion of original issue discount, the accrual of interest, the accrual of dividends, the payment of interest in the form of additional Indebtedness and the payment of dividends on Preferred Stock in the form of additional shares of Preferred Stock (to the extent provided for when the Indebtedness or Preferred Stock on which such interest or dividend is paid was originally issued) shall not be considered an Incurrence of Indebtedness. The terms "Incurrence," "Incurred" and "Incurring" have meanings correlative with the foregoing.

"*Indebtedness*" means, with respect to any Person at any date of determination (without duplication):

(1) all indebtedness of such Person for borrowed money;

(2) all obligations of such Person evidenced by bonds, debentures, notes or other similar instruments;

(3) all obligations of such Person in respect of letters of credit, bankers' acceptances or other similar instruments;

(4) all obligations of such Person to pay the deferred and unpaid purchase price of property or services, except Trade Payables;

(5) all Capitalized Lease Obligations and Attributable Indebtedness;

(6) all Indebtedness of other Persons secured by a Lien on any asset of such Person, whether or not such Indebtedness is assumed by such Person; *provided* that the amount of such Indebtedness shall be the lesser of (A) the Fair Market Value of such asset at such date of determination and (B) the amount of such Indebtedness;

(7) all Indebtedness of other Persons guaranteed by such Person to the extent such Indebtedness is guaranteed by such Person;

(8) to the extent not otherwise included in this definition, Hedging Obligations;

(9) all Disqualified Stock issued by such Person valued at the greater of its voluntary or involuntary liquidation preference and its maximum fixed repurchase price plus accrued dividends (to the extent not included therein); and

(10) any Preferred Stock issued by (i) such Person, if such Person is a Restricted Subsidiary or (ii) any Restricted Subsidiary of such Person, valued at the greater of its voluntary or involuntary liquidation preference and its maximum fixed repurchase price plus (to the extent not included therein) accrued dividends.

Notwithstanding the foregoing, "Indebtedness" will not include (i) any capital commitments, pre-sale receipts, deposits or advances from customers or any contingent obligations to refund payments (including deposits) to customers (or any guarantee thereof) in connection with mandatory obligations under or pending completion of a customer contract, or (ii) obligations of the Company or a Restricted Subsidiary to pay the deferred and unpaid purchase price of property or services due to suppliers of equipment or other assets (including parts thereof) not more than one year after such property is acquired or such services are completed and the amount of unpaid purchase price retained by the Company or any Restricted Subsidiary in the ordinary course of business in connection with an acquisition of equipment or other assets (including parts thereof) pending full operation or contingent on certain conditions during a warranty period of such equipment or assets in accordance with the terms of the acquisition; *provided* that, in each case, such Indebtedness is not reflected as borrowings on the consolidated statement of

financial position of the Company (contingent obligations and commitments referred to in a footnote to financial statements and not otherwise reflected as borrowings on the statement of financial position will not be deemed to be reflected on such statement of financial position). For the avoidance of doubt, "Indebtedness" will include the Existing Perpetual Securities.

Notwithstanding the foregoing, in connection with the purchase by the Company or any Restricted Subsidiary of any asset or property to be used in the ordinary course of business by the Company or any Restricted Subsidiary in the Permitted Business (including any such purchase through the acquisition of Capital Stock of any Person that owns such asset or property, which will, upon such acquisition, become a Restricted Subsidiary), the term "Indebtedness" will not include post-closing payment obligations of the Company or such Restricted Subsidiary to which the seller may become entitled to the extent the amount of such payment is determined by a final closing statement of financial position, final reserve assessment or a similar report or document or such payment depends on the performance of such asset or property after the closing; *provided*, *however*, that, at the time of closing, the amount of any such payment obligation is not determinable and, to the extent such payment thereafter becomes fixed and determined, the amount is paid within 360 days thereafter.

The amount of Indebtedness of any Person at any time shall be the outstanding balance at such time of all unconditional obligations as described above and, with respect to contingent obligations, the maximum liability upon the occurrence of the contingency giving rise to the obligation; *provided* that:

(A) the amount outstanding at any time of any Indebtedness issued with original issue discount is the face amount of such Indebtedness less the remaining unamortized portion of the original issue discount of such Indebtedness at such time as determined in conformity with IFRS;

(B) money borrowed and set aside at the time of the Incurrence of any Indebtedness in order to prefund the payment of the interest on such Indebtedness shall not be deemed to be "Indebtedness" so long as such money is held to secure the payment of such interest; and

(C) that the amount of or the principal amount of Indebtedness with respect to any Hedging Obligation shall be equal to the net amount payable if such Hedging Obligation terminated at or prior to that time due to a default by such Person.

"*Interest Rate Agreement*" means any interest rate protection agreement, interest rate future agreement, interest rate option agreement, interest rate swap agreement, interest rate cap agreement, interest rate collar agreement, interest rate hedge agreement, option or future contract or other similar agreement or arrangement designed to protect against fluctuations in interest rates.

"*Investment*" means:

(i) any direct or indirect advance, loan or other extension of credit to another Person,

(ii) any capital contribution to another Person (by means of any transfer of cash or other property to others or any payment for property or services for the account or use of others),

(iii) any purchase or acquisition of Capital Stock, Indebtedness, bonds, notes, debentures or other similar instruments or securities issued by another Person, or

(iv) any guarantee of any obligation of another Person to the extent such obligation is outstanding and to the extent guaranteed by such Person.

For the purposes of the provisions of the "– Certain Covenants – Designation of Restricted and Unrestricted Subsidiaries" and "– Certain Covenants – Limitation on Restricted Payments" covenants: (i) the Company will be deemed to have made an Investment in an Unrestricted Subsidiary in an amount equal to the Company's proportional interest in the Fair Market Value of the assets (net of liabilities owed to any Person other than the Company or a Restricted Subsidiary and that are not guaranteed by the

Company or a Restricted Subsidiary) of a Restricted Subsidiary that is designated an Unrestricted Subsidiary at the time of such designation representing the percentage ownership of such Unrestricted Subsidiary at such time and (ii) any property transferred to or from any Person shall be valued at its Fair Market Value at the time of such transfer, as determined in good faith by the Board of Directors.

"*Investment Grade*" means a rating of "AAA," "AA," "A" or "BBB," as modified by a "+" or "-" indication, or an equivalent rating representing one of the four highest Rating Categories, by Fitch or any of its successors or assigns or a rating of "Aaa," "Aa," "A" or "Baa," as modified by a "1," "2" or "3" indication, or an equivalent rating representing one of the four highest rating categories, by Moody's, or any of its successors or assigns or the equivalent ratings of any internationally recognized rating agency or agencies, as the case may be, which shall have been designated by the Issuers as having been substituted for Fitch or Moody's or both, as the case may be.

"*Leverage Ratio*" means, as of any Transaction Date, the ratio of (i) the aggregate amount of Indebtedness of the Company and its Restricted Subsidiaries on a consolidated basis outstanding on such Transaction Date to (ii) the aggregate amount of Consolidated EBITDA for the Two Semi-annual Periods with respect to such Transaction Date. In making the foregoing calculation:

(A) *pro forma* effect will be given to any Indebtedness Incurred, repaid or redeemed during the Reference Period relating to such Two Semi-annual Periods (other than Indebtedness Incurred or repaid under a revolving credit or similar arrangement (or any predecessor revolving credit or similar arrangement) in effect on the last day of such Two Semi-annual Periods), in each case as if such Indebtedness had been Incurred, repaid or redeemed on the first day of such Reference Period; provided that, in the event of any such repayment or redemption, Consolidated EBITDA for such Two Semi-annual Periods will not include any interest income actually earned by the Company or such Restricted Subsidiary during such Two Semi-annual Periods in respect of the funds used to repay or redeem such Indebtedness;

(B) *pro forma* effect will be given to Asset Dispositions and Asset Acquisitions (including giving *pro forma* effect to the application of proceeds of any Asset Disposition) that occur during such Reference Period as if they had occurred and such proceeds had been applied on the first day of such Reference Period;

(C) *pro forma* effect will be given to asset dispositions and asset acquisitions (including giving *pro forma* effect to the application of proceeds of any asset disposition) that have been made by any Person that has become a Restricted Subsidiary or has been merged with or into the Company or any Restricted Subsidiary during such Reference Period and that would have constituted Asset Dispositions or Asset Acquisitions had such transactions occurred when such Person was a Restricted Subsidiary as if such asset dispositions or asset acquisitions were Asset Dispositions or Asset Acquisitions that occurred on the first day of such Reference Period; and

(D) *pro forma* effect will be given to the creation, designation or re-designation of Restricted Subsidiaries and Unrestricted Subsidiaries as if such creation, designation or re-designation had occurred on the first day of such Reference Period,

provided that to the extent that clause (B) or (C) of this paragraph requires that *pro forma* effect be given to an Asset Acquisition or Asset Disposition (or asset acquisition or asset disposition), such *pro forma* calculation will be based upon the two full semi-annual fiscal periods immediately preceding the Transaction Date of the Person, or division or line of business of the Person, that is acquired or disposed for which financial information is available.

"*Liabilities*" means, with respect to a Luxembourg Subsidiary Guarantor, all existing liabilities (other than any liabilities owed to the direct or indirect shareholders of such Luxembourg Subsidiary Guarantor) incurred by such Luxembourg Subsidiary Guarantor and as reflected in the books of such Luxembourg Subsidiary Guarantor.

"*Lien*" means any mortgage, pledge, security interest, encumbrance, lien or charge of any kind (including, without limitation, any conditional sale or other title retention agreement or lease in the nature thereof or any agreement to create any mortgage, pledge, security interest, lien, charge, easement or encumbrance of any kind).

"*Material Acquisitions or Dispositions*" means any transaction that would require the preparation of *pro forma* financial information pursuant to Rule 11-01(a) or (b) of Regulation S-X promulgated under the Securities Act, assuming that such Rule is applicable to the Company.

"*Maximum Amount*" means, with respect to a Luxembourg Subsidiary Guarantor, an amount equal to 90% of the Luxembourg Subsidiary Guarantor's own funds (*capitaux propres*), as referred to in annex I to the grand-ducal regulation dated December 18, 2015 defining the form and content of the presentation of balance sheet and profit and loss account, and enforcing the Luxembourg law dated December 19, 2002 concerning the trade and companies register and the accounting and annual accounts of undertakings less the Liabilities at the time the guarantee or the indemnity is called.

"*Measurement Date*" means July 1, 2018.

"*Moody's*" means Moody's Investors Service, Inc. and its successors.

"*Net Cash Proceeds*" means:

(a) with respect to any Asset Sale (other than the issuance or sale of Capital Stock), the proceeds of such Asset Sale in the form of cash or Temporary Cash Investments, including payments in respect of deferred payment obligations (to the extent corresponding to the principal, but not interest, component thereof) when received in the form of cash or Temporary Cash Investments and proceeds from the conversion of other property received when converted to cash or Temporary Cash Investments, net of:

    (1) brokerage commissions and other fees and expenses (including fees and expenses of counsel and investment banks) related to such Asset Sale;

    (2) provisions for all taxes (whether or not such taxes will actually be paid or are payable) as a result of such Asset Sale without regard to the consolidated results of operations of the Company and its Restricted Subsidiaries, taken as a whole;

    (3) payments made to repay Indebtedness or any other obligation outstanding at the time of such Asset Sale that either (x) is secured by a Lien on the property or assets sold or (y) is required to be paid as a result of such sale;

    (4) appropriate amounts to be provided by the Company or any Restricted Subsidiary as a reserve against any liabilities associated with such Asset Sale, including, without limitation, pension and other post-employment benefit liabilities, liabilities related to environmental matters and liabilities under any indemnification obligations associated with such Asset Sale, all as determined in conformity with IFRS; and

    (5) all distributions and other payments required to be made to minority interest holders in Subsidiaries or joint ventures as a result of such Asset Sale or the distribution of proceeds from such Asset Sale; and

(b) with respect to any Asset Sale consisting of the issuance or sale of Capital Stock, the proceeds of such issuance or sale in the form of cash or Temporary Cash Investments, including payments in respect of deferred payment obligations (to the extent corresponding to the principal, but not interest, component thereof) when received in the form of cash or Temporary Cash Investments and proceeds from the conversion of other property received when converted to cash or Temporary Cash Investments, net of attorneys' fees, accountants' fees, underwriters' or placement agents' fees, discounts or commissions and brokerage, consultant and other fees incurred in connection with such issuance or sale and net of taxes paid or payable as a result thereof.

"*Offer to Purchase*" means an offer to purchase the Notes by the Issuers from the Holders commenced by the Issuers mailing a notice by first class mail, postage prepaid, to the Trustee and each Holder at its last address appearing in the Note register stating:

(1) the provision of the Indenture pursuant to which the offer is being made and that all Notes validly tendered will be accepted for payment on a pro rata basis;

(2) the purchase price and the date of purchase (which shall be a Business Day no earlier than 30 days nor later than 60 days from the date such notice is mailed) (the "Offer to Purchase Payment Date");

(3) that any Note not tendered will continue to accrue interest pursuant to its terms;

(4) that, unless the Issuers default in the payment of the purchase price, any Note accepted for payment pursuant to the Offer to Purchase shall cease to accrue interest on and after the Offer to Purchase Payment Date;

(5) that Holders electing to have a Note purchased pursuant to the Offer to Purchase will be required to surrender the Note, together with the form entitled "Option of the Holder to Elect Purchase" on the reverse side of the Note completed, to the Paying Agent at the address specified in the notice prior to the close of business on the Business Day immediately preceding the Offer to Purchase Payment Date;

(6) that Holders will be entitled to withdraw their election if the Paying Agent receives, not later than the close of business on the third Business Day immediately preceding the Offer to Purchase Payment Date, a facsimile transmission or letter setting forth the name of such Holder, the principal amount of Notes delivered for purchase and a statement that such Holder is withdrawing his election to have such Notes purchased; and

(7) that Holders whose Notes are being purchased only in part will be issued new Notes equal in principal amount to the unpurchased portion of the Notes surrendered; *provided* that each Note purchased and each new Note issued shall be in a principal amount of US$125,000 or integral multiples of US$1,000 in excess thereof.

One Business Day prior to the Offer to Purchase Payment Date, the Issuers will deposit with the Paying Agent money sufficient to pay the purchase price of all Notes or portions thereof to be accepted by the Issuers for payment on the Offer to Purchase Payment Date. On the Offer to Purchase Payment Date, the Issuers shall (a) accept for payment on a pro rata basis Notes or portions thereof tendered pursuant to an Offer to Purchase; and (b) deliver, or cause to be delivered, to the Trustee all Notes or portions thereof so accepted together with an Officers' Certificate specifying the Notes or portions thereof accepted for payment by the Issuers. In the case of Certificated Notes, the Paying Agent shall promptly mail to the Holders of Notes so accepted payment in an amount equal to the purchase price, and the Trustee shall promptly authenticate and mail to such Holders a new Note equal in principal amount to any unpurchased portion of the Note surrendered; *provided* that each Note purchased and each new Note issued shall be in a principal amount of US$125,000 or integral multiples of US$1,000 in excess thereof. The Issuers will publicly announce the results of an Offer to Purchase as soon as practicable after the Offer to Purchase Payment Date. The Issuers will comply with Rule 14e-1 under the Exchange Act and any other securities laws and regulations to the extent such laws and regulations are applicable, in the event that the Issuers are required to repurchase Notes pursuant to an Offer to Purchase.

To the extent that the provisions of any securities laws or regulations of any jurisdiction conflict with the provisions of the Indenture governing any Offer to Purchase, the Issuers will comply with the applicable securities laws and regulations and will not be deemed to have breached its obligations under the Indenture by virtue of such compliance.

The materials used in connection with an Offer to Purchase are required to contain or incorporate by reference information concerning the business of the Issuers and their Subsidiaries which the Issuers in good faith believe will assist such Holders to make an informed decision with respect to the Offer to Purchase, including a brief description of the events requiring the Issuers to make the Offer to Purchase, and any other information required by applicable law to be included therein. The offer is required to contain all instructions and materials necessary to enable such Holders to tender Notes pursuant to the Offer to Purchase.

"*Officer*" means one of the executive officers of the Company and/or the Co-Issuer (as the case may be) or, in the case of a Subsidiary Guarantor, one of the directors or executive officers of such Subsidiary Guarantor.

"*Officers' Certificate*" means a certificate signed by two Officers; *provided* that, with respect to any Subsidiary Guarantor having only one Officer, an "Officers' Certificate" means a certificate signed by such Officer.

"*Opinion of Counsel*" means a written opinion from legal counsel which is acceptable to the Trustee that meets the requirements of the Indenture; *provided* that legal counsel shall be entitled to rely on certificates of the Company and any Subsidiary of the Company as to matters of fact.

"*Original Issue Date*" means the date on which the Notes are originally issued under the Indenture.

"*Payment Default*" means (i) any default in the payment of interest on any Note when the same becomes due and payable, (ii) any default in the payment of principal of (or premium, if any, on) the Notes when the same becomes due and payable at maturity, upon acceleration, redemption or otherwise, (iii) the failure by the Issuers to make or consummate a Change of Control Offer in the manner described under the caption "– Repurchase of Notes upon a Change of Control Triggering Event," or an Offer to Purchase in the manner described under the caption "– Certain Covenants – Limitation on Asset Sales" or (iv) any Event of Default specified in clause (e) of the definition of Events of Default.

"*Permitted Business*" means any business conducted by the Company and its Restricted Subsidiaries on the Original Issue Date as described in this Offering Memorandum, any other natural resources extraction, processing, transportation or marketing business, renewable energy and transportation business, and other businesses reasonably related or ancillary thereto.

"*Permitted Holders*" means any or all of the following:

(1) Mr. Odjargal Jambaljamts and Mr. Od Jambaljamts;

(2) the estate, trust and spouse or any immediate family member of the Person specified in clause (1) or the legal representative of any of the foregoing;

(3) any Affiliate (other than an Affiliate as defined in clause (ii) or (iii) of the definition of "Affiliate") of either of the Persons specified in clause (1) of this definition; and

(4) any Person both the Capital Stock and the Voting Stock of which (or in the case of a trust, the beneficial interests in which) are more than 80% owned by Persons specified in clauses (1) and (2) of this definition.

"*Permitted Investment*" means:

(1) any Investment in (a) the Company or a Restricted Subsidiary that is, directly or indirectly primarily engaged in a Permitted Business; (b) a Person which will, upon the making of such Investment, become a Restricted Subsidiary that is, directly or indirectly primarily engaged in a Permitted Business or be merged or consolidated with or into or to transfer or convey all or substantially all its assets to the Company or a Restricted Subsidiary that is, directly or indirectly primarily engaged in a Permitted Business; or (c) any member of EM Group as described in the EM Transaction Announcement;

(2) cash or Temporary Cash Investments;

(3) payroll, travel and similar advances to cover matters that are expected at the time of such advances ultimately to be treated as expenses in accordance with IFRS;

(4) stock, obligations or securities received in satisfaction of judgments;

(5) an Investment in an Unrestricted Subsidiary consisting solely of an Investment in another Unrestricted Subsidiary;

(6) any Investment pursuant to a Hedging Obligation designed solely to protect the Company or any Restricted Subsidiary against fluctuations in commodity prices, interest rates or foreign currency exchange rates and not for speculation;

(7) receivables, trade credits or other current assets owing to the Company or any Restricted Subsidiary, if created or acquired in the ordinary course of business and payable or dischargeable in accordance with customary trade terms, including such concessionary trade terms as the Company or any Restricted Subsidiary considers reasonable under the circumstances;

(8) any securities or other Investments received as consideration in, or retained in connection with, sales or other dispositions of property or assets, including Asset Dispositions made in compliance with the covenant described under the caption "– Certain Covenants – Limitation on Asset Sales";

(9) pledges or deposits (x) with respect to leases or utilities provided to third parties in the ordinary course of business or (y) otherwise described in the definition of "Permitted Liens" or made in connection with Liens permitted under the covenant described under the caption "– Certain Covenants – Limitation on Liens";

(10) Investments in securities or other obligations of trade creditors, trade debtors or customers received in compromise or settlement of debts created in the ordinary course of business, or pursuant to any plan of reorganization or similar arrangement upon the bankruptcy or insolvency of such trade creditor, trade debtor or customer, or as a result of foreclosure of or transfer of title with respect to any secured investment;

(11) loans or advances to contractors, vendors, suppliers or distributors for the acquisition of assets or consumables or services in the ordinary course of business that are recorded as deposits or prepaid expenses on the Company's consolidated statement of financial position;

(12) loans or advances to employees made in the ordinary course of business in an aggregate principal amount not to exceed US$5.0 million at any one time outstanding;

(13) deposits made in order to comply with statutory or regulatory obligations to maintain deposits for workers, compensation claims and other purposes specified by statute or regulation from time to time in the ordinary course of business;

(14) deposits made in order to secure the performance of the Company or any of its Restricted Subsidiaries and prepayments made in connection with the acquisition of real property or land use rights by the Company or any Restricted Subsidiary, in each case, in the ordinary course of a Permitted Business;

(15) any guarantee of Indebtedness Incurred in accordance with the covenant "– Limitation on Indebtedness," including guarantee of any Indebtedness of any member of EM Group Incurred under clause (b)(18) of the covenant described under the caption "– Limitation on Indebtedness";

(16) repurchases of the Notes;

(17) an acquisition of assets, Capital Stock or other securities by the Company or its Subsidiary for consideration to the extent such consideration consists solely of Common Stock of the Company;

(18) Investments (including binding commitments to make Investments) in existence on the Original Issue Date and as described in this Offering Memorandum; or

(19) other Investments in any Person having an aggregate Fair Market Value (measured on the date each such Investment was made and without giving effect to subsequent changes in value), when taken together with all other Investments (minus to the extent that an Investment made after the Original Issue Date under this clause (19) is sold or otherwise liquidated or repaid for cash, the lesser of (x) the net cash proceeds from the return of capital with respect to such Investment (less the cost of disposition, if any) and (y) the initial amount of such Investment, not to exceed, in each case, the amount of Investments made by the Company or a Restricted Subsidiary after the Original Issue Date in any such Person under this clause) made pursuant to this clause (19) since the Original Issue Date, not to exceed 3.0% of Total Assets.

"*Permitted Liens*" means:

(1) Liens for taxes, assessments, governmental charges or claims that are being contested in good faith by appropriate legal or administrative proceedings promptly instituted and diligently conducted and for which a reserve or other appropriate provision, if any, as shall be required in conformity with IFRS shall have been made;

(2) statutory and common law Liens of landlords and carriers, warehousemen, mechanics, suppliers, repairmen or other similar Liens arising in the ordinary course of business and with respect to amounts not yet delinquent or being contested in good faith by appropriate legal or administrative proceedings promptly instituted and diligently conducted and for which a reserve or other appropriate provision, if any, as shall be required in conformity with IFRS shall have been made;

(3) Liens incurred or deposits made to secure the performance of tenders, bids, leases, statutory or regulatory obligations, bankers' acceptances, surety and appeal bonds, government contracts, performance and return-of-money bonds and other obligations of a similar nature incurred in the ordinary course of business (exclusive of obligations for the payment of borrowed money);

(4) leases or subleases granted to others that do not materially interfere with the ordinary course of business of the Company and its Restricted Subsidiaries, taken as a whole;

(5) Liens encumbering property or assets under construction arising from progress or partial payments by a customer of the Company or its Restricted Subsidiaries relating to such property or assets;

(6) any interest or title of a lessor in the property subject to any operating lease;

(7) Liens on property of, or on shares of Capital Stock or Indebtedness of, any Person existing at the time such Person becomes, or becomes a part of, any Restricted Subsidiary; *provided* that such Liens do not extend to or cover any property or assets of the Company or any Restricted Subsidiary other than the property or assets acquired; *provided further* that such Liens were not created in contemplation of or in connection with the transactions or series of transactions pursuant to which such Person became a Restricted Subsidiary;

(8) Liens in favor of the Company or any Restricted Subsidiary;

(9) Liens arising from attachment or the rendering of a final judgment or order against the Company or any Restricted Subsidiary that does not give rise to an Event of Default;

(10) (a) Liens securing reimbursement obligations with respect to letters of credit or trade guarantees, performance and surety bonds and similar instruments that encumber documents and other property relating to such letters of credit or trade guarantees, performance and surety bonds and similar instruments and the products and proceeds thereof, in each case exclusive of obligations for the payment of borrowed money or (b) Liens in favor of any bank having a right of setoff, revocation, refund or chargeback with respect to money or instruments of the Company or any Restricted Subsidiary on deposit with or in the possession of such bank;

(11) Liens existing on the Original Issue Date;

(12) Liens securing Indebtedness which is Incurred to refinance secured Indebtedness which is permitted to be Incurred under clause (b)(4) of the covenant described under the caption "Limitation on Indebtedness"; *provided* that such Liens do not extend to or cover any property or assets of the Company or any Restricted Subsidiary other than the property or assets securing the Indebtedness being refinanced;

(13) Liens (including extensions and renewals thereof) upon real or personal property, asset or equipment acquired after the Original Issue Date of the Company or any Restricted Subsidiary; *provided* that (a) such Lien is created solely for the purpose of securing Indebtedness Incurred under clause (b)(6)(B) of the covenant described under the caption "– Limitation on Indebtedness," (b) such Lien is created prior to, at the time of or within 180 days after the later of the acquisition or the completion of development, construction or improvement of such property, (c) the principal amount of Indebtedness secured by such Lien does not exceed 100% of the cost of such property, development, construction or improvement and (d) such Lien shall not extend to or cover any property or assets other than such item of property and any improvements on such item;

(14) easements, rights-of-way, municipal and zoning ordinances or other restrictions as to the use of properties in favor of governmental agencies or utility companies that do not materially adversely affect the value of such properties or materially impair the use for the purposes of which such properties are held by the Company or any Restricted Subsidiary;

(15) Liens securing Indebtedness under any Hedging Obligation permitted to be Incurred under clause (b)(5) of the covenant described under the caption "– Certain Covenants – Limitation on Indebtedness"; *provided* that (i) Indebtedness relating to any such Hedging Obligations is, and is permitted under the covenant described under the caption "– Certain Covenants – Limitation on Liens" to be, secured by a Lien on the same property securing such Hedging Obligation or (ii) such Lien is encumbering customary initial deposits or margin deposits or are otherwise within the general parameters customary in the industry;

(16) any interest or title of a lessor under any Capitalized Lease Obligation permitted to be Incurred under the Indenture; *provided, however*, that the Liens do not extend to any property or assets which is not leased property subject to such Capitalized Lease Obligation;

(17) Liens on pledges or deposits under worker's compensation laws, unemployment insurance laws or similar legislation, or good faith deposits in connection with bids, tenders, contracts or leases, or to secure public or statutory obligations, and other purposes specified by statute made in the ordinary course of business and not securing Indebtedness of the Company or any Restricted Subsidiary;

(18) Liens on deposits made in order to secure the performance of the Company or any of its Restricted Subsidiaries in connection with the acquisition of real property or land use rights by the Company or any of its Restricted Subsidiaries in the ordinary course of business and not securing Indebtedness of the Company or any Restricted Subsidiary;

(19) Liens to secure Indebtedness permitted under clause (b)(12) under the caption "Limitation on Indebtedness";

(20) Liens on assets of a Non-Guarantor Restricted Subsidiary securing any Permitted Subsidiary Indebtedness of such Non-Guarantor Restricted Subsidiary permitted to be Incurred under clause (a) of the covenant "– Limitation on Indebtedness";

(21) Liens in favor of customs and revenue authorities arising by operation of law to secure payment of customs duties in connection with importation or exportation of goods in the ordinary course of business;

(22) retention of title reserved by any seller of goods or any Lien imposed, reserved or granted over goods supplied by such seller, in each case in the ordinary course of business;

(23) Liens on the Capital Stock of Unrestricted Subsidiaries or any Person that is not a Subsidiary of the Company solely to secure Indebtedness of Unrestricted Subsidiaries or such Person, in each case that is non-recourse to the Company or any Restricted Subsidiary, unless the Company or such Restricted Subsidiary could have incurred such Indebtedness under the Indenture on the date of incurrence of such Lien;

(24) Liens with respect to minor survey exceptions, minor encumbrances, easements or reservations of, or rights of others for, licenses, rights of way, sewers, electric lines, telegraph and telephone lines and other similar purposes, or zoning or other restrictions as to the use of real property, not interfering in any material respect with the conduct of the business of the Company and its Restricted Subsidiaries;

(25) Liens with respect to licenses or leases or subleases as licensor, lessor or sublessor of any of the Company's or its Restricted Subsidiaries property, including intellectual property, in the ordinary course of business;

(26) Liens on the Capital Stock of any Finance Subsidiary or any loan extended by a Finance Subsidiary to the Company or any other Restricted Subsidiary; *provided* such Lien is for the benefit of the lenders relating to, or interests in, such Indebtedness Incurred by such Finance Subsidiary in compliance with the covenant "– Limitation on Indebtedness";

(27) Liens to secure Indebtedness permitted to be Incurred by the Company or any Restricted Subsidiary under clause (b)(14), (b)(15) or (b)(16) of the covenant described under "Limitation on Indebtedness";

(28) Liens on the Capital Stock of any member of the EM Group to secure Indebtedness permitted to be Incurred by the Company or any Restricted Subsidiary under clause (b)(18) of the covenant described under "– Limitation on Indebtedness"; and

(29) Liens with respect to obligations of the Company or any Restricted Subsidiary that do not exceed US$5.0 million (or the Dollar Equivalent thereof using the Original Issue Date as the date of determination) at any one time outstanding,

provided that Permitted Liens shall not include any Liens on the mining license for the Ukhaa Khudag mine or the Capital Stock of the entity holding the mining license for the Ukhaa Khudag mine.

"*Permitted Subsidiary Indebtedness*" means any Indebtedness of any Non-Guarantor Restricted Subsidiary; *provided* that, on the date of the Incurrence of such Indebtedness and after giving effect thereto and the application of the proceeds thereof, the aggregate principal amount outstanding of all Indebtedness of all Non-Guarantor Restricted Subsidiaries (but excluding the amount of any Indebtedness of any Non-Guarantor Restricted Subsidiary permitted under clauses (b)(3), (b)(5), (b)(7), (b)(8), (b)(9), (b)(10), (b)(11) and (b)(13) of the covenant described under the caption "– Certain Covenants – Limitation on Indebtedness") does not exceed an amount equal to 15% of Total Assets.

"*Person*" means any individual, corporation, partnership, limited liability company, joint venture, trust, unincorporated organization or government or any agency or political subdivision thereof.

"*Preferred Stock*" as applied to the Capital Stock of any Person means Capital Stock of any class or classes that by its term is preferred as to the payment of dividends, or as to the distribution of assets upon any voluntary or involuntary liquidation or dissolution of such Person, over any other class of Capital Stock of such Person.

"*Rating Agencies*" means (i) Fitch, (ii) Moody's and (iii) if Fitch or Moody's or both shall not make a rating of the Notes publicly available, one or more "nationally recognized statistical rating organizations," as the case may be, within the meaning of Rule 15c3-I(c)(2)(iv)(F) under the Exchange Act, selected by the Issuers, which shall be substituted for Fitch or Moody's or both, as the case may be.

"*Rating Category*" means (i) with respect to Fitch, any of the following categories: "BB," "B," "CCC," "CC," "C" and "D" (or equivalent successor categories); (ii) with respect to Moody's, any of the following categories: "Ba," "B," "Caa," "Ca," "C" and "D" (or equivalent successor categories); and (iii) the equivalent of any such category of Fitch or Moody's used by another Rating Agency. In determining whether the rating of the Notes has decreased by one or more gradations, gradations within Rating Categories ("+" and "-" for Fitch and "1," "2" and "3" for Moody's; or the equivalent gradations for another Rating Agency) shall be taken into account (e.g., with respect to Fitch, a decline in a rating from "BB+" to "BB," as well as from "BB-" to "B+," will constitute a decrease of one gradation).

"*Rating Date*" means, (i) in connection with a Change of Control Triggering Event, that date which is 90 days prior to the earlier of (x) a Change of Control and (y) a public notice of the occurrence of a Change of Control or of the intention by any Issuer or any other Person or Persons to effect a Change of Control or (ii) in connection with actions contemplated under the caption "– Consolidation, Merger and Sale of Assets," that date which is 90 days prior to the earlier of (x) the occurrence of any such actions as set forth therein and (y) a public notice of the occurrence of any such actions.

"*Rating Decline*" means, (i) in connection with a Change of Control Triggering Event, the occurrence on, or within 90 days after, the date, or public notice of the occurrence of, a Change of Control or the intention by any Issuer or any other Person or Persons to effect a Change of Control (which period will be extended so long as the rating of the Notes is under publicly announced consideration for possible downgrade by any of the Rating Agencies) of any of the events listed below or (ii) in connection with actions contemplated under the caption "– Consolidation, Merger and Sale of Assets," the notification by any of the Rating Agencies that such proposed actions will result in any of the events listed below:

(a) in the event the Notes are rated by both Fitch and Moody's on the Rating Date as Investment Grade, the rating of the Notes by either Rating Agency shall be below Investment Grade;

(b) in the event the Notes are rated by either, but not both, of the Rating Agencies on the Rating Date as Investment Grade, the rating of the Notes by such Rating Agency shall be below Investment Grade; or

(c) in the event the Notes are rated below Investment Grade by both Rating Agencies on the Rating Date, the rating of the Notes by either Rating Agency shall be decreased by one or more gradations (including gradations within Rating Categories as well as between Rating Categories).

"*Reference Period*" means, as of any Transaction Date, the period commencing on and including the first day of the Two Semi-annual Periods with respect to such Transaction Date and ending on and including the Transaction Date.

"*Reference Treasury Dealer*" means each of any three investment banks of recognized standing that is a primary U.S. Government securities dealer in The City of New York, selected by the Issuers in good faith.

"*Reference Treasury Dealer Quotations*" means, with respect to each Reference Treasury Dealer and any redemption date, the average as determined by an investment banking firm of recognized international standing selected by the Issuers, of the bid and asked prices for the Comparable Treasury Issue (expressed in each case as a percentage of its principal amount) quoted in writing to such investment banking firm by such Reference Treasury Dealer at 5:00 p.m. on the fifth Business Day preceding such redemption date.

"*Replacement Assets*" means, on any date, property or assets (other than current assets) of a nature or type or that are used in a Permitted Business, including the Capital Stock of any Person holding such property or assets that is, directly or indirectly, primarily engaged in a Permitted Business and is or will become, upon the acquisition by the Company or any of its Restricted Subsidiaries of such Capital Stock, a Restricted Subsidiary.

"*Restricted Subsidiary*" means any Subsidiary of the Company other than an Unrestricted Subsidiary.

"*Sale and Leaseback Transaction*" means any direct or indirect arrangement relating to property (whether real, personal or mixed), now owned or hereafter acquired whereby the Company or any Restricted Subsidiary transfers such property to another Person and the Company or any Restricted Subsidiary leases it from such Person.

"*Senior Indebtedness*" of the Company or any Restricted Subsidiary, as the case may be, means all Indebtedness of the Company or such Restricted Subsidiary, as relevant, whether outstanding on the Original Issue Date or thereafter created, except for Indebtedness which, in the instrument creating or evidencing the same, is expressly stated to be subordinated in right of payment to (a) in respect of the Issuers, the Notes or (b) in respect of any Restricted Subsidiary that is a Subsidiary Guarantor, its Subsidiary Guarantee; *provided* that Senior Indebtedness does not include (i) any obligation to the Company or any Restricted Subsidiary, (ii) trade payables or (iii) Indebtedness Incurred in violation of the Indenture.

"*Significant Subsidiary*" means any Restricted Subsidiary that would constitute a "significant subsidiary" as defined in Article 1, Rule 1-02 of Regulation S-X, promulgated pursuant to the United States Securities Act of 1933, as such Regulation is in effect on the date of the Indenture.

"*Singapore EM HoldCo*" means Mongolian Mining Corporation Pte. Ltd., a Wholly Owned Subsidiary of the Company incorporated under the laws of Singapore.

"*Stated Maturity*" means, (1) with respect to any Indebtedness, the date specified in such debt security as the fixed date on which the final installment of principal of such Indebtedness is due and payable as set forth in the documentation governing such Indebtedness and (2) with respect to any scheduled installment of principal of or interest on any Indebtedness, the date specified as the fixed date on which such installment is due and payable as set forth in the documentation governing such Indebtedness, and shall not include any contingent obligations to repay, redeem or repurchase any such interest or principal prior to the date originally scheduled for the payment thereof.

"*Subordinated Indebtedness*" means any Indebtedness of the Company, the Co-Issuer or any Subsidiary Guarantor which is contractually subordinated or junior in right of payment to the Notes or any Subsidiary Guarantee, as applicable, pursuant to a written agreement to such effect.

"*Subordinated Shareholder Loan*" means any unsecured Indebtedness for borrowed money Incurred by the Company, the Co-Issuer or any Subsidiary Guarantor but only so long as such Indebtedness is owed to any direct or indirect holder of the Common Stock of the Company that, at such time, is an Affiliate of the Company which (i) is expressly made subordinate to the prior payment in full of the Notes or such Subsidiary Guarantor's Subsidiary Guarantee, as the case may be, by its terms or by the terms of any agreement or instrument pursuant to which such Indebtedness is issued, created or remains outstanding, with respect to the payment of principal and any other payment obligations in respect of such Indebtedness, (ii) by its terms (and by the terms of any security into which it is convertible or for which it is exchangeable) does not mature and is not required to be repaid, redeemed, repurchased or otherwise retired, pursuant to a sinking fund obligation, event of default or otherwise, in whole or in part, on or prior to the date that is one year after the Stated Maturity of the Notes and (iii) by its terms, does not provide for any cash payment of interest (or premium).

"*Subsidiary*" means, with respect to any Person, any corporation, association or other business entity (i) of which more than 50% of the voting power of the outstanding Voting Stock is owned, directly or indirectly, by such Person and one or more other Subsidiaries of such Person or (ii) of which 50% of the outstanding Voting Stock is owned, directly or indirectly, by such Person and which is "controlled" and consolidated by such Person in accordance with IFRS; *provided, however*, that with respect to clause (ii) the occurrence of any event (other than the issuance or sale of Capital Stock) as a result of which such corporation, association or other business entity ceases to be "controlled" by such Person under IFRS and to constitute a Subsidiary of such Person (other than in the case of any member of the EM Group) shall be deemed to be a designation of such corporation, association or other business entity as an Unrestricted Subsidiary by such Person and be subject to the requirements under the first paragraph of "– Designation of Restricted and Unrestricted Subsidiaries" covenant.

"*Subsidiary Guarantee*" means any guarantee of the obligations of the Issuers under the Indenture and the Notes by any Subsidiary Guarantor, subject to the limitations set forth therein.

"*Subsidiary Guarantor*" means any initial Subsidiary Guarantor named herein and any other Restricted Subsidiary which guarantees the payment of the Notes pursuant to the Indenture and the Notes; *provided* that Subsidiary Guarantor will not include any Person whose Subsidiary Guarantee has been released in accordance with the Indenture and the Notes.

"*Temporary Cash Investment*" means any of the following:

(1) direct obligations of the United States of America, any state of the European Economic Area, the United Kingdom, Japan, the People's Republic of China, Singapore and Hong Kong or any agency of the foregoing; *provided* that such country or state is rated "AA" (or such similar equivalent rating) or higher by at least two nationally recognized statistical rating organization (as defined in Rule 436 under the Securities Act) (each such country or state a "Rated Country/State"), or obligations fully and unconditionally guaranteed by any Rated Country/State, in each case maturing within one year;

(2) demand or time deposit accounts, certificates of deposit and money market deposits maturing within 180 days of the date of acquisition thereof issued by a bank or trust company which is organized under the laws of the United States of America or any state thereof, any state of the European Economic Area that is rated "AA" (or such similar equivalent rating) or higher by at least two nationally recognized statistical rating organization (as defined in Rule 436 under the Securities Act), the United Kingdom, Japan, Singapore or Hong Kong, and which bank or trust company has capital, surplus and undivided profits aggregating in excess of US$500.0 million (or the Dollar Equivalent thereof) and has outstanding debt which is rated "A" (or such similar equivalent rating) or higher by at least one nationally recognized statistical rating organization (as defined in Rule 436 under the Securities Act) or any money market fund sponsored by a registered broker dealer or mutual fund distributor;

(3) repurchase obligations with a term of not more than 30 days for underlying securities of the types described in clause (1) above entered into with a bank or trust company meeting the qualifications described in clause (2) above;

(4) commercial paper, maturing within one year of the date of acquisition thereof, issued by a corporation (other than an Affiliate of the Company) organized and in existence under the laws of the United States of America, any state thereof or any foreign country recognized by the United States of America with a rating at the time as of which any investment therein is made of "P-1" (or higher) according to Moody's or "A-1" (or higher) according to Fitch;

(5) securities, maturing within 180 days of the date of acquisition thereof, issued or fully and unconditionally guaranteed by any state, commonwealth or territory of the United States of America, or by any political subdivision or taxing authority thereof and rated at least "A" by Fitch or Moody's;

(6) any mutual or money market fund that has at least 95% of its assets continuously invested in investments of the types described in clauses (1) through (5) above; and

(7) demand or time deposit accounts, certificates of deposit, overnight or call deposits and money market deposits with (i) Standard Chartered Bank, Citibank, N.A., Hong Kong Branch, The Bank of East Asia Limited, Standard Bank Plc, Trade and Development Bank of Mongolia, Golomt Bank, Khan Bank, Xac Bank, Industrial and Commercial Bank of China, Bank of China, China Construction Bank, ING, HSBC and Deutsche Bank (or, in each case, any successor), (ii) any other bank or trust company organized under the laws of the People's Republic of China, Hong Kong, Mongolia or the United Kingdom, whose long-term debt rating by Moody's or Fitch is "A2" or "A" or higher, respectively, or (iii) any other bank organized under the laws of the People's Republic of China, Hong Kong, Mongolia or the United Kingdom, provided that, in the case of clause (iii), such deposits do not exceed US$30.0 million (or the Dollar Equivalent thereof) in the aggregate on any date of determination.

"*Total Assets*" means, as of any date, the total consolidated assets of the Company and its Restricted Subsidiaries measured in accordance with IFRS as of the last day of the most recent semi-annual fiscal period for which consolidated financial statements of the Company (which the Company shall use its reasonable best efforts to compile in a timely manner) are available(which may be internal consolidated financial statements); *provided* that only with respect to clause (b)(6) of the covenant described under the caption "– Certain Covenants – Limitation on Indebtedness" and the definition of "Permitted Subsidiary Indebtedness," Total Assets shall be calculated after giving pro forma effect to include the cumulative value of all of the real or personal property, asset or equipment the acquisition, development, construction or improvement of which requires or required the Incurrence of Indebtedness and calculation of Total Assets thereunder, as measured by the purchase price or cost therefor or budgeted cost provided in good faith by the Company or any of its Restricted Subsidiaries to the bank or other similar financial institutional lender providing such Indebtedness.

"*Trade Payables*" means, with respect to any Person, any accounts payable or any other indebtedness or monetary obligation to trade creditors created, assumed or guaranteed by such Person or any of its Subsidiaries arising in the ordinary course of business in connection with the acquisition of goods or services and payable within 180 days.

"*Transaction Date*" means, with respect to the Incurrence of any Indebtedness, the date such Indebtedness is to be Incurred and, with respect to any Restricted Payment, the date such Restricted Payment is to be made.

"*Two Semi-annual Periods*" means, as of any Transaction Date, the then most recent two semi-annual fiscal periods prior to such Transaction Date for which consolidated financial statements of the Company (which the Company will use its reasonable best efforts to compile in a timely manner) are available (which may include internal consolidated financial statements).

"*Unrestricted Subsidiary*" means, unless redesignated as a Restricted Subsidiary pursuant to the covenant summarized under the caption "– Certain covenants – Designation of Restricted and Unrestricted Subsidiaries," (1) any Subsidiary of the Company that at the time of determination shall be designated an Unrestricted Subsidiary by the Board of Directors in the manner provided in the Indenture, (2) any member of the EM Group that is a Subsidiary of the Company and (3) any Subsidiary of an Unrestricted Subsidiary.

"*U.S. Government Obligations*" means securities that are (1) direct obligations of the United States of America for the payment of which its full faith and credit is pledged or (2) obligations of a Person controlled or supervised by and acting as an agency or instrumentality of the United States of America the payment of which is unconditionally guaranteed as a full faith and credit obligation by the United States of America, which, in either case, are not callable or redeemable at the option of the issuer thereof at any time prior to the Stated Maturity of the Notes, and shall also include a depository receipt issued by a bank or trust company as custodian with respect to any such U.S. Government Obligation or a specific payment of interest on or principal of any such U.S. Government Obligation held by such custodian for the account of the holder of a depository receipt; provided that (except as required by law) such custodian is not authorized to make any deduction from the amount payable to the holder of such depository receipt from any amount received by the custodian in respect of the U.S. Government Obligation or the specific payment of interest on or principal of the U.S. Government Obligation evidenced by such depository receipt.

"*Voting Stock*" means, with respect to any Person, Capital Stock of any class or kind ordinarily having the power to vote for the election of directors, managers or other voting members of the governing body of such Person.

"*Wholly Owned*" means, with respect to any Subsidiary of any Person, the ownership of 100% of the outstanding Capital Stock of such Subsidiary (other than any director's qualifying shares or Investments by foreign nationals mandated by applicable law or a minimum number of shares owned by a second shareholder as mandated by applicable law) by such Person or one or more Wholly Owned Subsidiaries of such Person.

TAXATION

The following summary of certain Cayman Islands and Mongolian tax consequences of the ownership and disposition of the Notes is based upon applicable laws, regulations, rulings and decisions as of the date of this Offering Memorandum, all of which are subject to change (possibly with retroactive effect). This discussion does not purport to be a comprehensive description of all the tax considerations that may be relevant to a decision to purchase, own or dispose of the Notes and does not purport to deal with consequences applicable to all categories of investors, some of which may be subject to special rules. Persons considering the purchase of the Notes should consult their own tax advisers concerning the tax consequences of the purchase, ownership and disposition of the Notes, including such possible consequences under the laws of their country of citizenship, tax residence or domicile.

CAYMAN ISLANDS TAXATION

Under the laws of the Cayman Islands, payments of interest, principal or premium on the Notes will not be subject to taxation in the Cayman Islands and no withholding will be required on the payment of interest, principal or premium to any holder of the Notes, as the case may be, nor will gains derived from the disposal of the Notes be subject to Cayman Islands income or corporation tax. The Cayman Islands currently have no income, corporation or capital gains tax and no estate duty, inheritance tax or gift tax. The Cayman Islands are not party to any double taxation treaties that are applicable to any payments made by or to the Company.

No stamp duty is payable in respect of the issue of the Notes. The holder of any Notes (or a legal personal representative of such holder) whose Notes are brought into the Cayman Islands may in certain circumstances be liable to pay stamp duty imposed under the laws of the Cayman Islands in respect of such Notes. Certificates evidencing registered Notes, to which title is not transferable by delivery, will not attract Cayman Islands stamp duty. However, an instrument transferring title to a registered Note, if brought to or executed in the Cayman Islands, would be subject to nominal Cayman Islands stamp duty. Stamp duty will be payable on any documents executed by the Company if any such documents are executed in or brought into the Cayman Islands or produced before the Cayman Islands Courts.

The Company has been incorporated under the laws of the Cayman Islands as an exempted company with limited liability and, as such, has obtained an undertaking from the Governor in Cabinet of the Cayman Islands as to tax concessions under the Tax Concessions Law (1999 Revision). In accordance with the provision of section 6 of The Tax Concessions Law (1999 Revision), the Governor in Cabinet undertakes with Mongolian Mining Corporation:

- That no law which is hereafter enacted in the Cayman Islands imposing any tax to be levied on profits, income, gains or appreciations shall apply to the Company or its operations; and

- In addition, that no tax to be levied on profits, income, gains or appreciations or which is in the nature of estate duty or inheritance tax shall be payable (i) on or in respect of the shares, debentures or other obligations of the Company; or (ii) by way of the withholding, in whole or part, of any relevant payment as defined in Section 6(3) of the Tax Concessions Law (1999 Revision).

- These concessions shall be for a period of twenty years from 25 May 2010.

The Cayman Islands does not have any income tax treaty arrangement with any country, however the Cayman Islands has entered into tax information exchange agreements with a number of countries.

MONGOLIAN TAXATION

Mongolia does not have capital gains tax and no Mongolian income or withholding tax is payable on principal payments. Thus, any considerations, except interest payments, paid by the Issuer to Notes holders shall not be subject to tax.

Whereas, interest payments paid by Mongolian issuer, ER LLC, is subject to withholding tax and ER LLC will withhold Mongolian taxes from interest payments it makes at the rates described below. Under the terms of the Notes, ER LLC is required, subject to certain exceptions, to pay additional amounts with respect to Mongolian withholding tax. Different tax treatment applies to resident and non-resident tax payers when ER LLC makes the interest payment.

- 20% withholding tax would apply to interest payments to non-resident corporations as Notes holders, while 10% withholding tax applies to Mongolian resident corporations as Notes holders. Rates applicable to non-resident tax payers may be reduced if there is an effective double taxation treaty between Mongolia and the Notes holder's resident country.

- 5% withholding tax applies to interest payments to individual Notes holders, either resident or non-resident and rates could also be reduced by the applicable double taxation treaty in case of non-resident individual holders. Mongolia has concluded a double taxation treaty with 26 countries. However, Mongolia does not have a double taxation treaty with the Cayman Islands, Hong Kong, Luxembourg or the United States.

No income or withholding tax would apply to the sale or transfer of Notes by the Notes holders at the secondary market, unless (i) the selling Notes holder, or (ii) the purchaser or receiver of Notes is a Mongolian entity or individual. If the seller or transferor of Notes at the secondary market appears to be Mongolian resident, then such Mongolian resident holder is subject to 10-25% tax depending on the amount of taxable income. Whereas, if the Notes are transferred from non-resident holders to the Mongolian entities or individuals at secondary market, then 20% withholding tax is applicable to the gross Notes sales or transfer price and rates can be reduced by the applicable double taxation treaty.

TRANSFER RESTRICTIONS

Because of the following restrictions, purchasers are advised to consult legal counsel prior to making any offer, sale, resale, pledge or other transfer of the Notes.

The Notes and the Subsidiary Guarantees have not been and will not be registered under the Securities Act and the Notes may only be offered or sold outside the United States in offshore transactions in reliance on Regulation S under the Securities Act. Terms used above and otherwise in this section of this Offering Memorandum have the meanings given to them by Regulation S under the Securities Act.

Each purchaser of Notes will be deemed to have represented and agreed as follows:

(1) You understand and acknowledge that:–

- the Notes have not been and will not be registered under the Securities Act or any other applicable securities laws;
- the Notes are being offered for resale in transactions not requiring registration under the Securities Act or any other securities laws;
- the Notes are being offered and sold only outside of the United States in offshore transactions in reliance on Regulation S under the Securities Act; and
- unless so registered, the Notes may not be sold or otherwise transferred except pursuant to an exemption from, or in a transaction not subject to, the registration requirements of the Securities Act or any other applicable securities laws.

(2) You represent that you are purchasing the Notes in an offshore transaction in accordance with Regulation S.

(3) You acknowledge that none of us, the Initial Purchasers or any person representing us or the Initial Purchasers has made any representation to you with respect to us or the offer or sale of any of the Notes, other than the information contained in this Offering Memorandum, which Offering Memorandum has been delivered to you. You represent that you are only relying on this Offering Memorandum in making your investment decision with respect to the Notes. You acknowledge that the Initial Purchasers make no representation or warranty as to the accuracy or completeness of this Offering Memorandum. You have had access to such financial and other information concerning us and the Notes, including an opportunity to ask questions of, and request information from, us and the Initial Purchasers.

(4) You are purchasing Notes for your own account, or for one or more investor accounts for which you are acting as a fiduciary or agent, in each case for investment, and not with a view to, or for offer or sale in connection with, any distribution thereof in violation of the Securities Act.

(5) You acknowledge that each Note will contain a legend substantially in the following form:

"THIS NOTE AND THE GUARANTEE RELATED TO THIS NOTE HAVE NOT BEEN REGISTERED UNDER THE UNITED STATES SECURITIES ACT OF 1933, AS AMENDED (THE "SECURITIES ACT"), OR THE SECURITIES LAWS OF ANY STATE OR OTHER JURISDICTION. NEITHER THIS NOTE, THE GUARANTEE NOR ANY INTEREST OR PARTICIPATION HEREIN MAY BE OFFERED, SOLD, PLEDGED OR OTHERWISE TRANSFERRED IN THE ABSENCE OF SUCH REGISTRATION OR UNLESS SUCH TRANSACTION IS EXEMPT FROM, OR NOT SUBJECT TO, SUCH REGISTRATION. BY ITS ACQUISITION HEREOF, THE HOLDER HEREOF REPRESENTS THAT IT IS ACQUIRING THIS NOTE IN AN OFFSHORE TRANSACTION IN ACCORDANCE WITH REGULATION S UNDER THE SECURITIES ACT."

If you purchase Notes, you will also be deemed to acknowledge that the foregoing restrictions apply to holders of beneficial interests in these Notes as well as to holders of these Notes.

(6) You acknowledge that the registrar will not be required to accept for registration or transfer any Notes acquired by you, except upon presentation of evidence satisfactory to us and the registrar that the restrictions set forth herein have been complied with.

(7) You acknowledge that:

(a) the Issuers and their subsidiaries, the Initial Purchasers and others will rely upon the truth and accuracy of your acknowledgements, representations and agreements set forth herein and you agree that, if any of your acknowledgements, representations or agreements herein cease to be accurate and complete, you will notify us and the Initial Purchasers promptly in writing; and

(b) if you are acquiring any Notes as fiduciary or agent for one or more investor accounts, you represent with respect to each such account that:

(i) you have sole investment discretion; and

(ii) you have full power to make the foregoing acknowledgements, representations and agreements.

(8) You agree that you will give to each person to whom you transfer these Notes notice of any restrictions on the transfer of the Notes.

(9) You understand that no action has been taken in any jurisdiction (including the United States) by us or the Initial Purchasers that would permit a public offering of the Notes or the possession, circulation or distribution of this Offering Memorandum or any other material relating to us or the Notes in any jurisdiction where action for that purpose is required. Consequently, any transfer of the Notes will be subject to the selling restrictions set forth under "Plan of Distribution".

PLAN OF DISTRIBUTION

Deutsche Bank AG, Hong Kong Branch and Morgan Stanley & Co. International plc are acting as the Initial Purchasers. Subject to the terms and conditions stated in the purchase agreement dated the date of this Offering Memorandum (the "Purchase Agreement"), each Initial Purchaser named below has severally and not jointly agreed to purchase, and each of the Issuers has jointly and severally agreed to issue and sell to each such Initial Purchaser, the principal amount of the Notes set forth opposite the name of such Initial Purchaser.

Initial Purchaser	Principal Amount
Deutsche Bank AG, Hong Kong Branch	US$2,143,000
Morgan Stanley & Co. International plc	US$2,144,000
Total	US$4,287,000

The Purchase Agreement provides that the several and not joint obligations of the Initial Purchasers to purchase the Notes are subject to approval of certain legal matters by counsel and to certain other conditions. The Initial Purchasers must purchase all of the Notes if they purchase any of the Notes. The initial offering price is set forth on the cover page of this Offering Memorandum. After the Notes are released for sale, the Initial Purchasers may change the offering price and other selling terms. The Initial Purchasers reserve the right to withdraw, cancel or modify offers to investors and to reject orders in whole or in part. Delivery of the Notes is expected to occur on or about September 13, 2023.

The Issuers and the Subsidiary Guarantors have agreed to indemnify the Initial Purchasers against certain liabilities, including liabilities under the Securities Act, or to contribute to payments that the Initial Purchasers may be required to make in respect of any of such liabilities.

None of the Issuers or the Subsidiary Guarantors will, for a period of 90 days following the date hereof, without first obtaining the prior written consent of the Initial Purchasers, directly or indirectly, offer, sell, contract to sell, pledge, otherwise dispose of, or enter into any transaction which is designed to, or might reasonably be expected to, result in the disposition of any debt securities or securities exchangeable for or convertible into debt securities, issued or guaranteed by the Issuers, the Subsidiary Guarantors or their subsidiaries, except for the Notes sold to the Initial Purchasers pursuant to the Purchase Agreement. The Notes have not been registered under the Securities Act and, unless so registered, may not be offered or sold within the United States except in certain transactions exempt from, or not subject to, the registration requirements of the Securities Act.

The Notes will constitute a new class of securities with no established trading market. Approval in-principle has been received from the SGX-ST for the listing and quotation of the Notes on the SGX-ST. The Issuers does not intend to apply for listing or quotation of the Notes on any national securities exchange in the United States.

However, there can be no assurance that the prices at which the Notes will sell in the market after the offering of the Notes will not be lower than the initial offering price or that an active trading market for the Notes after the completion of the offering of the Notes will develop and continue after the offering. The Initial Purchasers have advised us that they currently intend to make a market in the Notes. However, they are not obligated to do so and may discontinue any market-making activities with respect to the Notes at any time without notice. In addition, market-making activity will be subject to the limits imposed by applicable law. Accordingly, there can be no assurance that the trading market for the Notes will have any liquidity.

In connection with the offering, Morgan Stanley & Co. International plc (the "Stabilizing Manager") (or persons acting on its behalf) may over-allot Notes or effect transactions with a view to supporting the market price of the Notes during the stabilization period at a level higher than that which might otherwise prevail.

However, stabilization may not necessarily occur. Any stabilization action may begin on or after the date of adequate public disclosure of the terms of the offer of the Notes and, if begun, may cease at any time, but it must end no later than 30 calendar days after the date on which the Issuers receive the proceeds of the issue, or no later than 60 calendar days after the date of allotment of the Notes, whichever is the earlier. Any stabilization action or over-allotment must be conducted by the Stabilizing Manager (or persons acting on its behalf) in accordance with all applicable laws and rules and will be undertaken at the offices of the Stabilizing Manager (or persons acting on its behalf) and on the SGX-ST.

Certain of the Initial Purchasers and their respective affiliates have, from time to time, performed, and may in the future perform, certain commercial banking and lending, investment banking and advisory and other banking services for us, and/or our affiliates for which they have received or will receive customary fees and expenses. The Initial Purchasers are acting as dealer managers in connection with the Exchange Offer, for which they may receive customary and usual fees. The Initial Purchasers and their respective affiliates are full service financial institutions engaged in various activities, which may include securities trading, commercial and investment banking, financial advice, investment management, principal investment, hedging, financing and brokerage activities. In the ordinary course of their various business activities, the Initial Purchasers and their respective affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities) and financial instruments (including bank loans) for their own account and for the accounts of their customers and may at any time hold long and short positions in such securities and instruments. Such investments and securities activities may involve securities and instruments of the Issuers or the Subsidiary Guarantors, and may also exchange in the Exchange Offer the relevant securities that they may hold or acquire.

If a jurisdiction requires that the offering of the Notes be made by a licensed broker or dealer and the Initial Purchasers or any affiliate of the Initial Purchasers is a licensed broker or dealer in that jurisdiction, the offering shall be deemed to be made by that Initial Purchaser or its affiliate on behalf of the Issuer in such jurisdiction.

Delivery of the Notes is expected on or about September 13, 2023, which is the fifth business day following the date of this Offering Memorandum (such settlement cycle being referred to as "T+5"). Under Rule 15c6-1 under the Exchange Act, trades in the secondary market generally are required to settle in two business days, unless the parties to any such trade expressly agree otherwise. Accordingly, purchasers who wish to trade the Notes on the date of pricing or the next two succeeding business days will be required, because the Notes initially will settle in T+5, to specify an alternate settlement cycle at the time of any such trade to prevent a failed settlement. Purchasers who wish to trade the Notes on the pricing date or the next two succeeding business days should consult their own advisers.

IMPORTANT NOTICE TO CMIS (INCLUDING PRIVATE BANKS)

This notice to CMIs (including private banks) is a summary of certain obligations the SFC Code imposes on CMIs, which require the attention and cooperation of other CMIs (including private banks). Certain CMIs may also be acting as OCs for this offering and are subject to additional requirements under the SFC Code.

Prospective investors who are the directors, employees or major shareholders of the Issuers, a CMI or its group companies would be considered under the SFC Code as having an Association with the Issuers, the CMI or the relevant group company. CMIs should specifically disclose whether their investor clients have any Association when submitting orders for the Notes. In addition, private banks should take all reasonable steps to identify whether their investor clients may have any Associations with the Issuer or any CMI (including its group companies) and inform the Joint Bookrunners and Joint Lead Managers accordingly.

CMIs are informed that the marketing and investor targeting strategy for this offering includes institutional investors, sovereign wealth funds, pension funds, hedge funds, family offices and high net worth individuals, in each case, subject to the selling restrictions and any MiFID II product governance language or any UK MiFIR product governance language set out elsewhere in this Offering Memorandum.

CMIs should ensure that orders placed are bona fide, are not inflated and do not constitute duplicated orders (i.e., two or more corresponding or identical orders placed via two or more CMIs). CMIs should enquire with their investor clients regarding any orders which appear unusual or irregular. CMIs should disclose the identities of all investors when submitting orders for the Notes (except for omnibus orders where underlying investor information may need to be provided to any OCs when submitting orders). Failure to provide underlying investor information for omnibus orders, where required to do so, may result in that order being rejected. CMIs should not place "X-orders" into the order book.

CMIs should segregate and clearly identify their own proprietary orders (and those of their group companies, including private banks as the case may be) in the order book and book messages.

CMIs (including private banks) should not offer any rebates to prospective investors or pass on any rebates provided by the Issuers. In addition, CMIs (including private banks) should not enter into arrangements which may result in prospective investors paying different prices for the Notes.

The SFC Code requires that a CMI disclose complete and accurate information in a timely manner on the status of the order book and other relevant information it receives to targeted investors for them to make an informed decision. In order to do this, those Joint Bookrunners and Joint Lead Managers in control of the order book should consider disclosing order book updates to all CMIs.

When placing an order for the Notes, private banks should disclose, at the same time, if such order is placed other than on a "principal" basis (whereby it is deploying its own balance sheet for onward selling to investors).

Private banks who do not provide such disclosure are hereby deemed to be placing their order on such a "principal" basis. Otherwise, such order may be considered to be an omnibus order pursuant to the SFC Code.

Private banks should be aware that placing an order on a "principal" basis may require the relevant affiliated Manager(s) (if any) to categorise it as a proprietary order and apply the "proprietary orders" requirements of the SFC Code to such order and will result in that private bank not being entitled to, and not being paid, any rebate.

In relation to omnibus orders, when submitting such orders, CMIs (including private banks) that are subject to the SFC Code should disclose underlying investor information in respect of each order constituting the relevant omnibus order (failure to provide such information may result in that order being rejected). Underlying investor information in relation to omnibus orders should consist of:

- the name of each underlying investor;
- a unique identification number for each investor;
- whether an underlying investor has any "Associations" (as used in the SFC Code);
- whether any underlying investor order is a "Proprietary Order" (as used in the SFC Code);
- whether any underlying investor order is a duplicate order.

Underlying investor information in relation to omnibus orders should be sent to: if to Morgan Stanley & Co. International plc, to omnibus_debt@morganstanley.com; omnibus_debt@morganstanley.com; and if to Deutsche Bank AG, Hong Kong Branch, to akela.db@list.db.com.

To the extent information being disclosed by CMIs and investors is personal and/or confidential in nature, CMIs (including private banks) agree and warrant: (A) to take appropriate steps to safeguard the transmission of such information to any OCs; and (B) that they have obtained the necessary consents from the underlying investors to disclose such information to any OCs. By submitting an order and providing

such information to any OCs, each CMI (including private banks) further warrants that they and the underlying investors have understood and consented to the collection, disclosure, use and transfer of such information by any OCs and/or any other third parties as may be required by the SFC Code, including to the Issuer, relevant regulators and/or any other third parties as may be required by the SFC Code, for the purpose of complying with the SFC Code, during the bookbuilding process for this offering. CMIs that receive such underlying investor information are reminded that such information should be used only for submitting orders in this offering. The Joint Bookrunners and Joint Lead Managers may be asked to demonstrate compliance with their obligations under the SFC Code, and may request other CMIs (including private banks) to provide evidence showing compliance with the obligations above (in particular, that the necessary consents have been obtained). In such event, other CMIs (including private banks) are required to provide the relevant Joint Bookrunners and Joint Lead Manager with such evidence within the timeline requested.

SELLING RESTRICTIONS

General

No action has been taken or will be taken in any jurisdiction by the Issuers, the Subsidiary Guarantors or the Initial Purchasers that would permit a public offering of Notes, or the possession, circulation or distribution of this Offering Memorandum or any other material relating to the Notes or the offering of the Notes, in any jurisdiction where action for that purpose is required.

Accordingly, the Notes may not be offered or sold, directly or indirectly, and neither this Offering Memorandum nor such other material may be distributed or published, in or from any country or jurisdiction except in compliance with any applicable rules and regulations of such country or jurisdiction.

Cayman Islands

No offer or invitation, whether directly or indirectly, may be made to the public in the Cayman Islands to subscribe for the Notes. This Offering Memorandum does not constitute, and will not be, an offering of the Notes to any person in the Cayman Islands.

France

This Offering Memorandum has not been and will not be submitted to the clearance procedure *(visa)* nor approved by the *Autorite des marches financiers* (the "AMF"). The Notes have not been and will not be, directly or indirectly, offered or sold to the public in France. This Offering Memorandum and any other documents or offering materials relating to the offering of the Notes may only be distributed or caused to distributed to: (i) qualified investors (*investisseurs qualifies*) acting for their own account and/or (ii) providers of investment services relating to portfolio management for the account of third parties (*personnes fournissant le service d'investissement de gestion de portefeuille pour compte de tiers*), all as defined in, and in accordance with, Articles L. 411-2 and D. 411-1 of the French Financial and Monetary Code (*Code monetaire et financier*).

The Notes so purchased may not be offered or resold, directly or indirectly, to the public in France other than in compliance with Articles L. 411-1, L. 411-2, L. 412-1 and L. 621-8 to L. 621-8-3 of the French Financial and Monetary Code (*Code monetaire et financier*).

Hong Kong

This Offering Memorandum has not been and will not be registered with the Registrar of Companies in Hong Kong. Accordingly, except as mentioned below, this Offering Memorandum may not be issued, circulated or distributed in Hong Kong. A copy of this Offering Memorandum may, however, be issued to a limited number of prospective applicants for the Notes in Hong Kong in a manner which does not constitute an offer of the Notes to the public in Hong Kong or an issue, circulation or distribution in Hong Kong of a prospectus for the purposes of the Companies (Winding Up and Miscellaneous Provisions)

Ordinance (Chapter 32 of the Laws of Hong Kong). No advertisement, invitation or document relating to the Notes may be issued or may be in the possession of any person other than with respect to the Notes which are or are intended to be disposed of only to persons outside Hong Kong or only to "professional investors" within the meaning as defined in the Securities and Futures Ordinance (Chapter 571 of the Laws of Hong Kong) and any rules made thereunder.

Luxembourg

This Offering Memorandum has not been approved by, and will not be submitted for approval to, the Luxembourg Financial Services Supervisory Authority (Commission de Surveillance du Secteur Financier, the "CSSF") or a competent authority of another Member State of the EEA for notification to the CSSF, where applicable, for purposes of a public offering or sale in the Grand Duchy of Luxembourg.

Accordingly, the Notes will not and may not be offered or sold to the public in the Grand Duchy of Luxembourg, directly or indirectly, and neither this Offering Memorandum nor any other offering circular, prospectus, form of application, advertisement or other material may be distributed, or otherwise made available in, from or published in, Luxembourg, except in circumstances where the offer of Notes is made pursuant to an exemption from the requirement to publish a prospectus (i) under the Prospectus Regulation and (ii) under the Luxembourg law of July 16, 2019 on prospectuses for securities, as amended.

Mongolia

Each Initial Purchaser has represented and agreed that neither it nor any of its affiliates has offered or sold or will offer or sell any of the Notes in the territory of Mongolia.

People's Republic of China

Each Initial Purchaser has represented, undertaken, warranted and agreed that the Notes are not being offered or sold and may not be offered or sold, directly or indirectly, in the People's Republic of China (for such purposes, not including Hong Kong and Macau Special Administrative Regions or Taiwan), except as permitted by the applicable laws of the People's Republic of China.

Republic of Italy

The offering of the Notes has not been registered pursuant to Italian securities legislation and, accordingly, no Notes may be offered, sold or delivered, nor may copies of the offering memorandum or of any other document relating to the Notes be distributed in the Republic of Italy, except:

(a) to qualified investors (investitori qualificati), as defined pursuant to Article 100 of Legislative Decree No. 58 of February 24, 1998, as amended (the "Financial Services Act") and Article 34-ter, first paragraph, letter b) of CONSOB Regulation No. 11971 of May 14, 1999, as amended from time to time ("Regulation No. 11971"); or

(b) in other circumstances which are exempted from the rules on public offerings pursuant to Article 100 of the Financial Services Act and Article 34-ter of Regulation No. 11971.

Any offer, sale or delivery of the Notes or distribution of copies of the offering memorandum or any other document relating to the Notes in the Republic of Italy under (a) or (b) above must:

(1) be made by an investment firm, bank or financial intermediary permitted to conduct such activities in the Republic of Italy in accordance with the Financial Services Act, CONSOB Regulation No. 20307 of February 15, 2018 (as amended from time to time) and Legislative Decree No. 385 of September 1, 1993, as amended (the "Banking Act"); and

(2) comply with any other applicable laws and regulations or requirement imposed by CONSOB, the Bank of Italy (including the reporting requirements, where applicable, pursuant to Article 129 of the Banking Act and the implementing guidelines of the Bank of Italy, as amended from time to time) and/or any other Italian authority.

Singapore

This Offering Memorandum has not been and will not be registered as a prospectus with the MAS under the Securities and Futures Act 2001 of Singapore (the "SFA"). As such, each of the Initial Purchasers has represented, warranted and agreed, that it has not offered or sold any Notes or caused the Notes to be made the subject of an invitation for subscription or purchase and will not offer or sell any Notes or cause the Notes to be made the subject of an invitation for subscription or purchase, and has not circulated or distributed, nor will it circulate or distribute, this Offering Memorandum or any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of the Notes, whether directly or indirectly, to any person in Singapore other than (i) to an institutional investor (as defined in Section 4A of the SFA) pursuant to Section 274 of the SFA, (ii) to a relevant person (as defined in Section 275(2) of the SFA) pursuant to Section 275(1) of the SFA, or any person pursuant to Section 275(1A) of the SFA, and in accordance with the conditions specified in Section 275 of the SFA and (where applicable) Regulation 3 of the Securities and Futures (Classes of Investors) Regulations 2018 of Singapore or (iii) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA.

Where the Notes are subscribed or purchased in reliance of an exemption under Section 274 or 275 of the SFA, the Notes must not be sold within the period of six (6) months from the date of the initial acquisition of the Notes, except to any of the following persons:

(i) an institutional investor (as defined in Section 4A of the SFA);

(ii) a relevant person (as defined in Section 275(2) of the SFA); or

(iii) any person pursuant to an offer referred to in Section 275(1A) of the SFA,

unless expressly specified otherwise in Section 276(7) of the SFA or Regulation 37A of the Securities and Futures (Offers of Investments) (Securities and Securities-based Derivatives Contracts) Regulations 2018 of Singapore.

Where the Notes are subscribed or purchased under Section 275 of the SFA by a relevant person which is:

(a) a corporation (which is not an accredited investor (as defined in Section 4A of the SFA)) the sole business of which is to hold investments and the entire share capital of which is owned by one or more individuals, each of whom is an accredited investor; or

(b) a trust (where the trustee is not an accredited investor) whose sole purpose is to hold investments and each beneficiary of the trust is an individual who is an accredited investor,

securities or securities-based derivatives contracts (each term as defined in Section 2(1) of the SFA) of that corporation or the beneficiaries' rights and interest (howsoever described) in that trust must not be transferred within six (6) months after that corporation or that trust has acquired the Notes pursuant to an offer made under Section 275 of the SFA except:

(1) to an institutional investor or to a relevant person (as defined in Section 275(2) of the SFA), or (in the case of such corporation) where the transfer arises from an offer referred to in Section 276(3)(c)(ii) of the SFA, or (in the case of such trust) where the transfer arises from an offer referred to in Section 276(4)(c)(ii) of the SFA;

(2) where no consideration is or will be given for the transfer;

(3) where the transfer is by operation of law;

(4) as specified in Section 276(7) of the SFA; or

(5) as specified in Regulation 37A of the Securities and Futures (Offers of Investments) (Securities and Securities-based Derivatives Contracts) Regulations 2018 of Singapore.

Any reference to the SFA is a reference to the Securities and Futures Act 2001 of Singapore and a reference to any term as defined in the SFA or any provision in the SFA is a reference to that term or provision as modified or amended from time to time including by such of its subsidiary legislation as may be applicable at the relevant time.

Switzerland

This Offering Memorandum does not constitute an issue prospectus pursuant to Article 652a or Article 1156 of the Swiss Code of Obligations and the notes will not be listed on the SIX Swiss Exchange. Therefore, this Offering Memorandum may not comply with the disclosure standards of the listing rules (including any additional listing rules or prospectus schemes) of the SIX Swiss Exchange. Accordingly, the notes may not be offered to the public in or from Switzerland, but only to a selected and limited circle of investors who do not subscribe to the notes with a view to distribution. Any such investors will be individually approached by the Initial Purchasers from time to time.

Neither this document nor any other offering or marketing material relating to the offering, the Issuers or the Notes have been or will be filed with or approved by any Swiss regulatory authority. In particular, this document will not be filed with, and the offer of the Notes will not be supervised by, the Swiss Financial Market Supervisory Authority ("FINMA"), and the offer of the Notes has not been and will not be authorized under the Swiss Federal Act on Collective Investment Schemes ("CISA"). The investor protection afforded to acquirers of interests in collective investment schemes under the CISA does not extend to acquirers of the Notes.

The Netherlands

The Notes that qualify as savings certificates as defined in the Dutch Savings Certificates Act (Wet inzake spaarbewijzen) may only be transferred or accepted through the mediation of the Issuer with due observance of the Dutch Savings Certificates Act and its implementing regulations (including registration requirements), provided that no such mediation is required in respect of (i) the initial issue of such Notes to the first holders thereof, (ii) any transfer and acceptance by individuals who do not act in the conduct of a profession or trade, or (iii) the issue and trading of Notes, if such Notes are physically issued outside the Netherlands and are not distributed in the Netherlands in the course of primary trading or immediately thereafter.

European Economic Area

Each Initial Purchaser has represented, warranted and agreed that it has not offered, sold or otherwise made available and will not offer, sell or otherwise make available any Notes to any retail investor in the European Economic Area (the "EEA"). For the purposes of this provision the expression "retail investor" means a person who is one (or more) of the following:

(a) a retail client as defined in point (11) of Article 4(1) of Directive 2014/65/EU (as amended, "MiFID II");

(b) a customer within the meaning of Directive 2016/97/EU (the "Insurance Distribution Directive"), where that customer would not qualify as a professional client as defined in point (10) of Article 4(1) of MiFID II; or

(c) not a qualified investor as defined in Regulation (EU) 2017/1129 (the "EU Prospectus Regulation"); and

the expression an "offer" includes the communication in any form and by any means of sufficient information on the terms of the offer and the Notes to be offered so as to enable an investor to decide to purchase or subscribe for the Notes.

In addition to any other specific selling restriction provided for any Member State of the EEA and in relation to each Member State of the European Economic Area, each Initial Purchaser has represented and agreed that it has not made and will not make an offer of Notes which are the subject of the offering contemplated by this Offering Memorandum to the public in that Member State other than:

- to any legal entity which is a qualified investor as defined in the Prospectus Regulation;

- to fewer than 150 natural or legal persons (other than qualified investors as defined in the Prospectus Regulation), subject to obtaining the prior consent of the Initial Purchasers for any such offer; or

- in any other circumstances falling within Article 1(4) of the Prospectus Regulation, provided that no such offer of Notes shall require the Issuers or any Initial Purchaser to publish a prospectus pursuant to Article 3 of the Prospectus Regulation.

For the purposes of this provision, the expression "an offer of Notes to the public" in relation to any Notes in any Member State means the communication in any form and by any means of sufficient information on the terms of the offer and the Notes to be offered so as to enable an investor to decide to purchase or subscribe for the Notes; the expression Prospectus Regulation means Regulation (EU) 2017/1129.

United Kingdom

This Offering Memorandum has been prepared on the basis that any offer of Notes in the United Kingdom will be made pursuant to an exemption under the Financial Services and Markets Act 2000 (as amended, "FSMA") from the requirement to publish a prospectus for offers of Notes.

The Initial Purchasers have represented and agreed that it has not offered, sold or otherwise made available and will not offer, sell or otherwise make available any Notes to any retail investor in the United Kingdom. For the purposes of this provision, the expression "retail investor" means a person who is one (or more) of the following:

(i) a retail client, as defined in point (8) of Article 2 of Regulation (EU) No 2017/565 as it forms part of domestic law by virtue of the European Union (Withdrawal) Act 2018 (as amended, "EUWA"); or

(ii) a customer within the meaning of the provisions of the FSMA and any rules or regulations made under the FSMA to implement the Insurance Distribution Directive, where that customer would not qualify as a professional client, as defined in point (8) of Article 2(1) of Regulation (EU) No 600/2014 as it forms part of domestic law by virtue of the EUWA.

This Offering Memorandum is for distribution only to persons who (i) fall within Article 43(2)(b) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 (as amended, the "Financial Promotion Order"), (ii) have professional experience in matters relating to investments falling within Article 19(5) of the Financial Promotion Order, (iii) are persons falling within Article 49(2)(a) to (d) ("high net worth companies, unincorporated associations etc") of the Financial Promotion Order, (iv) are outside the United Kingdom, or (v) are persons to whom an invitation or inducement to engage in investment activity (within the meaning of section 21 of the FSMA) in connection with the issue or sale of any securities may otherwise lawfully be communicated or caused to be communicated (all such persons together being referred to as "relevant persons"). This Offering Memorandum is directed only at relevant persons and must not be acted on or relied on by persons who are not relevant persons.

Any investment or investment activity to which this Offering Memorandum relates is available only to relevant persons and will be engaged in only with relevant persons.

Each of the Initial Purchasers has represented, warranted and agreed that:

(1) it has only communicated or caused to be communicated, and will only communicate or cause to be communicated, any invitation or inducement to engage in investment activity (within the meaning of section 21 of the FSMA) received by it in connection with the issue or sale of any Notes in circumstances in which section 21(1) of the FSMA does not apply to the Issuers; and

(2) it has complied and will comply with all applicable provisions of the FSMA with respect to anything done by it in relation to the Notes in, from or otherwise involving the United Kingdom.

United States

The Notes and the Subsidiary Guarantees have not been, and will not be, registered under the Securities Act or any state securities laws and, unless so registered, may not be offered or sold within the United States except pursuant to an exemption from, or in a transaction not subject to, the registration requirements of the Securities Act and applicable state securities laws. See "Transfer Restrictions" for a description of other restrictions on the transfer of the Notes. Accordingly, the Notes are being offered and sold only outside of the United States in offshore transactions in reliance on Regulation S.

As used herein, the term "United States" has the meaning given to it in Regulation S.

RATINGS

The Notes are expected to be rated "B" by Fitch and "B3" by Moody's. The ratings reflect the rating agencies' assessment of the likelihood of timely payment of the principal of and the interest on the Notes. The credit ratings accorded the Notes are not a recommendation to purchase, hold or sell the Notes in as much as such ratings do not comment as to market price or suitability for a particular investor. There can be no assurance that the ratings will remain in effect for any given period or that the ratings will not be revised by the rating agencies in the future if, in their judgment, circumstances so warrant. Each such rating should be evaluated independently of any other rating on the Notes, on any of our other securities, or on us.

LEGAL MATTERS

Certain legal matters will be passed upon for us by Davis Polk & Wardwell as to United States federal and New York law and Hong Kong law. Certain legal matters as to Mongolian law will be passed on for us by Snowhill Consultancy LLP. Certain legal matters as to Cayman Islands law will be passed on for us by Maples and Calder (Hong Kong) LLP. Certain legal matters as to Luxembourg law will be passed on for us by Loyens & Loeff Luxembourg S.à r.l.

Certain legal matters will be passed upon for the Initial Purchasers by Shearman & Sterling LLP as to matters of United States federal securities and New York State laws and Melville Erdenedalai LLP as to Mongolian law.

Certain legal matters will be passed upon for the Trustee by Allen & Overy as to matters of New York State laws.

INDEPENDENT ACCOUNTANTS

The published consolidated financial statements of the Group as of and for the years ended December 31, 2020, 2021 and 2022, included in this Offering Memorandum, have been audited by KPMG, certified public accountants, Hong Kong, as stated in their reports appearing herein. The published consolidated financial statements of the Group as of and for the six months ended June 30, 2023, included in this Offering Memorandum, have been reviewed by KPMG.

For the purposes of the offers and sales outside the United States under the Regulation S of the Securities Act in reliance on Regulation S, KPMG has acknowledged the issue of this Offering Memorandum with the inclusion herein of and all references to (i) its name and (ii) its reports dated March 21, 2022, March 21, 2023 and August 15, 2023 on the consolidated financial statements for the years ended December 31, 2021 and 2022 and for the six months ended June 30, 2023 in the form and context in which they are, respectively, included in this Offering Memorandum.

INDEPENDENT MINING AND GEOLOGICAL EXPERT

The coal reserve estimates provided for our UHG and BN deposits presented in this Offering Memorandum are estimates that have been prepared by Glogex Consulting LLC ("**Glogex**"), a provider of consulting services to the mining industry. Glogex has given and has not withdrawn its written consent to the issue of this Offering Memorandum with inclusion of information from its independent technical review report and the references to its name included herein in the form and context in which they are, respectively, included.

LISTING AND GENERAL INFORMATION

CONSENTS

We have each obtained all necessary consents, approvals and authorizations in the Cayman Islands in connection with the issue and performance of the Notes. The entering into of the Indenture and the issue of the Notes have been authorized by a resolution of the Board dated August 24, 2023.

DOCUMENTS AVAILABLE

For so long as any of the Notes are outstanding, copies of the Indenture may be available free of charge following prior written request and satisfactory proof of holding and identity to the Trustee, during normal business hours (between 9:00 a.m. and 3:00 p.m. (London time)) on any weekday (except public holidays) (i) at the corporate trust office of the Trustee or (ii) electronically via email from the Trustee.

For so long as any of the Notes are outstanding, copies of our audited financial statements for the last two financial years may be inspected following prior written request and satisfactory proof of holding during normal business hours on any weekday (except public holidays) at the corporate trust office of the Company.

CLEARING SYSTEM AND SETTLEMENT

The Notes have been accepted for clearance through the facilities of Euroclear and Clearstream. Solely for operational purposes of Euroclear and Clearstream, Mongolian Mining Corporation has been designated as the issuer and Energy Resources LLC has been designated as the co-issuer. Certain trading information with respect to the Notes is set forth below:

	Common Code/ISIN
Regulation S Global Note	261660377/ XS2616603770

Only Notes evidenced by a Regulation S Global Note have been accepted for clearance through Euroclear and Clearstream.

LISTING OF THE NOTES

Approval in-principle has been received from the SGX-ST for the listing and quotation of the Notes on the Official List of the SGX-ST. The SGX-ST assumes no responsibility for the correctness of any of the statements made, opinions expressed or reports contained in this Offering Memorandum. The listing or quotation of the Notes on the SGX-ST or the admission of the Notes to the Official List of the SGX-ST are not to be taken as an indication of the merits of the Company, the Group, the Subsidiary Guarantors (if any), any of their respective subsidiaries and/or associated companies, the Notes or the Subsidiary Guarantees.

The Notes will be traded on the SGX-ST in a minimum board lot size of S$200,000 for so long as any of the Notes are listed on the SGX-ST and the rules of the SGX-ST so require.

For so long as the Notes are listed on the SGX-ST and the rules of the SGX-ST so require, we shall appoint and maintain a paying agent in Singapore, where the Notes may be presented or surrendered for payment or redemption, in the event that a Global Note is exchanged for Notes in definitive form. In addition, in the event that a Global Note is exchanged for Notes in definitive form, announcement of such exchange shall be made by us or on our behalf through the SGX-ST and such announcement will include all material information with respect to the delivery of the Notes in definitive form, including details of the paying agent in Singapore, for so long as the Notes are listed on the SGX-ST and the rules of the SGX-ST so require.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Unaudited consolidated financial information as of and for the six months ended June 30, 2023

Independent Review Report F-3

Consolidated Statement of Profit or Loss F-5

Consolidated Statement of Profit or Loss and Other Comprehensive Income F-6

Consolidated Statement of Financial Position F-7

Consolidated Statement of Changes in Equity F-9

Condensed Consolidated Cash Flow Statement F-12

Notes to the Unaudited Interim Financial Report F-13

Audited consolidated financial information as of and for the year ended December 31, 2022

Independent Auditor's Report F-29

Consolidated Statement of Profit or Loss F-35

Consolidated Statement of Profit or Loss and Other Comprehensive Income F-37

Consolidated Statement of Financial Position F-38

Consolidated Statement of Changes in Equity F-40

Consolidated Cash Flow Statement F-42

Notes to Consolidated Financial Statements F-44

Audited consolidated financial information as of and for the year ended December 31, 2021

Independent Auditor's Report F-119

Consolidated Statement of Profit or Loss F-125

Consolidated Statement of Profit or Loss and Other Comprehensive Income F-127

Consolidated Statement of Financial Position F-128

Consolidated Statement of Changes in Equity F-130

Consolidated Cash Flow Statement F-132

Notes to Consolidated Financial Statements F-134

Mongolian Mining Corporation

(Stock Code: 00975)

Interim Financial Report
for the six months ended 30 June 2023

KPMG

Independent Review Report to the Board of Directors of Mongolian Mining Corporation

(Incorporated in the Cayman Islands with limited liability)

Introduction

We have reviewed the interim financial report set out on pages 3 to 25 which comprises the consolidated statement of financial position of Mongolian Mining Corporation ("the **Company**") as of 30 June 2023 and the related consolidated statement of profit or loss, consolidated statement of profit or loss and other comprehensive income, consolidated statement of changes in equity and condensed consolidated cash flow statement for the six-month period then ended and explanatory notes. The Rules Governing the Listing of Securities on The Stock Exchange of Hong Kong Limited require the preparation of an interim financial report to be in compliance with the relevant provisions thereof and International Accounting Standard 34, *Interim financial reporting*, issued by the International Accounting Standards Board. The directors are responsible for the preparation and presentation of the interim financial report in accordance with International Accounting Standard 34.

Our responsibility is to form a conclusion, based on our review, on the interim financial report and to report our conclusion solely to you, as a body, in accordance with our agreed terms of engagement, and for no other purpose. We do not assume responsibility towards or accept liability to any other person for the contents of this report.

Scope of review

We conducted our review in accordance with Hong Kong Standard on Review Engagements 2410, *Review of interim financial information performed by the independent auditor of the entity*, issued by the Hong Kong Institute of Certified Public Accountants. A review of the interim financial report consists of making enquiries, primarily of persons responsible for financial and accounting matters, and applying analytical and other review procedures. A review is substantially less in scope than an audit conducted in accordance with Hong Kong Standards on Auditing and consequently does not enable us to obtain assurance that we would become aware of all significant matters that might be identified in an audit. Accordingly we do not express an audit opinion.

KPMG

Independent Review Report to the Board of Directors of Mongolian Mining Corporation (Continued)

(Incorporated in the Cayman Islands with limited liability)

Conclusion

Based on our review, nothing has come to our attention that causes us to believe that the interim financial report as at 30 June 2023 is not prepared, in all material respects, in accordance with International Accounting Standard 34, *Interim financial reporting*.

Certified Public Accountants

8th Floor, Prince's Building
10 Chater Road
Central, Hong Kong
15 August 2023

Consolidated Statement of Profit or Loss for the six months ended 30 June 2023 - unaudited

	Note	Six months ended 30 June 2023 USD'000	2022 USD'000
Revenue	4	516,701	106,539
Cost of revenue	5	(291,597)	(126,425)
Gross profit/(loss)		225,104	(19,886)
Other net income/(loss)		3,095	(2,306)
Selling and distribution costs		(2,107)	(647)
General and administrative expenses		(14,049)	(7,352)
Profit/(loss) from operations		212,043	(30,191)
Finance income	6(a)	616	2,671
Finance costs	6(a)	(26,360)	(27,250)
Net finance costs	6(a)	(25,744)	(24,579)
Gain from repurchase of Senior Notes due 2024	7	3,970	-
Share of profits of associates		307	22
Share of losses of joint ventures		-	(10)
Profit/(loss) before taxation		190,576	(54,758)
Income tax	8	(54,123)	22,446
Profit/(loss) for the period		136,453	(32,312)
Attributable to:			
Equity shareholders of the Company		136,635	(32,361)
Non-controlling interests		(182)	49
Profit/(loss) for the period		136,453	(32,312)
Basic earnings/(loss) per share	10	13.11 cents	(3.10) cents
Diluted earnings/(loss) per share	10	13.11 cents	(3.10) cents

The notes on pages 11 to 25 form part of this interim financial report. Details of dividends payable to equity shareholders of the Company are set out in Note 21(a).

Consolidated Statement of Profit or Loss and Other Comprehensive Income for the six months ended 30 June 2023 - unaudited

	Note	*Six months ended 30 June*	
		2023 USD'000	*2022* USD'000
Profit/(loss) for the period		136,453	(32,312)
Other comprehensive income for the period (after tax and reclassification adjustments)	9		
Item that may be reclassified subsequently to profit or loss:			
Exchange differences on translation		21	(12,004)
Total comprehensive income for the period		136,474	(44,316)
Attributable to:			
Equity shareholders of the Company		136,721	(44,365)
Non-controlling interests		(247)	49
Total comprehensive income for the period		136,474	(44,316)

The notes on pages 11 to 25 form part of this interim financial report.

Consolidated Statement of Financial Position at 30 June 2023 - unaudited

	Note	*At 30 June 2023* USD'000	*At 31 December 2022* USD'000
Non-current assets			
Property, plant and equipment, net	11	954,810	919,688
Construction in progress	12	45,439	47,387
Other right-of-use assets		48	49
Intangible assets	13	495,025	498,035
Interest in associates		7,586	7,657
Interest in joint ventures		4	4
Other non-current assets	14	39,102	59,537
Deferred tax assets		26,413	28,505
Total non-current assets		1,568,427	1,560,862
Current assets			
Inventories	15	99,172	102,794
Trade and other receivables	16	106,986	92,157
Cash and cash equivalents	17	208,219	64,695
Total current assets		414,377	259,646
Current liabilities			
Trade and other payables	18	155,388	136,369
Senior notes	19	341,607	-
Contract liabilities		178,346	182,246
Lease liabilities		-	56
Current taxation		55,421	9,617
Total current liabilities		730,762	328,288
Net current liabilities		(316,385)	(68,642)
Total assets less current liabilities		1,252,042	1,492,220

The notes on pages 11 to 25 form part of this interim financial report.

Consolidated Statement of Financial Position at 30 June 2023 - unaudited (continued)

	Note	At 30 June 2023 USD'000	At 31 December 2022 USD'000
Non-current liabilities			
Senior notes	19	-	373,756
Provisions	20	17,826	16,737
Deferred tax liabilities		169,949	174,650
Total non-current liabilities		187,775	565,143
NET ASSETS		1,064,267	927,077
CAPITAL AND RESERVES			
Share capital		104,248	104,248
Reserves		905,745	768,308
Total equity attributable to equity shareholders of the Company		1,009,993	872,556
Perpetual notes	21	55,476	55,476
Non-controlling interests		(1,202)	(955)
TOTAL EQUITY		1,064,267	927,077

Approved and authorised for issue by the board of Directors on 15 August 2023.

) Directors

The notes on pages 11 to 25 form part of this interim financial report.

Consolidated Statement of Changes in Equity for the six months ended 30 June 2023 - unaudited

	Attributable to equity shareholders of the Company									
	Share capital USD'000	*Share premium* USD'000	*Other reserve* USD'000	*Exchange reserve* USD'000	*Property revaluation reserve* USD'000	*Retained profits* USD'000	*Total* USD'000	*Perpetual notes* USD'000 (Note 21(c))	*Non-controlling interests* USD'000	*Total equity* USD'000
At 1 January 2022	103,158	769,326	36,327	(499,069)	370,827	49,254	829,823	66,569	186	896,578
Changes in equity for the six months ended 30 June 2022:										
Loss for the period	-	-	-	-	-	(32,361)	(32,361)	-	49	(32,312)
Other comprehensive income	-	-	-	(12,004)	-	-	(12,004)	-	-	(12,004)
Total comprehensive income	-	-	-	(12,004)	-	(32,361)	(44,365)	-	49	(44,316)
Equity-settled share-based transactions	1,090	3,688	(1,453)	-	-	-	3,325	-	-	3,325
Reclassification of property revaluation reserve to retained profits upon disposal of property	-	-	-	-	(114)	114	-	-	-	-
At 30 June 2022	104,248	773,014	34,874	(511,073)	370,713	17,007	788,783	66,569	235	855,587

The notes on pages 11 to 25 form part of this interim financial report.

Consolidated Statement of Changes in Equity
for the six months ended 30 June 2023 - unaudited (continued)

	Attributable to equity shareholders of the Company									
	Share capital USD'000	*Share premium* USD'000	*Other reserve* USD'000	*Exchange reserve* USD'000	*Property revaluation reserve* USD'000	*Retained profits* USD'000	*Total* USD'000	*Perpetual notes* USD'000 (Note 21(c))	*Non-controlling interests* USD'000	*Total equity* USD'000
At 1 July 2022	104,248	773,014	34,874	(511,073)	370,713	17,007	788,783	66,569	235	855,587
Changes in equity for the six months ended 31 December 2022:										
Profits for the period	-	-	-	-	-	91,538	91,538	-	(335)	91,203
Other comprehensive income	-	-	-	(8,867)	-	-	(8,867)	-	(855)	(9,722)
Total comprehensive income	-	-	-	(8,867)	-	91,538	82,671	-	(1,190)	81,481
Repurchase of perpetual notes	-	-	-	-	-	1,102	1,102	(11,093)	-	(9,991)
Reclassification of property revaluation reserve to retained profits upon disposal of property	-	-	-	-	(397)	397	-	-	-	-
At 31 December 2022	104,248	773,014	34,874	(519,940)	370,316	110,044	872,556	55,476	(955)	927,077

The notes on pages 11 to 25 form part of this interim financial report.

Consolidated Statement of Changes in Equity
for the six months ended 30 June 2023 - unaudited (continued)

	Attributable to equity shareholders of the Company									
	Share capital USD'000	*Share premium* USD'000	*Other reserve* USD'000	*Exchange reserve* USD'000	*Property revaluation reserve* USD'000	*Retained profits* USD'000	*Total* USD'000	*Perpetual notes* USD'000 (Note 21(c))	*Non-controlling interests* USD'000	*Total equity* USD'000
At 1 January 2023	104,248	773,014	34,874	(519,940)	370,316	110,044	872,556	55,476	(955)	927,077
Changes in equity for the six months ended 30 June 2023:										
Profits for the period	-	-	-	-	-	136,635	136,635	-	(182)	136,453
Other comprehensive income	-	-	-	86	-	-	86	-	(65)	21
Total comprehensive income	-	-	-	86	-	136,635	136,721	-	(247)	136,474
Equity-settled share-based transactions	-	-	716	-	-	-	716	-	-	716
Reclassification of property revaluation reserve to accumulated losses upon disposal of property	-	-	-	-	(368)	368	-	-	-	-
At 30 June 2023	104,248	773,014	35,590	(519,854)	369,948	247,047	1,009,993	55,476	(1,202)	1,064,267

The notes on pages 11 to 25 form part of this interim financial report.

Condensed Consolidated Cash Flow Statement for the six months ended 30 June 2023 - unaudited

	Note	*Six months ended 30 June*	
		2023	*2022*
		USD'000	USD'000
Operating activities			
Cash generated from operations		258,920	80,425
Income tax paid		(11,110)	(93)
Net cash generated from operating activities		247,810	80,332
Investing activities			
Payments for acquisition of property, plant and equipment and construction in progress		(42,445)	(28,465)
Payments for acquisition of intangible asset		(6)	(710)
Payments for investment in an associate		-	(6,951)
Prepayment for acquisition of a subsidiary		(10,000)	-
Interest received		212	10
Net cash used in investing activities		(52,239)	(36,116)
Financing activities			
Proceeds from shares issued under share option scheme		-	3,325
Capital element of lease rentals paid		(102)	(72)
Repurchase of Senior Notes due 2024		(28,978)	-
Interest element of lease rentals paid		(5)	(1)
Interest paid		(17,156)	(20,946)
Net cash used in financing activities		(46,241)	(17,694)
Net increase in cash and cash equivalents		149,330	26,522
Cash and cash equivalents at the beginning of the period		64,695	25,937
Effect of foreign exchange rates changes		(5,806)	(1,620)
Cash and cash equivalents at the end of the period	17	208,219	50,839

The notes on pages 11 to 25 form part of this interim financial report.

Notes to the unaudited interim financial report

1 Basis of preparation

This interim financial report has been prepared in accordance with the applicable disclosure provisions of the Rules Governing the Listing of Securities on The Stock Exchange of Hong Kong Limited (the "**Listing Rules**"), including compliance with International Accounting Standard ("**IAS**") 34, *Interim financial reporting*, issued by the International Accounting Standards Board ("**IASB**"). It was authorised for issuance on 15 August 2023.

The interim financial report has been prepared in accordance with the same accounting policies adopted in the 2022 annual financial statements, except for the accounting policy changes that are expected to be reflected in the 2023 annual financial statements. Details of these changes in accounting policies are set out in Note 2.

The preparation of an interim financial report in conformity with IAS 34 requires management to make judgements, estimates and assumptions that affect the application of policies and reported amounts of assets and liabilities, income and expenses on a year-to-date basis. Actual results may differ from these estimates.

The interim financial report contains condensed consolidated financial statements and selected explanatory notes. The notes include an explanation of events and transactions that are significant to an understanding of the changes in financial position and performance of Mongolian Mining Corporation (the "**Company**") together with its subsidiaries (the "**Group**") since the 2022 annual financial statements. The condensed consolidated interim financial statements and notes thereon do not include all of the information required for a full set of financial statements prepared in accordance with International Financial Reporting Standards ("**IFRSs**").

The interim financial report is unaudited, but has been reviewed by KPMG in accordance with Hong Kong Standard on Review Engagements 2410, *Review of interim financial information performed by the independent auditor of the entity*, issued by the Hong Kong Institute of Certified Public Accountants. KPMG's independent review report to the Board of Directors is included on pages 1 to 2.

As a result of the improvement and stabilisation of the border crossing throughput level from the second half of 2022, the Group's financial performance improved substantially during the reporting period. The Group had net current liabilities of USD316,385,000 as at 30 June 2023. The Group has standby facilities from local banks in Mongolia totalling USD50,000,000 as of the reporting date. Based on the cash flow forecast of the Group for the next twelve months ending 30 June 2024 prepared by the management, the directors of the Company (the "**Directors**") expect to maintain adequate financial resources to cover its operating costs and meet its financing commitments, as and when they fall due for the twelve months period subsequent to 30 June 2023.

2 Changes in accounting policies

The IASB has issued the following amendments to IFRSs that are first effective for the current accounting period of the Group:

- IFRS 17 *Insurance Contracts*
- Amendments to IAS 8, *Accounting policies, changes in accounting estimates and errors: Definition of accounting estimates*
- Amendments to IAS 12*, Income taxes: Deferred tax related to assets and liabilities arising from a Single Transaction*
- Amendments to IAS 12, *Income taxes: International tax reform – Pilar Two model rules*

None of these developments have had a material effect on how the Group's results and financial position for the current or prior periods have been prepared or presented. The Group has not applied any new standard or interpretation that is not yet effective for the current accounting period.

3 Segment reporting

The Group has one business segment, the mining, processing, transportation and sale of coal products. The majority of assets and liabilities are located in Mongolia and the majority of its customers are located in the People's Republic of China ("**PRC**"). Based on information reported by the chief operating decision maker for the purpose of resource allocation and performance assessment, the Group's only operating segment is the mining, processing, transportation and sale of coal products. Accordingly, no additional business and geographical segment information are presented.

4 Revenue

The Group is principally engaged in the mining, processing, transportation and sale of coal products. Revenue represents the sales value of goods sold to customers exclusive of value added or sales taxes and after deduction of any trade discounts and volume rebates. The amount of each significant category of revenue recognised for the six months ended 30 June 2023 and 2022 are as follows:

	Six months ended 30 June	
	2023	*2022*
	USD'000	USD'000
Washed hard-coking coal	450,216	94,244
Washed semi-soft coking coal	48,154	10,562
Middlings	17,364	1,595
Raw thermal coal	967	138
	516,701	106,539

5 Cost of revenue

	Six months ended 30 June	
	2023	*2022*
	USD'000	USD'000
Mining costs	124,285	26,942
Processing costs	29,472	7,332
Transportation costs	41,831	31,454
Others (Note (i))	96,009	36,318
Cost of revenue during mine operations	291,597	102,046
Cost of revenue during idled mine period (Note (ii))	-	24,379
Cost of revenue	291,597	126,425

Notes:

(i) Others mainly include royalty tax on the coal sold.

(ii) For the six months ended 30 June 2022, cost of revenue during idled mine period mainly includes depreciation expense related to idled plant and equipment, staff costs and mining contractor costs.

6 Profit/(loss) before taxation

Profit/(loss) before taxation is arrived at after (crediting)/charging:

(a) Net finance costs:

	Six months ended 30 June	
	2023	*2022*
	USD'000	USD'000
Interest income	(616)	(10)
Net change in fair value of derivative component of senior notes	-	(2,661)
Finance income	(616)	(2,671)
Interest on liability component of senior notes (Note 19)	18,189	23,047
Interest on lease liabilities	5	1
Transaction cost	9	26
Unwinding interest on accrued reclamation obligations (Note 20)	637	865
Foreign exchange loss, net	7,520	3,311
Finance costs	26,360	27,250
Net finance costs	25,744	24,579

6 Profit/(loss) before taxation (continued)

Note:

No borrowing costs have been capitalised during the six months ended 30 June 2023 and 2022.

(b) Other items:

	Six months ended 30 June	
	2023	*2022*
	USD'000	USD'000
Depreciation and amortisation	46,026	22,954
Loss/(gain) on disposal of property, plant and equipment	286	(6)

7 Gain from repurchase of Senior Notes due 2024

The Group repurchased a total of USD33,160,000 principal amount from senior notes with initial principal amount of USD440,000,000 maturing on 15 April 2024 ("**Senior Notes due 2024**") through open market purchase during the six months ended 30 June 2023. The excess of derecognised carrying amount of the Senior Notes due 2024 over the consideration to settle the financial liabilities, amounting to approximately USD3,970,000, has been recognised as a gain from repurchase of Senior Notes due 2024 and credited to profit or loss during the six months ended 30 June 2023.

8 Income tax

(a) Income tax in the consolidated statement of profit and loss and other comprehensive income represents:

	Six months ended 30 June	
	2023	*2022*
	USD'000	USD'000
Current tax		
Provision for the year	56,148	111
Over-provision in respect of prior years	-	(115)
	56,148	(4)
Deferred tax	(2,025)	(22,442)
	54,123	(22,446)

8 Income tax (continued)

(b) Reconciliation between tax expenses/(credit) and accounting profit/(loss) at applicable tax rates:

	Six months ended 30 June	
	2023	*2022*
	USD'000	USD'000
Profit/(loss) before taxation	190,576	(54,758)
Notional tax on profit/(loss) before taxation	48,048	(24,239)
Tax effect of non-deductible items (Note (iii))	8,039	4,765
Tax effect of non-taxable items (Note (iii))	(2,167)	(3,037)
Tax losses not recognised	203	180
Over-provision in prior years	-	(115)
Actual tax expenses/(credit)	54,123	(22,446)

Notes:

(i) Pursuant to the income tax rules and regulations of Mongolia, the subsidiaries of the Group located in Mongolia are liable to Mongolian Corporate Income Tax at a rate of 10% for the first MNT6 billion taxable income, and 25% for the remaining taxable income for the six months ended 30 June 2023 and 2022. According to the Corporate Income Tax Law of the PRC, the Company's subsidiaries in the PRC are subject to statutory income tax rate of 25%.

(ii) Pursuant to the rules and regulations of the Cayman Islands, the Group is not subject to any income tax in the Cayman Islands. The Group is not subject to Hong Kong, Luxembourg and Singapore profits tax as it has no assessable income arising in or derived from Hong Kong, Luxembourg and Singapore during the six months ended 30 June 2023 and 2022.

(iii) Non-deductible and non-taxable items mainly includes net unrealised exchange gain or loss, other non-deductible expenses and non-taxable income pursuant to the income tax rules and regulations of Mongolia and other related tax source regions during the six months ended 30 June 2023 and 2022.

9 Other comprehensive income

	Six months ended 30 June	
	2023	*2022*
	USD'000	USD'000
Exchange differences on translation of the financial statements of certain subsidiaries	21	(12,004)

10 Earnings/(loss) per share

(a) Basic earnings/(loss) per share

The calculation of basic earnings/(loss) per share is based on the profit attributable to ordinary equity shareholders of the Company of USD136,635,000 (loss attributable to ordinary equity shareholders of the Company for the six months ended 30 June 2022: USD32,361,000) and the weighted average of 1,042,476,786 ordinary shares (six months ended 30 June 2022: weighted average of 1,042,476,786 ordinary shares) in issue during the interim period.

(b) Diluted earnings/(loss) per share

For the six months ended 30 June 2023 and 2022, basic and diluted earnings/(loss) per share are the same.

The effects of the outstanding share options (see Note 21(b)) are anti-dilutive and therefore not included in calculating diluted earnings/(loss) per share for the six months ended 30 June 2023 and 2022.

11 Property, plant and equipment, net

(a) Right-of-use assets

During the six months ended 30 June 2023 and 2022, the Group did not enter into any new lease agreements, and therefore no additional right-of-use assets were recognised.

(b) Acquisitions and disposals of owned assets

Mining properties of the Group as at 30 June 2023 include stripping activity assets with carrying amount of USD461,925,000 (31 December 2022: USD447,797,000).

During the six months ended 30 June 2023, the additions of property, plant and equipment of the Group, representing mainly various mining structures, amounted to USD75,548,000 (six months ended 30 June 2022: USD12,394,000). Items of property, plant and equipment with a net book value of USD286,000 were disposed of during the six months ended 30 June 2023 (six months ended 30 June 2022: USD172,000).

12 Construction in progress

The construction in progress is mainly related to machinery and equipment.

13 Intangible assets

Intangible assets mainly represent the mining right acquired during the acquisition of Baruun Naran mine and the permission to operate at the customs bonded terminal.

14 Other non-current assets

	At 30 June 2023 USD'000	*At 31 December 2022* USD'000
Prepayments in connection with construction work, equipment purchases and others	38,488	58,923
Other financial asset (Note)	614	614
	39,102	59,537

Note: The Group has an investment of 2.25% equity interest in International Medical Center LLC.

15 Inventories

Inventories in the consolidated statement of financial position comprise:

	At 30 June 2023 USD'000	*At 31 December 2022* USD'000
Coal	91,591	96,945
Materials and supplies	18,018	16,286
	109,609	113,231
Less: provision on coal inventories	(10,437)	(10,437)
	99,172	102,794

16 Trade and other receivables

As of the end of the reporting period, the ageing analysis of trade debtors (which are included in trade and other receivables), based on the invoice date and net of allowance for doubtful debts, is as follows:

	At 30 June 2023 USD'000	*At 31 December 2022* USD'000
Within 90 days	10,047	4,245
90 to 180 days	1,890	187
180 to 270 days	12	-
Trade receivables net of allowance for doubtful debts	11,949	4,432
Amounts due from related parties	14	3
Other debtors	996	763
Financial assets measured at amortised cost	12,959	5,198
Prepayments and deposits (Note (i))	43,494	53,809
Value added tax ("**VAT**") and other tax receivables (Note (ii))	40,533	33,150
Others	10,000	-
	106,986	92,157

Notes:

(i) At 30 June 2023 and 31 December 2022, prepayments and deposits mainly represent the prepayments made to the Group's mining contractor.

(ii) VAT and other tax receivables include amounts that have been accumulated to date in certain subsidiaries and were due from Mongolian Tax Authority ("**MTA**"). According to the prevailing tax rules and regulations in Mongolia, a taxpayer may offset future taxes and royalties payable to MTA against VAT receivable from MTA. The Group verifies the collectability of such funds with MTA on a regular basis, and based on currently available information, the Group anticipates full recoverability.

17 Cash and cash equivalents

	At 30 June 2023 USD'000	*At 31 December 2022* USD'000
Cash in hand	2	2
Cash at banks	208,217	64,693
Cash and cash equivalents in the consolidated statement of financial position and the consolidated cash flow statement	208,219	64,695

18 Trade and other payables

As of the end of the reporting period, the ageing analysis of trade creditors (which are included in trade and other payables), based on the invoice date, is as follows:

	At 30 June 2023 USD'000	*At 31 December 2022* USD'000
Within 90 days	72,457	71,264
90 to 180 days	4	-
180 to 365 days	102	-
Over 365 days	31,607	32,723
Total trade creditors	104,170	103,987
Payables for purchase of equipment	1,767	2,013
Interest payables	6,703	7,350
Other taxes payables	28,164	11,015
Amounts due to related parties	5,107	3,986
Others	9,477	8,018
	155,388	136,369

19 Senior notes

	At 30 June 2023 USD'000	*At 31 December 2022* USD'000
Senior Notes due 2024 (Note)	341,607	373,756

Note:

On 15 April 2019, the Group issued the Senior Notes due 2024 with a principal amount of USD440,000,000 which were listed on the Singapore Exchange Securities Trading Limited. The Senior Notes due 2024 bear interest at 9.25% per annum fixed rate, payable semi-annually, and due on 15 April 2024.

The Senior Notes due 2024 have been accounted for as a hybrid financial instrument containing a derivative component and a liability component. The derivative component of early redemption option was initially recognised at its fair value of nil. The fair value of the derivative component of early redemption option as at 30 June 2023 was nil (31 December 2022: nil). The liability component was initially recognised at fair value of USD429,795,446, after taking into account attributable transaction costs of USD10,204,554 and is accounted on amortised cost subsequently. In 2022, the Group repurchased an aggregate principal amount of USD63,591,000 from Senior Notes due 2024. During the six months ended 30 June 2023, the Group repurchased an aggregate principal amount of USD33,160,000 from Senior Notes due 2024 (See Note 7). As at 30 June 2023, the carrying amount of the liability component was USD341,607,000 (31 December 2022: USD373,756,000). The outstanding principal amount of the Senior Notes due 2024 is USD343,249,000 as at 30 June 2023 (31 December 2022: USD376,409,000).

Fair value of the derivative component was estimated by the Directors based on the binomial model.

20 Provisions

	At 30 June 2023 USD'000	*At 31 December 2022* USD'000
Accrued reclamation obligations	17,826	16,737
Others	1,500	1,500
	19,326	18,237
Less: current portion	(1,500)	(1,500)
	17,826	16,737

20 Provisions (continued)

The accrual for reclamation costs has been determined based on management's best estimates. The estimate of the associated costs may be subject to change in the near term when the reclamation on the land from current mining activities becomes apparent in future periods. At the end of the reporting period, the Group reassessed the estimated costs and adjusted the accrued reclamation obligations, where necessary. The Group's management believes that the accrued reclamation obligations as at 30 June 2023 are adequate and appropriate. The accrual is based on estimates and therefore, the ultimate liability may exceed or be less than such estimates. The movement of the accrued reclamation cost is as follows:

	2023 USD'000	*2022* USD'000
At 1 January	16,737	30,928
Increase/(decrease) for reassessment of estimated costs	452	(15,784)
Accretion expense (Note 6(a))	637	1,593
At 30 June/31 December	17,826	16,737

21 Capital, reserves and dividends

(a) Dividends

The board of Directors of the Company does not recommend declaration and payment of interim dividend in respect of the six months ended 30 June 2023 (six months ended 30 June 2022: nil).

(b) Equity settled share-based transactions

On 3 April 2023, 33,250,000 share options were granted to a director and the employees of the Company under the share option scheme (no share options were granted during the six months ended 30 June 2022). Each option gives the holder the right to subscribe for one ordinary share of the Company. These share options will vest on 3 April 2024, 3 April 2025, 3 April 2026 and 3 April 2027 separately of 25% each, and then be exercisable until 3 April 2028.The exercise price is HKD3.26, being the closing price as stated in the daily quotations sheet issued by the Stock Exchange of Hong Kong Limited on the date of grant.

No options were exercised during the six months ended 30 June 2023 (six months ended 30 June 2022: 10,900,000).

21 Capital, reserves and dividends (continued)

(c) Perpetual notes

The Company issued perpetual notes which were listed on the Singapore Exchange Securities Trading Limited on 4 May 2017, with a principal amount of USD195,000,000 and with a fair value of USD75,897,000. Fair value of the perpetual notes was valued by the management with the reference to a valuation report issued by an independent valuer based on the discounted cash flow method.

On 15 April 2019, the Company redeemed a principal amount of USD23,972,000 with a carrying amount of USD9,328,000 through debt refinancing. After the debt refinancing, the outstanding principal amount of the perpetual notes was USD171,028,000 with a carrying amount of USD66,569,000. Pursuant to the Company's announcements dated 12 July 2022 and 23 November 2022, the Company repurchased a principal amount of USD22,120,000 and USD6,380,000, respectively, with a carrying amount of USD8,610,000 and USD2,483,000. As at 30 June 2023, the outstanding principal amount of the perpetual notes was USD142,528,000 with a carrying amount of USD55,476,000.

The perpetual notes have no fixed maturity and are redeemable at the Company's option. The distribution payments can be deferred at the discretion of the Company. So long as the perpetual notes are outstanding, the Company shall not declare or pay any dividend or make any distribution on or with respect to its capital shares; or redeem, reduce, cancel, buy-back or acquire for any consideration any of its capital shares.

22 Fair value measurement of financial instruments

(a) Financial assets and liabilities measured at fair value

(i) Fair value hierarchy

The following table presents the fair value of the Group's financial instruments measured at the end of the reporting period on a recurring basis, categorised into the three-level fair value hierarchy as defined in IFRS 13, *Fair value measurement*. The level into which a fair value measurement is classified is determined with reference to the observability and significance of the inputs used in the valuation technique as follows:

- Level 1 valuations: Fair value measured using only Level 1 inputs i.e. unadjusted quoted prices in active markets for identical assets or liabilities at the measurement date

- Level 2 valuations: Fair value measured using Level 2 inputs i.e. observable inputs which fail to meet Level 1, and not using significant unobservable inputs. Unobservable inputs are inputs for which market data are not available

- Level 3 valuations: Fair value measured using significant unobservable inputs

The Group has a team headed by the finance manager performing valuations for the financial instruments, including the redemption option embedded in the senior notes. The team reports directly to the chief financial officer. A valuation report with analysis of changes in fair value measurement is prepared by the team at each interim and annual reporting date, and is reviewed and approved by the chief financial officer. Discussion of the valuation process and results with the chief financial officer is held twice a year, to coincide with the reporting dates.

22 Fair value measurement of financial instruments (continued)

		Fair value measurements as at 30 June 2023 categorised into		
	Fair value at 30 June 2023 USD'000	*Level 1* USD'000	*Level 2* USD'000	*Level 3* USD'000
Recurring fair value measurement				
Financial asset				
- Redemption option embedded in Senior Notes due 2024	-	Not applicable	Not applicable	-

		Fair value measurements as at 31 December 2022 categorised into		
	Fair value at 31 December 2022 USD'000	*Level 1* USD'000	*Level 2* USD'000	*Level 3* USD'000
Recurring fair value measurement				
Financial asset				
- Redemption option embedded in Senior Notes due 2024	-	Not applicable	Not applicable	-

During the six months ended 30 June 2023, there were no transfers between Level 1 and Level 2, or transfers into or out of Level 3 (2022: nil). The Group's policy is to recognise transfers between levels of fair value hierarchy as at the end of the reporting period in which they occur.

(ii) Information about Level 3 fair value measurements

	Valuation techniques	*Significant unobservable inputs*	*Value of unobservable inputs*
Redemption option embedded in Senior Notes due 2024	Binomial model	Expected volatility	12.2% (2022:12.8%)

The fair value of redemption option embedded in Senior Notes due 2024 is determined using binomial model and the significant unobservable input used in the fair value measurement is expected volatility. The fair value measurement is positively correlated to the expected volatility. As at 30 June 2023, it is estimated that with all other variables held constant, an increase/decrease in the expected volatility by 1% would have increased/decreased the Group's profit by nil.

The net gain or loss resulting from the redemption option embedded in the Senior Notes due 2024 are recognised in net finance costs in the consolidated statement of profit or loss.

22 Fair value measurement of financial instruments (continued)

(b) Fair value of financial assets and liabilities carried at other than fair value

The carrying amounts of the Group's financial instruments carried at cost or amortised cost were not materially different from their fair values as at 30 June 2023 and 31 December 2022 except for the following financial instruments, for which their carrying amounts and fair value are disclosed below:

	At 30 June 2023	
	Carrying amount USD'000	*Fair value* USD'000
Liability component of Senior Notes due 2024	341,607	329,949

	At 31 December 2022	
	Carrying amount USD'000	*Fair value* USD'000
Liability component of Senior Notes due 2024	373,756	352,414

23 Material related party transactions

Particulars of significant transactions between the Group and related parties during the period ended 30 June 2023 and 2022 are ancillary services and sales of goods. Ancillary services received by the Group represent expenditures for support services such as power and heat generation, security service, vehicle inspection, cleaning and canteen expense. The amount of ancillary service and related charges incurred during the six months ended 30 June 2023 was USD9,176,000 (six months ended 30 June 2022: USD6,448,000). Sales of goods represent coal sales. The amount of goods sold to related parties during the six months ended 30 June 2023 was nil (six months ended 30 June 2022: USD3,218,000).

24 Commitments and contingencies

(a) Capital commitments outstanding not provided for in the interim financial report

Capital commitments outstanding at respective reporting dates not provided for in the interim financial report were as follows:

	At 30 June 2023 USD'000	*At 31 December 2022* USD'000
Contracted for	6,793	-

(b) Environmental contingencies

Historically, the Group has not incurred any significant expenditure for environmental remediation. Further, except for the accrued reclamation obligations as disclosed in Note 20 and amounts incurred pursuant to the environment compliance protection and precautionary measures in Mongolia, the Group has not incurred any other significant expenditure for environmental remediation, is currently not involved in any other environmental remediation, and has not accrued any other amounts for environmental remediation relating to its operations. Under existing legislation, the Directors believe that there are no probable liabilities that will have a material adverse effect on the financial position or operating results of the Group. Environmental liabilities are subject to considerable uncertainties which affect the Group's ability to estimate the ultimate cost of remediation efforts. The outcome of environmental liabilities under future environmental legislations cannot be estimated reasonably at present and which could be material.

Mongolian Mining Corporation

(Stock Code: 00975)

Financial Statements
for the year ended 31 December 2022

KPMG

Independent Auditor's Report to the Shareholders of Mongolian Mining Corporation

(Incorporated in the Cayman Islands with limited liability)

Opinion

We have audited the consolidated financial statements of Mongolian Mining Corporation ("**the Company**") and its subsidiaries ("**the Group**") set out on pages 7 to 89 which comprise the consolidated statement of financial position as at 31 December 2022, the consolidated statement of profit or loss, the consolidated statement of profit or loss and other comprehensive income, the consolidated statement of changes in equity and the consolidated cash flow statement for the year then ended and notes to the consolidated financial statements, including a summary of significant accounting policies.

In our opinion, the consolidated financial statements give a true and fair view of the consolidated financial position of the Group as at 31 December 2022 and of its consolidated financial performance and its consolidated cash flows for the year then ended in accordance with International Financial Reporting Standards ("**IFRSs**") issued by the International Accounting Standards Board ("**IASB**") and have been properly prepared in compliance with the disclosure requirements of the Hong Kong Companies Ordinance.

Basis for Opinion

We conducted our audit in accordance with Hong Kong Standards on Auditing ("**HKSAs**") issued by the Hong Kong Institute of Certified Public Accountants ("**HKICPA**"). Our responsibilities under those standards are further described in the *Auditor's responsibilities for the audit of the consolidated financial statements* section of our report. We are independent of the Group in accordance with the HKICPA's *Code of Ethics for Professional Accountants* ("**the Code**") together with any ethical requirements that are relevant to our audit of the consolidated financial statements in the Cayman Islands, and we have fulfilled our other ethical responsibilities in accordance with these requirements and the Code. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Key Audit Matter

Key audit matter is the matter that, in our professional judgement, was of most significance in our audit of the consolidated financial statements of the current period. The matter was addressed in the context of our audit of the consolidated financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on this matter.

Assessing impairment of mining related assets	
Refer to notes 2(h), 2(i), 3(a), 14, 15 and 17 to the consolidated financial statements and the accounting policies.	
The Key Audit Matter	**How the matter was addressed in our audit**
The Group's mining related assets are the most quantitatively significant items in the consolidated statement of financial position and mainly comprise property, plant and equipment, construction in progress, and intangible assets relating to the Group's mining operations located in Mongolia, which are considered by management to represent a single separately identifiable cash generating unit ("**CGU**"). The Group recognised impairment of its mining rights in the amount of USD190 million which reflected downward pressures on the prices of certain coking coal products in 2014 and concluded that no further impairment or reversal of previously recognised impairment was necessary subsequent to 2014. As at 31 December 2022, the carrying amount of net assets of the Group exceeded the Company's market capitalisation. Management considered this indicated that the Group's mining related assets may be impaired and performed an impairment assessment of the mining related assets to determine the recoverable amount.	Our audit procedures to assess impairment of mining related assets included the following: • evaluating the design and implementation of key internal controls over the estimations of the recoverable amounts of mining related assets; • assessing the allocation of assets and liabilities by management to the mining CGU and the methodology adopted by management in its impairment assessment with reference to the requirements of the prevailing accounting standards; • challenging the key assumptions and estimates used in the discounted cash flow forecast as at 31 December 2022, including those relating to future commodity prices, future sales, future operating costs and the discount rates applied, which included involving our internal valuation specialists to assist us in comparing these key assumptions and estimates with external benchmarks (including future commodity prices and discount rates for similar companies in the same industry) and in considering the key assumptions and estimates based on our knowledge of the Group and the industry in which it operates;

KPMG

Independent Auditor's Report to the Shareholders of Mongolian Mining Corporation (continued)

(Incorporated in the Cayman Islands with limited liability)

Key Audit Matters (continued)

Assessing impairment of mining related assets (continued)	
Refer to notes 2(h), 2(i), 3(a), 14, 15 and 17 to the consolidated financial statements and the accounting policies.	
The Key Audit Matter	**How the matter was addressed in our audit**
Management determines the recoverable amount of mining related assets based on the value in use of the CGU to which the assets have been allocated by using discounted cash flow techniques. The preparation of a discounted cash flow forecast involves the exercise of significant management judgement in the selection of assumptions, in particular in estimating future commodity prices and the discount rate applied as well as in determining internal assumptions relating to future sales and future operating costs. We identified assessing impairment of mining related assets as a key audit matter because of its significance to the consolidated financial statements and the inherent uncertainty involved in forecasting and discounting future cash flows which involves significant management judgement and could be subject to management bias.	• assessing the reliability of management's forecasting process and whether there is any indication of management bias by comparing the key assumptions and estimates included in the discounted cash flow forecast prepared in the prior year with the current year's performance and those adopted in current year's forecast, and making enquiries of management as to the reasons for any significant variances or changes identified; • performing sensitivity analyses of the key assumptions and estimates adopted in the discounted cash flow forecast and assessing the impact of changes in the key assumptions and estimates and whether there were any indication of management bias; and • assessing the reasonableness of disclosures in the consolidated financial statements in respect of the impairment of mining related assets with reference to the requirements of the prevailing accounting standards.

Information other than the consolidated financial statements and auditor's report thereon

The directors are responsible for the other information. The other information comprises all the information included in the annual report, other than the consolidated financial statements and our auditor's report thereon.

Our opinion on the consolidated financial statements does not cover the other information and we do not express any form of assurance conclusion thereon.

In connection with our audit of the consolidated financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the consolidated financial statements or our knowledge obtained in the audit or otherwise appears to be materially misstated.

Information other than the consolidated financial statements and auditor's report thereon (continued)

If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Responsibilities of the directors for the consolidated financial statements

The directors are responsible for the preparation of the consolidated financial statements that give a true and fair view in accordance with IFRSs issued by the IASB and the disclosure requirements of the Hong Kong Companies Ordinance and for such internal control as the directors determine is necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, the directors are responsible for assessing the Group's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the directors either intend to liquidate the Group or to cease operations, or have no realistic alternative but to do so.

The directors are assisted by the Audit Committee in discharging their responsibilities for overseeing the Group's financial reporting process.

Auditor's responsibilities for the audit of the consolidated financial statements

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. This report is made solely to you, as a body, and for no other purpose. We do not assume responsibility towards or accept liability to any other person for the contents of this report.

Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with HKSAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements.

Auditor's responsibilities for the audit of the consolidated financial statements (continued)

As part of an audit in accordance with HKSAs, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Group's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the directors.

- Conclude on the appropriateness of the directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the consolidated financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Group to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express an opinion on the consolidated financial statements. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinion.

We communicate with the Audit Committee regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Auditor's responsibilities for the audit of the consolidated financial statements (continued)

We also provide the Audit Committee with a statement that we have complied with relevant ethical requirements regarding independence and communicate with them all relationships and other matters that may reasonably be thought to bear on our independence and, where applicable, actions taken to eliminate threats or safeguards applied.

From the matters communicated with the Audit Committee, we determine those matters that were of most significance in the audit of the consolidated financial statements of the current period and are therefore the key audit matters. We describe these matters in our auditor's report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

The engagement partner on the audit resulting in this independent auditor's report is Man Siu Kei.

KPMG

Certified Public Accountants

8th Floor, Prince's Building
10 Chater Road
Central, Hong Kong

21 March 2023

Consolidated statement of profit or loss for the year ended 31 December 2022

(Expressed in United States dollars)

	Note	*2022* USD'000	*2021* USD'000
Revenue	4	546,248	184,069
Cost of revenue	5	(451,131)	(161,490)
Gross profit		95,117	22,579
Other costs		(1,328)	(3,422)
Other net income		5,509	3,382
Selling and distribution costs	6(c)	(2,434)	(9,625)
General and administrative expenses		(24,775)	(24,242)
Profit/(loss) from operations		72,089	(11,328)
Finance income	6(a)	6,286	54
Finance costs	6(a)	(47,081)	(48,980)
Net finance costs	6(a)	(40,795)	(48,926)
Gain from repurchase of Senior Notes due 2024	7	23,144	-
Share of profits/(losses) of associates		286	(196)
Share of losses of joint ventures		(16)	(1)

The notes on pages 16 to 89 form part of these financial statements. Details of dividends payable to equity shareholders of the Company attributable to the profit for the year are set out in Note 29(b).

Consolidated statement of profit or loss for the year ended 31 December 2022 (continued)

(Expressed in United States dollars)

	Note	*2022* USD'000	*2021* USD'000
Profit/(loss) before taxation	6	54,708	(60,451)
Income tax	8	4,183	5,013
Profit/(loss) for the year		58,891	(55,438)
Attributable to:			
Equity shareholders of the Company		59,177	(55,238)
Non-controlling interests		(286)	(200)
Profit/(loss) for the year		58,891	(55,438)
Basic earnings/(loss) per share	9	5.68 cents	(5.35) cents
Diluted earnings/(loss) per share	9	5.68 cents	(5.35) cents

The notes on pages 16 to 89 form part of these financial statements. Details of dividends payable to equity shareholders of the Company attributable to the profit for the year are set out in Note 29(b).

Consolidated statement of profit or loss and other comprehensive income for the year ended 31 December 2022

(Expressed in United States dollars)

	Note	*2022* USD'000	*2021* USD'000
Profit/(loss) for the year		58,891	(55,438)
Other comprehensive income for the year (after tax and reclassification adjustments)	12		
Item that will not be reclassified to profit or loss:			
Surplus on revaluation of plants, buildings, and machinery and equipment	14,15, 26	-	62,895
Item that may be reclassified subsequently to profit or loss:			
Exchange differences on re-translation		(21,726)	184
Other comprehensive income for the year		(21,726)	63,079
Total comprehensive income for the year		37,165	7,641
Attributable to:			
Equity shareholders of the Company		38,306	7,841
Non-controlling interests		(1,141)	(200)
Total comprehensive income for the year		37,165	7,641

The notes on pages 16 to 89 form part of these financial statements.

Consolidated statement of financial position at 31 December 2022

(Expressed in United States dollars)

	Note	*2022* USD'000	*2021* USD'000
Non-current assets			
Property, plant and equipment, net	14	919,688	968,681
Construction in progress	15	47,387	46,828
Other right-of-use assets	16	49	50
Intangible assets	17	498,035	500,086
Interests in associates	19	7,657	949
Interest in joint venture		4	23
Other non-current assets	20	59,537	55,634
Deferred tax assets	26(b)	28,505	21,767
Total non-current assets		1,560,862	1,594,018
Current assets			
Inventories	21	102,794	159,663
Trade and other receivables	22	92,157	99,520
Cash and cash equivalents	23	64,695	25,937
Total current assets		259,646	285,120
Current liabilities			
Trade and other payables	25	136,369	175,598
Contract liabilities		182,246	141,498
Senior Notes	24	-	17,885
Lease liabilities		56	72
Current taxation	26(a)	9,617	65
Total current liabilities		328,288	335,118
Net current liabilities		(68,642)	(49,998)
Total assets less current liabilities		1,492,220	1,544,020

The notes on pages 16 to 89 form part of these financial statements.

Consolidated statement of financial position at 31 December 2022 (continued)

(Expressed in United States dollars)

	Note	*2022* USD'000	*2021* USD'000
Non-current liabilities			
Senior Notes	24	373,756	434,716
Provisions	28	16,737	30,928
Deferred tax liabilities	26(b)	174,650	181,798
Total non-current liabilities		565,143	647,442
NET ASSETS		927,077	896,578
CAPITAL AND RESERVES			
Share capital	29(c)	104,248	103,158
Reserves		768,308	726,665
Total equity attributable to equity shareholders of the Company		872,556	829,823
Perpetual notes	29(e)	55,476	66,569
Non-controlling interests		(955)	186
TOTAL EQUITY		927,077	896,578

Approved and authorised for issue by the board of directors on 21 March 2023.

Odjargal Jambaljamts
Chairman

Battsengel Gotov
Chief Executive Officer

The notes on pages 16 to 89 form part of these financial statements.

Consolidated statement of changes in equity for the year ended 31 December 2022

(Expressed in United States dollars)

		Attributable to equity shareholders of the Company									
	Note	*Share capital* USD'000 (Note 29(c))	*Share premium* USD'000 (Note 29(d)(i))	*Other reserve* USD'000 (Note 29(d)(ii))	*Exchange reserve* USD'000 (Note 29(d)(iii))	*Property revaluation reserve* USD'000 (Note 29(d)(iv))	*Retained profits* USD'000	*Total* USD'000	*Perpetual notes* USD'000 (Note 29(e))	*Non-controlling interests* USD'000	*Total equity* USD'000
At 1 January 2021		102,918	768,520	36,600	(499,253)	310,683	101,741	821,209	66,569	386	888,164
Loss for the year		-	-	-	-	-	(55,238)	(55,238)	-	(200)	(55,438)
Other comprehensive income	12	-	-	-	184	62,895	-	63,079	-	-	63,079
Total comprehensive income		-	-	-	184	62,895	(55,238)	7,841	-	(200)	7,641
Equity-settled share-based transactions	27	240	806	(273)	-	-	-	773	-	-	773
Reclassification of property revaluation reserve to accumulated losses upon disposals of assets concerned		-	-	-	-	(2,751)	2,751	-	-	-	-
At 31 December 2021		103,158	769,326	36,327	(499,069)	370,827	49,254	829,823	66,569	186	896,578

The notes on pages 16 to 89 form part of these financial statements.

Consolidated statement of changes in equity for the year ended 31 December 2022 (continued)

(Expressed in United States dollars)

	Note	Attributable to equity shareholders of the Company									
		Share capital USD'000 (Note 29(c))	*Share premium* USD'000 (Note 29(d)(i))	*Other reserve* USD'000 (Note 29(d)(ii))	*Exchange reserve* USD'000 (Note 29(d)(iii))	*Property revaluation reserve* USD'000 (Note 29(d)(iv))	*Retained profits* USD'000	*Total* USD'000	*Perpetual notes* USD'000 (Note 29(e))	*Non-controlling interests* USD'000	*Total equity* USD'000
At 1 January 2022		103,158	769,326	36,327	(499,069)	370,827	49,254	829,823	66,569	186	896,578
Profit for the year		-	-	-	-	-	59,177	59,177	-	(286)	58,891
Other comprehensive income	12	-	-	-	(20,871)	-	-	(20,871)	-	(855)	(21,726)
Total comprehensive income		-	-	-	(20,871)	-	59,177	38,306	-	(1,141)	37,165
Repurchase of perpetual notes	29(e)	-	-	-	-	-	1,102	1,102	(11,093)	-	(9,991)
Equity-settled share-based transactions	27	1,090	3,688	(1,453)	-	-	-	3,325	-	-	3,325
Reclassification of property revaluation reserve to retained profits upon disposals of assets concerned		-	-	-	-	(511)	511	-	-	-	-
At 31 December 2022		104,248	773,014	34,874	(519,940)	370,316	110,044	872,556	55,476	(955)	927,077

The notes on pages 16 to 89 form part of these financial statements.

Consolidated cash flow statement for the year ended 31 December 2022

(Expressed in United States dollars)

	Note	*2022* USD'000	*2021* USD'000
Operating activities			
Profit/(loss) before taxation		54,708	(60,451)
Adjustments for:			
Depreciation and amortisation	6(c)	61,708	49,704
Share of (profits)/losses of associate and joint venture		(270)	197
Gain on disposals of property, plant and equipment	6(c)	(6)	(29)
Net finance costs	6(a)	40,795	48,926
Gain from repurchase of Senior Notes due 2024	7	(23,144)	-
Equity-settled share-based payment expenses	6(b)	-	34
Employee benefit accrued		-	(321)
Changes in working capital:			
Decrease/(increase) in inventories		56,869	(53,395)
Decrease/(increase) in trade and other receivables		7,363	(5,165)
Increase in trade and other payables and contract liabilities		40,353	148,678
Increase in other non-current assets		(3,903)	(3,265)
Decrease in other non-current liabilities		-	(39,029)
Cash generated from operations		234,473	85,884
Income tax paid	26(a)	(694)	(973)
Net cash generated from operating activities		233,779	84,911

The notes on pages 16 to 89 form part of these financial statements.

Consolidated cash flow statement for the year ended 31 December 2022 (continued)

(Expressed in United States dollars)

	Note	*2022* USD'000	*2021* USD'000
Investing activities			
Payments for acquisition of property, plant and equipment and construction in progress		(80,379)	(48,130)
Proceeds from disposals of property, plant and equipment		6	37
Payments for acquisition of intangible asset		(715)	(2,331)
Acquisition of subsidiary, net of cash acquired		-	(5,557)
Payments for acquisition of an associate		(6,951)	(785)
Interest received		123	3
Net cash used in investing activities		(87,916)	(56,763)
Financing activities			
Capital element of lease rentals paid		(130)	(141)
Repayment of Senior Notes due 2022	23(b)	(14,912)	-
Repurchase of Senior Notes due 2024	23(b)	(39,671)	-
Repurchase of perpetual notes	29	(9,991)	-
Interest element of lease rentals paid		(6)	(5)
Proceeds from shares issued under share option scheme		3,325	-
Interest paid		(42,489)	(41,518)
Net cash used in financing activities		(103,874)	(41,664)
Net increase/(decrease) in cash and cash equivalents		41,989	(13,516)
Cash and cash equivalents at beginning of the year		25,937	38,904
Effect of foreign exchange rate changes		(3,231)	549
Cash and cash equivalents at end of the year	23	64,695	25,937

The notes on pages 16 to 89 form part of these financial statements.

Notes to consolidated financial statements

1 Corporate information

Mongolian Mining Corporation (the "**Company**") was incorporated in the Cayman Islands on 18 May 2010 as an exempted company with limited liability under the Companies Law, Cap 22 (Law 3 of 1961, as consolidated and revised) of the Cayman Islands. The Company's shares have been listed on the Main Board of The Stock Exchange of Hong Kong Limited (the "**Stock Exchange**") since 13 October 2010. The Company and its subsidiaries (together referred to as the "**Group**") are principally engaged in the mining, processing, transportation and sale of coal.

2 Significant accounting policies

(a) Statement of compliance

These financial statements have been prepared in accordance with all applicable International Financial Reporting Standards ("**IFRSs**"), promulgated by the International Accounting Standards Board ("**IASB**"). IFRSs include all applicable individual International Financial Reporting Standards, International Accounting Standards ("**IASs**") and related interpretations. These financial statements also comply with the applicable disclosure requirements of the Hong Kong Companies Ordinance. These financial statements also comply with the applicable disclosure provisions of the Rules Governing the Listing of Securities on The Stock Exchange of Hong Kong Limited (the "**Listing Rules**"). A summary of the significant accounting policies adopted by the Group is set out below.

The IASB has issued certain amendments to IFRSs that are first effective or available for early adoption for the current accounting period of the Group and the Company. Note 2(c) provides information on any changes in accounting policies resulting from initial application of these developments to the extent that they are relevant to the Group for the current and prior accounting periods reflected in these financial statements.

(b) Basis of preparation of the financial statements

The consolidated financial statements for the year ended 31 December 2022 comprise the Group and the Group's interests in two associates and a joint venture.

The measurement basis used in the preparation of the financial statements is the historical cost basis except that the following assets and liabilities are stated at their fair value as explained in the accounting policies set out below:

- Investments in debt and equity securities (see Note 2(f));
- Buildings and plants as well as machinery and equipment (see Note 2(h)); and
- Derivative financial instruments (see Note 2(g)).

Non-current assets and disposals groups held for sale are stated at the lower of carrying amount and fair value less costs (see Note 2(y)).

2 Significant accounting policies (continued)

The preparation of financial statements in conformity with IFRSs requires management to make judgements, estimates and assumptions that affect the application of policies and reported amounts of assets, liabilities, income and expenses. The estimates and associated assumptions are based on historical experience and various other factors that are believed to be reasonable under the circumstances, the results of which form the basis of making the judgements about carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates.

The estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised in the period in which the estimate is revised if the revision affects only that period or in the period of the revision and future periods if the revision affects both current and future periods.

The novel coronavirus ("COVID-19") outbreak has adversely impacted the operating environment and business performance of the Group during the first half of the year ended 31 December 2022. The coal sales volume has been impacted by temporary border crossing limitations and volatility caused by the COVID-19 during the first half of 2022. During the second half of 2022, the border throughput started to improve and reached pre-COVID-19 level towards the end of 2022. The Group had net current liabilities of USD68,642,000 as at 31 December 2022. The Group had put in place contingency measures for cash conservation and efficiency purposes such as temporary adjustment to levels of production and obtained standby facilities from local banks in Mongolia totalling USD38,700,000 as of the reporting date. Based on the cash flow forecast of the Group for the next twelve months ending 31 December 2023 prepared by the management, the directors of the Company (the "**Directors**") expect to maintain adequate financial resources to cover its operating costs and meet its financing commitments, as and when they fall due for the twelve months period subsequent to 31 December 2022.

Items included in the financial statements of each of the Group's entities are measured using the currency of the primary economic environment in which the entity operates (the "**functional currency**").

The functional currency of the Group's overseas holding entities and main operating subsidiaries located in Mongolia is USD and the functional currency of remaining subsidiaries located in Mongolia is Mongolian Togrog ("**MNT**").

The Company and the Group's presentation currency is USD.

Judgements made by management in the application of IFRSs that have significant effect on the financial statements and major sources of estimation uncertainty are discussed in Note 3.

2 Significant accounting policies (continued)

(c) Changes in accounting policies

The IASB has issued the following amendments to IFRSs that are first effective for the current accounting period of the Group:

- Amendments to IAS 16, *Property, plant and equipment: Proceeds before intended use*
- Amendments to IAS 37, *Provisions, contingent liabilities and contingent assets: Onerous contracts — cost of fulfilling a contract*

None of these developments have had a material effect on how the Group's results and financial position for the current or prior periods have been prepared or presented. The Group has not applied any new standard or interpretation that is not yet effective for the current accounting period.

(d) Subsidiaries and non-controlling interests

Subsidiaries are entities controlled by the Group. The Group controls an entity when it is exposed, or has rights, to variable returns from its involvement with the entity and has the ability to affect those returns through its power over the entity. When assessing whether the Group has power, only substantive rights (held by the Group and other parties) are considered.

An investment in a subsidiary is consolidated into the consolidated financial statements from the date that control commences until the date that control ceases. Intra-group balances, transactions, cash flows and any unrealised profits arising from intra-group transactions are eliminated in full in preparing the consolidated financial statements. Unrealised losses resulting from intra-group transactions are eliminated in the same way as unrealised gains but only to the extent that there is no evidence of impairment.

Non-controlling interests represent the equity in a subsidiary not attributable directly or indirectly to the Company, and in respect of which the Group has not agreed any additional terms with the holders of those interests which would result in the Group as a whole having a contractual obligation in respect of those interests that meets the definition of a financial liability. For each business combination, the Group can elect to measure any non-controlling interests either at fair value or at the non-controlling interests' proportionate share of the subsidiary's net identifiable assets.

Non-controlling interests are presented in the consolidated statement of financial position within equity, separately from equity attributable to the equity shareholders of the Company. Non-controlling interests in the results of the Group are presented on the face of the consolidated statement of profit or loss and the consolidated statement of profit or loss and other comprehensive income as an allocation of the total profit or loss and total comprehensive income for the year between non-controlling interests and the equity shareholders of the Company. Loans from holders of non-controlling interests and other contractual obligations towards these holders are presented as financial liabilities in the consolidated statement of financial position in accordance with Notes 2(n) or (o) depending on the nature of the liability.

2 Significant accounting policies (continued)

Changes in the Group's interests in a subsidiary that do not result in a loss of control are accounted for as equity transactions, whereby adjustments are made to the amounts of controlling and non-controlling interests within consolidated equity to reflect the change in relative interests, but no adjustments are made to goodwill and no gain or loss is recognised.

When the Group loses control of a subsidiary, it is accounted for as a disposal of the entire interest in that subsidiary, with a resulting gain or loss being recognised in profit or loss. Any interest retained in that former subsidiary at the date when control is lost is recognised at fair value and this amount is regarded as the fair value on initial recognition of a financial asset or, when appropriate, the cost on initial recognition of an interest in an associate or joint venture (see Note 2(e)).

In the Company's statement of financial position, an investment in a subsidiary is stated at cost less impairment losses (see Note 2(k)), unless the investment is classified as held for sale (or included in a disposal group that is classified as held for sale) (see Note 2(y)).

(e) Associates and joint ventures

An associate is an entity in which the Group has significant influence, but not control or joint control, over its management, including participation in the financial and operating policy decisions.

A joint venture is an arrangement whereby the Group and other parties contractually agree to share control of the arrangement, and have rights to the net assets of the arrangement.

An investment in an associate or a joint venture is accounted for in the consolidated financial statements under the equity method, unless it is classified as held for sale (or included in a disposal group that is classified as held for sale (see Note 2(y)). Under the equity method, the investment is initially recorded at cost, adjusted for any excess of the Group's share of the acquisition-date fair values of investee's identifiable net assets over the cost of the investment (if any). The cost of the investment includes purchase price, other costs directly attributable to the acquisition of the investment, and any direct investment into the associate or joint venture that forms part of the Group's equity investment. Thereafter, the investment is adjusted for the post-acquisition change in the Group's share of the investee's net assets and any impairment loss relating to the investment (see Note 2(k)). At each reporting date, the Group assesses whether there is any objective evidence that the investment is impaired. Any acquisition-date excess over cost, the Group's share of the post-acquisition, post-tax results of the investees and any impairment losses for the year are recognised in the consolidated statement of profit or loss, whereas the Group's share of the post-acquisition post-tax items of the investees' other comprehensive income is recognised in the consolidated statement of profit or loss and other comprehensive income.

When the Group's share of losses exceeds its interest in the associate or the joint venture, the Group's interest is reduced to nil and recognition of further losses is discontinued except to the extent that the Group has incurred legal or constructive obligations or made payments on behalf of the investee. For this purpose, the Group's interest is the carrying amount of the investment under the equity method together with the Group's long-term interests that in substance form part of the Group's net investment in the associate or the joint venture, after applying the ECL model to such other long-term interests where applicable (see Note 2(k)(i)).

2 Significant accounting policies (continued)

Unrealised profits and losses resulting from transactions between the Group and its associate and joint venture are eliminated to the extent of the Group's interest in the investee, except where unrealised losses provide evidence of an impairment of the asset transferred, in which case they are recognised immediately in profit or loss.

If an investment in an associate becomes an investment in a joint venture or vice versa, retained interest is not remeasured. Instead, the investment continues to be accounted for under the equity method.

In all other cases, when the Group ceases to have significant influence over an associate or joint control over a joint venture, it is accounted for as a disposal of the entire interest in that investee, with a resulting gain or loss being recognised in profit or loss. Any interest retained in that former investee at the date when significant influence or joint control is lost is recognised at fair value and this amount is regarded as the fair value on initial recognition of a financial asset (see Note 2(f)).

In the Company's statement of financial position, investments in associate and joint venture are stated at cost less impairment losses, unless classified as held for sale (or included in a disposal group that is classified as held for sale) (see Note 2(y)).

(f) Other investments in debt and equity securities

The Group's and the Company's policies for investments in debt and equity securities, other than investments in subsidiaries, associates and joint ventures, are as follows:

Investments in debt and equity securities are recognised/derecognised on the date the Group commits to purchase/sell the investment. The investments are initially stated at fair value plus directly attributable transaction costs, except for those investments measured at fair value through profit or loss (FVPL) for which transaction costs are recognised directly in profit or loss. For an explanation of how the Group determines fair value of financial instruments, see Note 30(f). These investments are subsequently accounted for as follows, depending on their classification.

(i) Investments other than equity investments

Non-equity investments held by the Group are classified into one of the following measurement categories:

- amortised cost, if the investment is held for the collection of contractual cash flows which represent solely payments of principal and interest. Interest income from the investment is calculated using the effective interest method (see Note 2(v)(ii)).

- fair value through other comprehensive income (FVOCI) - recycling, if the contractual cash flows of the investment comprise solely payments of principal and interest and the investment is held within a business model whose objective is achieved by both the collection of contractual cash flows and sale. Changes in fair value are recognised in other comprehensive income, except for the recognition in profit or loss of expected credit losses, interest income (calculated using the effective interest method) and foreign exchange gains and losses. When the investment is derecognised, the amount accumulated in other comprehensive income is recycled from equity to profit or loss.

- fair value through profit or loss (FVPL) if the investment does not meet the criteria for being measured at amortised cost or FVOCI (recycling). Changes in the fair value of the investment (including interest) are recognised in profit or loss.

2 Significant accounting policies (continued)

(ii) Equity investments

An investment in equity securities is classified as FVPL unless the equity investment is not held for trading purposes and on initial recognition of the investment the Group makes an irrevocable election to designate the investment at FVOCI (non-recycling) such that subsequent changes in fair value are recognised in other comprehensive income. Such elections are made on an instrument-by-instrument basis, but may only be made if the investment meets the definition of equity from the issuer's perspective. Where such an election is made, the amount accumulated in other comprehensive income remains in the fair value reserve (non-recycling) until the investment is disposed of. At the time of disposal, the amount accumulated in the fair value reserve (non-recycling) is transferred to retained earnings. It is not recycled through profit or loss. Dividends from an investment in equity securities, irrespective of whether classified as at FVPL or FVOCI, are recognised in profit or loss as other income.

(g) Derivative financial instruments

Derivative financial instruments are recognised initially at fair value. At the end of each reporting period the fair value is remeasured. The gain or loss on remeasurement of fair value is recognised immediately in profit or loss.

(h) Property, plant and equipment

The following items are stated at their revalued amounts, being their fair values at the date of the revaluation less any subsequent accumulated depreciation and any subsequent accumulated impairment losses:

- buildings and plants (under the Property, plant and equipment and Construction in progress); and

- machinery and equipment.

Revaluations are performed with sufficient regularity to ensure that the carrying amounts of these assets do not differ materially from that which would be determined using fair values at the end of reporting period.

The following items of property, plant and equipment are stated at cost less accumulated depreciation and impairment losses (see Note 2(k)):

- right-of-use assets arising from leases over leasehold properties where the Group is not the registered owner of the property interest;

- motor vehicles;

- office equipment; and

- mining properties.

2 Significant accounting policies (continued)

Changes arising on the revaluation are generally dealt with in other comprehensive income and are accumulated separately in equity in the property revaluation reserve. The only exceptions are as follows:

- when a deficit arises on revaluation, it will be charged to profit or loss to the extent that it exceeds the amount held in the reserve in respect of that same asset immediately prior to the revaluation; and

- when a surplus arises on revaluation, it will be credited to profit or loss to the extent that a deficit on revaluation in respect of that same asset had previously been charged to profit or loss.

The cost of an asset comprises its purchase price, any directly attributable costs of bringing the asset to its present working condition and location for its intended use, the cost of borrowed funds used during the period of construction and, when relevant, the costs of dismantling and removing the items and restoring the site on which they are located, and changes in the measurement of existing liabilities recognised for these costs resulting from changes in the timing or outflow of resources required to settle the obligation or from changes in the discount rate.

Items may be produced while bringing an item of property, plant and equipment to the location and condition necessary for it to be capable of operating in the manner intended by management. The proceeds from selling any such items and the related costs are recognised in profit or loss.

All other expenditures, including the cost of repairs and maintenance and major overhaul, are expensed as they are incurred.

Construction in progress represents property, plant and equipment under construction and equipment pending installation. Except for those stated at their revalued amount as aforementioned, other construction in progress items are initially recognised at cost less impairment losses (Note 2(k)). Cost comprises cost of materials, direct labour and an appropriate proportion of production overheads and borrowing costs (Note 2(x)). Capitalisation of these costs ceases and the construction in progress is transferred to property, plant and equipment when the asset is substantially ready for its intended use.

Gains or losses arising from the retirement or disposal of an item of property, plant and equipment are determined as the difference between the net disposal proceeds and the carrying amount of the item and are recognised in profit or loss on the date of retirement or disposal. Any related revaluation surplus is transferred from the revaluation reserve to retained profits and is not reclassified to profit or loss.

2 Significant accounting policies (continued)

Depreciation is calculated to write off the cost or valuation of items of property, plant and equipment, other than mining properties, over their estimated useful lives using the straight-line method, after taking into account the estimated residual values.

The estimated useful lives of property, plant and equipment are as follows:

	Depreciable life
- Buildings and plants	10 - 40 years
- Machinery and equipment	10 years
- Motor vehicles	5 - 10 years
- Office equipment	3 - 10 years
- Right of use assets are depreciated over the unexpired term of lease	

Mining properties, except for stripping activity assets related to capitalised stripping costs incurred during the production phase, are depreciated on the units-of-production method utilising only proven and probable coal reserves in the depletion base.

Stripping activity assets related to stripping costs incurred during the production phase are depreciated using a units-of-production basis over the proven and probable coal reserves of the component to which they relate.

No depreciation is provided in respect of construction in progress until it is substantially completed and ready for its intended use.

Where parts of an item of property, plant and equipment have different useful lives, the cost of the item is allocated on a reasonable basis between parts and each part is depreciated separately. Both the useful life of an asset and its residual value, if any, are reviewed annually.

(i) Intangible assets

Intangible assets (acquired mining rights, software and GS Terminal) acquired separately are measured on initial recognition at cost. The cost of intangible assets acquired in a business combination is their fair value as at the date of acquisition. Following the initial recognition, intangible assets are stated at cost less accumulated amortisation (where the estimated useful life is finite) and impairment losses (see Note 2(k)).

Intangible assets (acquired mining rights) are depreciated on the units-of-production method utilising only proven and probable coal reserves in the depletion base.

Amortisation of other intangible assets with finite useful lives is recognised in profit or loss on a straight-line basis over the expected useful lives. The software are amortised over 10 years from the date they are available for use, and GS Terminal is amortised for 3 years from the date it is available for use.

Both the period and method of amortisation are reviewed annually.

2 Significant accounting policies (continued)

(j) Leased assets

At inception of a contract, the Group assesses whether the contract is, or contains, a lease. A contract is, or contains, a lease if the contract conveys the right to control the use of an identified asset for a period of time in exchange for consideration. Control is conveyed where the customer has both the right to direct the use of the identified asset and to obtain substantially all of the economic benefits from that use.

As a lessee

Where the contract contains lease components and non-lease components, the Group has elected not to separate non-lease components and accounts for each lease component and any associated non-lease components as a single lease component for all leases.

At the lease commencement date, the Group recognises a right-of-use asset and a lease liability, except for short-term leases that have a lease term of 12 months or less and leases of low-value assets. When the Group enters into a lease in respect of a low-value asset, the Group decides whether to capitalise the lease on a lease-by-lease basis. The lease payments associated with those leases which are not capitalised are recognised as an expense on a systematic basis over the lease term.

Where the lease is capitalised, the lease liability is initially recognised at the present value of the lease payments payable over the lease term, discounted using the interest rate implicit in the lease or, if that rate cannot be readily determined, using a relevant incremental borrowing rate. After initial recognition, the lease liability is measured at amortised cost and interest expense is calculated using the effective interest method. Variable lease payments that do not depend on an index or rate are not included in the measurement of the lease liability and hence are charged to profit or loss in the accounting period in which they are incurred.

The right-of-use asset recognised when a lease is capitalised is initially measured at cost, which comprises the initial amount of the lease liability plus any lease payments made at or before the commencement date, and any initial direct costs incurred. Where applicable, the cost of the right-of-use assets also includes an estimate of costs to dismantle and remove the underlying asset or to restore the underlying asset or the site on which it is located, discounted to their present value, less any lease incentives received. The right-of-use asset is subsequently stated at cost less accumulated depreciation and impairment losses (see Notes 2(h) and 2(k)(ii)).

The initial fair value of refundable rental deposits is accounted for separately from the right-of-use assets in accordance with the accounting policy applicable to investments in debt securities carried at amortised cost (see Notes 2(f)(i), 2(v)(ii) and 2(k)(i)). Any difference between the initial fair value and the nominal value of the deposits is accounted for as additional lease payments made and is included in the cost of right-of-use assets.

The lease liability is remeasured when there is a change in future lease payments arising from a change in an index or rate, or there is a change in the Group's estimate of the amount expected to be payable under a residual value guarantee, or there is a change arising from the reassessment of whether the Group will be reasonably certain to exercise a purchase, extension or termination option. When the lease liability is remeasured in this way, a corresponding adjustment is made to the carrying amount of the right-of-use asset, or is recorded in profit or loss if the carrying amount of the right-of-use asset has been reduced to zero.

2 Significant accounting policies (continued)

The lease liability is also remeasured when there is a change in the scope of a lease or the consideration for a lease that is not originally provided for in the lease contract ("lease modification") that is not accounted for as a separate lease. In this case the lease liability is remeasured based on the revised lease payments and lease term using a revised discount rate at the effective date of the modification.

(k) Credit losses and impairment of assets

(i) Credit losses from financial instruments, contract assets and lease receivables

The Group recognises a loss allowance for expected credit losses (ECLs) on the following items:

- financial assets measured at amortised cost (including cash and cash equivalents, trade receivables and other receivables, including loans to associates and joint ventures, which are held for the collection of contractual cash flows which represent solely payments of principal and interest);

- contract assets as defined in IFRS 15 (see Note 2(p)); and

- debt securities measured at FVOCI (recycling).

Other financial assets measured at fair value, including units in bond funds, equity and debt securities measured at FVPL, equity securities designated at FVOCI (non-recycling) and derivative financial assets, are not subject to the ECL assessment.

Measurement of ECLs

ECLs are a probability-weighted estimate of credit losses. Credit losses are measured as the present value of all expected cash shortfalls (i.e. the difference between the cash flows due to the Group in accordance with the contract and the cash flows that the Group expects to receive).

The expected cash shortfalls are discounted using the following discount rates where the effect of discounting is material:

- fixed-rate financial assets, trade and other receivables and contract assets: effective interest rate determined at initial recognition or an approximation thereof;

- variable-rate financial assets: current effective interest rate.

The maximum period considered when estimating ECLs is the maximum contractual period over which the Group is exposed to credit risk.

In measuring ECLs, the Group takes into account reasonable and supportable information that is available without undue cost or effort. This includes information about past events, current conditions and forecasts of future economic conditions.

2 Significant accounting policies (continued)

ECLs are measured on either of the following bases:

- 12-month ECLs: these are losses that are expected to result from possible default events within the 12 months after the reporting date; and

- lifetime ECLs: these are losses that are expected to result from all possible default events over the expected lives of the items to which the ECL model applies.

Loss allowances for trade receivables and contract assets are always measured at an amount equal to lifetime ECLs. ECLs on these financial assets are estimated using a provision matrix based on the Group's historical credit loss experience, adjusted for factors that are specific to the debtors and an assessment of both the current and forecast general economic conditions at the reporting date.

For all other financial instruments, the Group recognises a loss allowance equal to 12-month ECLs unless there has been a significant increase in credit risk of the financial instrument since initial recognition, in which case the loss allowance is measured at an amount equal to lifetime ECLs.

Significant increases in credit risk

In assessing whether the credit risk of a financial instrument has increased significantly since initial recognition, the Group compares the risk of default occurring on the financial instrument assessed at the reporting date with that assessed at the date of initial recognition. In making this reassessment, the Group considers that a default event occurs when (i) the borrower is unlikely to pay its credit obligations to the Group in full, without recourse by the Group to actions such as realising security (if any is held); or (ii) the financial asset is 90 days past due. The Group considers both quantitative and qualitative information that is reasonable and supportable, including historical experience and forward-looking information that is available without undue cost or effort.

In particular, the following information is taken into account when assessing whether credit risk has increased significantly since initial recognition:

- failure to make payments of principal or interest on their contractually due dates;

- an actual or expected significant deterioration in a financial instrument's external or internal credit rating (if available);

- an actual or expected significant deterioration in the operating results of the debtor; and

- existing or forecast changes in the technological, market, economic or legal environment that have a significant adverse effect on the debtor's ability to meet its obligation to the Group.

Depending on the nature of the financial instruments, the assessment of a significant increase in credit risk is performed on either an individual basis or a collective basis. When the assessment is performed on a collective basis, the financial instruments are grouped based on shared credit risk characteristics, such as past due status and credit risk ratings.

2 Significant accounting policies (continued)

ECLs are remeasured at each reporting date to reflect changes in the financial instrument's credit risk since initial recognition. Any change in the ECL amount is recognised as an impairment gain or loss in profit or loss. The Group recognises an impairment gain or loss for all financial instruments with a corresponding adjustment to their carrying amount through a loss allowance account, except for investments in debt securities that are measured at FVOCI (recycling), for which the loss allowance is recognised in other comprehensive income and accumulated in the fair value reserve (recycling).

Basis of calculation of interest income

Interest income recognised in accordance with Note 2(v)(ii) is calculated based on the gross carrying amount of the financial asset unless the financial asset is credit-impaired, in which case interest income is calculated based on the amortised cost (i.e. the gross carrying amount less loss allowance) of the financial asset.

At each reporting date, the Group assesses whether a financial asset is credit-impaired. A financial asset is credit-impaired when one or more events that have a detrimental impact on the estimated future cash flows of the financial asset have occurred.

Evidence that a financial asset is credit-impaired includes the following observable events:

- significant financial difficulties of the debtor;

- a breach of contract, such as a default or past due event;

- it becoming probable that the borrower will enter into bankruptcy or other financial reorganisation;

- significant changes in the technological, market, economic or legal environment that have an adverse effect on the debtor; or

- the disappearance of an active market for a security because of financial difficulties of the issuer.

Write-off policy

The gross carrying amount of a financial asset or contract asset is written off (either partially or in full) to the extent that there is no realistic prospect of recovery. This is generally the case when the Group determines that the debtor does not have assets or sources of income that could generate sufficient cash flows to repay the amounts subject to the write-off.

Subsequent recoveries of an asset that was previously written off are recognised as a reversal of impairment in profit or loss in the period in which the recovery occurs.

2 Significant accounting policies (continued)

(ii) Impairment of other assets

Internal and external sources of information are reviewed at the end of each reporting period to identify indications that the following assets may be impaired or an impairment loss previously recognised no longer exists or may have decreased:

- property, plant and equipment, including right-of-use assets;
- construction in progress;
- intangible assets;
- other non-current assets (excluding other financial assets); and
- investment in subsidiaries in the Company's statement of financial position.

If any such indication exists, the asset's recoverable amount is estimated.

- Calculation of recoverable amount

  The recoverable amount of an asset is the greater of its fair value less costs of disposal and value in use. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset. Where an asset does not generate cash inflows largely independent of those from other assets, the recoverable amount is determined for the smallest group of assets that generates cash inflows independently (i.e. a cash-generating unit). A portion of the carrying amount of a corporate asset (for example, head office building) is allocated to an individual cash-generating unit if the allocation can be done on a reasonable and consistent basis, or to the smallest group of cash-generating units if otherwise.

- Recognition of impairment losses

  An impairment loss is recognised in profit or loss if the carrying amount of an asset, or the cash-generating unit to which it belongs, exceeds its recoverable amount. Impairment losses recognised in respect of cash-generating units are allocated first to reduce the carrying amount of any goodwill allocated to the cash-generating unit (or group of units) and then, to reduce the carrying amount of the other assets in the unit (or group of units) on a pro rata basis, except that the carrying value of an asset will not be reduced below its individual fair value less costs of disposal (if measurable) or value in use (if determinable).

- Reversals of impairment losses

  An impairment loss is reversed if there has been a favourable change in the estimates used to determine the recoverable amount.

  A reversal of an impairment loss is limited to the asset's carrying amount that would have been determined had no impairment loss been recognised in prior years. Reversals of impairment losses are credited to profit or loss in the year in which the reversals are recognised.

2 Significant accounting policies (continued)

(iii) Interim financial reporting and impairment

Under the Rules Governing the Listing of Securities on The Stock Exchange of Hong Kong Limited, the Group is required to prepare an interim financial report in compliance with IAS 34, *Interim financial reporting*, in respect of the first six months of the financial year. At the end of the interim period, the Group applies the same impairment testing, recognition, and reversal criteria as it would at the end of the financial year (see Notes 2(k)(i) and (ii)).

(l) Inventories

Coal inventories are physically measured or estimated and valued at the lower of cost and net realisable value.

Cost is calculated using the weighted average cost formula and comprises all costs of purchase, an appropriate portion of fixed and variable overhead costs, including the stripping costs incurred during the production phase, and other costs incurred in bringing the inventories to their present location and condition.

Net realisable value is the estimated future sales price of the product the Group expects to realise when such item is sold or processed, less estimated costs to complete and bring the product to sale.

When coal inventories are sold, the carrying amount of those inventories is recognised as an expense in the period in which the related revenue is recognised. The amount of any write-down of inventories to net realisable value and all losses of inventories are recognised as an expense in the period the write-down or loss occurs. The amount of any reversal of any write-down of inventories is recognised as a reduction in the amount of inventories recognised as an expense in the period in which the reversal occurs.

Inventories of ancillary materials, spare parts and small tools used in production are stated at cost less impairment losses for obsolescence.

(m) Trade and other receivables

A receivable is recognised when the Group has an unconditional right to receive consideration. A right to receive consideration is unconditional if only the passage of time is required before payment of that consideration is due. If revenue has been recognised before the Group has an unconditional right to receive consideration, the amount is presented as a contract asset (see Note 2(p)).

Trade receivables that do not contain a significant financing component are initially measured at their transaction price. Trade receivables that contain a significant financing component and other receivables are initially measured at fair value plus transaction costs. All receivables are subsequently stated at amortised cost using the effective interest method less allowance for credit losses (see Note 2(k)(i)).

Insurance reimbursement is recognised and measured in accordance with Note 2(t).

2 Significant accounting policies (continued)

(n) Interest-bearing borrowings

Interest-bearing borrowings are recognised initially at fair value less attributable transaction costs. Subsequent to initial recognition, interest-bearing borrowings are stated at amortised cost with any difference between the amount initially recognised and redemption value being recognised in profit or loss over the period of the borrowings, together with any interest and fees payable, using the effective interest method.

(o) Trade and other payables

Trade and other payables are initially recognised at fair value. Subsequent to initial recognition, trade and other payables are stated at amortised cost unless the effect of discounting would be immaterial, in which case they are stated at invoice amounts.

(p) Contract assets and contract liabilities

A contract asset is recognised when the Group recognises revenue (see Note 2(v)) before being unconditionally entitled to the consideration under the payment terms set out in the contract. Contract assets are assessed for expected credit losses (ECL) in accordance with the policy set out in Note 2(k)(i) and are reclassified to receivables when the right to the consideration has become unconditional (see Note 2(m)).

A contract liability is recognised when the customer pays consideration before the Group recognises the related revenue (see Note 2(v)). A contract liability would also be recognised if the Group has an unconditional right to receive non-refundable consideration before the Group recognises the related revenue. In such cases, a corresponding receivable would also be recognised (see Note 2(m)).

For a single contract with the customer, either a net contract asset or a net contract liability is presented. For multiple contracts, contract assets and contract liabilities of unrelated contracts are not presented on a net basis.

When the contract includes a significant financing component, the contract balance includes interest accrued under the effective interest method (see Note 2(v)).

(q) Cash and cash equivalents

Cash and cash equivalents comprise cash at bank and in hand, demand deposits with banks and other financial institutions, and short-term, highly liquid investments that are readily convertible into known amounts of cash and which are subject to an insignificant risk of changes in value, having been within three months of maturity at acquisition. Cash and cash equivalents are assessed for expected credit losses (ECL) in accordance with the policy set out in Note 2(k)(i).

2 Significant accounting policies (continued)

(r) Employee benefits

(i) Short-term employee benefits and contributions to defined contribution retirement plans

Salaries, annual bonuses, paid annual leave, contributions to defined contribution retirement plans and the cost of non-monetary benefits are accrued in the year in which the associated services are rendered by employees. Where payment or settlement is deferred and the effect would be material, these amounts are stated at their present values.

(ii) Share-based payments

The fair value of share options granted to employees is recognised as an employee cost with a corresponding increase in other reserve within equity. The fair value is measured at grant date using Black-Scholes option pricing model, taking into account the terms and conditions upon which the options were granted. Where the employees have to meet vesting conditions before becoming unconditionally entitled to the options, the total estimated fair value of the options is spread over the vesting period, taking into account the probability that the options will vest.

During the vesting period, the number of share options that is expected to vest is reviewed. Any resulting adjustment to the cumulative fair value recognised in prior years is charged/credited to the profit or loss for the year of the review, unless the original employee expenses qualify for recognition as an asset, with a corresponding adjustment to the other reserve. On vesting date, the amount recognised as an expense is adjusted to reflect the actual number of options that vest (with a corresponding adjustment to the other reserve) except where forfeiture is only due to not achieving vesting conditions that relate to the market price of the Company's shares. The equity amount is recognised in the other reserve until the option is exercised (when it is transferred to the share capital and share premium account).

(iii) Termination benefits

Termination benefits are recognised at the earlier of when the Group can no longer withdraw the offer of those benefits and when it recognises restructuring costs involving the payment of termination benefits.

(s) Income tax

Income tax for the year comprises current tax and movements in deferred tax assets and liabilities. Current tax and movements in deferred tax assets and liabilities are recognised in profit or loss except to the extent that they relate to items recognised in other comprehensive income or directly in equity, in which case the relevant amounts of tax are recognised in other comprehensive income or directly in equity, respectively.

Current tax is the expected tax payable on the taxable income for the year, using tax rates enacted or substantively enacted at the end of the reporting period, and any adjustment to tax payable in respect of previous years.

Deferred tax assets and liabilities arise from deductible and taxable temporary differences respectively, being the differences between the carrying amounts of assets and liabilities for financial reporting purposes and their tax bases. Deferred tax assets also arise from unused tax losses and unused tax credits.

2 Significant accounting policies (continued)

Apart from certain limited exceptions, all deferred tax liabilities, and all deferred tax assets to the extent that it is probable that future taxable profits will be available against which the asset can be utilised, are recognised. Future taxable profits that may support the recognition of deferred tax assets arising from deductible temporary differences include those that will arise from the reversal of existing taxable temporary differences, provided those differences relate to the same taxation authority and the same taxable entity, and are expected to reverse either in the same period as the expected reversal of the deductible temporary difference or in periods into which a tax loss arising from the deferred tax asset can be carried back or forward. The same criteria are adopted when determining whether existing taxable temporary differences support the recognition of deferred tax assets arising from unused tax losses and credits, that is, those differences are taken into account if they relate to the same taxation authority and the same taxable entity, and are expected to reverse in a period, or periods, in which the tax loss or credit can be utilised.

The limited exceptions to recognition of deferred tax assets and liabilities are those temporary differences arising from the initial recognition of assets or liabilities that affect neither accounting nor taxable profit (provided they are not part of a business combination), and temporary differences relating to interests in subsidiaries to the extent that, in the case of taxable differences, the Group controls the timing of the reversal and it is probable that the differences will not reverse in the foreseeable future, or in the case of deductible differences, unless it is probable that they will reverse in the future.

The amount of deferred tax recognised is measured based on the expected manner of realisation or settlement of the carrying amount of the assets and liabilities, using tax rates enacted or substantively enacted at the end of the reporting period. Deferred tax assets and liabilities are not discounted.

The carrying amount of a deferred tax asset is reviewed at the end of each reporting period and is reduced to the extent that it is no longer probable that sufficient taxable profit will be available to allow the related tax benefit to be utilised. Any such reduction is reversed to the extent that it becomes probable that sufficient taxable profit will be available.

Additional income taxes that arise from the distribution of dividends are recognised when the liability to pay the related dividend is recognised.

Current tax balances and deferred tax balances, and movements therein, are presented separately from each other and are not offset. Current tax assets are offset against current tax liabilities, and deferred tax assets against deferred tax liabilities if, the Company or the Group have the legally enforceable right to set off current tax assets against current tax liabilities and the following additional conditions are met:

- in the case of current tax assets and liabilities, the Company or the Group intends either to settle on a net basis, or to realise the asset and settle the liability simultaneously; or

- in the case of deferred tax assets and liabilities, if they relate to income taxes levied by the same taxation authority on either:

    - the same taxable entity; or

    - different taxable entities, which, in each future period in which significant amounts of deferred tax liabilities or assets are expected to be settled or recovered, intend to realise the current tax assets and settle the current tax liabilities on a net basis or realise and settle simultaneously.

2 Significant accounting policies (continued)

(t) Provisions and contingent liabilities

Provisions are recognised for liabilities of uncertain timing or amount when the Group has a legal or constructive obligation arising as a result of a past event, it is probable that an outflow of economic benefits will be required to settle the obligation and a reliable estimate can be made. Where the time value of money is material, provisions are stated at the present value of the expenditure expected to settle the obligation.

Where it is not probable that an outflow of economic benefits will be required, or the amount cannot be estimated reliably, the obligation is disclosed as a contingent liability, unless the probability of outflow of economic benefits is remote. Possible obligations, whose existence will only be confirmed by the occurrence or non-occurrence of one or more future events are also disclosed as contingent liabilities unless the probability of outflow of economic benefits is remote.

Where some or all of the expenditure required to settle a provision is expected to be reimbursed by another party, a separate asset is recognised for any expected reimbursement that would be virtually certain. The amount recognised for the reimbursement is limited to the carrying amount of the provision.

(u) Obligations for reclamation

The Group's obligations for reclamation consist of spending estimates at its mines in accordance with the relevant rules and regulations in Mongolia. The Group estimates its liabilities for final reclamation and mine closure based upon detailed calculations of the amount and timing of the future cash spending to perform the required work. Spending estimates are escalated for inflation, then discounted at a discount rate that reflects current market assessments of the time value of money and the risks specific to the liability such that the amount of provision reflects the present value of the expenditures expected to be required to settle the obligation. The Group records a corresponding asset associated with the liability for final reclamation and mine closure, which is included in the mining properties. The obligation and corresponding asset are recognised in the period in which the liability is incurred. The asset is depreciated on the units-of-production method over its expected life and the liability is accreted to the projected spending date. As changes in estimates occur (such as mine plan revisions, changes in estimated costs, or changes in timing of the performance of reclamation activities), the revisions to the obligation and the corresponding asset are recognised at the appropriate discount rate.

(v) Revenue recognition

Income is classified by the Group as revenue when it arises from the sale of goods or the provision of services in the ordinary course of the Group's business.

The Group is the principal for its revenue transactions and recognises revenue on a gross basis. In determining whether the Group acts as a principal or as an agent, it considers whether it obtains control of the products before they are transferred to the customers. Control refers to the Group's ability to direct the use of and obtain substantially all of the remaining benefits from the products.

2 Significant accounting policies (continued)

(i) Revenue from contracts with customers

Sales of the Group's products are recognised as follows:

Revenue is recognised when control over a product or service is transferred to the customer, at the amount of promised consideration to which the Group is expected to be entitled, excluding those amounts collected on behalf of third parties such as value added tax or other sales taxes.

(a) Sale of goods

Revenue associated with the sale of coal is recognised when the control over the goods is transferred to the customer. Revenue excludes value added tax or other sales taxes and is after deduction of any trade discounts and volume rebates.

(ii) Revenue from other sources and other income

(a) Interest income

Interest income is recognised as it accrues using the effective interest method. For financial assets measured at amortised cost or FVOCI (recycling) that are not credit-impaired, the effective interest rate is applied to the gross carrying amount of the asset. For credit-impaired financial assets, the effective interest rate is applied to the amortised cost (i.e. gross carrying amount net of loss allowance) of the asset (see Note 2(k)(i)).

(w) Translation of foreign currencies

The presentation currency of the Group is USD. The functional currency of the Company, the investment holding companies and main operating group entities located in Mongolia is USD and the functional currency of remaining group entities located in Mongolia is MNT. Foreign currency transactions during the year are translated at the foreign exchange rates ruling at the transaction dates. Monetary assets and liabilities denominated in foreign currencies are translated at the foreign exchange rates ruling at the end of the reporting period. Exchange gains and losses are recognised in profit or loss.

Non-monetary assets and liabilities that are measured in terms of historical cost in a foreign currency are translated using the foreign exchange rates ruling at the transaction dates.

The results of subsidiaries using the functional currency other than USD are translated into USD at the exchange rates approximating the foreign exchange rates ruling at the dates of the transactions. Statement of financial position items are translated into USD at the closing foreign exchange rates ruling at the end of the reporting period. The resulting exchange differences are recognised in other comprehensive income and accumulated separately in equity in the exchange reserve.

On disposal of a foreign operation, the cumulative amount of the exchange differences relating to that foreign operation is reclassified from equity to profit or loss when the profit or loss on disposal is recognised.

2 Significant accounting policies (continued)

(x) Borrowing costs

Borrowing costs that are directly attributable to the acquisition, construction or production of an asset which necessarily takes a substantial period of time to get ready for its intended use or sale are capitalised as part of the cost of that asset. Other borrowing costs are expensed in the period in which they are incurred.

The capitalisation of borrowing costs as part of the cost of a qualifying asset commences when expenditure for the asset is being incurred, borrowing costs are being incurred and activities that are necessary to prepare the asset for its intended use or sale are in progress. Capitalisation of borrowing costs is suspended or ceases when substantially all the activities necessary to prepare the qualifying asset for its intended use or sale are interrupted or complete.

(y) Non-current assets held for sale

A non-current asset is classified as held for sale if it is highly probable that its carrying amount will be recovered through a sale transaction rather than through continuing use and the asset is available for sale in its present condition.

Immediately before classification as held for sale, the measurement of the non-current assets is brought up-to-date in accordance with the accounting policies before the classification. Then, on initial classification as held for sale and until disposal, the non-current assets (except for certain assets as explained below) are recognised at the lower of their carrying amount and fair value less costs to sell. The principal exceptions to this measurement policy so far as the financial statements of the Group and the Company are concerned are deferred tax assets, assets arising from employee benefits, financial assets (other than investments in subsidiaries, associates and joint ventures) and investment properties. These assets, even if held for sale, would continue to be measured in accordance with the policies set out elsewhere in Note 2.

Impairment losses on initial classification as held for sale, and on subsequent remeasurement while held for sale, are recognised in profit or loss. As long as a non-current asset is classified as held for sale the non-current asset is not depreciated or amortised.

(z) Asset acquisition

Groups of assets acquired and liabilities assumed are assessed to determine if they are business or asset acquisitions. On an acquisition-by-acquisition basis, the Group chooses to apply a simplified assessment of whether an acquired set of activities and assets is an asset rather than business acquisition, when substantially all of the fair value of the gross assets acquired is concentrated in a single identifiable asset or group of similar identifiable assets.

When a group of assets acquired and liabilities assumed do not constitute a business, the overall acquisition cost is allocated to the individual identifiable assets and liabilities based on their relative fair values at the date of acquisition. An exception is when the sum of the individual fair values of the identifiable assets and liabilities differs from the overall acquisition cost. In such case, any identifiable assets and liabilities that are initially measured at an amount other than cost in accordance with the Group's policies are measured accordingly, and the residual acquisition cost is allocated to the remaining identifiable assets and liabilities based on their relative fair values at the date of acquisition.

2 Significant accounting policies (continued)

(aa) Related parties

(a) A person, or a close member of that person's family, is related to the Group if that person:

(i) has control or joint control over the Group;

(ii) has significant influence over the Group; or

(iii) is a member of the key management personnel of the Group or the Group's parent.

(b) An entity is related to the Group if any of the following conditions applies:

(i) The entity and the Group are members of the same group (which means that each parent, subsidiary and fellow subsidiary is related to the others).

(ii) One entity is an associate or joint venture of the other entity (or an associate or joint venture of a member of a group of which the other entity is a member).

(iii) Both entities are joint ventures of the same third party.

(iv) One entity is a joint venture of a third entity and the other entity is an associate of the third entity.

(v) The entity is a post-employment benefit plan for the benefit of employees of either the Group or an entity related to the Group.

(vi) The entity is controlled or jointly controlled by a person identified in (a).

(vii) A person identified in (a)(i) has significant influence over the entity or is a member of the key management personnel of the entity (or of a parent of the entity).

(viii) The entity, or any member of a group of which it is a part, provides key management personnel services to the Group or to the Group's parent, if any.

Close members of the family of a person are those family members who may be expected to influence, or be influenced by, that person in their dealings with the entity.

(bb) Segment reporting

Operating segments, and the amounts of each segment item reported in the financial statements, are identified from the financial information provided regularly to the Group's most senior executive management for the purposes of allocating resources to, and assessing the performance of, the Group's various lines of business and geographical locations.

Individually material operating segments are not aggregated for financial reporting purposes unless the segments have similar economic characteristics and are similar in respect of the nature of products and services, the nature of production processes, the type or class of customers, the methods used to distribute the products or provide the services, and the nature of the regulatory environment. Operating segments which are not individually material may be aggregated if they share a majority of these criteria.

3 Accounting judgements and estimates

(a) Critical accounting judgements in applying the Group's accounting policies

In the process of applying the Group's accounting policies, management has made the following accounting judgements:

(i) Fair value of buildings and plants, machinery and equipment classified as property, plant and equipment and construction in progress

The Group has changed its accounting policy for its buildings and plants, machinery and equipment, and such class of items under construction status from cost model to valuation model with effect from 31 December 2016. Buildings and plants, machinery and equipment classified as property, plant and equipment and construction in progress were revalued by an external appraiser as at 31 December 2016 and 2021, respectively (see Notes 14 and 15). Such valuations were based on certain assumptions which are subject to uncertainty and might materially differ from the actual results. Judgement is required in relation to the selection of assumptions in arriving at the fair values and the determination of the frequency of performing a revaluation with sufficient regularity.

(ii) Reserves

The Group estimates and reports Mineral Resources and Ore Reserves, commonly referred to as Coal Resources and Coal Reserves in the coal mining industry, meeting requirements of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the "JORC Code"), and subsequently the Australian Guidelines for the Estimation and Classification of Coal Resources (2014) to which are referred.

The JORC Code is a professional code of practice that sets minimum standards for Public Reporting of minerals Exploration Results, Mineral Resources and Ore Reserves. The JORC Code provides a mandatory system for the classification of minerals Exploration Results, Mineral Resources and Ore Reserves according to the levels of confidence in geological knowledge and technical and economic considerations in public reports.

Responsibility for demonstrating the required transparency and materiality in the estimation of Coal Resources and/or Coal Reserves required by the JORC Code lies with the "Competent Person". A Competent Person is a minerals industry professional who is a Member or Fellow of The Australasian Institute of Mining and Metallurgy (the "**AusIMM**"), or of the Australian Institute of Geoscientists (the "**AIG**"), or of a Recognised Professional Organisation, as included in a list available on the JORC website. These organisations have enforceable codes of ethics, including disciplinary processes with powers to suspend or expel a member. A Competent Person must have a minimum of five years' relevant experience in the style of mineralisation or type of deposit under consideration and in the activity which that person is undertaking.

A "Coal Reserve" is the economically mineable part of a Measured and/or Indicated Coal Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.

3 Accounting judgements and estimates (continued)

A “Probable Coal Reserve” is the economically mineable part of an Indicated, and in some circumstances, a Measured Coal Resource. The confidence in the Modifying Factors applying to a Probable Coal Reserve is lower than that applying to a Proved Coal Reserve. A “Proved Coal Reserve” is the economically mineable part of a Measured Mineral Resource. A Proved Coal Reserve implies a high degree of confidence in the Modifying Factors.

“Modifying Factors” are considerations used to convert Coal Resources to Coal Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors. Modifying Factors may change from one estimation to the next, where the materiality of such changes is demonstrable. Such changes may be as result of variation to any of the mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social, governmental or other factors.

Because the Modifying Factors used to estimate Coal Reserves may change from one estimate to the next, estimates of Coal Reserves may change from one period to another. Changes in reported Coal Reserves thus may affect the Group’s financial results and financial position in a number of ways, including the following:

- Asset recoverable amounts may be affected due to changes in estimated future cash flows.

- Depreciation, depletion and amortisation charged to the statement of profit or loss may change where such charges are determined on the units of production basis, or where the useful economic lives of assets change.

- Overburden removal costs recorded on the statement of financial position or charged to the statement of profit or loss may change due to changes in stripping ratios or the units of production basis of depreciation.

- Reclamation and mine closure provisions may change where changes in estimated reserves affect expectations about the timing or cost of these activities.

- The carrying amount of deferred tax assets may change due to changes in estimates of the likely recovery of the tax benefits.

(iii) Useful lives of property, plants and equipment

Management determines the estimated useful lives of and related depreciation charges for its property, plant and equipment. This estimate is based on the actual useful lives of assets of similar nature and functions. It could change significantly as a result of significant technical innovations and competitor actions in response to industry cycles. Management will increase the depreciation charges where useful lives are less than previously estimated, or will write-off or write-down technically obsolete or non-strategic assets that have been abandoned or sold.

3 Accounting judgements and estimates (continued)

(iv) Impairment of mining related assets

The Group identifies if there is any indication of impairment of mining related assets at each end of the reporting period to determine whether there is objective evidence of impairment. When indication of impairment is identified, management prepares discounted future cash flow to assess the differences between the carrying amount and value in use and provided for impairment loss. Any change in the assumptions adopted in the cash flow forecasts would result in increase or decrease in the provision of the impairment loss and affect the Group's net asset value.

An increase or decrease in the above impairment loss would affect the net profit in future years.

(v) Obligation for reclamation

The estimation of the liabilities for final reclamation and mine closure involves the estimates of the amount and timing for the future cash spending as well as the discount rate used for reflecting current market assessments of the time value of money and the risks specific to the liability. The Group considers the factors including future production volume and development plan, the geological structure of the mining regions and reserve volume to determine the scope, amount and timing of reclamation and mine closure works to be performed. Determination of the effect of these factors involves judgements from the Group and the estimated liabilities may turn out to be different from the actual expenditure to be incurred. The discount rate used by the Group may also be altered to reflect the changes in the market assessments of the time value of money and the risks specific to the liability, such as change of the borrowing rate and inflation rate in the market. As changes in estimates occur (such as mine plan revisions, changes in estimated costs, or changes in timing of the performance of reclamation activities), the revisions to the obligation will be recognised at the appropriate discount rate.

(vi) Derivative financial instruments

In determining the fair value of the derivative financial instruments, considerable judgement is required to interpret market data used in the valuation techniques. The use of different market assumptions and/or estimation methodologies may have a material effect on the estimated fair value amounts.

(vii) Capitalised stripping costs

The process of removing overburden and other mine waste materials to access mineral deposits is referred to as stripping. Stripping costs (waste removal costs) are incurred during the development and production phases at open-pit mining and they are accounted for separately for each component of an ore body unless the stripping activity provides improved access to the whole of the ore body. A component is a specific section within an ore body that is made more accessible by the stripping activity. The identification of components is dependent on the mine plan. Judgement is required to identify and define these components and also to determine the expected volumes of waste to be stripped and ore to be mined in each of these components. Judgement is also required to identify a suitable production measure that can be applied in the calculation and allocation of production stripping costs between inventory and production stripping activity. These are used to calculate and allocate the production stripping costs to inventory and/or the stripping activity assets.

3 Accounting judgements and estimates (continued)

Development stripping costs are capitalised as a stripping activity asset, in construction in progress and forming part of the cost of constructing the mine, when:

- It is probable that future economic benefits associated with the asset will flow to the entity; and

- The costs can be measured reliably.

Capitalisation of development stripping costs ceases and these costs are transferred to mine properties in property, plant and equipment when the ore body or component of ore body is ready for its intended use.

Production stripping can give rise to two benefits being the extraction of ore in the current period and improved access to the ore body or component of ore body in future periods. To the extent that the benefit is the extraction of ore, the stripping costs are recognised as an inventory cost. To the extent the benefit is improved access to the ore body or component of ore body in future periods, the stripping costs are capitalised as mine properties in property, plant and equipment, if the following criteria are met:

- It is probable that the future economic benefit (improved access to ore) will flow to the Group;

- The ore body or component of ore body for which access has been improved can be identified; and

- The costs relating to the stripping activity can be measured reliably.

Production stripping costs are allocated between the inventory produced and the mine properties capitalised using a life-of-component waste to ore strip ratio. When the current strip ratio is greater than the life-of-component ratio, a portion of the stripping costs is capitalised to the existing mine properties.

The development and production stripping assets are depreciated using the units of production method based on the proven and probable mineral reserves of the relevant ore body or component of ore body.

(viii) Taxation

The Group is subject to various taxes and levies in the jurisdictions where it has operations. The Group makes payments and determines the provision for tax and levy liabilities primarily based on the computations as prepared by the Group. Nevertheless, judgement is required in determining the provision for taxes and levies as there are many transactions and calculations for which the ultimate determination is uncertain during the ordinary course of business, there are possible cases of disagreements with the relevant authorities on treatment of certain items included in the computations and certain non-routine transactions. The Group uses its best judgement to determine the probability although it is typically very difficult to determine the timing and ultimate outcome of each case. If the Group considers it probable that these judgements will result in different positions, the most likely amounts of the outcome will be estimated and adjustments to the liabilities will be made in the period in which such determination is made. Due to the inherent uncertainties related to the eventual outcome of each case, it is probable that certain matters may be resolved for amounts materially different from any estimated provisions or previous disclosures.

3 Accounting judgements and estimates (continued)

(b) Sources of estimation uncertainty

Other than requiring critical accounting judgements, assumptions concerning the future and other major sources of estimation uncertainty at the end of the reporting period are required in relation to certain Group's accounting policies. Respective information and assumptions and their risk factors are disclosed accordingly in Notes 3(a)(i), (iii), (iv), (v), (vi) and (vii).

4 Revenue

The Group is principally engaged in the mining, processing, transportation and sale of coal products. Revenue represents the sales value of goods sold to customers exclusive of value added or sales taxes and after deduction of any trade discounts and volume rebates. The amount of each significant category of revenue recognised in revenue during the year is as follows:

	2022 USD'000	*2021* USD'000
Washed hard-coking coal	508,355	174,175
Washed semi-soft coking coal	27,342	6,357
Middlings	9,922	3,019
Raw thermal coal	629	518
	546,248	184,069

During the year ended 31 December 2022, the Group had two customers that individually exceeded 10% of the Group's revenue from sales of goods and rendering of services, being USD81,177,000 and USD79,645,000. During the year ended 31 December 2021, the Group had two customers that individually exceeded 10% of the Group's revenue from sales of goods and rendering of services, being USD30,191,000 and USD23,320,000.

Revenue during the year ended 31 December 2022 includes approximately USD43,535,000 (2021: USD75,516,000) which arose from sales of coal products to customers through agent sales arrangements for diversifying and expanding the Group's sales channels.

Details of concentrations of credit risk arising from these customers are set out in Note 30(b).

5 Cost of revenue

	2022 USD'000	*2021* USD'000
Mining costs	147,846	42,475
Processing costs	43,734	11,950
Transportation costs	100,942	43,138
Others (Note (i))	134,164	43,906
Cost of revenue during mine operations	426,686	141,469
Cost of revenue during idled mine period (Note (ii))	24,445	20,021
Cost of revenue	451,131	161,490

Notes:

(i) Others mainly include royalty tax on the coal sold.

(ii) For the years ended 31 December 2022 and 2021, cost of revenue during idled mine period mainly includes depreciation expense related to idled plant and equipment, staff costs and mining contractor costs.

6 Profit/(loss) before taxation

Profit/(loss) before taxation is arrived at after (crediting)/charging:

(a) Net finance costs:

	2022 USD'000	*2021* USD'000
Interest income	(145)	(54)
Net change in fair value of derivative component of senior notes	(2,661)	-
Gain on derecognition of derivative component of Senior Notes due 2022	(507)	-
Foreign exchange gain, net	(2,973)	-
Finance income	(6,286)	(54)
Interest on liability component of senior notes (Note 23)	45,430	46,170
Interest on lease liabilities	6	5
Transaction cost	52	66
Unwinding interest on accrued reclamation obligations (Note 28)	1,593	492
Net interest expense	47,081	46,733
Net change in fair value of derivative component of senior notes	-	608
Foreign exchange loss, net	-	1,639
Finance costs	47,081	48,980
Net finance costs	40,795	48,926

No borrowing costs have been capitalised for the years ended 31 December 2022 and 2021.

6 Profit/(loss) before taxation (continued)

(b) Staff costs:

	2022 USD'000	*2021* USD'000
Salaries, wages, bonuses and benefits	26,494	20,353
Retirement scheme contributions	3,722	2,894
Equity-settled share-based payment expenses (Note 27)	-	34
	30,216	23,281

Pursuant to the relevant labour rules and regulations in Mongolia, the Group participates in defined contribution retirement benefit schemes (the "**Schemes**") organised by the Government of Mongolia whereby the Group is required to make contributions to the Schemes at a rate of 8.5% of the eligible employees' salaries. Contributions to the Schemes vest immediately.

The Group has no other material obligation for the payment of pension benefits beyond the annual contributions described above.

(c) Other items:

	2022 USD'000	*2021* USD'000
Selling and distribution costs (Note (i))	2,434	9,625
Depreciation and amortisation	61,708	49,704
Net gain on disposals of property, plant and equipment	(6)	(29)
Auditors' remuneration		
- audit services	639	639
- tax and other services	7	30
	646	669
Cost of inventories (Note (ii))	426,686	141,469

Notes:

(i) Selling and distribution costs represent fees and charges incurred for importing coal into the People's Republic of China ("**PRC**"), logistics and transportation costs, governmental fees and charges and fixed agent fees associated with sales activities in inland PRC.

(ii) Cost of inventories includes USD106,300,000 (2021: USD48,711,000) relating to personnel expenses, and depreciation and amortisation which are also included in the respective amounts disclosed separately above for each of these types of expenses. Cost of inventories also includes transportation and stockpile losses amounted to USD479,000 (2021: USD2,269,000).

7 Gain from repurchase of Senior Notes due 2024

The Group repurchased a total of USD63,591,000 principal amount from senior notes with initial principal amount of USD440,000,000 maturing on 15 April 2024 ("**Senior Notes due 2024**") through open market purchase and tender offer during the year ended 31 December 2022. The excess of derecognised carrying amount of the Senior Notes due 2024 over the consideration to settle the financial liabilities, amounting to approximately USD23,144,000, has been recognised as a gain from repurchase of Senior Notes due 2024 and credited to profit or loss during the year ended 31 December 2022.

8 Income tax

(a) Income tax in the consolidated statement of comprehensive income represents:

	2022 USD'000	*2021* USD'000
Current tax		
Provision for the year (Note 26(a))	11,194	132
Over-provision in respect of prior years	(115)	-
Deferred tax		
Origination and reversal of temporary difference (Note 26(b))	(15,262)	(5,145)
	(4,183)	(5,013)

(b) Reconciliation between tax expense and accounting profit/(loss) at applicable tax rates:

	2022 USD'000	*2021* USD'000
Profit/(loss) before taxation	54,708	(60,451)
Notional tax on profit/(loss) before taxation	14,335	(12,141)
Tax effect of non-deductible items (Note (iii))	1,743	6,732
Tax effect of non-taxable items (Note (iii))	(20,678)	(334)
Prior year tax loss utilised	(163)	-
Tax losses not recognised	695	730
Over-provision in respect of prior years	(115)	-
Actual tax expenses	(4,183)	(5,013)

8 Income tax (continued)

Notes:

(i) Pursuant to the income tax rules and regulations of Mongolia, the subsidiaries of the Group located in Mongolia are liable to Mongolian Corporate Income Tax at a rate of 10% of the first MNT6 billion taxable income, and 25% of the remaining taxable income for the years ended 31 December 2022 and 2021. According to the Corporate Income Tax Law of the PRC, the Company's subsidiaries in the PRC are subject to statutory income tax rate of 25%.

(ii) Pursuant to the rules and regulations of the Cayman Islands, the Group is not subject to any income tax in the Cayman Islands. The Group is not subject to Hong Kong, Luxembourg, and Singapore profits tax as it has no assessable income arising in or derived from Hong Kong, Luxembourg and Singapore during the years ended 31 December 2022 and 2021.

(iii) Non-deductible and non-taxable items mainly include net unrealised exchange gain or loss, other non-deductible expenses and non-taxable income pursuant to the income tax rules and regulations of Mongolia and other related tax source regions during the years ended 31 December 2022 and 2021.

9 Earnings/(loss) per share

(a) Basic earnings/(loss) per share

The calculation of basic profit per share is based on the profit attributable to ordinary equity shareholders of the Company of USD59,177,000 (loss attributable to ordinary equity shareholders of the Company of 2021: USD55,238,000) and the weighted average of 1,042,476,786 ordinary shares (2021: 1,031,576,786 ordinary shares) in issue during the year.

(b) Diluted earnings/(loss) per share

For the years ended 31 December 2022 and 2021, basic and diluted earnings/(loss) per share are the same.

No potential dilutive shares existed as at 31 December 2022. The equity-settled share-based payment transactions (see Note 27) are anti-dilutive and therefore not included in calculating diluted earnings/(loss) per share for the year ended 31 December 2021.

10 Directors' remuneration and interest of Directors

Directors' remuneration was disclosed according to the requirement of Section 383 - *Notes to financial statements to contain information on directors' emoluments* of Companies Ordinance (Cap. 622) and Companies Regulation (Cap. 622G). Details of the Directors' remuneration disclosed are as follows:

	Year ended 31 December 2022					
	Directors' fee USD'000	*Salaries, allowances and benefits in kind* USD'000	*Discretionary bonuses* USD'000	*Retirement scheme contributions* USD'000	*Equity-settled share-based payment expenses (Note 11))* USD'000	*Total* USD'000
Executive directors						
Odjargal Jambaljamts (Chairman)	19	1,134	75	99	-	1,327
Battsengel Gotov	19	729	75	66	-	889
Non-executive directors						
Enkhtuvshin Gombo	19	-	-	-	-	19
Myagmarjav Ganbyamba (appointed on 1 January 2022)	19	-	-	-	-	19
Od Jambaljamts	19	-	-	-	-	19
Enkhtuvshin Dashtseren (resigned on 1 January 2022)	-	-	-	-	-	-
Independent non-executive directors						
Khashchuluun Chuluundorj	19	-	-	-	-	19
Unenbat Jigjid	19	-	-	-	-	19
Chan Tze Ching, Ignatius	58	-	-	-	-	58
Total	191	1,863	150	165	-	2,369

	Year ended 31 December 2021					
	Directors' fee USD'000	*Salaries, allowances and benefits in kind* USD'000	*Discretionary bonuses* USD'000	*Retirement scheme contributions* USD'000	*Equity-settled share-based payment expenses (Note 11))* USD'000	*Total* USD'000
Executive directors						
Odjargal Jambaljamts (Chairman)	19	1,139	23	96	-	1,277
Battsengel Gotov	19	732	23	62	10	846
Non-executive directors						
Enkhtuvshin Gombo	19	-	-	-	-	19
Enkhtuvshin Dashtseren	19	-	-	-	-	19
Od Jambaljamts	19	-	-	-	-	19
Independent non-executive directors						
Khashchuluun Chuluundorj	19	-	-	-	-	19
Unenbat Jigjid	19	-	-	-	-	19
Chan Tze Ching, Ignatius	58	-	-	-	-	58
Total	191	1,871	46	158	10	2,276

Notes:

(i) No emoluments have been paid to the Directors as an inducement to join or upon joining the Group or as compensation for loss of office during the years ended 31 December 2022 and 2021.

(ii) There are no loans, quasi-loans or other dealings in favour of the Directors, their controlled bodies corporate and connected entities existed at the end of the year or at any time during the years ended 31 December 2022 and 2021.

10 Directors' remuneration and interest of Directors (continued)

(iii) No transactions, arrangements and contracts in relation to Company's business to which the Company was a party and in which a director of the Company had a material interest, whether directly or indirectly, existed at the end of the year or at any time during the years ended 31 December 2022 and 2021.

(iv) No consideration was provided to or receivable by third parties for making available Directors' services during the years ended 31 December 2022 and 2021.

11 Individuals with highest emoluments

The number of directors and non-directors included in the five highest paid individuals is set forth below:

	2022 Number of individuals	*2021 Number of individuals*
Directors	2	2
Non-directors	3	3
	5	5

The emoluments of the Directors are disclosed in Note 10. The aggregate of the emoluments in respect of the remaining highest paid individuals are as follows:

	2022 USD'000	*2021* USD'000
Basic salaries, allowances and benefits in kind	744	749
Discretionary bonuses	225	83
Retirement scheme contributions	79	69
Equity-settled share-based payment expenses	-	15
	1,048	916

The emoluments of the remaining individuals with the highest emoluments are within the following band:

	2022 Number of individuals	*2021 Number of individuals*
HKD2,000,001 to HKD2,500,000	-	3
HKD2,500,001 to HKD3,000,000	3	-

No emoluments have been paid to these individuals as an inducement to join or upon joining the Group or as compensation for loss of office during the years ended 31 December 2022 and 2021.

12 Other comprehensive income

	2022 USD'000	*2021* USD'000
Exchange differences on re-translation of the financial statements of certain subsidiaries	(21,726)	184
Surplus on revaluation of plants, buildings, and machinery and equipment:		
- Before-tax amount (Notes 14, 15)	-	78,672
- Tax effects	-	(15,777)
- Net-of-tax amount	-	62,895
	(21,726)	63,079

Note:

Exchange differences on re-translation mainly resulted from the fluctuation of MNT and RMB exchange rate against USD during the respective reporting periods.

13 Segment reporting

The Group has one business segment, the mining, processing, transportation and sale of coal products. The majority assets and liabilities are located in Mongolia and the majority of its customers are located in China. Based on information reported by the chief operating decision maker for the purpose of resource allocation and performance assessment, the Group's only operating segment is the mining, processing, transportation and sales of coal products. Accordingly, no additional business and geographical segment information is presented.

14 Property, plant and equipment, net

	Buildings and plants USD'000	*Machinery and equipment* USD'000	*Motor vehicles* USD'000	*Office equipment* USD'000	*Mining properties* USD'000	*Total* USD'000
Cost or valuation:						
At 1 January 2021	435,680	297,241	42,945	4,409	522,632	1,302,907
Additions	285	95	2,506	570	49,567	53,023
Disposals	(789)	(2,274)	(1,770)	(234)	-	(5,067)
Transfer from construction in progress	850	255	-	-	-	1,105
Adjustment on mining rehabilitation	-	-	-	-	10,978	10,978
Surplus on revaluation	75,662	35,117	-	-	-	110,779
Exchange adjustments	31	14	2	-	-	47
At 31 December 2021	511,719	330,448	43,683	4,745	583,177	1,473,772
Representing:						
Cost	502	-	43,683	4,745	583,177	632,107
Valuation	511,217	330,448	-	-	-	841,665
	511,719	330,448	43,683	4,745	583,177	1,473,772
At 1 January 2022	511,719	330,448	43,683	4,745	583,177	1,473,772
Additions	437	1,145	1,667	790	44,699	48,738
Disposals	(929)	(201)	(454)	(220)	-	(1,804)
Transfer from construction in progress	51	-	-	-	-	51
Adjustment on mining rehabilitation	-	-	-	-	(15,784)	(15,784)
Exchange adjustments	(26,107)	(11,560)	(19)	(128)	-	(37,814)
At 31 December 2022	485,171	319,832	44,877	5,187	612,092	1,467,159
Representing:						
Cost	616	-	44,877	5,187	612,092	662,772
Valuation	484,555	319,832	-	-	-	804,387
	485,171	319,832	44,877	5,187	612,092	1,467,159
Accumulated amortisation and depreciation:						
At 1 January 2021	108,959	164,835	33,292	3,700	109,071	419,857
Charge for the year	13,490	17,853	4,326	567	11,568	47,804
Written back on disposals	(29)	(1,415)	(197)	(145)	-	(1,786)
Adjustment on revaluation	19,723	19,472	-	-	-	39,195
Exchange adjustments	11	7	1	2	-	21
At 31 December 2021	142,154	200,752	37,422	4,124	120,639	505,091
At 1 January 2022	142,154	200,752	37,422	4,124	120,639	505,091
Charge for the year	14,666	18,350	4,463	330	21,704	59,513
Written back on disposals	(4)	(191)	(454)	(215)	-	(864)
Exchange adjustments	(9,339)	(6,810)	(16)	(104)	-	(16,269)
At 31 December 2022	147,477	212,101	41,415	4,135	142,343	547,471
Carrying amount:						
At 31 December 2022	337,694	107,731	3,462	1,052	469,749	919,688
At 31 December 2021	369,565	129,696	6,261	621	462,538	968,681

14 Property, plant and equipment, net (continued)

Notes:

(a) Majority part of the Group's property, plant and equipment are located in Mongolia.

(b) Mining properties as at 31 December 2022 include stripping activity assets with the carrying amount of USD447,797,000 (2021: USD424,554,000) and application fee for the mining rights of USD934,000 (2021: USD898,000) in relation to the Group's mine deposits.

(c) As at 31 December 2022, the Group is in the process of applying for the ownership certificates for certain of its buildings. The aggregate carrying value of such properties of the Group as at 31 December 2022 is approximately USD8,446,000 (2021: USD9,371,000). The Directors are of the opinion that the Group is entitled to lawfully occupy or use of these properties.

(d) Buildings and plants as at 31 December 2022 include right-of-use assets for office leasing with the carrying amount of USD57,000 (2021: USD71,000).

(e) Fair value measurement of property, plant and machinery

(i) Fair value hierarchy

The following table presents the fair value of the Group's property, plant and machinery measured at the end of the reporting period on a recurring basis, categorised into the three-level fair value hierarchy as defined in IFRS 13, *Fair value measurement*. The level into which a fair value measurement is classified is determined with reference to the observability and significance of the inputs used in the valuation technique as follows:

- Level 1 valuations: Fair value measured using only Level 1 inputs i.e. unadjusted quoted prices in active markets for identical assets or liabilities at the measurement date

- Level 2 valuations: Fair value measured using Level 2 inputs i.e. observable inputs which fail to meet Level 1, and not using significant unobservable inputs. Unobservable inputs are inputs for which market data are not available

- Level 3 valuations: Fair value measured using significant unobservable inputs

14 Property, plant and equipment, net (continued)

	Fair value as at 31 December 2022	*Fair value measurements as at 31 December 2022 categorised into*		
		Level 1	*Level 2*	*Level 3*
	USD'000	USD'000	USD'000	USD'000
Recurring fair value measurement				
Buildings and plants	337,637	-	-	337,637
Machinery and equipment	107,731	-	-	107,731
Buildings and plants, machinery and equipment under construction (Note 15)	47,387	-	-	47,387
Total	492,755	-	-	492,755

	Fair value as at 31 December 2021	*Fair value measurements as at 31 December 2021 categorised into*		
		Level 1	*Level 2*	*Level 3*
	USD'000	USD'000	USD'000	USD'000
Recurring fair value measurement				
Buildings and plants	369,495	-	-	369,495
Machinery and equipment	129,696	-	-	129,696
Buildings and plants, machinery and equipment under construction (Note 15)	46,828	-	-	46,828
Total	546,019	-	-	546,019

During the year ended 31 December 2022, there were no transfers between Level 1 and Level 2, or transfers into or out of Level 3. The Group's policy is to recognise transfers between levels of fair value hierarchy as at the end of the reporting period in which they occur.

As at 31 December 2021, buildings and plants as well as machinery and equipment were revalued and such valuation was carried out by a firm of external appraisers, Duff and Phelps Corporation, who has among their staff fellows of the American Society of Appraisers, Royal Institute of Charted Surveyors, Chartered Certified Accountant, Chartered Financial Analyst and Financial Risk Manager with recent experience in the mining property valuation worldwide including valuation of coal mines. The Group's property manager and the chief financial officer had discussion with the appraisers on the valuation assumptions and valuation results when the valuation was performed. At each following interim and annual reporting date, the management reviewed the key indicators adopted in the revaluation assessment as at 31 December 2021 and concluded there was no significant change.

The subject properties are purpose-built industrial facilities including buildings and plants, machinery and equipment and construction in progress located in South Gobi of Mongolia. They are operated according to their highest and best use for coal mining and processing. There is no other alternative use of the subject properties. Upon consideration of all relevant facts, it was concluded that the properties subject to valuations are specialised properties.

14 Property, plant and equipment, net (continued)

Depreciated replacement cost is defined by International Valuation Standards ("**IVS**") as "the current cost of replacing an asset with its modern equivalent asset less deductions for physical deterioration and all relevant forms of obsolescence and optimisation". Depreciated replacement cost application for major assets classes is briefly described below:

- Buildings and plants, and such items under construction status:
  - Reproduction cost new ("**RCN**") estimations for the buildings and structures were calculated using indexing method;
  - Indices were applied to the historical cost. The indices were obtained from recognised sources such as: FM Global, Unitary Construction costs, etc.;
  - Physical depreciation was applied using straight line method based on the economic useful life of production, auxiliary, administrative facilities, land improvements, and transfer devices;
  - No any functional obsolescence was revealed.
- Machinery and equipment:
  - Machinery RCN was estimated based on the actual machinery quotations received from the purchase department of the Company. These estimates were adjusted with installation expenses, engineering expenses and interest during construction. Estimated RCN was compared to indexed historical cost and considered to be relevant. Additionally, unitary reproduction cost (USD/kg of equipment weight) of major and most expensive equipment appraised such as crushers, screens, spirals and flotation cells were compared with unitary cost range of similar equipment recently purchased by other mining companies and considered to be in line with these data. Overall Coal Handling and Preparation Plant ("**CHPP**") modules' estimated unitary RCN (USD/ton of processing capacity) is in the middle of the range of recently constructed coal processing plants;
  - Engineering and general administrative expenses for several analysed coal mines range between 7-8% of RCN; and
  - Interest During Construction estimated to be equal to 7.8% of RCN based on the actual interest paid during CHPP construction.

14 Property, plant and equipment, net (continued)

(ii) Information about Level 3 fair value measurements

IVS requires that for a private sector entity with specialised assets, a valuation assessed by depreciated replacement cost must be subject to a test of profitability in relation to the whole of the assets held by the entity or the cash generating unit ("**CGU**"). For the purpose of the profitability test, the Company was considered as a single CGU.

In testing profitability, the impact that current economic conditions may potentially have on the Group's operations, financial performance, expectations of financial performance of or financial conditions is considered. Such impact was assessed with the use of financial models, which make use of projections of operating activities and financial performance of the Group provided by the management. No economic obsolescence for the Group was indicated by the profitability test.

(iii) Depreciated cost of properties held for own use carried at fair value

Had the revalued properties held for own use been carried at cost less accumulated depreciation, the carrying amounts would have been:

	2022 USD'000	*2021* USD'000
Buildings and plants	119,085	141,397
Machinery and equipment	13,236	24,439
Buildings and plants, machinery and equipment under construction (Note 15)	23,670	20,692
	155,991	186,528

(f) Impairment of mining related assets

Given the fact that the carrying amount of the Group's net assets exceeded the Group's market capitalisation as at 31 December 2022, according to IAS 36, *Impairment of assets*, the management has performed impairment assessment on the carrying amount of the Group's property, plant and equipment, construction in progress and intangible assets related to the Ukhaa Khudag ("**UHG**") mine and Baruun Naran ("**BN**") mine operations (collectively referred to as "**UHG and BN Assets**"). For the purpose of this, the UHG and BN Assets are treated as a CGU.

14 Property, plant and equipment, net (continued)

The recoverable amount of the CGU was based on value in use, determined by discounting the future cash flows to be generated from the continuing use of the UHG and BN Assets. The key assumptions used in the estimation of value in use were as follows:

- Recoverable reserves and resources

  Economically recoverable reserves and resources represent management's expectations at the time of completing the impairment testing, based on reserves and resource statements and exploration and evaluation work undertaken by appropriately qualified persons.

- Growth rate

  The growth rate is estimated based on coal product price consensus and life-of-mine ("**LOM**") production plan.

- Coal prices

  The coal price assumptions are management's best estimate of the future price of coal in China. Coal price assumptions for the next five years are built on past experience of the industry and consistent with external sources. These prices are adjusted to arrive at appropriately consistent price assumptions for the different qualities and type of coal.

  Preparation basis used for the coal price assumptions for the next five years estimated at the year end of 2022 is consistent with that at the year end of 2021, which was also updated with reference to the latest market forecast. The coal price estimation over a period longer than five years contains no growth rate, except for annual inflation rate.

- Sales quantity/production profile

  Sales quantity is in line with production profile. Estimated production volumes are based on detailed LOM plans and take into account development plans for the mines agreed by management as part of the long-term planning process. Production volumes are dependent on a number of variables, such as the recoverable quantities, the production profile, the cost of the development of the infrastructure necessary to extract the reserves, the production costs, and the contractual duration of mining rights and the selling price of the coal extracted. The production profiles used were consistent with the reserves and resource volumes approved as part of the Group's process for the estimation of proved and probable reserves.

14 Property, plant and equipment, net (continued)

- Operating costs

  Operating cost assumptions are based on management's best estimation of the costs to be incurred at the date of impairment testing. Costs are determined after considering current operating costs, future cost expectations, as well as the nature and location of the operation. The estimation also takes future mining contractor arrangements into consideration; and the Directors are of the opinion that such mining contractor arrangements are in line with the Group's business plan.

- Capital expenditure

  Future capital expenditure is based on management's best estimate of required future capital requirements. It has been determined by taking into account all committed and anticipated capital expenditure adjusted for future cost estimates.

- Discount rate

  This discount rate is derived from the Group's weighted average cost of capital ("**WACC**"), with appropriate adjustments made to reflect the risks specific to the CGU. The WACC takes into account both debt and equity, weighted based on the Group and comparable peer companies' average capital structure. The cost of equity is derived from the expected return on investment by the Group's investors based on publicly available market data of comparable peer companies. The cost of debt is based on the borrowing cost of interest-bearing borrowings of the Group that reflects the credit rating of the Group.

  Post-tax discount rate of 17% and pre-tax discount rate of 23% were applied to the future cash flows projection at the year end of 2022 (2021: post-tax discount rate of 17% and pre-tax discount rate of 22%). The Directors believe that the discount rates were matching with the latest cash flow projection modelling.

  Based on above-mentioned impairment assessment, the carrying amount of the CGU has not exceeded its recoverable amount as at 31 December 2022, and has not resulted in the identification of an impairment loss for the year ended 31 December 2022. The Directors are of the opinion that the impairment provision is adequate as at 31 December 2022 and no additional or reversal of impairment provision is needed in respect of the Group's non-financial assets in this regard.

  The Directors believe that the estimates and assumptions incorporated in the impairment assessment are reasonable; however, the estimates and assumptions are subject to significant uncertainties and judgements. The Directors consider that a reasonable changes in assumptions will not result in an impairment of mining related assets.

15 Construction in progress

	2022 USD'000	*2021* USD'000
At 1 January	46,828	43,961
Additions	2,052	9
Transfer to property, plant and equipment (Note 14)	(51)	(1,105)
Revaluation gain	-	7,088
Disposal	-	(3,126)
Exchange adjustments	(1,442)	1
At 31 December	47,387	46,828

Note: The construction in progress is mainly related to machinery and equipment.

16 Other right-of-use assets

	2022 USD'000	*2021* USD'000
Cost:		
At 1 January	65	65
At 31 December	65	65
Accumulated depreciation:		
At 1 January	15	14
Charge for the year	1	1
At 31 December	16	15
Net carrying amount:	49	50

Note: Right-of-use assets comprise interests in leasehold land held for own use located in Mongolia, with original lease period from 15 years to 60 years.

17 Intangible assets

	Acquired mining right (Note (i)) USD'000	*Software* USD'000	*GS Terminal (Note (ii))* USD'000	*Total* USD'000
Cost:				
At 1 January 2021	701,557	3,676	-	705,233
Addition	-	-	3,031	3,031
At 31 December 2021	701,557	3,676	3,031	708,264
Addition	-	-	143	143
At 31 December 2022	701,557	3,676	3,174	708,407
Accumulated amortisation and impairment loss:				
At 1 January 2021	204,073	2,206	-	206,279
Amortisation charge for the year	1,467	368	64	1,899
At 31 December 2021	205,540	2,574	64	208,178
Amortisation charge for the year	765	368	1,061	2,194
At 31 December 2022	206,305	2,942	1,125	210,372
Carrying amount:				
At 31 December 2022	495,252	734	2,049	498,035
At 31 December 2021	496,017	1,102	2,967	500,086

Notes:

(i) Acquired mining right represents the mining right acquired during the acquisition of BN mine.

(ii) GS Terminal represents the permission to operate at the customs bonded terminal for 3 years.

18 Interests in subsidiaries

The following list contains the particulars of subsidiaries which affected the results, assets or liabilities of the Group. The class of shares held is ordinary unless otherwise stated.

Name of company	*Place of incorporation and business*	*Particulars of issued and paid up capital*	*Equity attributable to the Company*		*Principal activities*
			Direct	*Indirect*	
Mongolian Coal Corporation Limited	Hong Kong	1 share	100%	-	Investment holding
Mongolian Mining Corporation Pte. Ltd. (i)	Singapore	1 share of USD1 each	100%	-	Investment holding
Mongolian Coal Corporation S.à.r.l.	Luxembourg	1,712,669 shares of USD10 each	-	100%	Investment holding
Energy Resources Corporation LLC	Mongolia	19,800,000 shares of USD1 each	-	100%	Investment holding
Energy Resources LLC ("**ER**")	Mongolia	117,473,410 shares of USD2 each	-	100%	Mining and trading of coal
Energy Resources Rail LLC	Mongolia	15,300,000 shares of MNT1,000 each	-	100%	Railway project management
Tavan Tolgoi Airport LLC	Mongolia	5,795,521 shares of MNT1,000 each	-	100%	Airport operation and management
Ukhaa Khudag Water Supply LLC	Mongolia	96,016,551 shares of MNT1,000 each	-	100%	Water exploration and supply management
United Power LLC	Mongolia	100,807,646 shares of MNT1,000 each	-	100%	Power supply project management
Tavan Tolgoi Power Plant Water Supply LLC	Mongolia	6,554,000 shares of MNT 1,000 each	-	100%	Power supply and water exploration project
Khangad Exploration LLC	Mongolia	34,532,399 shares of USD1 each	-	100%	Exploration and development of coal mine
Baruun Naran S.à.r.l.	Luxembourg	24,918,394 shares of EUR1 each	-	100%	Investment holding
Tianjin Zhengcheng Import and Export Trade Co., Ltd. ("**TZJV**") (ii)	China	RMB2,035,998	-	51%	Trading of coals and machinery equipment
Inner Mongolia Fangcheng Trade Co., Ltd.(ii)	China	RMB1,000,000	-	51%	Trading of coals and machinery equipment

Notes:

(i) Incorporated as Private Company under the laws of Singapore.

(ii) Registered as Sino-Foreign Cooperative Equity Joint Ventures under PRC law.

(iii) Registered as Private Enterprise under PRC law.

19 Interests in associates

The following table presents the particulars of the associates, which are unlisted corporate entities whose quoted market prices are not available:

				Equity attributable to the Company		
Name of associate	*Form of business structure*	*Place of incorporation and business*	*Particulars of issued and paid up capital*	*Group's effective interest*	*Held by a subsidiary*	*Principal activity*
Gashuun Sukhait Road LLC	Incorporated	Mongolia	100,000 shares of MNT1,000 each	40.00%	40.00%	Paved road maintenance service (Note (i))
Guoneng Inner Mongolia Ganqimaodu International Energy Co., Ltd.	Incorporated	People's Republic of China	RMB500,000,000	10.00%	10.00%	Operate warehouse for coal storage (Note (ii))

Notes:

(i) The principal activities of Gashuun Sukhait Road LLC are supplying safety, readiness, protection, repair and maintenance service for paved road operations from UHG to Gashuun Sukhait ("**GS**"). The investment in Gashuun Sukhait Road LLC enables the Group to monitor the usage situation of the aforementioned paved road.

(ii) The principal activities of Guoneng Inner Mongolia Ganqimaodu International Energy Co., Ltd. ("**Guoneng Ganqimaodu**") are provision of customs-supervised warehousing services, road cargo transportation, general cargo warehousing services, domestic freight forwarding and loading service.

On 9 April 2021, ER, a wholly-owned subsidiary of the Company, entered into an investment agreement ("**Investment agreement**") with CHN Energy Coal Coking Co., Ltd. ("**CECC**"), an independent third party and one of the Group's largest customer. Pursuant to the Investment Agreement, ER and CECC agreed to establish Guoneng Ganqimaodu for coal storage and handling customs bonded stockyard located at the Ganqimaodu port in the PRC. ER and CECC hold 10% and 90%, respectively, of the total equity interests in Guoneng Ganqimaodu. The registered capital of Guoneng Ganqimaodu is RMB500,000,000 which is contributed by ER and CECC respectively, in proportion to their equity interests in Guoneng Ganqimaodu. On 30 December 2021, ER paid up RMB5,000,000 (then equivalent to approximately USD785,000) of Guoneng Ganqimaodu's registered capital,and paid up the remaining of Guoneng Ganqimaodu's registered capital RMB45,000,000 (then equivalent to approximately USD6,951,000) on 25 April 2022. Pursuant to ER's rights stated on the articles of association of Guoneng Ganqimaodu, the directors of the Company considered that the Group has significant influence on Guoneng Ganqimaodu through its participation in the board of directors of Guoneng Ganqimaodu.

All of above associates are accounted for using the equity method in the consolidated financial statements.

19 Interests in associates (continued)

Summarised financial information of the associate, adjusted for any differences in accounting policies, and reconciled to the carrying amounts in the consolidated financial statements, are disclosed below:

	Gashuun Sukhait Road LLC	
	2022 USD'000	*2021* USD'000
Gross amounts of the associate:		
Current assets	1,639	1,547
Non-current assets	627	859
Current liabilities	1,763	1,997
Equity	503	409
Revenue	1,565	1,898
Profit/(loss) from continuing operations	180	(490)
Total comprehensive income	94	(490)
Reconciled to the Group's interests in associate:		
Gross amounts of net assets of the associate	503	409
Group's effective interest	40%	40%
Group's share of net assets of the associate	201	164
Carrying amount in the consolidated financial statements	201	164

19 Interests in associates (continued)

	Guoneng Inner Mongolia Gangimaodu International Energy Co., Ltd.
	2022
	USD'000
Gross amounts of the associate:	
Current assets	20,745
Non-current assets	77,057
Current liabilities	11,649
Non-current liabilities	11,597
Equity	74,556
Revenue	12,211
Profit from continuing operations	2,139
Total comprehensive income	(4,242)
Reconciled to the Group's interests in associate:	
Gross amounts of net assets of the associate	74,556
Group's effective interest	10%
Group's share of net assets of the associate	7,456
Carrying amount in the consolidated financial statements	7,456

20 Other non-current assets

	2022	*2021*
	USD'000	USD'000
Prepayments in connection with construction work, equipment purchases and others (Note 22(c)(ii))	58,923	55,020
Other financial asset (Note)	614	614
	59,537	55,634

Note: The Group has an investment of 2.25% equity interest in International Medical Center LLC.

21 Inventories

(a) Inventories in the consolidated statement of financial position comprise:

	2022 USD'000	*2021* USD'000
Coal	96,945	155,217
Materials and supplies	16,286	14,883
	113,231	170,100
Less: Provision on coal inventories	(10,437)	(10,437)
	102,794	159,663

(b) The analysis of the amount of inventories recognised as an expense and included in profit or loss is as follows:

	2022 USD'000	*2021* USD'000
Carrying amount of inventories sold	426,686	141,469

22 Trade and other receivables

	2022 USD'000	*2021* USD'000
Trade receivables (Note (a))	4,432	14,038
Other receivables (Note (c))	87,725	85,482
	92,157	99,520
Less: allowance for credit losses (Note (b))	-	-
	92,157	99,520

22 Trade and other receivables (continued)

Notes:

(a) Ageing analysis

As of the end of the reporting period, the ageing analysis of trade debtors, based on the invoice date and net of loss allowance, is as follows:

	2022 USD'000	*2021* USD'000
Within 90 days	4,245	14,020
90 to 180 days	187	-
180 to 270 days	-	18
	4,432	14,038

(b) Loss allowance for trade receivables

Credit losses in respect of trade receivables are recorded using an allowance account unless the Group is satisfied that recovery of the amount is remote, in which case the credit losses are written off against trade receivables directly (Note 2(k)(i)).

As at 31 December 2022, the Group evaluated the loss allowance for ECL and no loss allowance of trade receivables (2021: nil) was made based on the assessment. Further details on the Group's credit policy and credit risk arising from trade debtors are set out in Note 30(b).

(c) Other receivables

	2022 USD'000	*2021* USD'000
Amounts due from related parties (Note (i))	3	1
Prepayments and deposits (Note (ii))	53,809	49,220
Value added tax ("**VAT**") and other tax receivables (Note (iii))	33,150	24,236
Others	763	12,025
	87,725	85,482

Notes:

(i) Amounts due from related parties are unsecured, interest-free and have no fixed repayment terms (see Note 32(a)).

(ii) At 31 December 2022 and 2021, prepayments and deposits mainly represent the prepayments made to the Group's mining contractor.

(iii) VAT and other tax receivables include amounts that have been accumulated to date in certain subsidiaries and were due from Mongolian Tax Authority ("**MTA**"). According to the prevailing tax rules and regulations in Mongolia, a taxpayer may offset future taxes and royalties payable to MTA against VAT receivable from MTA. The Group verifies the collectability of such funds with MTA on a regular basis, and based on currently available information, the Group anticipates full recoverability.

All other receivables were aged within one year and expected to be recovered or expensed off within one year.

23 Cash and cash equivalents and other cash flow information

(a) Cash and cash equivalents comprise:

	2022 USD'000	*2021* USD'000
Cash on hand	2	2
Cash at bank	64,693	25,935
Cash and cash equivalents in the consolidated cash flow statement	64,695	25,937

(b) Reconciliation of liabilities arising from financing activities

The table below details changes in the Group's liabilities from financing activities, including both cash and non-cash changes. Liabilities arising from financing activities are liabilities for which cash flows were, or future cash flows will be, classified in the Group's consolidated cash flow statement as cash flows from financing activities.

	Senior Notes due 2022 (Note) USD'000 (Note 24)	*Senior Notes due 2024* (Note) USD'000 (Note 24)	*Total* USD'000
At 1 January 2022	18,183	443,308	461,491
Changes from financing cash flows:			
Interest paid	(1,190)	(41,299)	(42,489)
Repayment of Senior Notes due 2022	(14,912)	-	(14,912)
Repurchase of Senior Notes due 2024	-	(39,671)	(39,671)
Total changes from financing cash flows	(16,102)	(80,970)	(97,072)
Changes in fair value	(3,168)	-	(3,168)
Other changes:			
Interest expenses (Note 6(a))	1,153	44,277	45,430
Excess of derecognised carrying amount over the consideration	-	(23,144)	(23,144)
Others	(66)	(2,365)	(2,431)
Total other changes	1,087	18,768	19,855
At 31 December 2022	-	381,106	381,106

Note: Liabilities include accrued interest as disclosed in Note 25.

23 Cash and cash equivalents and other cash flow information (continued)

	Senior Notes due 2022 (Note) USD'000 (Note 24)	*Senior Notes due 2024* (Note) USD'000 (Note 24)	*Total* USD'000
At 1 January 2021	17,067	441,328	458,395
Changes from financing cash flows:			
Interest paid	(818)	(40,700)	(41,518)
Total changes from financing cash flows	(818)	(40,700)	(41,518)
Changes in fair value	608	-	608
Other changes:			
Interest expenses (Note 6(a))	1,408	44,762	46,170
Others	(82)	(2,082)	(2,164)
Total other changes	1,326	42,680	44,006
At 31 December 2021	18,183	443,308	461,491

Note: Liabilities include accrued interest as disclosed in Note 25.

24 Senior notes

	2022 USD'000	*2021* USD'000
Senior Notes due 2022 (Note (i))	-	17,885
Senior Notes due 2024 (Note (ii))	373,756	434,716
	373,756	452,601

Notes:

(i) The Senior Notes due 2022 bore interest, ranging from 5% to 8% per annum based on the benchmark coal price index, payable semi-annually, and was due on 30 September 2022 ("**Senior Notes due 2022**"). The Senior Notes due 2022 was fully repaid on 30 September 2022 and the outstanding principal amount was nil as at 31 December 2022 (31 December 2021: USD14,912,000).

24 Senior notes (continued)

(ii) On 15 April 2019, the Group issued the Senior Notes due 2024 with a principal amount of USD440,000,000 which were listed on the Singapore Exchange Securities Trading Limited. The Senior Notes due 2024 bear interest at 9.25% per annum fixed rate, payable semi-annually, and due on 15 April 2024.

The Senior Notes due 2024 have been accounted for as a hybrid financial instrument containing a derivative component and a liability component. The derivative component of early redemption option was initially recognised at its fair value of nil. The fair value of the derivative component of early redemption option as at 31 December 2022 was nil (31 December 2021: nil). The liability component was initially recognised at fair value of USD429,795,446, after taking into account attributable transaction costs of USD10,204,554 and is accounted on amortised cost subsequently. In October and December 2022, the Group repurchased an aggregate principal amount of USD63,591,000 from Senior Notes due 2024 (See Note 7). As at 31 December 2022, the carrying amount of the liability component was USD373,756,000 (31 December 2021: USD434,716,000) The outstanding principal amount of the Senior Notes due 2024 is USD376,409,000 as at 31 December 2022 (31 December 2021: USD440,000,000).

Fair value of the derivative component was estimated by the Directors based on the Binomial model.

25 Trade and other payables

	2022 USD'000	*2021* USD'000
Trade payables (Note (i))	103,987	141,395
Amounts due to related parties (Note (ii))	3,986	3,870
Payables for purchase of equipment	2,013	4,504
Interest payable (Note (iii))	7,350	8,890
Other taxes payables	11,015	13,276
Others (Note (iv))	8,018	3,663
	136,369	175,598

Notes:

(i) As of the end of the reporting period, the ageing analysis of trade creditors based on the invoice date is as follows:

	2022 USD'000	*2021* USD'000
Within 90 days	71,264	48,505
90 to 180 days	-	5,812
180 to 365 days	-	31,323
Over 365 days	32,723	55,755
	103,987	141,395

(ii) Amounts due to related parties represent contractual service fee payable and payables for equipment and construction work, which are unsecured, interest-free and have no fixed terms of repayments (see Note 32(a)).

(iii) As at 31 December 2022, interest payables was related to Senior Notes due 2024 amounting to USD7,350,000 (interest payables for Senior Notes due 2022 and 2024 as at 31 December 2021: USD8,890,000).

(iv) Others represent accrued expenses, payables for staff related costs and other deposits.

All of the other payables are expected to be settled or recognised in profit or loss within one year or are repayable on demand.

26 Income tax in the consolidated statement of financial position

(a) Tax payable in the consolidated statement of financial position represents:

	2022 USD'000	*2021* USD'000
At 1 January	65	3,323
Provision for the year (Note 8(a))	11,194	132
Offsetting with other tax receivables	-	(2,436)
Income tax paid	(694)	(973)
Exchange adjustments	(948)	19
At 31 December	9,617	65

(b) Deferred tax assets and liabilities recognised

The components of deferred tax assets/(liabilities) recognised in the consolidated statement of financial position and the movements during the year are as follows:

Deferred tax arising from:	*Revaluation of other properties* USD'000	*Tax losses* USD'000	*Unrealised profits on intra-group transactions* USD'000	*Depreciation and amortisation* USD'000	*Unrealised foreign exchange differences on Senior Notes* USD'000	*Fair value adjustments in relation to the acquisition* USD'000	*Fair value of financial instrument* USD'000	*Total* USD'000
At 1 January 2021	(64,542)	1,453	(232)	2,122	10,672	(99,222)	8	(149,741)
Credited/(charged) to profit or loss (Note 8(a))	4,423	5,650	(820)	(4,328)	-	71	149	5,145
Credited/(charged) to reserves	(15,225)	1	8	(224)	3	1	1	(15,435)
At 31 December 2021	(75,344)	7,104	(1,044)	(2,430)	10,675	(99,150)	158	(160,031)
At 1 January 2022	(75,344)	7,104	(1,044)	(2,430)	10,675	(99,150)	158	(160,031)
Credited/(charged) to profit or loss (Note 8(a))	4,458	(4,835)	714	(1,246)	16,054	275	(158)	15,262
Credited/(charged) to reserves	2,010	(801)	131	533	(3,249)	-	-	(1,376)
At 31 December 2022	(68,876)	1,468	(199)	(3,143)	23,480	(98,875)	-	(146,145)

26 Income tax in the consolidated statement of financial position (continued)

	2022 USD'000	*2021* USD'000
Net deferred tax assets recognised in the consolidated statement of financial position	28,505	21,767
Net deferred tax liabilities recognised in the consolidated statement of financial position	(174,650)	(181,798)
	(146,145)	(160,031)

(c) Deferred tax assets not recognised

In accordance with the accounting policy set out in Note 2(s), the Group has not recognised deferred tax assets in respect of cumulative tax losses of USD406,173,000 as at 31 December 2022 (2021: USD406,646,000) as it is not probable that future taxable profits against which the losses can be utilised will be available in the relevant tax jurisdiction and entity. According to the amendment to Mongolian Corporate Income Tax Law which is effective on 1 January 2010, for entities engaged in mining or infrastructure construction, the tax losses generated after 1 January 2010 will expire in four to eight years after the tax losses generated under current tax legislation. Tax losses of other entities will expire in two years after the tax losses generated. Expiry of unrecognised tax losses of Group entities located in PRC will expire in five years under the PRC tax regulations.

Expiry of unrecognised tax losses of Group entities located in Mongolia and PRC:

	2022 USD'000	*2021* USD'000
Year of expiry		
2022	-	131
2023	96	96
2024	-	-
2025	9	1,030
2026	347	233
2027	1,020	-
	1,472	1,490

In relation to group entities located in the jurisdictions other than Mongolia and PRC, the tax losses do not expire under current tax legislations.

27 Equity-settled share-based payment transactions

The Company had a share option scheme ("**Share Option Scheme**") which was adopted on 17 September 2010, that became effective on the Listing Date on 13 October 2010 ("**Adoption Date**"), whereby the board of Directors of the Company is authorised, at their discretion, invites eligible participants to receive options to subscribe for shares ("**Options**") subject to the terms and conditions stipulated therein as incentives or rewards for their contributions to the Group. The Share Option Scheme expired 12 October 2020; however, the provisions of the Share Option Scheme remained in force to the extent necessary to give effect to any Options granted or exercised thereto or otherwise as may be required.

On 16 June 2021, the Company adopted a new share option scheme ("**New Share Option Scheme**"), in which the board of Directors of the Company is authorised, at its discretion, to grant to eligible participants options to subscribe for shares subject to the terms and conditions stipulated therein as incentives or rewards for their contributions to the Company. There is no Share Options granted under the New Share Option Scheme during the years ended 31 December 2022 and 31 December 2021.

(a) The terms and conditions of the grants as at 31 December 2022 are as follows:

Grant Date	*Number of options (Note (b))* '000	*Vesting conditions*	*Contractual life of options*
8 May 2017	2,800	1 July 2017	1 July 2017 to 8 May 2022
8 May 2017	2,800	8 May 2017 to 8 May 2018	8 May 2017 to 8 May 2022
8 May 2017	2,800	8 May 2017 to 8 May 2019	8 May 2017 to 8 May 2022
8 May 2017	2,800	8 May 2017 to 8 May 2020	8 May 2017 to 8 May 2022
8 May 2017	2,800	8 May 2017 to 8 May 2021	8 May 2017 to 8 May 2022

27 Equity-settled share-based payment transactions (continued)

(b) The movement of the number and weighted average exercise prices of share options are as follows:

	2022		*2021*	
	Weighted average exercise price HKD	*Number of options* '000	*Weighted average exercise price* HKD	*Number of options* '000
Outstanding at 1 January	2.39	10,900	2.39	13,680
Forfeited during the year	-	-	2.39	(380)
Expired during the year	-	-	-	-
Exercised during the year	2.39	(10,900)	2.39	(2,400)
Outstanding at 31 December	-	-	2.39	10,900
Exercisable at 31 December	-	-	2.39	10,900

(c) Fair value of share options and assumptions

The fair value of services received in return for share options granted is measured by reference to the fair value of share options granted. The estimate of the fair value of the share options granted is measured based on the Black-Scholes option pricing model. The variables of the models included expected life of the options, risk-free interest rate, expected volatility and expected dividend of the shares of the Company.

Fair value of share options and assumptions:

	8 May 2017
Fair value at measurement date	HKD0.160 ~ HKD0.1150
Share price	HKD0.2392
Exercise price	HKD0.2392
Expected life	5 years
Risk-free interest rate	1.132%
Expected volatility	62%
Expected dividends	-

The expected volatility is based on the historic volatility of entities in the same industry (calculated based on the weighted average remaining life of the share options), adjusted for any expected changes to future volatility based on publicly available information. Expected dividends are based on management's estimates. The risk-free interest rate is based on the yield of Hong Kong Exchange Fund Notes corresponding to the expected life of the options as at the grant date. Changes in the subjective input assumptions could materially affect the fair value estimate.

Share options were granted under a service condition. The condition has not been taken into account in the grant date fair value measurement of the services received. There was no market condition associated with the share option grants.

28 Provisions

	2022 USD'000	*2021* USD'000
Accrued reclamation obligations	16,737	30,928
Others	1,500	1,500
	18,237	32,428
Less: Current portion	(1,500)	(1,500)
	16,737	30,928

The accrual for reclamation costs has been determined based on management's best estimates. The estimate of the associated costs may be subject to change in the near term when the reclamation on the land from current mining activities becomes apparent in future periods. At the end of each reporting period, the Group reassesses the estimated costs and adjusts the accrued reclamation obligations, where necessary. The Group's management believes that the accrued reclamation obligations at 31 December 2022 are adequate and appropriate. The accrual is based on estimates and therefore, the ultimate liability may exceed or be less than such estimates. The movement of the accrued reclamation cost is as follows:

	2022 USD'000	*2021* USD'000
At 1 January	30,928	19,458
(Decrease)/increase for reassessment of estimated costs	(15,784)	10,978
Accretion expense (Note 6(a))	1,593	492
At 31 December	16,737	30,928

Accrued reclamation costs change during the years ended 31 December 2022 and 2021 resulted from the reassessment of estimated costs.

29 Capital, reserves and dividends

(a) Movements in components of equity

The reconciliation between the opening and closing balances of each component of the Group's consolidated equity is set out in the consolidated statement of changes in equity. Details of the changes in the Company's individual components of equity between the beginning and the end of the year are set out below:

	Note	*Share capital* USD'000 (Note 29(c))	*Share premium* USD'000 (Note 29(d)(i))	*Other reserve* USD'000 (Note 29(d)(ii))	*Accumulated losses* USD'000	*Perpetual notes* USD'000 (Note 29(e))	*Total equity* USD'000
At 1 January 2021		102,918	768,520	22,895	(132,129)	66,569	828,773
Changes in equity for 2021:							
Total comprehensive income		-	-	-	(2,681)	-	(2,681)
Equity-settled share-based transactions	27	240	806	(273)	-	-	773
At 31 December 2021		103,158	769,326	22,622	(134,810)	66,569	826,865
At 1 January 2022		103,158	769,326	22,622	(134,810)	66,569	826,865
Changes in equity for 2022:							
Total comprehensive income		-	-	-	1,629	-	1,629
Repurchase of perpetual notes		-	-	-	1,102	(11,093)	(9,991)
Equity-settled share-based transactions	27	1,090	3,688	(1,453)	-	-	3,325
At 31 December 2022		104,248	773,014	21,169	(132,079)	55,476	821,828

(b) Dividends

The board of Directors of the Company does not recommend the payment of a final dividend in respect of the year ended 31 December 2022 (dividend in respect of the year ended 31 December 2021: nil).

29 Capital, reserves and dividends (continued)

(c) Share capital

	2022		*2021*	
	Number of shares'000	USD'000	*Number of shares'000*	USD'000
Ordinary shares, authorised				
At 1 January and 31 December	1,500,000	150,000	1,500,000	150,000

	2022		*2021*	
	Number of shares'000	USD'000	*Number of shares'000*	USD'000
Ordinary shares, issued and fully paid				
At 1 January	1,031,577	103,158	1,029,177	102,918
Impact of share option exercise	10,900	1,090	2,400	240
At 31 December	1,042,477	104,248	1,031,577	103,158

10,900,000 share options were exercised during the year ended 31 December 2022 (2021: 2,400,000).

(d) Nature and purpose of reserves

(i) Share premium

Under the Companies Law of the Cayman Islands, the share premium account of the Company may be applied for payment of distributions or dividends to shareholders provided that immediately following the date on which the distribution or dividend is proposed to be paid the Company is able to pay its debts as they fall due in the ordinary courses of business.

29 Capital, reserves and dividends (continued)

(ii) Other reserve

The other reserve comprises the following:

- the aggregate amount of share capital and other reserves of the companies now comprising the Group after elimination of the investments in subsidiaries; and

- the portion of the grant date fair value of unexercised share options granted to Directors and employees of the Company that has been recognised in accordance with the accounting policy adopted for share-based payments in Note 2(r)(ii).

(iii) Exchange reserve

The exchange reserve comprises all foreign exchange adjustments arising from the translation of the MNT denominated financial statements of the Group's entities to the Group's presentation currency. The reserve is dealt with in accordance with the accounting policy set out in Note 2(w).

(iv) Property revaluation reserve

The property revaluation reserve has been set up and is dealt with in accordance with the accounting policies adopted for land and buildings held for own use in Note 2(h).

(e) Perpetual notes

The Company issued perpetual notes which were listed on the Singapore Exchange Securities Trading Limited on 4 May 2017, with a principal amount of USD195,000,000 and with a fair value of USD75,897,000. Fair value of the perpetual notes was valued by the management with reference to a valuation report issued by an independent valuer based on the discounted cash flow method. On 15 April 2019, the Company redeemed a principal amount of USD23,972,000 with a carrying amount of USD9,328,000 through debt refinancing. After the debt refinancing, the outstanding principal amount of perpetual notes was USD171,028,000 with a carrying amount of USD66,569,000. Pursuant to the Company's announcements dated 12 July 2022 and 23 November 2022, the Company repurchased a principal amount of USD22,120,000 and USD6,380,000, respectively, with a carrying amount of USD8,610,000 and USD2,483,000. As at 31 December 2022, the outstanding principal amount of the perpetual notes was USD142,528,000 with a carrying amount of USD55,476,000.

The perpetual notes have no fixed maturity and are redeemable at the Company's option. The distribution payments can be deferred at the discretion of the Company. So long as the perpetual notes are outstanding, the Company shall not declare or pay any dividend or make any distribution on or with respect to its capital shares; or redeem, reduce, cancel, buy-back or acquire for any consideration any of its capital shares.

29 Capital, reserves and dividends (continued)

(f) Capital management

The Group's primary objectives when managing capital are to safeguard the Group's ability to continue as a going concern, so that it can continue to provide returns for shareholders and benefits for other stakeholders. The Group defines the capital as total shareholders' equity plus loans and borrowings.

The Group actively and regularly reviews and manages its capital structure to maintain a balance between the higher shareholder returns that might be possible with higher levels of borrowings and the advantages and security afforded by a sound capital position.

The gearing ratio (calculated as total bank and other borrowings divided by total assets) of the Group as at 31 December 2022 was 20.5% (2021: 24.1%).

30 Financial risk management and fair value of financial instruments

(a) Financial risk management objectives and policies

Management has adopted certain policies on financial risk management with the objective of:

(i) ensuring that appropriate funding strategies are adopted to meet the Group's short-term and long-term funding requirements taking into consideration the cost of funding, gearing levels and cash flow projections of each project and that of the Group; and

(ii) ensuring that appropriate strategies are also adopted to manage related interest and currency risk funding.

(b) Credit risk

The Group's credit risk is primarily attributable to cash at bank, trade and other receivables. Management monitors the exposures to these credit risks on an ongoing basis.

Substantially all of the Group's cash at bank are deposited in the reputable banks which management assessed the credit risk to be insignificant.

30 Financial risk management and fair value of financial instruments (continued)

Trade receivables are presented net of loss allowance. In order to minimise the credit risk, the credit committee, comprising the senior management team of the Group, has established a policy for determining credit limits, credit approvals and other monitoring procedures to ensure that follow-up action is taken to recover overdue debts. The credit committee also evaluates and reviews the credit quality and the recoverable amount of each individual trade debt on an ongoing basis. These evaluations and reviews focus on the customer's past history of making payments when due and current ability to pay, and take into account information specific to the customer as well as pertaining to the economic environment in which the customer operates. The Group establishes a loss allowance for trade receivables that represents its estimate of losses in respect of trade receivables. The components of this allowance are a specific loss component that relates to individually significant exposures, and a collective loss component established for groups of similar assets. At the end of the reporting period, the Group believes that no loss allowance for trade receivables is required in the consolidated financial statements. The Group does not hold any collateral as security for these receivables. The Group has a certain concentration credit risk as two customers accounted for 100% (2021: two customers accounted for 99%) of the total trade receivables as at 31 December 2022.

The Group measures loss allowances for trade receivables at an amount equal to lifetime ECLs, which is calculated using a provision matrix. As the Group's historical credit loss experience does not indicate significantly different loss patterns for different customer segments, the loss allowance based on past due status is not further distinguished between the Group's different customer bases.

The following table provides information about the Group's exposure to credit risk and ECLs for trade receivables and contract assets as at 31 December 2022:

	2022		
	Expected loss rate %	*Gross carrying amount* USD'000	*Loss allowance* USD'000
Current	0.0%	4,245	-
90 – 180 days	0.0%	187	-
180 – 270 days	0.0%	-	-
		4,432	-

	2021		
	Expected loss rate %	*Gross carrying amount* USD'000	*Loss allowance* USD'000
Current	0.0%	14,020	-
90 – 180 days	0.0%	-	-
180 – 270 days	0.0%	18	-
		14,038	-

30 Financial risk management and fair value of financial instruments (continued)

Expected loss rates are based on actual loss experience over the past 2 years. These rates are adjusted to reflect differences between economic conditions during the period over which the historic data has been collected, current conditions and the Group's view of economic conditions over the expected lives of the receivables.

The credit risk on other receivables and related companies is limited because the counterparties have no historical default record and the Directors expect that the general economic conditions will not significantly change for the 12 months after the reporting date.

Further quantitative disclosures in respect of the Group's exposure to credit risk arising from trade and other receivables are set out in Note 22.

(c) Currency risk

The Group is exposed to currency risk primarily through sales, purchases and borrowings which give rise to receivables, payables, borrowings and cash balances that are denominated in a foreign currency, i.e. a currency other than the functional currency of the operations to which the transactions relate. The functional currency of the Group's overseas holding entities and main operating subsidiaries located in Mongolia is USD and the functional currency of remaining subsidiaries located in Mongolia is MNT. The currencies giving rise to this risk are primarily MNT and RMB.

(i) Exposure to currency risk

The following table details the Group's exposure at the end of the reporting period to currency risk arising from recognised assets or liabilities denominated in a currency other than the functional currency of the entity to which they relate. For presentation purpose, the amounts of the exposure are shown in USD, translated using the spot rate at the year-end date.

	Exposure to foreign currencies (expressed in United States Dollars) 2022				
	Mongolian Togrog USD'000	*Euros* USD'000	*Renminbi* USD'000	*Hong Kong Dollar* USD'000	*United States Dollars* USD'000
Trade and other receivables	55	-	4,467	-	-
Cash and cash equivalents	3,005	1	18,600	4	3
Trade and other payables	(58,249)	(14)	(10,562)	(179)	(272)
Net exposure arising from recognised assets and liabilities	(55,189)	(13)	12,505	(175)	(269)

	Exposure to foreign currencies (expressed in United States Dollars) 2021				
	Mongolian Togrog USD'000	*Euros* USD'000	*Renminbi* USD'000	*Hong Kong Dollar* USD'000	*United States Dollars* USD'000
Trade and other receivables	11,955	-	3,390	-	-
Cash and cash equivalents	496	2	21,807	486	3
Trade and other payables	(21,242)	(18)	(13,828)	(179)	(272)
Contract liabilities	(28,706)	-	(81,584)	-	-
Net exposure arising from recognised assets and liabilities	(37,497)	(16)	(70,215)	307	(269)

30 Financial risk management and fair value of financial instruments (continued)

(ii) Sensitivity analysis

An 5% strengthening/weakening of other currency against functional currencies defined in Note 2(w) as at the respective end of the reporting periods would (decrease)/increase profit after taxation (2021: (increase)/decrease loss after taxation) by the amount shown below. This analysis assumes that all other risk variables remained constant.

Profit/loss for the year	*2022* USD'000	*2021* USD'000
5% increase in MNT	(2,070)	(1,406)
5% decrease in MNT	2,070	1,406
5% increase in RMB	470	(2,632)
5% decrease in RMB	(470)	2,632
5% increase in EUR	(1)	(1)
5% decrease in EUR	1	1
5% increase in USD	(12)	(12)
5% decrease in USD	12	12
5% increase in HKD	(9)	15
5% decrease in HKD	9	(15)

(d) Interest rate risk

The Group's interest rate risk arises primarily from senior notes. Borrowings issued at variable rates expose the Group to cash flow interest rate risk and fair value interest rate risk.

The following table details the profile of the Group's net borrowings (interest-bearing financial liabilities less interest-bearing financial assets) at the end of the reporting period. The detailed interest rates and maturity information of the Group's and the Company's borrowings are disclosed in Note 24.

	2022 USD'000	*2021* USD'000
Net fixed rate borrowings:		
Senior Notes due 2024	373,756	434,716
	373,756	434,716
Net floating rate borrowings:		
Senior Notes due 2022	-	17,885
Less: Bank deposits	(64,693)	(25,935)
	(64,693)	(8,050)
Total net borrowings:	309,063	426,666

As at 31 December 2022, the interest rate risk of the Group was immaterial.

30 Financial risk management and fair value of financial instruments (continued)

(e) Liquidity risk

Liquidity risk is the risk that the Group will not be able to settle or manage its obligations associated with financial liabilities. In 2022 and thereafter, the liquidity of the Group is primarily dependent on its ability to maintain adequate cash inflow from operations to meet its debt obligations as they fall due. The Directors have carried out a detailed review of the cash flow forecast of the Group for the twelve months ending 31 December 2023. Based on such forecast, the Directors have determined that adequate liquidity exists to finance the working capital and capital expenditure requirements of the Group during that period. In preparing the cash flow forecast, the Directors have considered historical cash requirements of the Group as well as other key factors. The Directors are of the opinion that the assumptions and sensitivities which are included in the cash flow forecast are reasonable. However, as with all assumptions in regard to future events, these are subject to inherent limitations and uncertainties and some or all of these assumptions may not be realised.

The Group's objective is to maintain a suitable level of liquidity to finance the daily operation, capital expenditure and repayment of borrowings. The Group's policy is to regularly monitor current and expected liquidity requirements to ensure that it maintains sufficient reserves of cash and adequate committed lines of funding from major financial institutions to meet its liquidity requirements in the short and longer term. Note 2(b) explains management's plans for managing the liquidity needs of the Group to enable it to continue to meet its obligations as they fall due.

The following table details the remaining contractual maturities at the end of the reporting period of the Group's financial liabilities, which are based on contractual undiscounted cash flows (including interest payments computed using contractual rates or, if floating, based on rates current at the end of the reporting period) and the earliest date the Group can be required to pay:

	2022				
	Contractual undiscounted cash outflow				
	Within 1 year USD'000	*After 1 year but within 2 years* USD'000	*After 2 years but within 5 years* USD'000	*Total contractual undiscounted cash flow* USD'000	*Carrying amount at 31 Dec* USD'000
Senior Notes due 2024 (Note 24)	27,467	393,818	-	421,285	373,756
Trade and other payables (Note 25)	136,369	-	-	136,369	136,369
Lease liabilities	56	-	-	56	56
	163,892	393,818	-	557,710	510,181

30 Financial risk management and fair value of financial instruments (continued)

	2021				
	Contractual undiscounted cash outflow				
	Within 1 year USD'000	*After 1 year but within 2 years* USD'000	*After 2 years but within 5 years* USD'000	*Total contractual undiscounted cash flow* USD'000	*Carrying amount at 31 Dec* USD'000
Senior Notes due 2022 (Note 24)	15,807	-	-	15,807	17,885
Senior Notes due 2024 (Note 24)	32,108	40,700	460,350	533,158	434,716
Trade and other payables (Note 25)	175,598	-	-	175,598	175,598
Lease liabilities	72	-	-	72	72
	223,585	40,700	460,350	724,635	628,271

(f) Fair value measurement

(i) Fair value hierarchy

The following table presents the fair value of the Group's financial instruments measured at the end of the reporting period on a recurring basis, categorised into the three-level fair value hierarchy as defined in IFRS 13, *Fair value measurement*. The level into which a fair value measurement is classified is determined with reference to the observability and significance of the inputs used in the valuation technique as follows:

- Level 1 valuations: Fair value measured using only Level 1 inputs i.e. unadjusted quoted prices in active markets for identical assets or liabilities at the measurement date

- Level 2 valuations: Fair value measured using Level 2 inputs i.e. observable inputs which fail to meet Level 1, and not using significant unobservable inputs. Unobservable inputs are inputs for which market data are not available

- Level 3 valuations: Fair value measured using significant unobservable inputs

The Group has a team headed by the finance manager performing valuations for the financial instruments, including the redemption option embedded in the Senior Notes and derivative components of the Senior Notes due 2022. The team reports directly to the chief financial officer. A valuation report with analysis of changes in fair value measurement is prepared by the team at each interim and annual reporting date, and is reviewed and approved by the chief financial officer. Discussion of the valuation process and results with the chief financial officer is held twice a year, to coincide with the reporting dates.

	Fair value at 31 December 2022 USD'000	*Fair value measurements as at 31 December 2022 categorised into*		
		Level 1 USD'000	*Level 2* USD'000	*Level 3* USD'000
Recurring fair value measurement				
Financial asset				
- Redemption option embedded in Senior Notes due 2024	-	Not applicable	Not applicable	-

30 Financial risk management and fair value of financial instruments (continued)

	Fair value at 31 December 2021 USD'000	*Fair value measurements as at 31 December 2021 categorised into*		
		Level 1 USD'000	*Level 2* USD'000	*Level 3* USD'000
Recurring fair value measurement				
Financial asset				
- Redemption option embedded in Senior Notes due 2024	-	Not applicable	Not applicable	-
Financial liabilities				
- Derivative components of Senior Notes due 2022	3,168	Not applicable	Not applicable	3,168

During the year ended 31 December 2022, there were no transfers between Level 1 and Level 2, or transfers into or out of Level 3 (2021: nil). The Group's policy is to recognise transfers between levels of fair value hierarchy as at the end of the reporting period in which they occur.

Information about Level 3 fair value measurements

	Valuation techniques	*Significant unobservable inputs*	*Weighted average*
Derivative components of Senior Notes due 2022	Discounted cash flow method	Bond yield	Not applicable (2021: 9.76%)
		Coal price index	Not applicable (2021: USD201 to USD294)
Redemption option embedded in Senior Notes due 2024	Binomial model	Expected volatility	12.8% (2021: 89.5%)

The fair value of derivative components of the Senior Notes due 2022 is determined using discounted cash flow method and the significant unobservable input used in the fair value measurement is bond yield and coal price index. The fair value measurement is negatively correlated to the bond yield.

The fair value of redemption option embedded in Senior Notes due 2024 is determined using binomial model and the significant unobservable input used in the fair value measurement is expected volatility. The fair value measurement is positively correlated to the expected volatility. As at 31 December 2022, it is estimated that with all other variables held constant, an increase/decrease in the expected volatility by 1% would have decreased/increased the Group's net finance costs by nil.

30 Financial risk management and fair value of financial instruments (continued)

The movement during the period in the balance of Level 3 fair value measurements is as follows:

	2022 USD'000	*2021* USD'000
Derivative components of Senior Notes due 2022:		
At 1 January	3,168	2,560
Changes in fair value recognised in profit or loss during the year	(2,661)	608
Gain on derecognition	(507)	-
At 31 December	-	3,168
Total (gains)/losses for the period included in profit or loss for liabilities held at the end of the reporting year	(3,168)	608

The redemption option embedded in Senior Notes due 2024 was nil as at the years ended 31 December 2022 and 2021.
The net gains or losses resulting from the remeasurement of the derivative components of the Senior Notes due 2022 and the redemption option embedded in the Senior Notes due 2024 are recognised in net finance costs in the consolidated statement of profit or loss.

(ii) Fair value of financial assets and liabilities carried at other than fair value

The carrying amounts of the Group's financial instruments carried at cost or amortised cost were not materially different from their fair values as at 31 December 2022 and 31 December 2021 except for the following financial instruments, for which their carrying amounts and fair value are disclosed below:

	At 31 December 2022		*At 31 December 2021*	
	Carrying amount USD'000	*Fair value* USD'000	*Carrying amount* USD'000	*Fair value* USD'000
Liability component of Senior Notes due 2022	-	-	14,717	14,333
Liability component of Senior Notes due 2024	373,756	352,414	434,716	444,972

31 Commitments and contingencies

(a) Capital commitments

Capital commitments outstanding at respective end of the reporting periods not provided for in the financial statements were as follows:

	2022 USD'000	*2021* USD'000
Contracted for	-	763

(b) Environmental contingencies

Historically, the Group has not incurred any significant expenditure for environmental remediation. Further, except for the accrued reclamation obligations as disclosed in Note 28 and amounts incurred pursuant to the environment compliance protection and precautionary measures in Mongolia, the Group has not incurred any other significant expenditure for environmental remediation, is currently not involved in any other environmental remediation, and has not accrued any other amounts for environmental remediation relating to its operations. Under existing legislation, the Directors believe that there are no probable liabilities that will have a material adverse effect on the financial position or operating results of the Group. Environmental liabilities are subject to considerable uncertainties which affect the Group's ability to estimate the ultimate cost of remediation efforts. The outcome of environmental liabilities under future environmental legislations cannot be estimated reasonably at present and which could be material.

32 Material related party transactions

(a) Transactions with related parties

During the year, the Group entered into transactions with the following related parties.

Name of party	*Relationship*
MCS Mongolia LLC ("**MCS**")	Shareholder of MMC
MCS International LLC	Subsidiary of MCS
MCS Holding LLC	Subsidiary of MCS
MCS Estates LLC	Subsidiary of MCS
International Medical Center LLC	Subsidiary of MCS
Uniservice Solution LLC	Subsidiary of MCS
M Armor LLC	Subsidiary of MCS
Shangri-La Ulaanbaatar LLC	Subsidiary of MCS
Shangri-La Ulaanbaatar Hotel LLC	Subsidiary of MCS
Unitel LLC	Subsidiary of MCS
Univision LLC	Subsidiary of MCS
Skynetworks LLC	Subsidiary of MCS
Top Motors LLC	Subsidiary of MCS
Tengerleg Ekh Oron LLC	Subsidiary of MCS
Risun Supply Management Co., Ltd.	Shareholder of TZJV

32 Material related party transactions (continued)

Particulars of significant transactions between the Group and the above related parties during the year ended 31 December 2022 are as follows:

	2022 USD'000	*2021* USD'000
Ancillary services (Note (i))	14,379	13,502
Lease of property, plant and equipment (Note (ii))	215	208
Purchase of property and goods (Note (iii))	283	120
Sales of property (Note (iv))	(6)	-
Sales of goods (Note (v))	(6,107)	(7,477)

Notes:

(i) Ancillary services represent expenditures for support services such as security service and vehicle inspection fees, cleaning and canteen expense, power and heat generation, and distribution and management fees paid to M Armor LLC, Uniservice Solution LLC, MCS International LLC, MCS and its affiliates. The service charges are based on comparable or prevailing market rates, where applicable.

(ii) Lease of property, plant and equipment represents rental charges paid for properties leased from Shangri-La Ulaanbaatar LLC and its affiliates. The rental charges are based on comparable or prevailing market rates, where applicable.

(iii) Purchase of property and goods mainly represents purchase of motor vehicles from MCS and its affiliates. The purchasing charges are based on comparable or prevailing market rates, where applicable.

(iv) Sales of property represents sale of motor vehicle to International Medical Center LLC in 2022. There were no sales of property in 2021.

(v) Sales of goods represent the coal sales to Risun Supply Management Co., Ltd. The sales are carried out at comparable or prevailing market rates, where applicable.

The Directors are of the opinion that the above transactions were conducted in the ordinary course of business, on normal commercial terms and in accordance with the agreements governing such transactions.

Amounts due from/(to) related parties

	2022 USD'000	*2021* USD'000
Other receivables (Note 22(c))	3	1
Other accruals and payables (Note 25)	(3,986)	(3,870)

32 Material related party transactions (continued)

(b) Key management personnel remuneration

Key management personnel are those persons holding positions with authority and responsibility for planning, directing and controlling the activities of the Group, directly or indirectly, including the Directors.

Remuneration for key management personnel, including amounts paid to the Directors as disclosed in Note 10, and certain of the highest paid employees as disclosed in Note 11, is as follows:

	2022 USD'000	*2021* USD'000
Salaries and other emoluments	3,040	3,048
Discretionary bonus	442	170
Retirement scheme contributions	269	250
Equity-settled share-based payment expenses	-	28
	3,751	3,496

(c) Applicability of the Listing Rules relating to connected transactions

Certain related party transactions in respect of (a) above constitute connected transactions or continuing connected transactions as defined in Chapter 14A of the Listing Rules. The disclosures required by Chapter 14A of the Listing Rules are provided in section headed "Connected transactions and continuing connected transactions" of the Directors' Report.

33 Company-level statement of financial position

	Note	2022 USD'000	2021 USD'000
Non-current assets			
Interests in subsidiaries	18	820,999	838,650
Total non-current assets		820,999	838,650
Current assets			
Trade and other receivables		83	281
Cash and cash equivalents		1,278	564
Total current assets		1,361	845
Current liabilities			
Trade and other payables		314	557
Total current liabilities		314	557
Net current assets		1,047	288
Total assets less current liabilities		822,046	838,938
Non-current liabilities			
Senior Notes		218	12,073
Total non-current liabilities		218	12,073
NET ASSETS		821,828	826,865
CAPITAL AND RESERVES	29(a)		
Share capital		104,248	103,158
Reserves		717,580	723,707
TOTAL EQUITY		821,828	826,865

Approved and authorised for issue by the board of directors on 21 March 2023.

Odjargal Jambaljamts
Chairman

Battsengel Gotov
Chief Executive Officer

34 Non-adjusting events after the reporting period

Subsequent to the end of the reporting period, the Company entered into an investment agreement with Erdene Mongol LLC ("**EM**") and Erdene Resources Development Corporation to subscribe for 50% of the share capital of EM, a company engaged in the exploration of gold and other precious metals for a total consideration of USD40.0 million (the "**Investment Agreement**"). Pursuant to the Investment Agreement, the Company has paid USD5.0 million to EM in January 2023 and the remaining USD35.0 million is expected to be made in 2023 subject to the completion of a series of milestones. Following the third closing under the Investment Agreement, EM will become a subsidiary of the Company and its financial results will be consolidated into that of the Group.

35 Possible impact of amendments, new standards and interpretations issued but not yet effective for the year ended 31 December 2022

Up to the date of issue of these financial statements, the IASB has issued a number of amendments and a new standard, which are not yet effective for the year ended 31 December 2022 and which have not been adopted in these financial statements. These developments include the following which may be relevant to the Group.

	Effective for accounting periods beginning on or after
IFRS 17, *Insurance contracts*	1 January 2023
Amendments to IAS 1, *Presentation of financial statements: Classification of liabilities as current or non-current*	1 January 2024
Amendments to IAS 1, *Presentation of financial statements* and IFRS Practice Statement 2, *Making materiality judgements: Disclosure of accounting policies*	1 January 2023
Amendments to IAS 8, Accounting policies, changes in accounting estimates and errors: *Definition of accounting estimates*	1 January 2023
Amendments to IAS 12, *Income taxes*: *Deferred tax related to assets and liabilities arising from a single transaction*	1 January 2023

The Group is in the process of making an assessment of what the impact of these developments is expected to be in the period of initial application. So far it has concluded that the adoption of them is unlikely to have a significant impact on the consolidated financial statements.

Mongolian Mining Corporation

(Stock Code: 00975)

Financial Statements
for the year ended 31 December 2021

KPMG

Independent Auditor's Report to the Shareholders of Mongolian Mining Corporation

(Incorporated in the Cayman Islands with limited liability)

Opinion

We have audited the consolidated financial statements of Mongolian Mining Corporation ("**the Company**") and its subsidiaries ("**the Group**") set out on pages 7 to 89 which comprise the consolidated statement of financial position as at 31 December 2021, the consolidated statement of profit or loss, the consolidated statement of profit or loss and other comprehensive income, the consolidated statement of changes in equity and the consolidated cash flow statement for the year then ended and notes to the consolidated financial statements, including a summary of significant accounting policies.

In our opinion, the consolidated financial statements give a true and fair view of the consolidated financial position of the Group as at 31 December 2021 and of its consolidated financial performance and its consolidated cash flows for the year then ended in accordance with International Financial Reporting Standards ("**IFRSs**") issued by the International Accounting Standards Board ("**IASB**") and have been properly prepared in compliance with the disclosure requirements of the Hong Kong Companies Ordinance.

Basis for Opinion

We conducted our audit in accordance with Hong Kong Standards on Auditing ("**HKSAs**") issued by the Hong Kong Institute of Certified Public Accountants ("**HKICPA**"). Our responsibilities under those standards are further described in the *Auditor's responsibilities for the audit of the consolidated financial statements* section of our report. We are independent of the Group in accordance with the HKICPA's *Code of Ethics for Professional Accountants* ("**the Code**") together with any ethical requirements that are relevant to our audit of the consolidated financial statements in the Cayman Islands, and we have fulfilled our other ethical responsibilities in accordance with these requirements and the Code. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Independent Auditor's Report to the Shareholders of Mongolian Mining Corporation (continued)

(Incorporated in the Cayman Islands with limited liability)

Key Audit Matter

Key audit matter is the matter that, in our professional judgement, was of most significance in our audit of the consolidated financial statements of the current period. The matter was addressed in the context of our audit of the consolidated financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on this matter.

Assessing impairment of mining related assets	
Refer to notes 2(h), 2(i), 3(a), 13, 14 and 16 to the consolidated financial statements and the accounting policies.	
The Key Audit Matter	**How the matter was addressed in our audit**
The Group's mining related assets are the most quantitatively significant items in the consolidated statement of financial position and mainly comprise property, plant and equipment, construction in progress, and intangible assets relating to the Group's mining operations located in Mongolia, which are considered by management to represent a single separately identifiable cash generating unit ("**CGU**"). The Group recognised impairment of its mining rights in the amount of USD190 million which reflected downward pressures on the prices of certain coking coal products in 2014 and concluded that no further impairment or reversal of previously recognised impairment was necessary subsequent to 2014. As at 31 December 2021, the carrying amount of net assets of the Group exceeded the Company's market capitalisation. Management considered this indicated that the Group's mining related assets may be impaired and performed an impairment assessment of the mining related assets to determine the recoverable amount.	Our audit procedures to assess impairment of mining related assets included the following: • evaluating the design and implementation of key internal controls over the estimations of the recoverable amounts of mining related assets; • assessing the allocation of assets and liabilities by management to the mining CGU and the methodology adopted by management in its impairment assessment with reference to the requirements of the prevailing accounting standards; • challenging the key assumptions and estimates used in the discounted cash flow forecast as at 31 December 2021, including those relating to future commodity prices, future sales, future operating costs and the discount rates applied, which included involving our internal valuation specialists to assist us in comparing these key assumptions and estimates with external benchmarks (including future commodity prices and discount rates for similar companies in the same industry) and in considering the key assumptions and estimates based on our knowledge of the Group and the industry in which it operates;

Key Audit Matters (continued)

Assessing impairment of mining related assets	
Refer to notes 2(h), 2(i), 3(a), 13, 14 and 16 to the consolidated financial statements and the accounting policies.	
The Key Audit Matter	**How the matter was addressed in our audit**
Management determines the recoverable amount of mining related assets based on the value in use of the CGU to which the assets have been allocated by using discounted cash flow techniques. The preparation of a discounted cash flow forecast involves the exercise of significant management judgement in the selection of assumptions, in particular in estimating future commodity prices and the discount rate applied as well as in determining internal assumptions relating to future sales and future operating costs. We identified assessing impairment of mining related assets as a key audit matter because of its significance to the consolidated financial statements and the inherent uncertainty involved in forecasting and discounting future cash flows which involves significant management judgement and could be subject to management bias.	• assessing the reliability of management's forecasting process and whether there is any indication of management bias by comparing the key assumptions and estimates included in the discounted cash flow forecast prepared in the prior year with the current year's performance and those adopted in current year's forecast, and making enquiries of management as to the reasons for any significant variances or changes identified; • performing sensitivity analyses of the key assumptions and estimates adopted in the discounted cash flow forecast and assessing the impact of changes in the key assumptions and estimates and whether there were any indication of management bias; and • assessing the reasonableness of disclosures in the consolidated financial statements in respect of the impairment of mining related assets with reference to the requirements of the prevailing accounting standards.

Information other than the consolidated financial statements and auditor's report thereon

The directors are responsible for the other information. The other information comprises all the information included in the annual report, other than the consolidated financial statements and our auditor's report thereon.

Our opinion on the consolidated financial statements does not cover the other information and we do not express any form of assurance conclusion thereon.

In connection with our audit of the consolidated financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the consolidated financial statements or our knowledge obtained in the audit or otherwise appears to be materially misstated.

Information other than the consolidated financial statements and auditor's report thereon (continued)

If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Responsibilities of the directors for the consolidated financial statements

The directors are responsible for the preparation of the consolidated financial statements that give a true and fair view in accordance with IFRSs issued by the IASB and the disclosure requirements of the Hong Kong Companies Ordinance and for such internal control as the directors determine is necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, the directors are responsible for assessing the Group's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the directors either intend to liquidate the Group or to cease operations, or have no realistic alternative but to do so.

The directors are assisted by the Audit Committee in discharging their responsibilities for overseeing the Group's financial reporting process.

Auditor's responsibilities for the audit of the consolidated financial statements

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. This report is made solely to you, as a body, and for no other purpose. We do not assume responsibility towards or accept liability to any other person for the contents of this report.

Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with HKSAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements.

Auditor's responsibilities for the audit of the consolidated financial statements (continued)

As part of an audit in accordance with HKSAs, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Group's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the directors.

- Conclude on the appropriateness of the directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the consolidated financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Group to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express an opinion on the consolidated financial statements. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinion.

We communicate with the Audit Committee regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Auditor's responsibilities for the audit of the consolidated financial statements (continued)

We also provide the Audit Committee with a statement that we have complied with relevant ethical requirements regarding independence and communicate with them all relationships and other matters that may reasonably be thought to bear on our independence and, where applicable, actions taken to eliminate threats or safeguards applied.

From the matters communicated with the Audit Committee, we determine those matters that were of most significance in the audit of the consolidated financial statements of the current period and are therefore the key audit matters. We describe these matters in our auditor's report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

The engagement partner on the audit resulting in this independent auditor's report is Man Siu Kei.

Certified Public Accountants

8th Floor, Prince's Building
10 Chater Road
Central, Hong Kong

21 March 2022

Consolidated statement of profit or loss for the year ended 31 December 2021

(Expressed in United States dollars)

	Note	*2021* USD'000	*2020* USD'000
Revenue	4	184,069	417,424
Cost of revenue	5	(161,490)	(288,848)
Gross profit		22,579	128,576
Other costs		(3,422)	(2,155)
Other net income		3,382	2,418
Selling and distribution costs	6(c)	(9,625)	(27,645)
General and administrative expenses		(24,242)	(19,773)
(Loss)/profit from operations		(11,328)	81,421
Finance income	6(a)	54	5,053
Finance costs	6(a)	(48,980)	(46,191)
Net finance costs	6(a)	(48,926)	(41,138)
Share of losses of associate		(196)	(77)
Share of losses of joint venture		(1)	(5)

The notes on pages 16 to 89 form part of these financial statements. Details of dividends payable to equity shareholders of the Company attributable to the profit for the year are set out in Note 29(b).

Consolidated statement of profit or loss for the year ended 31 December 2021 (continued)

(Expressed in United States dollars)

	Note	*2021* USD'000	*2020* USD'000
(Loss)/profit before taxation	6	(60,451)	40,201
Income tax	7	5,013	(10,596)
(Loss)/profit for the year		(55,438)	29,605
Attributable to:			
Equity shareholders of the Company		(55,238)	28,940
Non-controlling interests		(200)	665
(Loss)/profit for the year		(55,438)	29,605
Basic (loss)/earnings per share	8	(5.35) cents	2.81 cents
Diluted (loss)/earnings per share	8	(5.35) cents	2.81 cents

The notes on pages 16 to 89 form part of these financial statements. Details of dividends payable to equity shareholders of the Company attributable to the profit for the year are set out in Note 29(b).

Consolidated statement of profit or loss and other comprehensive income for the year ended 31 December 2021

(Expressed in United States dollars)

	Note	*2021* USD'000	*2020* USD'000
(Loss)/profit for the year		(55,438)	29,605
Other comprehensive income for the year (after tax and reclassification adjustments)	11		
Item that will not be reclassified to profit or loss:			
Surplus on revaluation of plants, buildings, and machinery and equipment	13,14, 25	62,895	-
Item that may be reclassified subsequently to profit or loss:			
Exchange differences on re-translation		184	(7,556)
Other comprehensive income for the year		63,079	(7,556)
Total comprehensive income for the year		7,641	22,049
Attributable to:			
Equity shareholders of the Company		7,841	21,384
Non-controlling interests		(200)	665
Total comprehensive income for the year		7,641	22,049

The notes on pages 16 to 89 form part of these financial statements.

Consolidated statement of financial position at 31 December 2021

(Expressed in United States dollars)

	Note	*2021* USD'000	*2020* USD'000
Non-current assets			
Property, plant and equipment, net	13	968,681	883,050
Construction in progress	14	46,828	43,961
Other right-of-use assets	15	50	51
Intangible assets	16	500,086	498,954
Interests in associates	18	949	360
Interest in joint venture		23	24
Other non-current assets	19	55,634	52,369
Deferred tax assets	25(b)	21,767	17,244
Total non-current assets		1,594,018	1,496,013
Current assets			
Inventories	20	159,663	106,268
Trade and other receivables	21	99,520	94,355
Cash and cash equivalents	22	25,937	38,904
Total current assets		285,120	239,527
Current liabilities			
Trade and other payables	24	175,598	142,981
Contract liabilities		141,498	25,911
Senior Notes	23	17,885	-
Lease liabilities		72	71
Current taxation	25(a)	65	3,323
Total current liabilities		335,118	172,286
Net current (liabilities)/assets		(49,998)	67,241
Total assets less current liabilities		1,544,020	1,563,254

The notes on pages 16 to 89 form part of these financial statements.

Consolidated statement of financial position at 31 December 2021 (continued)

(Expressed in United States dollars)

	Note	2021 USD'000	2020 USD'000
Non-current liabilities			
Senior Notes	23	434,716	449,618
Provisions	28	30,928	19,458
Deferred tax liabilities	25(b)	181,798	166,985
Other non-current liabilities	26	-	39,029
Total non-current liabilities		647,442	675,090
NET ASSETS		896,578	888,164
CAPITAL AND RESERVES			
Share capital	29(c)	103,158	102,918
Reserves		726,665	718,291
Total equity attributable to equity shareholders of the Company		829,823	821,209
Perpetual notes	29(e)	66,569	66,569
Non-controlling interests		186	386
TOTAL EQUITY		896,578	888,164

Approved and authorised for issue by the board of directors on 21 March 2022.

Odjargal Jambaljamts
Chairman

Battsengel Gotov
Chief Executive Officer

The notes on pages 16 to 89 form part of these financial statements.

Consolidated statement of changes in equity for the year ended 31 December 2021

(Expressed in United States dollars)

		Attributable to equity shareholders of the Company									
	Note	*Share capital* USD'000 (Note 29(c))	*Share premium* USD'000 (Note 29(d)(i))	*Other reserve* USD'000 (Note 29(d)(ii))	*Exchange reserve* USD'000 (Note 29(d)(iii))	*Property revaluation reserve* USD'000 (Note 29(d)(iv))	*Retained profits* USD'000	*Total* USD'000	*Perpetual notes* USD'000 (Note 29(e))	*Non-controlling interests* USD'000	*Total equity* USD'000
At 1 January 2020		102,918	768,520	36,464	(491,697)	310,863	72,621	799,689	66,569	(279)	865,979
Profit for the year		-	-	-	-	-	28,940	28,940	-	665	29,605
Other comprehensive income	11	-	-	-	(7,556)	-	-	(7,556)	-	-	(7,556)
Total comprehensive income		-	-	-	(7,556)	-	28,940	21,384	-	665	22,049
Equity-settled share-based transactions	27	-	-	136	-	-	-	136	-	-	136
Reclassification of property revaluation reserve to accumulated losses upon disposals of assets concerned		-	-	-	-	(180)	180	-	-	-	-
At 31 December 2020		102,918	768,520	36,600	(499,253)	310,683	101,741	821,209	66,569	386	888,164

The notes on pages 16 to 89 form part of these financial statements.

Consolidated statement of changes in equity for the year ended 31 December 2021 (continued)

(Expressed in United States dollars)

		Attributable to equity shareholders of the Company									
	Note	*Share capital* USD'000 (Note 29(c))	*Share premium* USD'000 (Note 29(d)(i))	*Other reserve* USD'000 (Note 29(d)(ii))	*Exchange reserve* USD'000 (Note 29(d)(iii))	*Property revaluation reserve* USD'000 (Note 29(d)(iv))	*Retained profits* USD'000	*Total* USD'000	*Perpetual notes* USD'000 (Note 29(e))	*Non-controlling interests* USD'000	*Total equity* USD'000
At 1 January 2021		102,918	768,520	36,600	(499,253)	310,683	101,741	821,209	66,569	386	888,164
Loss for the year		-	-	-	-	-	(55,238)	(55,238)	-	(200)	(55,438)
Other comprehensive income	11	-	-	-	184	62,895	-	63,079	-	-	63,079
Total comprehensive income		-	-	-	184	62,895	(55,238)	7,841	-	(200)	7,641
Equity-settled share-based transactions	27	240	806	(273)	-	-	-	773	-	-	773
Reclassification of property revaluation reserve to accumulated losses upon disposals of assets concerned		-	-	-	-	(2,751)	2,751	-	-	-	-
At 31 December 2021		103,158	769,326	36,327	(499,069)	370,827	49,254	829,823	66,569	186	896,578

The notes on pages 16 to 89 form part of these financial statements.

Consolidated cash flow statement for the year ended 31 December 2021

(Expressed in United States dollars)

	Note	*2021* USD'000	*2020* USD'000
Operating activities			
(Loss)/profit before taxation		(60,451)	40,201
Adjustments for:			
Depreciation and amortisation	6(c)	49,704	61,199
Share of loss of associate and joint venture		197	82
(Gain)/loss on disposals of property, plant and equipment	6(c)	(29)	1
Net finance costs	6(a)	48,926	41,138
Equity-settled share-based payment expenses	6(b)	34	136
Employee benefit accrued		(321)	(340)
Changes in working capital:			
(Increase)/decrease in inventories		(53,395)	3,257
(Increase)/decrease in trade and other receivables		(5,165)	6,722
Increase/(decrease) in trade and other payables		148,678	(64,340)
(Increase)/decrease in other non-current assets		(3,265)	370
(Decrease)/increase in other non-current liabilities		(39,029)	38,316
Cash generated from operations		85,884	126,742
Income tax paid	25(a)	(973)	(18,055)
Net cash generated from operating activities		84,911	108,687

The notes on pages 16 to 89 form part of these financial statements.

Consolidated cash flow statement for the year ended 31 December 2021 (continued)

(Expressed in United States dollars)

	Note	*2021* USD'000	*2020* USD'000
Investing activities			
Payments for acquisition of property, plant and equipment and construction in progress		(48,130)	(68,419)
Proceeds from disposals of property, plant and equipment		37	291
Payments for acquisition of intangible asset		(2,331)	-
Acquisition of subsidiary, net of cash acquired		(5,557)	(2,776)
Payments for acquisition of an associate		(785)	-
Interest received		3	110
Net cash used in investing activities		(56,763)	(70,794)
Financing activities			
Capital element of lease rentals paid		(141)	(140)
Interest element of lease rentals paid		(5)	(6)
Interest paid		(41,518)	(41,504)
Net cash used in financing activities		(41,664)	(41,650)
Net decrease in cash and cash equivalents		(13,516)	(3,757)
Cash and cash equivalents at beginning of the year		38,904	40,619
Effect of foreign exchange rate changes		549	2,042
Cash and cash equivalents at end of the year	22	25,937	38,904

The notes on pages 16 to 89 form part of these financial statements.

Notes to consolidated financial statements

1 Corporate information

Mongolian Mining Corporation (the "**Company**") was incorporated in the Cayman Islands on 18 May 2010 as an exempted company with limited liability under the Companies Law, Cap 22 (Law 3 of 1961, as consolidated and revised) of the Cayman Islands. The Company's shares have been listed on the Main Board of The Stock Exchange of Hong Kong Limited (the "**Stock Exchange**") since 13 October 2010. The Company and its subsidiaries (together referred to as the "**Group**") are principally engaged in the mining, processing, transportation and sale of coal.

2 Significant accounting policies

(a) Statement of compliance

These financial statements have been prepared in accordance with all applicable International Financial Reporting Standards ("**IFRSs**"), promulgated by the International Accounting Standards Board ("**IASB**"). IFRSs include all applicable individual International Financial Reporting Standards, International Accounting Standards ("**IASs**") and related interpretations. These financial statements also comply with the applicable disclosure requirements of the Hong Kong Companies Ordinance. These financial statements also comply with the applicable disclosure provisions of the Rules Governing the Listing of Securities on The Stock Exchange of Hong Kong Limited (the "**Listing Rules**"). A summary of the significant accounting policies adopted by the Group is set out below.

The IASB has issued certain amendments to IFRSs that are first effective or available for early adoption for the current accounting period of the Group and the Company. Note 2(c) provides information on any changes in accounting policies resulting from initial application of these developments to the extent that they are relevant to the Group for the current and prior accounting periods reflected in these financial statements.

(b) Basis of preparation of the financial statements

The consolidated financial statements for the year ended 31 December 2021 comprise the Group and the Group's interests in two associates and a joint venture.

The measurement basis used in the preparation of the financial statements is the historical cost basis except that the following assets and liabilities are stated at their fair value as explained in the accounting policies set out below:

- Investments in debt and equity securities (see Note 2(f));
- Buildings and plants as well as machinery and equipment (see Note 2(h)); and
- Derivative financial instruments (see Note 2(g)).

Non-current assets and disposals groups held for sale are stated at the lower of carrying amount and fair value less costs (see Note 2(y)).

2 Significant accounting policies (continued)

The preparation of financial statements in conformity with IFRSs requires management to make judgements, estimates and assumptions that affect the application of policies and reported amounts of assets, liabilities, income and expenses. The estimates and associated assumptions are based on historical experience and various other factors that are believed to be reasonable under the circumstances, the results of which form the basis of making the judgements about carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates.

The estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised in the period in which the estimate is revised if the revision affects only that period or in the period of the revision and future periods if the revision affects both current and future periods.

The novel coronavirus ("**COVID-19**") outbreak has adversely impacted the operating environment and business performance of the Group during the year ended 31 December 2021. The coal sales volume has been impacted by temporary border crossing limitations and volatility caused by COVID-19 outbreak during the year of 2021. As a result, the Group recorded a net loss of USD55,438,000 for the year ended 31 December 2021 and had net current liabilities of USD49,998,000 as at 31 December 2021. The Group has been closely monitoring the impact of the COVID-19 outbreak on its operational and financial performance and has put in place contingency measures for cash conservation and efficiency purposes such as temporary adjustment to levels of production and obtained standby facilities from local banks in Mongolia totalling USD38,700,000 as of the reporting date. In addition, in order to secure export shipments by minimising COVID-19 impact, the Government of Mongolia ("**GoM**") established a custom bonded terminal for containerised shipments at Gashuunsukhait-Ganqimaodu border checkpoint ("**GS Terminal**") for coal exports, which has commenced operation in November 2021. The GS Terminal allows truck drivers to unload and pick up the containers with minimal human contact and thus lowering the risk of cross-border infection. Based on the cash flow forecast of the Group for the next twelve months ending 31 December 2022 prepared by the management, the directors of the Company (the "**Directors**") expect to maintain adequate financial resources to cover its operating costs and meet its financing commitments, as and when they fall due for the twelve months period subsequent to 31 December 2021.

Items included in the financial statements of each of the Group's entities are measured using the currency of the primary economic environment in which the entity operates (the "**functional currency**").

The functional currency of the Group's overseas holding entities and main operating subsidiaries located in Mongolia is USD and the functional currency of remaining subsidiaries located in Mongolia is Mongolian Togrog ("**MNT**").

The Company and the Group's presentation currency is USD.

2 Significant accounting policies (continued)

Judgements made by management in the application of IFRSs that have significant effect on the financial statements and major sources of estimation uncertainty are discussed in Note 3.

(c) Changes in accounting policies

The IASB has issued the following amendments to IFRSs that are first effective for the current accounting period of the Group:

- Amendments to IFRS 9, IAS 39, IFRS 7, IFRS 4 and IFRS 16, *Interest rate benchmark reform - phase 2*
- Amendment to IFRS 16*, Covid-19-related rent concessions*

None of these developments have had a material effect on how the Group's results and financial position for the current or prior periods have been prepared or presented. The Group has not applied any new standard or interpretation that is not yet effective for the current accounting period.

(d) Subsidiaries and non-controlling interests

Subsidiaries are entities controlled by the Group. The Group controls an entity when it is exposed, or has rights, to variable returns from its involvement with the entity and has the ability to affect those returns through its power over the entity. When assessing whether the Group has power, only substantive rights (held by the Group and other parties) are considered.

An investment in a subsidiary is consolidated into the consolidated financial statements from the date that control commences until the date that control ceases. Intra-group balances, transactions, cash flows and any unrealised profits arising from intra-group transactions are eliminated in full in preparing the consolidated financial statements. Unrealised losses resulting from intra-group transactions are eliminated in the same way as unrealised gains but only to the extent that there is no evidence of impairment.

Non-controlling interests represent the equity in a subsidiary not attributable directly or indirectly to the Company, and in respect of which the Group has not agreed any additional terms with the holders of those interests which would result in the Group as a whole having a contractual obligation in respect of those interests that meets the definition of a financial liability. For each business combination, the Group can elect to measure any non-controlling interests either at fair value or at the non-controlling interests' proportionate share of the subsidiary's net identifiable assets.

Non-controlling interests are presented in the consolidated statement of financial position within equity, separately from equity attributable to the equity shareholders of the Company. Non-controlling interests in the results of the Group are presented on the face of the consolidated statement of profit or loss and the consolidated statement of profit or loss and other comprehensive income as an allocation of the total profit or loss and total comprehensive income for the year between non-controlling interests and the equity shareholders of the Company. Loans from holders of non-controlling interests and other contractual obligations towards these holders are presented as financial liabilities in the consolidated statement of financial position in accordance with Notes 2(n) or (o) depending on the nature of the liability.

2 Significant accounting policies (continued)

Changes in the Group's interests in a subsidiary that do not result in a loss of control are accounted for as equity transactions, whereby adjustments are made to the amounts of controlling and non-controlling interests within consolidated equity to reflect the change in relative interests, but no adjustments are made to goodwill and no gain or loss is recognised.

When the Group loses control of a subsidiary, it is accounted for as a disposal of the entire interest in that subsidiary, with a resulting gain or loss being recognised in profit or loss. Any interest retained in that former subsidiary at the date when control is lost is recognised at fair value and this amount is regarded as the fair value on initial recognition of a financial asset or, when appropriate, the cost on initial recognition of an interest in an associate or joint venture (see Note 2(e)).

In the Company's statement of financial position, an investment in a subsidiary is stated at cost less impairment losses (see Note 2(k)), unless the investment is classified as held for sale (or included in a disposal group that is classified as held for sale) (see Note 2(y)).

(e) Associates and joint ventures

An associate is an entity in which the Group has significant influence, but not control or joint control, over its management, including participation in the financial and operating policy decisions.

A joint venture is an arrangement whereby the Group and other parties contractually agree to share control of the arrangement, and have rights to the net assets of the arrangement.

An investment in an associate or a joint venture is accounted for in the consolidated financial statements under the equity method, unless it is classified as held for sale (or included in a disposal group that is classified as held for sale (see Note 2(y)). Under the equity method, the investment is initially recorded at cost, adjusted for any excess of the Group's share of the acquisition-date fair values of investee's identifiable net assets over the cost of the investment (if any). The cost of the investment includes purchase price, other costs directly attributable to the acquisition of the investment, and any direct investment into the associate or joint venture that forms part of the Group's equity investment. Thereafter, the investment is adjusted for the post-acquisition change in the Group's share of the investee's net assets and any impairment loss relating to the investment (see Note 2(k)). At each reporting date, the Group assesses whether there is any objective evidence that the investment is impaired. Any acquisition-date excess over cost, the Group's share of the post-acquisition, post-tax results of the investees and any impairment losses for the year are recognised in the consolidated statement of profit or loss, whereas the Group's share of the post-acquisition post-tax items of the investees' other comprehensive income is recognised in the consolidated statement of profit or loss and other comprehensive income.

When the Group's share of losses exceeds its interest in the associate or the joint venture, the Group's interest is reduced to nil and recognition of further losses is discontinued except to the extent that the Group has incurred legal or constructive obligations or made payments on behalf of the investee. For this purpose, the Group's interest is the carrying amount of the investment under the equity method together with the Group's long-term interests that in substance form part of the Group's net investment in the associate or the joint venture, after applying the ECL model to such other long-term interests where applicable (see Note 2(k)(i)).

2 Significant accounting policies (continued)

Unrealised profits and losses resulting from transactions between the Group and its associate and joint venture are eliminated to the extent of the Group's interest in the investee, except where unrealised losses provide evidence of an impairment of the asset transferred, in which case they are recognised immediately in profit or loss.

If an investment in an associate becomes an investment in a joint venture or vice versa, retained interest is not remeasured. Instead, the investment continues to be accounted for under the equity method.

In all other cases, when the Group ceases to have significant influence over an associate or joint control over a joint venture, it is accounted for as a disposal of the entire interest in that investee, with a resulting gain or loss being recognised in profit or loss. Any interest retained in that former investee at the date when significant influence or joint control is lost is recognised at fair value and this amount is regarded as the fair value on initial recognition of a financial asset (see Note 2(f)).

In the Company's statement of financial position, investments in associate and joint venture are stated at cost less impairment losses, unless classified as held for sale (or included in a disposal group that is classified as held for sale) (see Note 2(y)).

(f) Other investments in debt and equity securities

The Group's and the Company's policies for investments in debt and equity securities, other than investments in subsidiaries, associates and joint ventures, are as follows:

Investments in debt and equity securities are recognised/derecognised on the date the Group commits to purchase/sell the investment. The investments are initially stated at fair value plus directly attributable transaction costs, except for those investments measured at fair value through profit or loss (FVPL) for which transaction costs are recognised directly in profit or loss. For an explanation of how the Group determines fair value of financial instruments, see Note 30(f). These investments are subsequently accounted for as follows, depending on their classification.

(i) Investments other than equity investments

Non-equity investments held by the Group are classified into one of the following measurement categories:

- amortised cost, if the investment is held for the collection of contractual cash flows which represent solely payments of principal and interest. Interest income from the investment is calculated using the effective interest method (see Note 2(v)(ii)).

- fair value through other comprehensive income (FVOCI) - recycling, if the contractual cash flows of the investment comprise solely payments of principal and interest and the investment is held within a business model whose objective is achieved by both the collection of contractual cash flows and sale. Changes in fair value are recognised in other comprehensive income, except for the recognition in profit or loss of expected credit losses, interest income (calculated using the effective interest method) and foreign exchange gains and losses. When the investment is derecognised, the amount accumulated in other comprehensive income is recycled from equity to profit or loss.

2 Significant accounting policies (continued)

- fair value through profit or loss (FVPL) if the investment does not meet the criteria for being measured at amortised cost or FVOCI (recycling). Changes in the fair value of the investment (including interest) are recognised in profit or loss.

(ii) Equity investments

An investment in equity securities is classified as FVPL unless the equity investment is not held for trading purposes and on initial recognition of the investment the Group makes an irrevocable election to designate the investment at FVOCI (non-recycling) such that subsequent changes in fair value are recognised in other comprehensive income. Such elections are made on an instrument-by-instrument basis, but may only be made if the investment meets the definition of equity from the issuer's perspective. Where such an election is made, the amount accumulated in other comprehensive income remains in the fair value reserve (non-recycling) until the investment is disposed of. At the time of disposal, the amount accumulated in the fair value reserve (non-recycling) is transferred to retained earnings. It is not recycled through profit or loss. Dividends from an investment in equity securities, irrespective of whether classified as at FVPL or FVOCI, are recognised in profit or loss as other income.

(g) Derivative financial instruments

Derivative financial instruments are recognised initially at fair value. At the end of each reporting period the fair value is remeasured. The gain or loss on remeasurement of fair value is recognised immediately in profit or loss.

(h) Property, plant and equipment

The following items are stated at their revalued amounts, being their fair values at the date of the revaluation less any subsequent accumulated depreciation and any subsequent accumulated impairment losses:

- buildings and plants (under the Property, plant and equipment and Construction in progress); and

- machinery and equipment.

Revaluations are performed with sufficient regularity to ensure that the carrying amounts of these assets do not differ materially from that which would be determined using fair values at the end of reporting period.

The following items of property, plant and equipment are stated at cost less accumulated depreciation and impairment losses (see Note 2(k)):

- right-of-use assets arising from leases over leasehold properties where the Group is not the registered owner of the property interest;

- motor vehicles;

- office equipment; and

- mining properties.

2 Significant accounting policies (continued)

Changes arising on the revaluation are generally dealt with in other comprehensive income and are accumulated separately in equity in the property revaluation reserve. The only exceptions are as follows:

- when a deficit arises on revaluation, it will be charged to profit or loss to the extent that it exceeds the amount held in the reserve in respect of that same asset immediately prior to the revaluation; and

- when a surplus arises on revaluation, it will be credited to profit or loss to the extent that a deficit on revaluation in respect of that same asset had previously been charged to profit or loss.

The cost of an asset comprises its purchase price, any directly attributable costs of bringing the asset to its present working condition and location for its intended use, the cost of borrowed funds used during the period of construction and, when relevant, the costs of dismantling and removing the items and restoring the site on which they are located, and changes in the measurement of existing liabilities recognised for these costs resulting from changes in the timing or outflow of resources required to settle the obligation or from changes in the discount rate.

All other expenditures, including the cost of repairs and maintenance and major overhaul, are expensed as they are incurred.

Construction in progress represents property, plant and equipment under construction and equipment pending installation. Except for those stated at their revalued amount as aforementioned, other construction in progress items are initially recognised at cost less impairment losses (Note 2(k)). Cost comprises cost of materials, direct labour and an appropriate proportion of production overheads and borrowing costs (Note 2(x)). Capitalisation of these costs ceases and the construction in progress is transferred to property, plant and equipment when the asset is substantially ready for its intended use.

Gains or losses arising from the retirement or disposal of an item of property, plant and equipment are determined as the difference between the net disposal proceeds and the carrying amount of the item and are recognised in profit or loss on the date of retirement or disposal. Any related revaluation surplus is transferred from the revaluation reserve to retained profits and is not reclassified to profit or loss.

Depreciation is calculated to write off the cost or valuation of items of property, plant and equipment, other than mining properties, over their estimated useful lives using the straight-line method, after taking into account the estimated residual values.

The estimated useful lives of property, plant and equipment are as follows:

	Depreciable life
- Buildings and plants	10 - 40 years
- Machinery and equipment	10 years
- Motor vehicles	5 - 10 years
- Office equipment	3 - 10 years
- Right of use assets are depreciated over the unexpired term of lease	

2 Significant accounting policies (continued)

Mining properties, except for stripping activity assets related to capitalised stripping costs incurred during the production phase, are depreciated on the units-of-production method utilising only proven and probable coal reserves in the depletion base.

Stripping activity assets related to stripping costs incurred during the production phase are depreciated using a units-of-production basis over the proven and probable coal reserves of the component to which they relate.

No depreciation is provided in respect of construction in progress until it is substantially completed and ready for its intended use.

Where parts of an item of property, plant and equipment have different useful lives, the cost of the item is allocated on a reasonable basis between parts and each part is depreciated separately. Both the useful life of an asset and its residual value, if any, are reviewed annually.

(i) Intangible assets

Intangible assets (acquired mining rights, software and GS Terminal) acquired separately are measured on initial recognition at cost. The cost of intangible assets acquired in a business combination is their fair value as at the date of acquisition. Following the initial recognition, intangible assets are stated at cost less accumulated amortisation (where the estimated useful life is finite) and impairment losses (see Note 2(k)).

Intangible assets (acquired mining rights) are depreciated on the units-of-production method utilising only proven and probable coal reserves in the depletion base.

Amortisation of other intangible assets with finite useful lives is recognised in profit or loss on a straight-line basis over the expected useful lives. The software are amortised over 10 years from the date they are available for use, and GS Terminal is amortised for 3 years from the date it is available for use.

Both the period and method of amortisation are reviewed annually.

(j) Leased assets

At inception of a contract, the Group assesses whether the contract is, or contains, a lease. A contract is, or contains, a lease if the contract conveys the right to control the use of an identified asset for a period of time in exchange for consideration. Control is conveyed where the customer has both the right to direct the use of the identified asset and to obtain substantially all of the economic benefits from that use.

2 Significant accounting policies (continued)

As a lessee

Where the contract contains lease components and non-lease components, the Group has elected not to separate non-lease components and accounts for each lease component and any associated non-lease components as a single lease component for all leases.

At the lease commencement date, the Group recognises a right-of-use asset and a lease liability, except for short-term leases that have a lease term of 12 months or less and leases of low-value assets. When the Group enters into a lease in respect of a low-value asset, the Group decides whether to capitalise the lease on a lease-by-lease basis. The lease payments associated with those leases which are not capitalised are recognised as an expense on a systematic basis over the lease term.

Where the lease is capitalised, the lease liability is initially recognised at the present value of the lease payments payable over the lease term, discounted using the interest rate implicit in the lease or, if that rate cannot be readily determined, using a relevant incremental borrowing rate. After initial recognition, the lease liability is measured at amortised cost and interest expense is calculated using the effective interest method. Variable lease payments that do not depend on an index or rate are not included in the measurement of the lease liability and hence are charged to profit or loss in the accounting period in which they are incurred.

The right-of-use asset recognised when a lease is capitalised is initially measured at cost, which comprises the initial amount of the lease liability plus any lease payments made at or before the commencement date, and any initial direct costs incurred. Where applicable, the cost of the right-of-use assets also includes an estimate of costs to dismantle and remove the underlying asset or to restore the underlying asset or the site on which it is located, discounted to their present value, less any lease incentives received. The right-of-use asset is subsequently stated at cost less accumulated depreciation and impairment losses (see Notes 2(h) and 2(k)(ii)).

The initial fair value of refundable rental deposits is accounted for separately from the right-of-use assets in accordance with the accounting policy applicable to investments in debt securities carried at amortised cost (see Notes 2(f)(i), 2(v)(ii) and 2(k)(i)). Any difference between the initial fair value and the nominal value of the deposits is accounted for as additional lease payments made and is included in the cost of right-of-use assets.

The lease liability is remeasured when there is a change in future lease payments arising from a change in an index or rate, or there is a change in the Group's estimate of the amount expected to be payable under a residual value guarantee, or there is a change arising from the reassessment of whether the Group will be reasonably certain to exercise a purchase, extension or termination option. When the lease liability is remeasured in this way, a corresponding adjustment is made to the carrying amount of the right-of-use asset, or is recorded in profit or loss if the carrying amount of the right-of-use asset has been reduced to zero.

The lease liability is also remeasured when there is a change in the scope of a lease or the consideration for a lease that is not originally provided for in the lease contract ("lease modification") that is not accounted for as a separate lease. In this case the lease liability is remeasured based on the revised lease payments and lease term using a revised discount rate at the effective date of the modification.

2 Significant accounting policies (continued)

(k) Credit losses and impairment of assets

(i) Credit losses from financial instruments, contract assets and lease receivables

The Group recognises a loss allowance for expected credit losses (ECLs) on the following items:

- financial assets measured at amortised cost (including cash and cash equivalents, trade receivables and other receivables, including loans to associates and joint ventures, which are held for the collection of contractual cash flows which represent solely payments of principal and interest);

- contract assets as defined in IFRS 15 (see Note 2(p)); and

- debt securities measured at FVOCI (recycling).

Other financial assets measured at fair value, including units in bond funds, equity and debt securities measured at FVPL, equity securities designated at FVOCI (non-recycling) and derivative financial assets, are not subject to the ECL assessment.

Measurement of ECLs

ECLs are a probability-weighted estimate of credit losses. Credit losses are measured as the present value of all expected cash shortfalls (i.e. the difference between the cash flows due to the Group in accordance with the contract and the cash flows that the Group expects to receive).

The expected cash shortfalls are discounted using the following discount rates where the effect of discounting is material:

- fixed-rate financial assets, trade and other receivables and contract assets: effective interest rate determined at initial recognition or an approximation thereof;

- variable-rate financial assets: current effective interest rate.

The maximum period considered when estimating ECLs is the maximum contractual period over which the Group is exposed to credit risk.

In measuring ECLs, the Group takes into account reasonable and supportable information that is available without undue cost or effort. This includes information about past events, current conditions and forecasts of future economic conditions.

ECLs are measured on either of the following bases:

- 12-month ECLs: these are losses that are expected to result from possible default events within the 12 months after the reporting date; and

- lifetime ECLs: these are losses that are expected to result from all possible default events over the expected lives of the items to which the ECL model applies.

2 Significant accounting policies (continued)

Loss allowances for trade receivables and contract assets are always measured at an amount equal to lifetime ECLs. ECLs on these financial assets are estimated using a provision matrix based on the Group's historical credit loss experience, adjusted for factors that are specific to the debtors and an assessment of both the current and forecast general economic conditions at the reporting date.

For all other financial instruments, the Group recognises a loss allowance equal to 12-month ECLs unless there has been a significant increase in credit risk of the financial instrument since initial recognition, in which case the loss allowance is measured at an amount equal to lifetime ECLs.

Significant increases in credit risk

In assessing whether the credit risk of a financial instrument has increased significantly since initial recognition, the Group compares the risk of default occurring on the financial instrument assessed at the reporting date with that assessed at the date of initial recognition. In making this reassessment, the Group considers that a default event occurs when (i) the borrower is unlikely to pay its credit obligations to the Group in full, without recourse by the Group to actions such as realising security (if any is held); or (ii) the financial asset is 90 days past due. The Group considers both quantitative and qualitative information that is reasonable and supportable, including historical experience and forward-looking information that is available without undue cost or effort.

In particular, the following information is taken into account when assessing whether credit risk has increased significantly since initial recognition:

- failure to make payments of principal or interest on their contractually due dates;

- an actual or expected significant deterioration in a financial instrument's external or internal credit rating (if available);

- an actual or expected significant deterioration in the operating results of the debtor; and

- existing or forecast changes in the technological, market, economic or legal environment that have a significant adverse effect on the debtor's ability to meet its obligation to the Group.

Depending on the nature of the financial instruments, the assessment of a significant increase in credit risk is performed on either an individual basis or a collective basis. When the assessment is performed on a collective basis, the financial instruments are grouped based on shared credit risk characteristics, such as past due status and credit risk ratings.

ECLs are remeasured at each reporting date to reflect changes in the financial instrument's credit risk since initial recognition. Any change in the ECL amount is recognised as an impairment gain or loss in profit or loss. The Group recognises an impairment gain or loss for all financial instruments with a corresponding adjustment to their carrying amount through a loss allowance account, except for investments in debt securities that are measured at FVOCI (recycling), for which the loss allowance is recognised in other comprehensive income and accumulated in the fair value reserve (recycling).

2 Significant accounting policies (continued)

Basis of calculation of interest income

Interest income recognised in accordance with Note 2(v)(ii) is calculated based on the gross carrying amount of the financial asset unless the financial asset is credit-impaired, in which case interest income is calculated based on the amortised cost (i.e. the gross carrying amount less loss allowance) of the financial asset.

At each reporting date, the Group assesses whether a financial asset is credit-impaired. A financial asset is credit-impaired when one or more events that have a detrimental impact on the estimated future cash flows of the financial asset have occurred.

Evidence that a financial asset is credit-impaired includes the following observable events:

- significant financial difficulties of the debtor;
- a breach of contract, such as a default or past due event;
- it becoming probable that the borrower will enter into bankruptcy or other financial reorganisation;
- significant changes in the technological, market, economic or legal environment that have an adverse effect on the debtor; or
- the disappearance of an active market for a security because of financial difficulties of the issuer.

Write-off policy

The gross carrying amount of a financial asset or contract asset is written off (either partially or in full) to the extent that there is no realistic prospect of recovery. This is generally the case when the Group determines that the debtor does not have assets or sources of income that could generate sufficient cash flows to repay the amounts subject to the write-off.

Subsequent recoveries of an asset that was previously written off are recognised as a reversal of impairment in profit or loss in the period in which the recovery occurs.

(ii) Impairment of other assets

Internal and external sources of information are reviewed at the end of each reporting period to identify indications that the following assets may be impaired or an impairment loss previously recognised no longer exists or may have decreased:

- property, plant and equipment, including right-of-use assets;
- construction in progress;
- intangible assets;
- other non-current assets (excluding other financial assets); and
- investment in subsidiaries, associates and joint ventures in the Company’s statement of financial position.

2 Significant accounting policies (continued)

If any such indication exists, the asset's recoverable amount is estimated.

- Calculation of recoverable amount

  The recoverable amount of an asset is the greater of its fair value less costs of disposal and value in use. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset. Where an asset does not generate cash inflows largely independent of those from other assets, the recoverable amount is determined for the smallest group of assets that generates cash inflows independently (i.e. a cash-generating unit). A portion of the carrying amount of a corporate asset (for example, head office building) is allocated to an individual cash-generating unit if the allocation can be done on a reasonable and consistent basis, or to the smallest group of cash-generating units if otherwise.

- Recognition of impairment losses

  An impairment loss is recognised in profit or loss if the carrying amount of an asset, or the cash-generating unit to which it belongs, exceeds its recoverable amount. Impairment losses recognised in respect of cash-generating units are allocated first to reduce the carrying amount of any goodwill allocated to the cash-generating unit (or group of units) and then, to reduce the carrying amount of the other assets in the unit (or group of units) on a pro rata basis, except that the carrying value of an asset will not be reduced below its individual fair value less costs of disposal (if measurable) or value in use (if determinable).

- Reversals of impairment losses

  An impairment loss is reversed if there has been a favourable change in the estimates used to determine the recoverable amount.

  A reversal of an impairment loss is limited to the asset's carrying amount that would have been determined had no impairment loss been recognised in prior years. Reversals of impairment losses are credited to profit or loss in the year in which the reversals are recognised.

(iii) Interim financial reporting and impairment

Under the Rules Governing the Listing of Securities on The Stock Exchange of Hong Kong Limited, the Group is required to prepare an interim financial report in compliance with IAS 34, *Interim financial reporting*, in respect of the first six months of the financial year. At the end of the interim period, the Group applies the same impairment testing, recognition, and reversal criteria as it would at the end of the financial year (see Notes 2(k)(i) and (ii)).

(l) Inventories

Coal inventories are physically measured or estimated and valued at the lower of cost and net realisable value.

Cost is calculated using the weighted average cost formula and comprises all costs of purchase, an appropriate portion of fixed and variable overhead costs, including the stripping costs incurred during the production phase, and other costs incurred in bringing the inventories to their present location and condition.

2 Significant accounting policies (continued)

Net realisable value is the estimated future sales price of the product the Group expects to realise when such item is sold or processed, less estimated costs to complete and bring the product to sale.

When coal inventories are sold, the carrying amount of those inventories is recognised as an expense in the period in which the related revenue is recognised. The amount of any write-down of inventories to net realisable value and all losses of inventories are recognised as an expense in the period the write-down or loss occurs. The amount of any reversal of any write-down of inventories is recognised as a reduction in the amount of inventories recognised as an expense in the period in which the reversal occurs.

Inventories of ancillary materials, spare parts and small tools used in production are stated at cost less impairment losses for obsolescence.

(m) Trade and other receivables

A receivable is recognised when the Group has an unconditional right to receive consideration. A right to receive consideration is unconditional if only the passage of time is required before payment of that consideration is due. If revenue has been recognised before the Group has an unconditional right to receive consideration, the amount is presented as a contract asset (see Note 2(p)).

Trade receivables that do not contain a significant financing component are initially measured at their transaction price. Trade receivables that contain a significant financing component and other receivables are initially measured at fair value plus transaction costs. All receivables are subsequently stated at amortised cost using the effective interest method less allowance for credit losses (see Note 2(k)(i)).

Insurance reimbursement is recognised and measured in accordance with Note 2(t).

(n) Interest-bearing borrowings

Interest-bearing borrowings are recognised initially at fair value less attributable transaction costs. Subsequent to initial recognition, interest-bearing borrowings are stated at amortised cost with any difference between the amount initially recognised and redemption value being recognised in profit or loss over the period of the borrowings, together with any interest and fees payable, using the effective interest method.

(o) Trade and other payables

Trade and other payables are initially recognised at fair value. Subsequent to initial recognition, trade and other payables are stated at amortised cost unless the effect of discounting would be immaterial, in which case they are stated at invoice amounts.

(p) Contract assets and contract liabilities

A contract asset is recognised when the Group recognises revenue (see Note 2(v)) before being unconditionally entitled to the consideration under the payment terms set out in the contract. Contract assets are assessed for expected credit losses (ECL) in accordance with the policy set out in Note 2(k)(i) and are reclassified to receivables when the right to the consideration has become unconditional (see Note 2(m)).

2 Significant accounting policies (continued)

A contract liability is recognised when the customer pays consideration before the Group recognises the related revenue (see Note 2(v)). A contract liability would also be recognised if the Group has an unconditional right to receive non-refundable consideration before the Group recognises the related revenue. In such cases, a corresponding receivable would also be recognised (see Note 2(m)).

For a single contract with the customer, either a net contract asset or a net contract liability is presented. For multiple contracts, contract assets and contract liabilities of unrelated contracts are not presented on a net basis.

When the contract includes a significant financing component, the contract balance includes interest accrued under the effective interest method (see Note 2(v)).

(q) Cash and cash equivalents

Cash and cash equivalents comprise cash at bank and in hand, demand deposits with banks and other financial institutions, and short-term, highly liquid investments that are readily convertible into known amounts of cash and which are subject to an insignificant risk of changes in value, having been within three months of maturity at acquisition. Cash and cash equivalents are assessed for expected credit losses (ECL) in accordance with the policy set out in Note 2(k)(i).

(r) Employee benefits

(i) Short-term employee benefits and contributions to defined contribution retirement plans

Salaries, annual bonuses, paid annual leave, contributions to defined contribution retirement plans and the cost of non-monetary benefits are accrued in the year in which the associated services are rendered by employees. Where payment or settlement is deferred and the effect would be material, these amounts are stated at their present values.

(ii) Share-based payments

The fair value of share options granted to employees is recognised as an employee cost with a corresponding increase in other reserve within equity. The fair value is measured at grant date using Black-Scholes option pricing model, taking into account the terms and conditions upon which the options were granted. Where the employees have to meet vesting conditions before becoming unconditionally entitled to the options, the total estimated fair value of the options is spread over the vesting period, taking into account the probability that the options will vest.

During the vesting period, the number of share options that is expected to vest is reviewed. Any resulting adjustment to the cumulative fair value recognised in prior years is charged/credited to the profit or loss for the year of the review, unless the original employee expenses qualify for recognition as an asset, with a corresponding adjustment to the other reserve. On vesting date, the amount recognised as an expense is adjusted to reflect the actual number of options that vest (with a corresponding adjustment to the other reserve) except where forfeiture is only due to not achieving vesting conditions that relate to the market price of the Company's shares. The equity amount is recognised in the other reserve until the option is exercised (when it is transferred to the share capital and share premium account).

2 Significant accounting policies (continued)

(iii) Termination benefits

Termination benefits are recognised at the earlier of when the Group can no longer withdraw the offer of those benefits and when it recognises restructuring costs involving the payment of termination benefits.

(s) Income tax

Income tax for the year comprises current tax and movements in deferred tax assets and liabilities. Current tax and movements in deferred tax assets and liabilities are recognised in profit or loss except to the extent that they relate to items recognised in other comprehensive income or directly in equity, in which case the relevant amounts of tax are recognised in other comprehensive income or directly in equity, respectively.

Current tax is the expected tax payable on the taxable income for the year, using tax rates enacted or substantively enacted at the end of the reporting period, and any adjustment to tax payable in respect of previous years.

Deferred tax assets and liabilities arise from deductible and taxable temporary differences respectively, being the differences between the carrying amounts of assets and liabilities for financial reporting purposes and their tax bases. Deferred tax assets also arise from unused tax losses and unused tax credits.

Apart from certain limited exceptions, all deferred tax liabilities, and all deferred tax assets to the extent that it is probable that future taxable profits will be available against which the asset can be utilised, are recognised. Future taxable profits that may support the recognition of deferred tax assets arising from deductible temporary differences include those that will arise from the reversal of existing taxable temporary differences, provided those differences relate to the same taxation authority and the same taxable entity, and are expected to reverse either in the same period as the expected reversal of the deductible temporary difference or in periods into which a tax loss arising from the deferred tax asset can be carried back or forward. The same criteria are adopted when determining whether existing taxable temporary differences support the recognition of deferred tax assets arising from unused tax losses and credits, that is, those differences are taken into account if they relate to the same taxation authority and the same taxable entity, and are expected to reverse in a period, or periods, in which the tax loss or credit can be utilised.

The limited exceptions to recognition of deferred tax assets and liabilities are those temporary differences arising from the initial recognition of assets or liabilities that affect neither accounting nor taxable profit (provided they are not part of a business combination), and temporary differences relating to interests in subsidiaries to the extent that, in the case of taxable differences, the Group controls the timing of the reversal and it is probable that the differences will not reverse in the foreseeable future, or in the case of deductible differences, unless it is probable that they will reverse in the future.

The amount of deferred tax recognised is measured based on the expected manner of realisation or settlement of the carrying amount of the assets and liabilities, using tax rates enacted or substantively enacted at the end of the reporting period. Deferred tax assets and liabilities are not discounted.

2 Significant accounting policies (continued)

The carrying amount of a deferred tax asset is reviewed at the end of each reporting period and is reduced to the extent that it is no longer probable that sufficient taxable profit will be available to allow the related tax benefit to be utilised. Any such reduction is reversed to the extent that it becomes probable that sufficient taxable profit will be available.

Additional income taxes that arise from the distribution of dividends are recognised when the liability to pay the related dividend is recognised.

Current tax balances and deferred tax balances, and movements therein, are presented separately from each other and are not offset. Current tax assets are offset against current tax liabilities, and deferred tax assets against deferred tax liabilities if, the Company or the Group have the legally enforceable right to set off current tax assets against current tax liabilities and the following additional conditions are met:

- in the case of current tax assets and liabilities, the Company or the Group intends either to settle on a net basis, or to realise the asset and settle the liability simultaneously; or

- in the case of deferred tax assets and liabilities, if they relate to income taxes levied by the same taxation authority on either:

    - the same taxable entity; or

    - different taxable entities, which, in each future period in which significant amounts of deferred tax liabilities or assets are expected to be settled or recovered, intend to realise the current tax assets and settle the current tax liabilities on a net basis or realise and settle simultaneously.

(t) Provisions and contingent liabilities

Provisions are recognised for liabilities of uncertain timing or amount when the Group has a legal or constructive obligation arising as a result of a past event, it is probable that an outflow of economic benefits will be required to settle the obligation and a reliable estimate can be made. Where the time value of money is material, provisions are stated at the present value of the expenditure expected to settle the obligation.

Where it is not probable that an outflow of economic benefits will be required, or the amount cannot be estimated reliably, the obligation is disclosed as a contingent liability, unless the probability of outflow of economic benefits is remote. Possible obligations, whose existence will only be confirmed by the occurrence or non-occurrence of one or more future events are also disclosed as contingent liabilities unless the probability of outflow of economic benefits is remote.

Where some or all of the expenditure required to settle a provision is expected to be reimbursed by another party, a separate asset is recognised for any expected reimbursement that would be virtually certain. The amount recognised for the reimbursement is limited to the carrying amount of the provision.

2 Significant accounting policies (continued)

(u) Obligations for reclamation

The Group's obligations for reclamation consist of spending estimates at its mines in accordance with the relevant rules and regulations in Mongolia. The Group estimates its liabilities for final reclamation and mine closure based upon detailed calculations of the amount and timing of the future cash spending to perform the required work. Spending estimates are escalated for inflation, then discounted at a discount rate that reflects current market assessments of the time value of money and the risks specific to the liability such that the amount of provision reflects the present value of the expenditures expected to be required to settle the obligation. The Group records a corresponding asset associated with the liability for final reclamation and mine closure, which is included in the mining properties. The obligation and corresponding asset are recognised in the period in which the liability is incurred. The asset is depreciated on the units-of-production method over its expected life and the liability is accreted to the projected spending date. As changes in estimates occur (such as mine plan revisions, changes in estimated costs, or changes in timing of the performance of reclamation activities), the revisions to the obligation and the corresponding asset are recognised at the appropriate discount rate.

(v) Revenue recognition

Income is classified by the Group as revenue when it arises from the sale of goods or the provision of services in the ordinary course of the Group's business.

Revenue is recognised when control over a product or service is transferred to the customer, at the amount of promised consideration to which the Group is expected to be entitled, excluding those amounts collected on behalf of third parties. Revenue excludes value added tax or other sales taxes and is after deduction of any trade discounts.

Further details of the Group's revenue and other income recognition policies are as follows:

(i) Sale of goods

Revenue associated with the sale of coal is recognised when the control over the goods is transferred to the customer. Revenue excludes value added tax or other sales taxes and is after deduction of any trade discounts and volume rebates.

(ii) Interest income

Interest income is recognised as it accrues using the effective interest method. For financial assets measured at amortised cost or FVOCI (recycling) that are not credit-impaired, the effective interest rate is applied to the gross carrying amount of the asset. For credit-impaired financial assets, the effective interest rate is applied to the amortised cost (i.e. gross carrying amount net of loss allowance) of the asset (see Note 2(k)(i)).

2 Significant accounting policies (continued)

(w) Translation of foreign currencies

The presentation currency of the Group is USD. The functional currency of the Company, the investment holding companies and main operating group entities located in Mongolia is USD and the functional currency of remaining group entities located in Mongolia is MNT. Foreign currency transactions during the year are translated at the foreign exchange rates ruling at the transaction dates. Monetary assets and liabilities denominated in foreign currencies are translated at the foreign exchange rates ruling at the end of the reporting period. Exchange gains and losses are recognised in profit or loss.

Non-monetary assets and liabilities that are measured in terms of historical cost in a foreign currency are translated using the foreign exchange rates ruling at the transaction dates.

The results of subsidiaries using the functional currency other than USD are translated into USD at the exchange rates approximating the foreign exchange rates ruling at the dates of the transactions. Statement of financial position items are translated into USD at the closing foreign exchange rates ruling at the end of the reporting period. The resulting exchange differences are recognised in other comprehensive income and accumulated separately in equity in the exchange reserve.

On disposal of a foreign operation, the cumulative amount of the exchange differences relating to that foreign operation is reclassified from equity to profit or loss when the profit or loss on disposal is recognised.

(x) Borrowing costs

Borrowing costs that are directly attributable to the acquisition, construction or production of an asset which necessarily takes a substantial period of time to get ready for its intended use or sale are capitalised as part of the cost of that asset. Other borrowing costs are expensed in the period in which they are incurred.

The capitalisation of borrowing costs as part of the cost of a qualifying asset commences when expenditure for the asset is being incurred, borrowing costs are being incurred and activities that are necessary to prepare the asset for its intended use or sale are in progress. Capitalisation of borrowing costs is suspended or ceases when substantially all the activities necessary to prepare the qualifying asset for its intended use or sale are interrupted or complete.

(y) Non-current assets held for sale

A non-current asset is classified as held for sale if it is highly probable that its carrying amount will be recovered through a sale transaction rather than through continuing use and the asset is available for sale in its present condition.

2 Significant accounting policies (continued)

Immediately before classification as held for sale, the measurement of the non-current assets is brought up-to-date in accordance with the accounting policies before the classification. Then, on initial classification as held for sale and until disposal, the non-current assets (except for certain assets as explained below) are recognised at the lower of their carrying amount and fair value less costs to sell. The principal exceptions to this measurement policy so far as the financial statements of the Group and the Company are concerned are deferred tax assets, assets arising from employee benefits, financial assets (other than investments in subsidiaries, associates and joint ventures) and investment properties. These assets, even if held for sale, would continue to be measured in accordance with the policies set out elsewhere in Note 2.

Impairment losses on initial classification as held for sale, and on subsequent remeasurement while held for sale, are recognised in profit or loss. As long as a non-current asset is classified as held for sale the non-current asset is not depreciated or amortised.

(z) Asset acquisition

Groups of assets acquired and liabilities assumed are assessed to determine if they are business or asset acquisitions. On an acquisition-by-acquisition basis, the Group chooses to apply a simplified assessment of whether an acquired set of activities and assets is an asset rather than business acquisition, when substantially all of the fair value of the gross assets acquired is concentrated in a single identifiable asset or group of similar identifiable assets.

When a group of assets acquired and liabilities assumed do not constitute a business, the overall acquisition cost is allocated to the individual identifiable assets and liabilities based on their relative fair values at the date of acquisition. An exception is when the sum of the individual fair values of the identifiable assets and liabilities differs from the overall acquisition cost. In such case, any identifiable assets and liabilities that are initially measured at an amount other than cost in accordance with the Group's policies are measured accordingly, and the residual acquisition cost is allocated to the remaining identifiable assets and liabilities based on their relative fair values at the date of acquisition.

(aa) Related parties

(a) A person, or a close member of that person's family, is related to the Group if that person:

  (i) has control or joint control over the Group;

  (ii) has significant influence over the Group; or

  (iii) is a member of the key management personnel of the Group or the Group's parent.

(b) An entity is related to the Group if any of the following conditions applies:

  (i) The entity and the Group are members of the same group (which means that each parent, subsidiary and fellow subsidiary is related to the others).

  (ii) One entity is an associate or joint venture of the other entity (or an associate or joint venture of a member of a group of which the other entity is a member).

2 Significant accounting policies (continued)

(iii) Both entities are joint ventures of the same third party.

(iv) One entity is a joint venture of a third entity and the other entity is an associate of the third entity.

(v) The entity is a post-employment benefit plan for the benefit of employees of either the Group or an entity related to the Group.

(vi) The entity is controlled or jointly controlled by a person identified in (a).

(vii) A person identified in (a)(i) has significant influence over the entity or is a member of the key management personnel of the entity (or of a parent of the entity).

(viii) The entity, or any member of a group of which it is a part, provides key management personnel services to the Group or to the Group's parent, if any.

Close members of the family of a person are those family members who may be expected to influence, or be influenced by, that person in their dealings with the entity.

(bb) Segment reporting

Operating segments, and the amounts of each segment item reported in the financial statements, are identified from the financial information provided regularly to the Group's most senior executive management for the purposes of allocating resources to, and assessing the performance of, the Group's various lines of business and geographical locations.

Individually material operating segments are not aggregated for financial reporting purposes unless the segments have similar economic characteristics and are similar in respect of the nature of products and services, the nature of production processes, the type or class of customers, the methods used to distribute the products or provide the services, and the nature of the regulatory environment. Operating segments which are not individually material may be aggregated if they share a majority of these criteria.

3 Accounting judgements and estimates

(a) Critical accounting judgements in applying the Group's accounting policies

In the process of applying the Group's accounting policies, management has made the following accounting judgements:

(i) Fair value of buildings and plants, machinery and equipment classified as property, plant and equipment and construction in progress

The Group has changed its accounting policy for its buildings and plants, machinery and equipment, and such class of items under construction status from cost model to valuation model with effect from 31 December 2016. Buildings and plants, machinery and equipment classified as property, plant and equipment and construction in progress were revalued by an external appraiser as at 31 December 2016 and 2021, respectively (see Notes 13 and 14). Such valuations were based on certain assumptions which are subject to uncertainty and might materially differ from the actual results. Judgement is required in relation to the selection of assumptions in arriving at the fair values and the determination of the frequency of performing a revaluation with sufficient regularity.

(ii) Reserves

The Group estimates and reports Mineral Resources and Ore Reserves, commonly referred to as Coal Resources and Coal Reserves in the coal mining industry, meeting requirements of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the "JORC Code"), and subsequently the Australian Guidelines for the Estimation and Classification of Coal Resources (2014) to which are referred.

The JORC Code is a professional code of practice that sets minimum standards for Public Reporting of minerals Exploration Results, Mineral Resources and Ore Reserves. The JORC Code provides a mandatory system for the classification of minerals Exploration Results, Mineral Resources and Ore Reserves according to the levels of confidence in geological knowledge and technical and economic considerations in public reports.

3 Accounting judgements and estimates (continued)

Responsibility for demonstrating the required transparency and materiality in the estimation of Coal Resources and/or Coal Reserves required by the JORC Code lies with the "Competent Person". A Competent Person is a minerals industry professional who is a Member or Fellow of The Australasian Institute of Mining and Metallurgy (the "**AusIMM**"), or of the Australian Institute of Geoscientists (the "**AIG**"), or of a Recognised Professional Organisation, as included in a list available on the JORC website. These organisations have enforceable codes of ethics, including disciplinary processes with powers to suspend or expel a member. A Competent Person must have a minimum of five years' relevant experience in the style of mineralisation or type of deposit under consideration and in the activity which that person is undertaking.

A "Coal Reserve" is the economically mineable part of a Measured and/or Indicated Coal Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.

A "Probable Coal Reserve" is the economically mineable part of an Indicated, and in some circumstances, a Measured Coal Resource. The confidence in the Modifying Factors applying to a Probable Coal Reserve is lower than that applying to a Proved Coal Reserve. A "Proved Coal Reserve" is the economically mineable part of a Measured Mineral Resource. A Proved Coal Reserve implies a high degree of confidence in the Modifying Factors.

"Modifying Factors" are considerations used to convert Coal Resources to Coal Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors. Modifying Factors may change from one estimation to the next, where the materiality of such changes is demonstrable. Such changes may be as result of variation to any of the mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social, governmental or other factors.

Because the Modifying Factors used to estimate Coal Reserves may change from one estimate to the next, estimates of Coal Reserves may change from one period to another. Changes in reported Coal Reserves thus may affect the Group's financial results and financial position in a number of ways, including the following:

- Asset recoverable amounts may be affected due to changes in estimated future cash flows.

- Depreciation, depletion and amortisation charged to the statement of profit or loss may change where such charges are determined on the units of production basis, or where the useful economic lives of assets change.

- Overburden removal costs recorded on the statement of financial position or charged to the statement of profit or loss may change due to changes in stripping ratios or the units of production basis of depreciation.

- Reclamation and mine closure provisions may change where changes in estimated reserves affect expectations about the timing or cost of these activities.

- The carrying amount of deferred tax assets may change due to changes in estimates of the likely recovery of the tax benefits.

3 Accounting judgements and estimates (continued)

(iii) Useful lives of property, plants and equipment

Management determines the estimated useful lives of and related depreciation charges for its property, plant and equipment. This estimate is based on the actual useful lives of assets of similar nature and functions. It could change significantly as a result of significant technical innovations and competitor actions in response to industry cycles. Management will increase the depreciation charges where useful lives are less than previously estimated, or will write-off or write-down technically obsolete or non-strategic assets that have been abandoned or sold.

(iv) Impairment of mining related assets

The Group identifies if there is any indication of impairment of mining related assets at each end of the reporting period to determine whether there is objective evidence of impairment. When indication of impairment is identified, management prepares discounted future cash flow to assess the differences between the carrying amount and value in use and provided for impairment loss. Any change in the assumptions adopted in the cash flow forecasts would result in increase or decrease in the provision of the impairment loss and affect the Group's net asset value.

An increase or decrease in the above impairment loss would affect the net profit in future years.

(v) Obligation for reclamation

The estimation of the liabilities for final reclamation and mine closure involves the estimates of the amount and timing for the future cash spending as well as the discount rate used for reflecting current market assessments of the time value of money and the risks specific to the liability. The Group considers the factors including future production volume and development plan, the geological structure of the mining regions and reserve volume to determine the scope, amount and timing of reclamation and mine closure works to be performed. Determination of the effect of these factors involves judgements from the Group and the estimated liabilities may turn out to be different from the actual expenditure to be incurred. The discount rate used by the Group may also be altered to reflect the changes in the market assessments of the time value of money and the risks specific to the liability, such as change of the borrowing rate and inflation rate in the market. As changes in estimates occur (such as mine plan revisions, changes in estimated costs, or changes in timing of the performance of reclamation activities), the revisions to the obligation will be recognised at the appropriate discount rate.

(vi) Derivative financial instruments

In determining the fair value of the derivative financial instruments, considerable judgement is required to interpret market data used in the valuation techniques. The use of different market assumptions and/or estimation methodologies may have a material effect on the estimated fair value amounts.

3 Accounting judgements and estimates (continued)

(vii) Capitalised stripping costs

The process of removing overburden and other mine waste materials to access mineral deposits is referred to as stripping. Stripping costs (waste removal costs) are incurred during the development and production phases at open-pit mining and they are accounted for separately for each component of an ore body unless the stripping activity provides improved access to the whole of the ore body. A component is a specific section within an ore body that is made more accessible by the stripping activity. The identification of components is dependent on the mine plan. Judgement is required to identify and define these components and also to determine the expected volumes of waste to be stripped and ore to be mined in each of these components. Judgement is also required to identify a suitable production measure that can be applied in the calculation and allocation of production stripping costs between inventory and production stripping activity. These are used to calculate and allocate the production stripping costs to inventory and/or the stripping activity assets.

Development stripping costs are capitalised as a stripping activity asset, in construction in progress and forming part of the cost of constructing the mine, when:

- It is probable that future economic benefits associated with the asset will flow to the entity; and

- The costs can be measured reliably.

Capitalisation of development stripping costs ceases and these costs are transferred to mine properties in property, plant and equipment when the ore body or component of ore body is ready for its intended use.

Production stripping can give rise to two benefits being the extraction of ore in the current period and improved access to the ore body or component of ore body in future periods. To the extent that the benefit is the extraction of ore, the stripping costs are recognised as an inventory cost. To the extent the benefit is improved access to the ore body or component of ore body in future periods, the stripping costs are capitalised as mine properties in property, plant and equipment, if the following criteria are met:

- It is probable that the future economic benefit (improved access to ore) will flow to the Group;

- The ore body or component of ore body for which access has been improved can be identified; and

- The costs relating to the stripping activity can be measured reliably.

Production stripping costs are allocated between the inventory produced and the mine properties capitalised using a life-of-component waste to ore strip ratio. When the current strip ratio is greater than the life-of-component ratio, a portion of the stripping costs is capitalised to the existing mine properties.

The development and production stripping assets are depreciated using the units of production method based on the proven and probable mineral reserves of the relevant ore body or component of ore body.

3 Accounting judgements and estimates (continued)

(viii) Taxation

The Group is subject to various taxes and levies in the jurisdictions where it has operations. The Group makes payments and determines the provision for tax and levy liabilities primarily based on the computations as prepared by the Group. Nevertheless, judgement is required in determining the provision for taxes and levies as there are many transactions and calculations for which the ultimate determination is uncertain during the ordinary course of business, there are possible cases of disagreements with the relevant authorities on treatment of certain items included in the computations and certain non-routine transactions. The Group uses its best judgement to determine the probability although it is typically very difficult to determine the timing and ultimate outcome of each case. If the Group considers it probable that these judgements will result in different positions, the most likely amounts of the outcome will be estimated and adjustments to the liabilities will be made in the period in which such determination is made. Due to the inherent uncertainties related to the eventual outcome of each case, it is probable that certain matters may be resolved for amounts materially different from any estimated provisions or previous disclosures.

(b) Sources of estimation uncertainty

Other than requiring critical accounting judgements, assumptions concerning the future and other major sources of estimation uncertainty at the end of the reporting period are required in relation to certain Group's accounting policies. Respective information and assumptions and their risk factors are disclosed accordingly in Notes 3(a) (i), (iii), (iv), (v), (vi) and (vii).

4 Revenue

The Group is principally engaged in the mining, processing, transportation and sale of coal products. Revenue represents the sales value of goods sold to customers exclusive of value added or sales taxes and after deduction of any trade discounts and volume rebates. The amount of each significant category of revenue recognised in revenue during the year is as follows:

	2021 USD'000	*2020* USD'000
Washed hard-coking coal ("**HCC**")	174,175	378,594
Washed semi-soft coking coal	6,357	30,627
Washed thermal coal	3,019	7,892
Raw thermal coal	518	311
	184,069	417,424

4 Revenue (continued)

During the year ended 31 December 2021, the Group had two customers that individually exceeded 10% of the Group's revenue from sales of goods and referring of services, being USD30,191,000 and USD23,320,000. During the year ended 31 December 2020, the Group had three customers that individually exceeded 10% of the Group's revenue from sales of goods and referring of services, being USD127,532,000, USD65,333,000 and USD45,432,000.

Revenue during the year ended 31 December 2021 includes approximately USD75,516,000 (2020: USD307,918,000) which arose from sales of coal products to customers through agent sales arrangements for diversifying and expanding the Group's sales channels.

Details of concentrations of credit risk arising from these customers are set out in Note 30(b).

5 Cost of revenue

	2021 USD'000	*2020* USD'000
Mining costs	42,475	108,333
Processing costs	11,950	35,430
Transportation costs	43,138	67,587
Others (Note (i))	43,906	69,865
Cost of revenue during mine operations	141,469	281,215
Cost of revenue during idled mine period (Note (ii))	20,021	7,633
Cost of revenue	161,490	288,848

Notes:

(i) Others include royalty tax on the coal sold.

(ii) For the year ended 31 December 2021, cost of revenue during idled mine period mainly includes depreciation expense related to idled plant and equipment, staff costs and mining contractor costs.

6 (Loss)/profit before taxation

(Loss)/profit before taxation is arrived at after charging/(crediting):

(a) Net finance costs:

	2021 USD'000	*2020* USD'000
Interest income	(54)	(110)
Net change in fair value of derivative component of senior notes	-	(548)
Foreign exchange gain, net	-	(4,395)
Finance income	(54)	(5,053)
Interest on liability component of senior notes (Note 23)	46,170	45,745
Interest on lease liabilities	5	6
Transaction fee	66	-
Unwinding interest on - Accrued reclamation obligations (Note 28)	492	440
Net interest expense	46,733	46,191
Net change in fair value of derivative component of senior notes	608	-
Foreign exchange loss, net	1,639	-
Finance costs	48,980	46,191
Net finance costs	48,926	41,138

No borrowing costs have been capitalised for the years ended 31 December 2021 and 2020.

(b) Staff costs:

	2021 USD'000	*2020* USD'000
Salaries, wages, bonuses and benefits	20,353	26,850
Retirement scheme contributions	2,894	3,726
Equity-settled share-based payment expenses (Note 27)	34	136
	23,281	30,712

6 (Loss)/profit before taxation (continued)

Pursuant to the relevant labour rules and regulations in Mongolia, the Group participates in defined contribution retirement benefit schemes (the "**Schemes**") organised by the GoM whereby the Group is required to make contributions to the Schemes at a rate of 8.5% of the eligible employees' salaries. Contributions to the Schemes vest immediately.

The Group has no other material obligation for the payment of pension benefits beyond the annual contributions described above.

(c) Other items:

	2021 USD'000	*2020* USD'000
Selling and distribution costs (Note (i))	9,625	27,645
Depreciation and amortisation	49,704	61,199
Net (gain)/loss on disposals of property, plant and equipment	(29)	1
Auditors' remuneration		
- audit services	639	608
- tax and other services	30	56
	669	664
Cost of inventories (Note (ii))	141,469	281,215

Notes:

(i) Selling and distribution costs represent fees and charges incurred for importing coal into the People's Republic of China ("**PRC**"), logistics and transportation costs, governmental fees and charges and fixed agent fees associated with sales activities in inland PRC.

(ii) Cost of inventories includes USD48,711,000 (2020: USD82,805,000) relating to personnel expenses, and depreciation and amortisation which are also included in the respective amounts disclosed separately above for each of these types of expenses. Cost of inventories also includes transportation and stockpile losses amounted to USD2,269,000 (2020: USD8,293,000).

7 Income tax

(a) Income tax in the consolidated statement of comprehensive income represents:

	2021 USD'000	*2020* USD'000
Current tax		
Provision for the year (Note 25(a))	132	17,004
Deferred tax		
Origination and reversal of temporary difference (Note 25(b))	(5,145)	(6,408)
	(5,013)	10,596

(b) Reconciliation between tax expense and accounting profit at applicable tax rates:

	2021 USD'000	*2020* USD'000
(Loss)/profit before taxation	(60,451)	40,201
Notional tax on (loss)/profit before taxation	(12,141)	8,301
Tax effect of non-deductible items (Note (iii))	6,732	4,052
Tax effect of non-taxable items (Note (iii))	(334)	(2,040)
Tax losses not recognised	730	283
Actual tax expenses	(5,013)	10,596

Notes:

(i) Pursuant to the income tax rules and regulations of Mongolia, the subsidiaries of the Group located in Mongolia are liable to Mongolian Corporate Income Tax at a rate of 10% of the first MNT6 billion taxable income, and 25% of the remaining taxable income for the years ended 31 December 2021 and 2020. According to the Corporate Income Tax Law of the PRC, the Company's subsidiaries in the PRC is subject to statutory income tax rate of 25%.

(ii) Pursuant to the rules and regulations of the Cayman Islands, the Group is not subject to any income tax in the Cayman Islands. The Group is not subject to Hong Kong and Luxembourg profits tax as it has no assessable income arising in or derived from Hong Kong and Luxembourg during the years ended 31 December 2021 and 2020.

(iii) Non-deductible and non-taxable items mainly include net unrealised exchange gain or loss, other non-deductible expenses and non-taxable income pursuant to the income tax rules and regulations of Mongolia and other related tax source regions during the years ended 31 December 2021 and 2020.

8 (Loss)/earnings per share

(a) Basic (loss)/earnings per share

The calculation of basic loss per share is based on the loss attributable to ordinary equity shareholders of the Company of USD55,238,000 (profit attributable to ordinary equity shareholders of the Company of 2020: USD28,940,000) and the weighted average of 1,031,576,786 ordinary shares (2020: 1,029,176,786 ordinary shares) in issue during the year.

(b) Diluted (loss)/earnings per share

For the years ended 31 December 2021 and 2020, basic and diluted (loss)/earnings per share are the same.

The equity-settled share-based payment transactions (see Note 27) are anti-dilutive and therefore not included in calculating diluted (loss)/earnings per share for the years ended 31 December 2021 and 2020.

9 Directors' remuneration

Details of the Directors' remuneration disclosed are as follows:

	Year ended 31 December 2021					
	Directors' fee USD'000	*Salaries, allowances and benefits in kind* USD'000	*Discretionary bonuses* USD'000	*Retirement scheme contributions* USD'000	*Equity-settled share-based payment expenses (Note 10))* USD'000	*Total* USD'000
Executive directors						
Odjargal Jambaljamts (Chairman)	19	1,139	23	96	-	1,277
Battsengel Gotov	19	732	23	62	10	846
Non-executive directors						
Enkhtuvshin Gombo	19	-	-	-	-	19
Enkhtuvshin Dashtseren	19	-	-	-	-	19
Od Jambaljamts	19	-	-	-	-	19
Independent non-executive directors						
Khashchuluun Chuluundorj	19	-	-	-	-	19
Unenbat Jigjid	19	-	-	-	-	19
Chan Tze Ching, Ignatius	58	-	-	-	-	58
Total	191	1,871	46	158	10	2,276

	Year ended 31 December 2020					
	Directors' fee USD'000	*Salaries, allowances and benefits in kind* USD'000	*Discretionary bonuses* USD'000	*Retirement scheme contributions* USD'000	*Equity-settled share-based payment expenses (Note 10))* USD'000	*Total* USD'000
Executive directors						
Odjargal Jambaljamts (Chairman)	19	1,336	75	46	-	1,476
Battsengel Gotov	19	704	75	26	43	867
Non-executive directors						
Enkhtuvshin Gombo	19	-	-	-	-	19
Enkhtuvshin Dashtseren	19	-	-	-	-	19
Od Jambaljamts	19	-	-	-	-	19
Independent non-executive directors						
Khashchuluun Chuluundorj	19	-	-	-	-	19
Unenbat Jigjid	19	-	-	-	-	19
Chan Tze Ching, Ignatius	58	-	-	-	-	58
Total	191	2,040	150	72	43	2,496

9 Directors' remuneration (continued)

No emoluments have been paid to the Directors as an inducement to join or upon joining the Group or as compensation for loss of office during the years ended 31 December 2021 and 2020.

10 Individuals with highest emoluments

The number of directors and non-directors included in the five highest paid individuals is set forth below:

	2021 Number of individuals	*2020 Number of individuals*
Directors	2	2
Non-directors	3	3
	5	5

The emoluments of the Directors are disclosed in Note 9. The aggregate of the emoluments in respect of the remaining highest paid individuals are as follows:

	2021 USD'000	*2020* USD'000
Basic salaries, allowances and benefits in kind	749	768
Discretionary bonuses	83	226
Retirement scheme contributions	69	33
Equity-settled share-based payment expenses *(Note)*	15	63
	916	1,090

The emoluments of the remaining individuals with the highest emoluments are within the following band:

	2021 Number of individuals	*2020 Number of individuals*
HKD2,000,001 to HKD2,500,000	3	-
HKD2,500,001 to HKD3,000,000	-	3

No emoluments have been paid to these individuals as an inducement to join or upon joining the Group or as compensation for loss of office during the years ended 31 December 2021 and 2020.

10 Individuals with highest emoluments (continued)

Note:

These represent the estimated value of share options granted to the key management under the Group's share option scheme. The value of these share options is measured according to the Group's accounting policies for share-based payment transactions as set out in Note 2(r)(ii) and, in accordance with that policy, included adjustments to reverse amounts accrued in previous years where grants of equity instruments are forfeited prior to vesting.

The details of the principal terms and number of options granted are disclosed under the paragraph in Note 27.

11 Other comprehensive income

	2021 USD'000	*2020* USD'000
Exchange differences on translation of the financial statements of certain subsidiaries	184	(7,556)
Surplus on revaluation of plants, buildings, and machinery and equipment:		
- Before-tax amount (Notes 13, 14)	78,672	-
- Tax effects	(15,777)	-
- Net-of-tax amount	62,895	-
	63,079	(7,556)

Note:

Exchange differences on re-translation mainly resulted from the fluctuation of RMB exchange rate against USD during the respective reporting periods.

12 Segment reporting

The Group has one business segment, the mining, processing, transportation and sale of coal products. The majority assets and liabilities are located in Mongolia and the majority of its customers are located in China. Based on information reported by the chief operating decision maker for the purpose of resource allocation and performance assessment, the Group's only operating segment is the mining, processing, transportation and sales of coal products. Accordingly, no additional business and geographical segment information is presented.

13 Property, plant and equipment, net

	Buildings and plants USD'000	*Machinery and equipment* USD'000	*Motor vehicles* USD'000	*Office equipment* USD'000	*Mining properties* USD'000	*Total* USD'000
Cost or valuation:						
At 1 January 2020	439,443	297,650	42,937	4,567	457,859	1,242,456
Additions	2,077	2,191	227	166	64,773	69,434
Disposals	(727)	(213)	(217)	(305)	-	(1,462)
Exchange adjustments	(5,113)	(2,387)	(2)	(19)	-	(7,521)
At 31 December 2020	435,680	297,241	42,945	4,409	522,632	1,302,907
Representing:						
Cost	360	-	42,945	4,409	522,632	570,346
Valuation	435,320	297,241	-	-	-	732,561
	435,680	297,241	42,945	4,409	522,632	1,302,907
At 1 January 2021	435,680	297,241	42,945	4,409	522,632	1,302,907
Additions	285	95	2,506	570	60,545	64,001
Disposals	(789)	(2,274)	(1,770)	(234)	-	(5,067)
Transfer from construction in progress	850	255	-	-	-	1,105
Surplus on revaluation	75,662	35,117	-	-	-	110,779
Exchange adjustments	31	14	2	-	-	47
At 31 December 2021	511,719	330,448	43,683	4,745	583,177	1,473,772
Representing:						
Cost	502	-	43,683	4,745	583,177	632,107
Valuation	511,217	330,448	-	-	-	841,665
	511,719	330,448	43,683	4,745	583,177	1,473,772
Accumulated amortisation and depreciation:						
At 1 January 2020	96,311	147,449	29,313	3,234	87,852	364,159
Charge for the year	14,061	18,750	4,199	533	21,219	58,762
Written back on disposals	-	(196)	(217)	(55)	-	(468)
Exchange adjustments	(1,413)	(1,168)	(3)	(12)	-	(2,596)
At 31 December 2020	108,959	164,835	33,292	3,700	109,071	419,857
At 1 January 2021	108,959	164,835	33,292	3,700	109,071	419,857
Charge for the year	13,490	17,853	4,326	567	11,568	47,804
Written back on disposals	(29)	(1,415)	(197)	(145)	-	(1,786)
Adjustment on revaluation	19,723	19,472	-	-	-	39,195
Exchange adjustments	11	7	1	2	-	21
At 31 December 2021	142,154	200,752	37,422	4,124	120,639	505,091
Carrying amount:						
At 31 December 2021	369,565	129,696	6,261	621	462,538	968,681
At 31 December 2020	326,721	132,406	9,653	709	413,561	883,050

13 Property, plant and equipment, net (continued)

Notes:

(a) Majority part of the Group's property, plant and equipment are located in Mongolia.

(b) Mining properties as at 31 December 2021 include stripping activity assets with the carrying amount of USD424,554,000 (2020: USD386,376,000) and application fee for the mining rights of USD898,000 (2020: USD858,000) in relation to the Group's mine deposits.

(c) As at 31 December 2021, the Group is in the process of applying for the ownership certificates for certain of its buildings. The aggregate carrying value of such properties of the Group as at 31 December 2021 is approximately USD9,371,000 (2020: USD8,427,000). The Directors are of the opinion that the Group is entitled to lawfully occupy or use of these properties.

(d) Buildings and plants as at 31 December 2021 include right-of-use assets for office leasing with the carrying amount of USD71,000 (2020: USD70,000).

(e) Fair value measurement of property, plant and machinery

(i) Fair value hierarchy

The following table presents the fair value of the Group's property, plant and machinery measured at the end of the reporting period on a recurring basis, categorised into the three-level fair value hierarchy as defined in IFRS 13, *Fair value measurement*. The level into which a fair value measurement is classified is determined with reference to the observability and significance of the inputs used in the valuation technique as follows:

- Level 1 valuations: Fair value measured using only Level 1 inputs i.e. unadjusted quoted prices in active markets for identical assets or liabilities at the measurement date

- Level 2 valuations: Fair value measured using Level 2 inputs i.e. observable inputs which fail to meet Level 1, and not using significant unobservable inputs. Unobservable inputs are inputs for which market data are not available

- Level 3 valuations: Fair value measured using significant unobservable inputs

13 Property, plant and equipment, net (continued)

	Fair value as at 31 December 2021 USD'000	*Fair value measurements as at 31 December 2021 categorised into* *Level 1* USD'000	*Level 2* USD'000	*Level 3* USD'000
Recurring fair value measurement				
Buildings and plants	369,495	-	-	369,495
Machinery and equipment	129,696	-	-	129,696
Buildings and plants, machinery and equipment under construction (Note 14)	46,828	-	-	46,828
Total	546,019	-	-	546,019

	Fair value as at 31 December 2020 USD'000	*Fair value measurements as at 31 December 2020 categorised into* *Level 1* USD'000	*Level 2* USD'000	*Level 3* USD'000
Recurring fair value measurement				
Buildings and plants	326,651	-	-	326,651
Machinery and equipment	132,406	-	-	132,406
Buildings and plants, machinery and equipment under construction (Note 14)	43,961	-	-	43,961
Total	503,018	-	-	503,018

During the year ended 31 December 2021, there were no transfers between Level 1 and Level 2, or transfers into or out of Level 3. The Group's policy is to recognise transfers between levels of fair value hierarchy as at the end of the reporting period in which they occur.

As at 31 December 2016 and 2021, buildings and plants as well as machinery and equipment were revalued and such valuation was carried out by a firm of external appraisers, Duff and Phelps Corporation, who has among their staff fellows of the American Society of Appraisers, Royal Institute of Charted Surveyors, Chartered Certified Accountant, Chartered Financial Analyst and Financial Risk Manager with recent experience in the mining property valuation worldwide including valuation of coal mines. The Group's property manager and the chief financial officer had discussion with the appraisers on the valuation assumptions and valuation results when the valuation was performed.

The subject properties are purpose-built industrial facilities including buildings and plants, machinery and equipment and construction in progress located in South Gobi of Mongolia. They are operated according to their highest and best use for coal mining and processing. There is no other alternative use of the subject properties. Upon consideration of all relevant facts, it was concluded that the properties subject to valuations are specialised properties.

13 Property, plant and equipment, net (continued)

Depreciated replacement cost is defined by International Valuation Standards ("**IVS**") as "the current cost of replacing an asset with its modern equivalent asset less deductions for physical deterioration and all relevant forms of obsolescence and optimisation". Depreciated replacement cost application for major assets classes is briefly described below:

- Buildings and plants, and such items under construction status:
  - Reproduction cost new ("**RCN**") estimations for the buildings and structures were calculated using indexing method;
  - Indices were applied to the historical cost. The indices were obtained from recognised sources such as: FM Global, Unitary Construction costs, etc.;
  - Physical depreciation was applied using straight line method based on the economic useful life of production, auxiliary, administrative facilities, land improvements, and transfer devices;
  - No any functional obsolescence was revealed.
- Machinery and equipment:
  - Machinery RCN was estimated based on the actual machinery quotations received from the purchase department of the Company. These estimates were adjusted with installation expenses, engineering expenses and interest during construction. Estimated RCN was compared to indexed historical cost and considered to be relevant. Additionally, unitary reproduction cost (USD/kg of equipment weight) of major and most expensive equipment appraised such as crushers, screens, spirals and flotation cells were compared with unitary cost range of similar equipment recently purchased by other mining companies and considered to be in line with these data. Overall Coal Handling and Preparation Plant ("**CHPP**") modules' estimated unitary RCN (USD/ton of processing capacity) is in the middle of the range of recently constructed coal processing plants;
  - Engineering and general administrative expenses for several analysed coal mines range between 7-8% of RCN; and
  - Interest During Construction estimated to be equal to 7.8% of RCN based on the actual interest paid during CHPP construction.

13 Property, plant and equipment, net (continued)

(ii) Information about Level 3 fair value measurements

IVS requires that for a private sector entity with specialised assets, a valuation assessed by depreciated replacement cost must be subject to a test of profitability in relation to the whole of the assets held by the entity or the cash generating unit ("**CGU**"). For the purpose of the profitability test, the Company was considered as a single CGU.

In testing profitability, the impact that current economic conditions may potentially have on the Group's operations, financial performance, expectations of financial performance of or financial conditions is considered. Such impact was assessed with the use of financial models, which make use of projections of operating activities and financial performance of the Group provided by the management. No economic obsolescence for the Group was indicated by the profitability test.

(iii) Depreciated cost of properties held for own use carried at fair value

Had the revalued properties held for own use been carried at cost less accumulated depreciation, the carrying amounts would have been:

	2021	*2020*
	USD'000	USD'000
Buildings and plants	141,397	119,617
Machinery and equipment	24,439	21,941
Buildings and plants, machinery and equipment under construction (Note 14)	20,692	5,573
	186,528	147,131

(f) Impairment of mining related assets

Given the fact that the carrying amount of the Group's net assets exceeded the Group's market capitalisation as at 31 December 2021, according to IAS 36, *Impairment of assets*, the management has performed impairment assessment on the carrying amount of the Group's property, plant and equipment, construction in progress and intangible assets related to the Ukhaa Khudag ("**UHG**") mine and Baruun Naran ("**BN**") mine operations (collectively referred to as "**UHG and BN Assets**"). For the purpose of this, the UHG and BN Assets are treated as a CGU.

13 Property, plant and equipment, net (continued)

The recoverable amount of the CGU was based on value in use, determined by discounting the future cash flows to be generated from the continuing use of the UHG and BN Assets. The key assumptions used in the estimation of value in use were as follows:

- Recoverable reserves and resources

  Economically recoverable reserves and resources represent management's expectations at the time of completing the impairment testing, based on reserves and resource statements and exploration and evaluation work undertaken by appropriately qualified persons.

- Growth rate

  The growth rate is estimated based on coal product price consensus and life-of-mine ("**LOM**") production plan.

- Coal prices

  The coal price assumptions are management's best estimate of the future price of coal in China. Coal price assumptions for the next five years are built on past experience of the industry and consistent with external sources. These prices are adjusted to arrive at appropriately consistent price assumptions for the different qualities and type of coal.

  Preparation basis used for the coal price assumptions for the next five years estimated at the year end of 2021 is consistent with that at the year end of 2020, which was also updated with reference to the latest market forecast. The coal price estimation over a period longer than five years contains no growth rate, except for annual inflation rate.

- Sales quantity/production profile

  Sales quantity is in line with production profile. Estimated production volumes are based on detailed LOM plans and take into account development plans for the mines agreed by management as part of the long-term planning process. Production volumes are dependent on a number of variables, such as the recoverable quantities, the production profile, the cost of the development of the infrastructure necessary to extract the reserves, the production costs, and the contractual duration of mining rights and the selling price of the coal extracted. The production profiles used were consistent with the reserves and resource volumes approved as part of the Group's process for the estimation of proved and probable reserves.

13 Property, plant and equipment, net (continued)

- Operating costs

  Operating cost assumptions are based on management's best estimation of the costs to be incurred at the date of impairment testing. Costs are determined after considering current operating costs, future cost expectations, as well as the nature and location of the operation. The estimation also takes future mining contractor arrangements into consideration; and the Directors are of the opinion that such mining contractor arrangements are in line with the Group's business plan.

- Capital expenditure

  Future capital expenditure is based on management's best estimate of required future capital requirements. It has been determined by taking into account all committed and anticipated capital expenditure adjusted for future cost estimates.

- Discount rate

  This discount rate is derived from the Group's weighted average cost of capital ("**WACC**"), with appropriate adjustments made to reflect the risks specific to the CGU. The WACC takes into account both debt and equity, weighted based on the Group and comparable peer companies' average capital structure. The cost of equity is derived from the expected return on investment by the Group's investors based on publicly available market data of comparable peer companies. The cost of debt is based on the borrowing cost of interest-bearing borrowings of the Group that reflects the credit rating of the Group.

  Post-tax discount rate of 17% and pre-tax discount rate of 22% were applied to the future cash flows projection at the year end of 2021 (2020: post-tax discount rate of 18% and pre-tax discount rate of 23%). The Directors believe that the post-tax discount rate was matching with the latest cash flow projection modelling.

  Based on above-mentioned impairment assessment, the carrying amount of the CGU has not exceeded its recoverable amount as at 31 December 2021, and has not resulted in the identification of an impairment loss for the year ended 31 December 2021. The Directors are of the opinion that the impairment provision is adequate as at 31 December 2021 and no additional or reversal of impairment provision is needed in respect of the Group's non-financial assets in this regard.

  The Directors believe that the estimates and assumptions incorporated in the impairment assessment are reasonable; however, the estimates and assumptions are subject to significant uncertainties and judgements. The Directors consider that a reasonable changes in assumptions will not result in an impairment of mining related assets.

14 Construction in progress

	2021 USD'000	*2020* USD'000
At 1 January	43,961	33,796
Additions	9	10,151
Transfer to property, plant and equipment (Note 13)	(1,105)	-
Revaluation gain	7,088	-
Disposal	(3,126)	-
Exchange adjustments	1	14
At 31 December	46,828	43,961

Note: The construction in progress is mainly related to machinery and equipment.

15 Other right-of-use assets

	2021 USD'000	*2020* USD'000
Cost:		
At 1 January	65	65
At 31 December	65	65
Accumulated depreciation:		
At 1 January	14	13
Charge for the year	1	1
At 31 December	15	14
Net carrying amount:	50	51

Note: Right-of-use assets comprise interests in leasehold land held for own use located in Mongolia, with original lease period from 15 years to 60 years.

16 Intangible assets

	Acquired mining right (Note (i)) USD'000	*Software* USD'000	*GS Terminal (Note (ii))* USD'000	*Total* USD'000
Cost:				
At 1 January 2020	701,557	3,676	-	705,233
At 31 December 2020	701,557	3,676	-	705,233
At 1 January 2021	701,557	3,676	-	705,233
Addition	-	-	3,031	3,031
At 31 December 2021	701,557	3,676	3,031	708,264
Accumulated amortisation and impairment loss:				
At 1 January 2020	202,004	1,839	-	203,843
Amortisation charge for the year	2,069	367	-	2,436
At 31 December 2020	204,073	2,206	-	206,279
At 1 January 2021	204,073	2,206	-	206,279
Amortisation charge for the year	1,467	368	64	1,899
At 31 December 2021	205,540	2,574	64	208,178
Carrying amount:				
At 31 December 2021	496,017	1,102	2,967	500,086
At 31 December 2020	497,484	1,470	-	498,954

Notes:

(i) Acquired mining right represents the mining right acquired during the acquisition of BN mine.

(ii) GS Terminal represents the permission to operate at the customs bonded terminal for 3 years.

17 Interests in subsidiaries

The following list contains only the particulars of subsidiaries which principally affected the results, assets or liabilities of the Group. The class of shares held is ordinary unless otherwise stated.

Name of company	*Place of incorporation and business*	*Particulars of issued and paid up capital*	*Equity attributable to the Company*		*Principal activities*
			Direct	*Indirect*	
Mongolian Coal Corporation Limited	Hong Kong	1 share	100%	-	Investment holding
Mongolian Coal Corporation S.à.r.l	Luxembourg	1,712,669 shares of USD10 each	-	100%	Investment holding
Energy Resources Corporation LLC	Mongolia	19,800,000 shares of USD1 each	-	100%	Investment holding
Energy Resources LLC ("**ER**")	Mongolia	117,473,410 shares of USD2 each	-	100%	Mining and trading of coal
Energy Resources Rail LLC	Mongolia	15,300,000 shares of MNT1,000 each	-	100%	Railway project management
Tavan Tolgoi Airport LLC	Mongolia	5,795,521 shares of MNT1,000 each	-	100%	Airport operation and management
Ukhaa Khudag Water Supply LLC	Mongolia	96,016,551 shares of MNT1,000 each	-	100%	Water exploration and supply management
United Power LLC	Mongolia	100,807,646 shares of MNT1,000 each	-	100%	Power supply project management
Tavan Tolgoi Power Plant Water Supply LLC	Mongolia	6,554,000 shares of MNT 1,000 each	-	100%	Power supply and water exploration project
Khangad Exploration LLC	Mongolia	34,532,399 shares of USD1 each	-	100%	Exploration and development of coal mine
Baruun Naran S.à.r.l	Luxembourg	24,918,394 shares of EUR1 each	-	100%	Investment holding
Tianjin Zhengcheng Import and Export Trade Co., Ltd. ("**TZJV**") (i)	China	RMB2,035,998	-	51%	Trading of coals and machinery equipment
Inner Mongolia Fangcheng Trade Co., Ltd.(ii)	China	RMB1,000,000	-	51%	Trading of coals and machinery equipment

Notes:

(i) Registered as Sino-Foreign Cooperative Equity Joint Ventures under PRC law.

(ii) Registered as Private Enterprise under PRC law.

18 Interests in associates

The following table presents the particulars of the associates, which are unlisted corporate entities whose quoted market prices are not available:

				Equity attributable to the Company		
Name of associate	*Form of business structure*	*Place of incorporation and business*	*Particulars of issued and paid up capital*	*Group's effective interest*	*Held by a subsidiary*	*Principal activity*
Gashuun Sukhait Road LLC	Incorporated	Mongolia	100,000 shares of MNT1,000 each	40.00%	40.00%	Paved road maintenance service (Note (i))
Guoneng Inner Mongolia Ganqimaodu International Energy Co., Ltd.	Incorporated	People's Republic of China	RMB455,000,000	10.00%	10.00%	Operate warehouse for coal storage (Note (ii))

Notes:

(i) The principal activities of Gashuun Sukhait Road LLC are supplying safety, readiness, protection, repair and maintenance service for paved road operations from UHG to Gashuun Sukhait ("**GS**"). The investment in Gashuun Sukhait Road LLC enables the Group to monitor the usage situation of the aforementioned paved road.

(ii) The principal activities of Guoneng Inner Mongolia Ganqimaodu International Energy Co., Ltd. ("**Guoneng Ganqimaodu**") are provision of customs-supervised warehousing services, road cargo transportation, general cargo warehousing services, domestic freight forwarding and loading service.

On 9 April 2021, ER, a wholly-owned subsidiary of the Company, entered into an investment agreement ("**Investment agreement**") with CHN Energy Coal Coking Co., Ltd. ("**CECC**"), an independent third party and one of the Group's largest customer. Pursuant to the Investment Agreement, ER and CECC agreed to establish Guoneng Ganqimaodu for coal storage and handling customs bonded stockyard located at the Ganqimaodu port in the PRC. ER and CECC hold 10% and 90%, respectively, of the total equity interests in Guoneng Ganqimaodu. The registered capital of Guoneng Ganqimaodu is RMB500,000,000 which is contributed by ER and CECC respectively, in proportion to their equity interests in Guoneng Ganqumaodu. On 30 December 2021, ER paid up RMB5,000,000 (equivalent to approximately USD785,000) of Guoneng Ganqimaodu's registered capital, and will pay the remaining of Guoneng Ganqimaodu's proportionate registered capital in 2022. Pursuant to ER's rights stated on the articles of association of Guoneng Ganqimaodu, the directors of the Company considered that the Group has significant influence on Guoneng Ganqimaodu through its participation in the board of directors of Guoneng Ganqimaodu.

All of above associates are accounted for using the equity method in the consolidated financial statements.

18 Interests in associates (continued)

Summarised financial information of the associate, adjusted for any differences in accounting policies, and reconciled to the carrying amounts in the consolidated financial statements, are disclosed below:

	Gashuun Sukhait Road LLC	
	2021 USD'000	*2020* USD'000
Gross amounts of the associate:		
Current assets	1,547	1,665
Non-current assets	859	870
Current liabilities	1,997	1,636
Equity	409	899
Revenue	1,898	3,138
Loss from continuing operations	(490)	(192)
Total comprehensive income	(490)	(192)
Reconciled to the Group's interests in associate:		
Gross amounts of net assets of the associate	409	899
Group's effective interest	40%	40%
Group's share of net assets of the associate	164	360
Carrying amount in the consolidated financial statements	164	360

19 Other non-current assets

	2021 USD'000	*2020* USD'000
Prepayments in connection with construction work, equipment purchases and others (Note 21(c)(ii))	55,020	51,755
Other financial asset (Note)	614	614
	55,634	52,369

Note: The Group has an investment of 2.25% equity interest in International Medical Centre LLC.

20 Inventories

(a) Inventories in the consolidated statement of financial position comprise:

	2021 USD'000	*2020* USD'000
Coal	155,217	103,831
Materials and supplies	14,883	12,874
	170,100	116,705
Less: Provision on coal inventories	(10,437)	(10,437)
	159,663	106,268

(b) The analysis of the amount of inventories recognised as an expense and included in profit or loss is as follows:

	2021 USD'000	*2020* USD'000
Carrying amount of inventories sold	141,469	281,215

21 Trade and other receivables

	2021 USD'000	*2020* USD'000
Trade receivables (Note (a))	14,038	11,093
Other receivables (Note (c))	85,482	83,262
	99,520	94,355
Less: allowance for credit losses (Note (b))	-	-
	99,520	94,355

21 Trade and other receivables (continued)

(a) Ageing analysis

As of the end of the reporting period, the ageing analysis of trade debtors and bills receivable (which are included in trade and other receivables), based on the invoice date and net of loss allowance, is as follows:

	2021 USD'000	*2020* USD'000
Within 90 days	14,020	7,378
90 to 180 days	-	3,715
180 to 270 days	18	-
	14,038	11,093

(b) Loss allowance for trade receivables

Credit losses in respect of trade receivables are recorded using an allowance account unless the Group is satisfied that recovery of the amount is remote, in which case the credit losses are written off against trade receivables directly (Note 2(k)(i)).

As at 31 December 2021, the Group evaluated the loss allowance for ECL and no loss allowance of trade receivables (2020: nil) was made based on the assessment. Further details on the Group's credit policy and credit risk arising from trade debtors are set out in Note 30(b).

(c) Other receivables

	2021 USD'000	*2020* USD'000
Amounts due from related parties (Note (i))	1	381
Prepayments and deposits (Note (ii))	49,220	51,095
Value added tax ("**VAT**") and other tax receivables (Note (iii))	24,236	31,408
Others	12,025	378
	85,482	83,262

Notes:

(i) Amounts due from related parties are unsecured, interest-free and have no fixed repayment terms (see Note 32(a)).

(ii) At 31 December 2021 and 2020, prepayments and deposits mainly represent the prepayments made to the Group's mining contractor.

21 Trade and other receivables (continued)

(iii) VAT and other tax receivables include amounts that have been accumulated to date in certain subsidiaries and were due from Mongolian Taxation Authority ("**MTA**"). According to the prevailing tax rules and regulations in Mongolia, a taxpayer may offset future taxes and royalties' payable to MTA against VAT receivable from MTA. The Group verifies the collectability of such funds with MTA on a regular basis, and based on currently available information, the Group anticipates full recoverability.

All other receivables were aged within one year and expected to be recovered or expensed off within one year.

22 Cash and cash equivalents and other cash flow information

(a) Cash and cash equivalents comprise:

	2021 USD'000	*2020* USD'000
Cash on hand	2	2
Cash at bank	25,935	38,902
Cash and cash equivalents in the consolidated cash flow statement	25,937	38,904

22 Cash and cash equivalents and other cash flow information (continued)

(b) Reconciliation of liabilities arising from financing activities

The table below details changes in the Group's liabilities from financing activities, including both cash and non-cash changes. Liabilities arising from financing activities are liabilities for which cash flows were, or future cash flows will be, classified in the Group's consolidated cash flow statement as cash flows from financing activities.

	Senior Notes due 2022 (Note) USD'000 (Note 23)	*Senior Notes due 2024* (Note) USD'000 (Note 23)	*Total* USD'000
At 1 January 2021	17,067	441,328	458,395
Changes from financing cash flows:			
Interest paid	(818)	(40,700)	(41,518)
Total changes from financing cash flows	(818)	(40,700)	(41,518)
Changes in fair value	608	-	608
Other changes:			
Interest expenses (Note 6(a))	1,408	44,762	46,170
Others	(82)	(2,082)	(2,164)
Total other changes	1,326	42,680	44,006
At 31 December 2021	18,183	443,308	461,491

Note: Liabilities include accrued interest as disclosed in Note 24.

22 Cash and cash equivalents and other cash flow information (continued)

	Senior Notes due 2022 (Note) USD'000 (Note 23)	*Senior Notes due 2024* (Note) USD'000 (Note 23)	*Total* USD'000
At 1 January 2020	17,306	439,545	456,851
Changes from financing cash flows:			
Interest paid	(804)	(40,700)	(41,504)
Total changes from financing cash flows	(804)	(40,700)	(41,504)
Changes in fair value	(548)	-	(548)
Other changes:			
Interest expenses (Note 6(a))	1,179	44,566	45,745
Others	(66)	(2,083)	(2,149)
Total other changes	1,113	42,483	43,596
At 31 December 2020	17,067	441,328	458,395

Note: Liabilities include accrued interest as disclosed in Note 24.

23 Senior notes

	2021 USD'000	*2020* USD'000
Senior Notes due 2022 (Note (i))	17,885	16,882
Senior Notes due 2024 (Note (ii))	434,716	432,736
	452,601	449,618

Notes:

(i) The outstanding principal amount of the Senior Notes due 2022 was USD14,912,012 as at 31 December 2021 (31 December 2020: USD14,764,368). The Senior Notes due 2022 bear interest, ranging from 5% to 8% per annum based on the benchmark coal price index, payable semi-annually, and due on 30 September 2022 ("**Senior Notes due 2022**"). Interest rate of 5% per annum comprises of cash interest rate and paid-in-kind ("**PIK**") interest rate components. During the year ended 31 December 2021, PIK notes of USD147,644 (2020: USD146,182) were issued as PIK interest and added onto the outstanding principal amount of the Senior Notes due 2022.

The Senior Notes due 2022 have been accounted for as a hybrid financial instrument containing derivative components and a liability component. The fair value of the derivative component of interest rate linked to the benchmark coal price index, the derivative component of cash sweep premium and the derivative component of early redemption option as at 31 December 2021 was USD712,000, USD2,456,000 and nil, respectively (31 December 2020: USD114,000, USD2,446,000 and nil, respectively). The liability component was initially recognised at its fair value and is accounted on amortised cost subsequently. As at 31 December 2021, the carrying amount of the liability component was USD14,717,000 (31 December 2020: USD14,322,000).

Fair value of the derivative components of the Senior Notes due 2022 was estimated by the Directors based on the discounted cash flow method.

(ii) On 15 April 2019, the Group issued the Senior Notes due 2024 with a principal amount of USD440,000,000 ("**Senior Notes due 2024**") which were listed on the Singapore Exchange Securities Trading Limited. The Senior Notes due 2024 bear interest at 9.25% per annum fixed rate, payable semi-annually, and due on 15 April 2024.

The Senior Notes due 2024 have been accounted for as a hybrid financial instrument containing a derivative component and a liability component. The derivative component of early redemption option was initially recognised at its fair value of nil. The fair value of the derivative component of early redemption option as at 31 December 2021 was nil (31 December 2020: nil). The liability component was initially recognised at fair value of USD429,795,446, after taking into account attributable transaction costs of USD10,204,554 and is accounted on amortised cost subsequently. As at 31 December 2021, the carrying amount of the liability component was USD434,716,000 (31 December 2020: USD432,736,000).

Fair value of the derivative component was estimated by the Directors based on the Binomial model.

24 Trade and other payables

	2021 USD'000	*2020* USD'000
Trade payables (Note (i))	141,395	95,607
Amounts due to related parties (Note (ii))	3,870	5,019
Payables for purchase of equipment	4,504	4,301
Interest payable (Note (iii))	8,890	8,777
Other taxes payables	13,276	20,734
Others (Note (iv))	3,663	8,543
	175,598	142,981

Notes:

(i) As of the end of the reporting period, the ageing analysis of trade creditors based on the invoice date is as follows:

	2021 USD'000	*2020* USD'000
Within 90 days	48,505	47,828
90 to 180 days	5,812	8,222
180 to 365 days	31,323	9,159
Over 365 days	55,755	30,398
	141,395	95,607

(ii) Amounts due to related parties represent contractual service fee payable and payables for equipment and construction work, which are unsecured, interest-free and have no fixed terms of repayments (see Note 32(a)).

(iii) As at 31 December 2021, interest payables related to Senior Notes due 2022 and Senior Notes due 2024 are amounting to USD298,000 and USD8,592,000, respectively. (31 December 2020: USD185,000 and USD8,592,000, respectively).

(iv) Others represent accrued expenses, payables for staff related costs and other deposits.

All of the other payables are expected to be settled or recognised in profit or loss within one year or are repayable on demand.

25 Income tax in the consolidated statement of financial position

(a) Tax payable in the consolidated statement of financial position represents:

	2021 USD'000	*2020* USD'000
At 1 January	3,323	25,311
Provision for the year (Note 7(a))	132	17,004
Offsetting with other tax receivables	(2,436)	(19,972)
Income tax paid	(973)	(18,055)
Exchange adjustments	19	(965)
At 31 December	65	3,323

(b) Deferred tax assets and liabilities recognised

The components of deferred tax assets/(liabilities) recognised in the consolidated statement of financial position and the movements during the year are as follows:

Deferred tax arising from:	*Revaluation of other properties* USD'000	*Tax losses* USD'000	*Unrealised profits on intra-group transactions* USD'000	*Depreciation and amortisation* USD'000	*Unrealised foreign exchange differences on long-term borrowings* USD'000	*Fair value adjustments in relation to the acquisition* USD'000	*Fair value of financial instrument* USD'000	*Total* USD'000
At 1 January 2020	(66,069)	1,501	(1,029)	3,682	6,452	(99,616)	283	(154,796)
Credited/(charged) to profit or loss (Note 7(a))	3,961	13	(338)	(1,899)	4,541	396	(266)	6,408
Credited/(charged) to reserves	(2,434)	(61)	1,135	339	(321)	(2)	(9)	(1,353)
At 31 December 2020	(64,542)	1,453	(232)	2,122	10,672	(99,222)	8	(149,741)
At 1 January 2021	(64,542)	1,453	(232)	2,122	10,672	(99,222)	8	(149,741)
Credited/(charged) to profit or loss (Note 7(a))	4,423	5,650	(820)	(4,328)	-	71	149	5,145
Credited/(charged) to reserves	(15,225)	1	8	(224)	3	1	1	(15,435)
At 31 December 2021	(75,344)	7,104	(1,044)	(2,430)	10,675	(99,150)	158	(160,031)

25 Income tax in the consolidated statement of financial position (continued)

	2021 USD'000	*2020* USD'000
Net deferred tax assets recognised in the consolidated statement of financial position	21,767	17,244
Net deferred tax liabilities recognised in the consolidated statement of financial position	(181,798)	(166,985)
	(160,031)	(149,741)

(c) Deferred tax assets not recognised

In accordance with the accounting policy set out in Note 2(s), the Group has not recognised deferred tax assets in respect of cumulative tax losses of USD406,646,000 as at 31 December 2021 (2020: USD402,396,000) as it is not probable that future taxable profits against which the losses can be utilised will be available in the relevant tax jurisdiction and entity. According to the amendment to Mongolian Corporate Income Tax Law which is effective on 1 January 2010, for entities engaged in mining or infrastructure construction, the tax losses generated after 1 January 2010 will expire in four to eight years after the tax losses generated under current tax legislation. Tax losses of other entities will expire in two years after the tax losses generated.

Expiry of unrecognised tax losses of Group entities located in Mongolia:

	2021 USD'000	*2020* USD'000
Year of expiry		
2021	-	13
2022	131	131
2023	96	-
2024	-	-
2025	1,021	-
	1,248	144

In relation to group entities located in the jurisdictions other than Mongolia, the tax losses amounting to USD405,398,000 as at 31 December 2021 do not expire under current tax legislations (31 December 2020: USD402,252,000).

26 Other non-current liabilities

	2021 USD'000	*2020* USD'000
Long-term payables to mining contractor	-	38,695
Long-term employee benefit expense	-	334
	-	39,029

27 Equity-settled share-based payment transactions

The Company had a share option scheme ("**Share Option Scheme**") which was adopted on 17 September 2010, that became effective on the Listing Date on 13 October 2010 ("**Adoption Date**"), whereby the board of Directors of the Company is authorised, at their discretion, invites eligible participants to receive options to subscribe for shares ("**Options**") subject to the terms and conditions stipulated therein as incentives or rewards for their contributions to the Group. The Share Option Scheme expired 12 October 2020; however, the provisions of the Share Option Scheme remain in force to the extent necessary to give effect to any Options granted or exercised thereto or otherwise as may be required.

On 16 June 2021, the Company adopted a new share option scheme ("**New Share Option Scheme**"), in which the board of Directors of the Company is authorised, at its discretion, to grant to eligible participants options to subscribe for shares subject to the terms and conditions stipulated therein as incentives or rewards for their contributions to the Company. There is no Share Options granted under the New Share Option Scheme during the year ended 31 December 2021.

(a) The terms and conditions of the grants as at 31 December 2021 are as follows:

Grant Date	*Number of options (Note (b)(ii))* '000	*Vesting conditions*	*Contractual life of options*
8 May 2017	2,800	1 July 2017	1 July 2017 to 8 May 2022
8 May 2017	2,800	8 May 2017 to 8 May 2018	8 May 2017 to 8 May 2022
8 May 2017	2,800	8 May 2017 to 8 May 2019	8 May 2017 to 8 May 2022
8 May 2017	2,800	8 May 2017 to 8 May 2020	8 May 2017 to 8 May 2022
8 May 2017	2,800	8 May 2017 to 8 May 2021	8 May 2017 to 8 May 2022

27 Equity-settled share-based payment transactions (continued)

(b) The movement of the number and weighted average exercise prices of share options are as follows:

	2021		*2020*	
	Weighted average exercise price HKD	*Number of options* '000	*Weighted average exercise price* HKD	*Number of options* '000
Outstanding at 1 January	2.39	13,680	5.80	31,589
Forfeited during the year	2.39	(380)	7.12	(60)
Expired during the year	-	-	8.43	(17,849)
Exercised during the year (Note (ii))	2.39	(2,400)	-	-
Outstanding at 31 December	2.39	10,900	2.39	13,680
Exercisable at 31 December	2.39	10,900	2.39	11,020

Notes:

(i) Following the share consolidation on 26 August 2019, the numbers of outstanding share options have been adjusted from 353,477,207 shares to 35,347,720 shares, the exercise price of the outstanding share options also have been adjusted as follows:

Date of grant	*Exercise price before share consolidation* (HKD)	*Exercise price after share consolidation* (HKD)
8 May 2017	0.2392	2.392

(ii) 2,400,000 options were exercised during the year ended 31 December 2021 (year ended 31 December 2020: nil). The options outstanding at 31 December 2021 had an exercise price of HKD2.392 (2020: HKD2.392) per share and a weighted average remaining contractual life of 0.35 years (2020: 1.35 years).

27 Equity-settled share-based payment transactions (continued)

(c) Fair value of share options and assumptions

The fair value of services received in return for share options granted is measured by reference to the fair value of share options granted. The estimate of the fair value of the share options granted is measured based on the Black-Scholes option pricing model. The variables of the models included expected life of the options, risk-free interest rate, expected volatility and expected dividend of the shares of the Company.

Fair value of share options and assumptions:

	8 May 2017
Fair value at measurement date	HKD0.160 ~ HKD0.1150
Share price	HKD0.2392
Exercise price	HKD0.2392
Expected life	5 years
Risk-free interest rate	1.132%
Expected volatility	62%
Expected dividends	-

The expected volatility is based on the historic volatility of entities in the same industry (calculated based on the weighted average remaining life of the share options), adjusted for any expected changes to future volatility based on publicly available information. Expected dividends are based on management's estimates. The risk-free interest rate is based on the yield of Hong Kong Exchange Fund Notes corresponding to the expected life of the options as at the grant date. Changes in the subjective input assumptions could materially affect the fair value estimate.

Share options were granted under a service condition. The condition has not been taken into account in the grant date fair value measurement of the services received. There was no market condition associated with the share option grants.

28 Provisions

	2021 USD'000	*2020* USD'000
Accrued reclamation obligations	30,928	19,458
Others	1,500	1,500
	32,428	20,958
Less: Current portion	(1,500)	(1,500)
	30,928	19,458

28 Provisions (continued)

The accrual for reclamation costs has been determined based on management's best estimates. The estimate of the associated costs may be subject to change in the near term when the reclamation on the land from current mining activities becomes apparent in future periods. At the end of each reporting period, the Group reassesses the estimated costs and adjusts the accrued reclamation obligations, where necessary. The Group's management believes that the accrued reclamation obligations at 31 December 2021 are adequate and appropriate. The accrual is based on estimates and therefore, the ultimate liability may exceed or be less than such estimates. The movement of the accrued reclamation cost is as follows:

	2021 USD'000	*2020* USD'000
At 1 January	19,458	15,407
Increase for reassessment of estimated costs	10,978	3,611
Accretion expense (Note 6(a))	492	440
At 31 December	30,928	19,458

Accrued reclamation costs change during the years ended 31 December 2021 and 2020 resulted from the reassessment of estimated costs.

29 Capital, reserves and dividends

(a) Movements in components of equity

The reconciliation between the opening and closing balances of each component of the Group's consolidated equity is set out in the consolidated statement of changes in equity. Details of the changes in the Company's individual components of equity between the beginning and the end of the year are set out below:

	Note	*Share capital* USD'000 (Note 29(c))	*Share premium* USD'000 (Note 29(d)(i))	*Other reserve* USD'000 (Note 29(d)(ii))	*Accumulated losses* USD'000	*Perpetual notes* USD'000 (Note 29(e))	*Total equity* USD'000
At 1 January 2020		102,918	768,520	22,759	(129,777)	66,569	830,989
Changes in equity for 2020:							
Total comprehensive income		-	-	-	(2,352)	-	(2,352)
Equity-settled share-based transactions	27	-	-	136	-	-	136
At 31 December 2020		102,918	768,520	22,895	(132,129)	66,569	828,773
At 1 January 2021		102,918	768,520	22,895	(132,129)	66,569	828,773
Changes in equity for 2021:							
Total comprehensive income		-	-	-	(2,681)	-	(2,681)
Equity-settled share-based transactions	27	240	806	(273)	-	-	773
At 31 December 2021		103,158	769,326	22,622	(134,810)	66,569	826,865

29 Capital, reserves and dividends (continued)

(b) Dividends

The board of Directors of the Company does not recommend the payment of a final dividend in respect of the year ended 31 December 2021 (dividend in respect of the year ended 31 December 2020: nil).

(c) Share capital

	2021		*2020*	
	Number of shares'000	USD'000	*Number of shares'000*	USD'000
Ordinary shares, authorised				
At 1 January and 31 December	1,500,000	150,000	1,500,000	150,000

	2021		*2020*	
	Number of shares'000	USD'000	*Number of shares'000*	USD'000
Ordinary shares, issued and fully paid				
At 1 January	1,029,177	102,918	1,029,177	102,918
Impact of share option exercise	2,400	240	-	-
At 31 December	1,031,577	103,158	1,029,177	102,918

2,400,000 share options were exercised during the year ended 31 December 2021 (2020: nil).

29 Capital, reserves and dividends (continued)

(d) Nature and purpose of reserves

(i) Share premium

Under the Companies Law of the Cayman Islands, the share premium account of the Company may be applied for payment of distributions or dividends to shareholders provided that immediately following the date on which the distribution or dividend is proposed to be paid the Company is able to pay its debts as they fall due in the ordinary courses of business.

(ii) Other reserve

The other reserve comprises the following:

- the aggregate amount of share capital and other reserves of the companies now comprising the Group after elimination of the investments in subsidiaries; and

- the portion of the grant date fair value of unexercised share options granted to Directors and employees of the Company that has been recognised in accordance with the accounting policy adopted for share-based payments in Note 2(r)(ii).

(iii) Exchange reserve

The exchange reserve comprises all foreign exchange adjustments arising from the translation of the MNT denominated financial statements of the Group's entities to the Group's presentation currency. The reserve is dealt with in accordance with the accounting policy set out in Note 2(w).

(iv) Property revaluation reserve

The property revaluation reserve has been set up and is dealt with in accordance with the accounting policies adopted for land and buildings held for own use in Note 2(h).

(e) Perpetual notes

The Company issued perpetual notes which were listed on the Singapore Exchange Securities Trading Limited on 4 May 2017, with a principal amount of USD195,000,000 and with a fair value of USD75,897,000. On 15 April 2019, the Company redeemed principal amount of USD23,972,000 with a fair value of USD9,328,000 through debt refinancing. After the debt refinancing, the outstanding principal amount of perpetual notes was USD171,028,000 with a fair value of USD66,569,000. There was no change during the years ended 31 December 2021 and 2020.

The perpetual notes have no fixed maturity and are redeemable at the Company's option. The distribution payments can be deferred at the discretion of the Company. So long as the perpetual notes are outstanding, the Company shall not declare or pay any dividend or make any distribution on or with respect to its capital shares; or redeem, reduce, cancel, buy-back or acquire for any consideration any of its capital shares.

29 Capital, reserves and dividends (continued)

Fair value of the perpetual notes was valued by the management with reference to a valuation report issued by an independent valuer based on the discounted cash flow method.

(f) Capital management

The Group's primary objectives when managing capital are to safeguard the Group's ability to continue as a going concern, so that it can continue to provide returns for shareholders and benefits for other stakeholders. The Group defines the capital as total shareholders' equity plus loans and borrowings.

The Group actively and regularly reviews and manages its capital structure to maintain a balance between the higher shareholder returns that might be possible with higher levels of borrowings and the advantages and security afforded by a sound capital position.

The gearing ratio (calculated as total bank and other borrowings divided by total assets) of the Group as at 31 December 2021 was 24.1% (2020: 25.9%).

30 Financial risk management and fair value of financial instruments

(a) Financial risk management objectives and policies

Management has adopted certain policies on financial risk management with the objective of:

(i) ensuring that appropriate funding strategies are adopted to meet the Group's short-term and long-term funding requirements taking into consideration the cost of funding, gearing levels and cash flow projections of each project and that of the Group; and

(ii) ensuring that appropriate strategies are also adopted to manage related interest and currency risk funding.

(b) Credit risk

The Group's credit risk is primarily attributable to cash at bank, trade and other receivables. Management monitors the exposures to these credit risks on an ongoing basis.

Substantially all of the Group's cash at bank are deposited in the reputable banks which management assessed the credit risk to be insignificant.

30 Financial risk management and fair value of financial instruments (continued)

Trade receivables are presented net of loss allowance. In order to minimise the credit risk, the credit committee, comprising the senior management team of the Group, has established a policy for determining credit limits, credit approvals and other monitoring procedures to ensure that follow-up action is taken to recover overdue debts. The credit committee also evaluates and reviews the credit quality and the recoverable amount of each individual trade debt on an ongoing basis. These evaluations and reviews focus on the customer's past history of making payments when due and current ability to pay, and take into account information specific to the customer as well as pertaining to the economic environment in which the customer operates. The Group establishes a loss allowance for trade receivables that represents its estimate of losses in respect of trade receivables. The components of this allowance are a specific loss component that relates to individually significant exposures, and a collective loss component established for groups of similar assets. At the end of the reporting period, the Group believes that no loss allowance for trade receivables is required in the consolidated financial statements. The Group does not hold any collateral as security for these receivables. The Group has a certain concentration credit risk as two customers accounted for 99% (2020: three customers accounted for 100%) of the total trade receivables as at 31 December 2021.

The Group measures loss allowances for trade receivables at an amount equal to lifetime ECLs, which is calculated using a provision matrix. As the Group's historical credit loss experience does not indicate significantly different loss patterns for different customer segments, the loss allowance based on past due status is not further distinguished between the Group's different customer bases.

The following table provides information about the Group's exposure to credit risk and ECLs for trade receivables and contract assets as at 31 December 2021:

	2021		
	Expected loss rate %	*Gross carrying amount* USD'000	*Loss allowance* USD'000
Current	0.0%	14,020	-
90 - 180 days	0.0%	-	-
180 - 270 days	0.0%	18	-
		14,038	-

	2020		
	Expected loss rate %	*Gross carrying amount* USD'000	*Loss allowance* USD'000
Current	0.0%	7,378	-
90 - 180 days	0.0%	3,715	-
		11,093	-

30 Financial risk management and fair value of financial instruments (continued)

Expected loss rates are based on actual loss experience over the past 2 years. These rates are adjusted to reflect differences between economic conditions during the period over which the historic data has been collected, current conditions and the Group's view of economic conditions over the expected lives of the receivables.

The credit risk on other receivables and related companies is limited because the counterparties have no historical default record and the Directors expect that the general economic conditions will not significantly change for the 12 months after the reporting date.

Further quantitative disclosures in respect of the Group's exposure to credit risk arising from trade and other receivables are set out in Note 21.

(c) Currency risk

The Group is exposed to currency risk primarily through sales, purchases and borrowings which give rise to receivables, payables, borrowings and cash balances that are denominated in a foreign currency, i.e. a currency other than the functional currency of the operations to which the transactions relate. The functional currency of the Group's overseas holding entities and main operating subsidiaries located in Mongolia is USD and the functional currency of remaining subsidiaries located in Mongolia is MNT. The currencies giving rise to this risk are primarily MNT and RMB.

(i) Exposure to currency risk

The following table details the Group's exposure at the end of the reporting period to currency risk arising from recognised assets or liabilities denominated in a currency other than the functional currency of the entity to which they relate. For presentation purpose, the amounts of the exposure are shown in USD, translated using the spot rate at the year-end date.

	Exposure to foreign currencies (expressed in United States Dollars)								
	2021					*2020*			
	Mongolian Togrog USD'000	*Euros* USD'000	*Renminbi* USD'000	*Hong Kong Dollar* USD'000	*United States Dollars* USD'000	*Mongolian Togrog* USD'000	*Euros* USD'000	*Renminbi* USD'000	*United States Dollars* USD'000
Trade and other receivables	11,955	-	3,390	-	-	31,924	-	45,399	12
Cash and cash equivalents	496	2	21,807	486	3	398	2	29,088	2
Trade and other payables	(21,242)	(18)	(13,828)	(179)	(272)	(54,885)	(259)	(6,694)	(272)
Contract liabilities	(28,706)	-	(81,584)	-	-	(825)	-	(20,371)	-
Net exposure arising from recognised assets and liabilities	(37,497)	(16)	(70,215)	307	(269)	(23,388)	(257)	47,422	(258)

30 Financial risk management and fair value of financial instruments (continued)

(ii) Sensitivity analysis

An 5% strengthening/weakening of other currency against functional currencies defined in Note 2(w) as at the respective end of the reporting periods would (increase)/decrease loss after taxation (2020: (decrease)/increase profit after taxation) by the amount shown below. This analysis assumes that all other risk variables remained constant.

Loss/profit for the year	*2021* USD'000	*2020* USD'000
5% increase in MNT	(1,406)	(921)
5% decrease in MNT	1,406	921
5% increase in RMB	(2,632)	1,747
5% decrease in RMB	2,632	(1,747)
5% increase in EUR	(1)	(1)
5% decrease in EUR	1	1
5% increase in USD	(12)	(12)
5% decrease in USD	12	12
5% increase in HKD	15	-
5% decrease in HKD	(15)	-

(d) Interest rate risk

The Group's interest rate risk arises primarily from senior notes. Borrowings issued at variable rates expose the Group to cash flow interest rate risk and fair value interest rate risk.

The following table details the profile of the Group's net borrowings (interest-bearing financial liabilities less interest-bearing financial assets) at the end of the reporting period. The detailed interest rates and maturity information of the Group's and the Company's borrowings are disclosed in Note 23.

	2021 USD'000	*2020* USD'000
Net fixed rate borrowings:		
Senior Notes due 2024	434,716	432,736
	434,716	432,736
Net floating rate borrowings:		
Senior Notes due 2022	17,885	16,882
Less: Bank deposits	(25,935)	(38,902)
	(8,050)	(22,020)
Total net borrowings:	426,666	410,716

At 31 December 2021, it is estimated that a general increase/decrease of 100 basis points in interest rates, with all other variables held constant, would have increased/decreased the Group's loss after taxation and decreased/increased retained profits by approximately USD3,205,000 (31 December 2020: decreased/increased profit after taxation and retained profits by approximately USD3,075,000).

30 Financial risk management and fair value of financial instruments (continued)

The sensitivity analysis above indicates the instantaneous change in the Group's loss after taxation that would arise assuming that the change in interest rates had occurred at the end of the reporting period and had been applied to re-measure those financial instruments held by the Group which expose the Group to fair value interest rate risk at the end of the reporting period. In respect of the expose to cash flow interest rate risk arising from floating rate non-derivative instruments held by the Group at the end of the reporting period, the impact on the Group's loss after taxation and retained profits and other components of consolidated equity is estimated as an annualised impact on interest expense or income of such a change in interest rates.

(e) Liquidity risk

Liquidity risk is the risk that the Group will not be able to settle or manage its obligations associated with financial liabilities. In 2021 and thereafter, the liquidity of the Group is primarily dependent on its ability to maintain adequate cash inflow from operations to meet its debt obligations as they fall due. The Directors have carried out a detailed review of the cash flow forecast of the Group for the twelve months ending 31 December 2022. Based on such forecast, the Directors have determined that adequate liquidity exists to finance the working capital and capital expenditure requirements of the Group during that period. In preparing the cash flow forecast, the Directors have considered historical cash requirements of the Group as well as other key factors. The Directors are of the opinion that the assumptions and sensitivities which are included in the cash flow forecast are reasonable. However, as with all assumptions in regard to future events, these are subject to inherent limitations and uncertainties and some or all of these assumptions may not be realised.

The Group's objective is to maintain a suitable level of liquidity to finance the daily operation, capital expenditure and repayment of borrowings. The Group's policy is to regularly monitor current and expected liquidity requirements to ensure that it maintains sufficient reserves of cash and adequate committed lines of funding from major financial institutions to meet its liquidity requirements in the short and longer term. Note 2(b) explains management's plans for managing the liquidity needs of the Group to enable it to continue to meet its obligations as they fall due.

The following table details the remaining contractual maturities at the end of the reporting period of the Group's financial liabilities, which are based on contractual undiscounted cash flows (including interest payments computed using contractual rates or, if floating, based on rates current at the end of the reporting period) and the earliest date the Group can be required to pay:

	2021					
	Contractual undiscounted cash outflow					
	Within 1 year USD'000	*After 1 year but within 2 years* USD'000	*After 2 years but within 5 years* USD'000	*After 5 years* USD'000	*Total contractual undiscounted cash flow* USD'000	*Carrying amount at 31 Dec* USD'000
Senior Notes due 2022 (Note 23)	15,807	-	-	-	15,807	17,885
Senior Notes due 2024 (Note 23)	32,108	40,700	460,350	-	533,158	434,716
Trade and other payables (Note 24)	175,598	-	-	-	175,598	175,598
Lease liabilities	72	-	-	-	72	72
	223,585	40,700	460,350	-	724,635	628,271

30 Financial risk management and fair value of financial instruments (continued)

	2020					
	Contractual undiscounted cash outflow					
	Within 1 year USD'000	*After 1 year but within 2 years* USD'000	*After 2 years but within 5 years* USD'000	*After 5 years* USD'000	*Total contractual undiscounted cash flow* USD'000	*Carrying amount at 31 Dec* USD'000
Senior Notes due 2022 (Note 23)	554	15,503	-	-	16,057	16,882
Senior Notes due 2024 (Note 23)	32,108	40,700	501,050	-	573,858	432,736
Trade and other payables (Note 24)	142,981	-	-	-	142,981	142,981
Contract liabilities	25,911	-	-	-	25,911	25,911
Lease liabilities	71	-	-	-	71	71
Long-term payables to mining contractor (Note 26)	-	38,695	-	-	38,695	38,695
	201,625	94,898	501,050	-	797,573	657,276

(f) Fair value measurement

(i) Fair value hierarchy

The following table presents the fair value of the Group's financial instruments measured at the end of the reporting period on a recurring basis, categorised into the three-level fair value hierarchy as defined in IFRS 13, *Fair value measurement*. The level into which a fair value measurement is classified is determined with reference to the observability and significance of the inputs used in the valuation technique as follows:

- Level 1 valuations: Fair value measured using only Level 1 inputs i.e. unadjusted quoted prices in active markets for identical assets or liabilities at the measurement date

- Level 2 valuations: Fair value measured using Level 2 inputs i.e. observable inputs which fail to meet Level 1, and not using significant unobservable inputs. Unobservable inputs are inputs for which market data are not available

- Level 3 valuations: Fair value measured using significant unobservable inputs

The Group has a team headed by the finance manager performing valuations for the financial instruments, including the redemption option embedded in the Senior Notes due 2024 and derivative components of the Senior Notes due 2022. The team reports directly to the chief financial officer. A valuation report with analysis of changes in fair value measurement is prepared by the team with assistance of a third party at each interim and annual reporting date, and is reviewed and approved by the chief financial officer. Discussion of the valuation process and results with the chief financial officer is held twice a year, to coincide with the reporting dates.

	Fair value at 31 December 2021 USD'000	*Fair value measurements as at 31 December 2021 categorised into*		
		Level 1 USD'000	*Level 2* USD'000	*Level 3* USD'000
Recurring fair value measurement				
Financial asset				
- Redemption option embedded in Senior Notes due 2024	-	Not applicable	Not applicable	-
Financial liabilities				
- Derivative components of Senior Notes due 2022	3,168	Not applicable	Not applicable	3,168

30 Financial risk management and fair value of financial instruments (continued)

	Fair value at 31 December 2020 USD'000	*Fair value measurements as at 31 December 2020 categorised into*		
		Level 1 USD'000	*Level 2* USD'000	*Level 3* USD'000
Recurring fair value measurement				
Financial asset				
- Redemption option embedded in Senior Notes due 2024	-	Not applicable	Not applicable	-
Financial liabilities				
- Derivative components of Senior Notes due 2022	2,560	Not applicable	Not applicable	2,560

During the year ended 31 December 2021, there were no transfers between Level 1 and Level 2, or transfers into or out of Level 3 (2020: nil). The Group's policy is to recognise transfers between levels of fair value hierarchy as at the end of the reporting period in which they occur.

Information about Level 3 fair value measurements

	Valuation techniques	*Significant unobservable inputs*	*Weighted average*
Derivative components of Senior Notes due 2022	Discounted cash flow method	Bond yield	9.76% (2020: 9.88%)
		Coal price index	USD201 to USD294 (2020: USD113 to USD129)
Redemption option embedded in Senior Notes due 2024	Binomial model	Expected volatility	89.5% (2020: 107.2%)

The fair value of derivative components of the Senior Notes due 2022 is determined using discounted cash flow method and the significant unobservable input used in the fair value measurement is bond yield and coal price index. The fair value measurement is negatively correlated to the bond yield. As at 31 December 2021, it is estimated that with all other variables held constant, an increase/decrease in bond yield by 100bps would have decreased/increased the Group's net finance costs by USD4,000/USD4,000 respectively. The fair value measurement is correlated to the coal price index. As at 31 December 2021, it is estimated that with all other variables held constant, an increase/decrease in coal price index by 1% would have increased/decreased the Group's net finance costs by nil/nil.

The fair value of redemption option embedded in Senior Notes due 2024 is determined using binomial model and the significant unobservable input used in the fair value measurement is expected volatility. The fair value measurement is positively correlated to the expected volatility. As at 31 December 2021, it is estimated that with all other variables held constant, an increase/decrease in the expected volatility by 1% would have decreased/increased the Group's net finance costs by nil.

30 Financial risk management and fair value of financial instruments (continued)

The movement during the period in the balance of Level 3 fair value measurements is as follows:

	2021 USD'000	*2020* USD'000
Derivative components of Senior Notes due 2022:		
At 1 January	2,560	3,108
Changes in fair value recognised in profit or loss during the year	608	(548)
At 31 December	3,168	2,560
Total losses/(gains) for the period included in profit or loss for liabilities held at the end of the reporting year	608	(548)

	2021 USD'000	*2020* USD'000
Derivative component of long-term borrowings:		
At 1 January and 31 December	-	-
Total losses/(gains) for the period included in profit or loss for liabilities held at the end of the reporting year	-	-

The net unrealised gains or losses resulting from the remeasurement of the derivative components of the Senior Notes due 2022 and the redemption option embedded in the Senior Notes due 2024 are recognised in net finance costs in the consolidated statement of profit or loss.

30 Financial risk management and fair value of financial instruments (continued)

(ii) Fair value of financial assets and liabilities carried at other than fair value

The carrying amounts of the Group's financial instruments carried at cost or amortised cost were not materially different from their fair values as at 31 December 2021 and 31 December 2020 except for the following financial instruments, for which their carrying amounts and fair value are disclosed below:

	At 31 December 2021		*At 31 December 2020*	
	Carrying amount USD'000	*Fair value* USD'000	*Carrying amount* USD'000	*Fair value* USD'000
Liability component of Senior Notes due 2022	14,717	14,333	14,322	13,731
Liability component of Senior Notes due 2024	434,716	444,972	432,736	433,039

31 Commitments and contingencies

(a) Capital commitments

Capital commitments outstanding at respective end of the reporting periods not provided for in the financial statements were as follows:

	2021 USD'000	*2020* USD'000
Contracted for	763	1,626

(b) Environmental contingencies

Historically, the Group has not incurred any significant expenditure for environmental remediation. Further, except for the accrued reclamation obligations as disclosed in Note 28 and amounts incurred pursuant to the environment compliance protection and precautionary measures in Mongolia, the Group has not incurred any other significant expenditure for environmental remediation, is currently not involved in any other environmental remediation, and has not accrued any other amounts for environmental remediation relating to its operations. Under existing legislation, the Directors believe that there are no probable liabilities that will have a material adverse effect on the financial position or operating results of the Group. However, environmental laws and regulations continue to evolve. Management of the Group regularly reassesses environmental remediation for its operations. Environmental liabilities are subject to considerable uncertainties which affect the Group's ability to estimate the ultimate cost of remediation efforts. The outcome of environmental liabilities under future environmental legislations cannot be estimated reasonably at present and which could be material.

32 Material related party transactions

(a) Transactions with related parties

Related parties refer to enterprises over which the Group is able to exercise significant influence or control during the year. During the year, the Group entered into transactions with the following related parties.

Name of party	*Relationship*
MCS Mongolia LLC ("**MCS**")	Shareholder of MMC
MCS International LLC	Subsidiary of MCS
MCS Holding LLC	Subsidiary of MCS
MCS Property LLC	Subsidiary of MCS
MCS Investment LLC	Subsidiary of MCS
Uniservice Solution LLC	Subsidiary of MCS
M Armor LLC	Subsidiary of MCS
Shangri-La Ulaanbaatar LLC	Subsidiary of MCS
Shangri-La Ulaanbaatar Hotel LLC	Subsidiary of MCS
Unitel LLC	Subsidiary of MCS
Univision LLC	Subsidiary of MCS
Skynetworks LLC	Subsidiary of MCS
Risun Supply Management Co., Ltd.	Shareholder of TZJV

Particulars of significant transactions between the Group and the above related parties during the year ended 31 December 2021 are as follows:

	2021 USD'000	*2020* USD'000
Ancillary services (Note (i))	13,502	13,781
Lease of property, plant and equipment (Note (ii))	208	248
Purchase of property and goods (Note (iii))	120	-
Sales of property (Note (iv))	-	(257)
Sales of goods (Note (v))	(7,477)	-

Notes:

(i) Ancillary services represent expenditures for support services such as security service and vehicle inspection fees, cleaning and canteen expense, power and heat generation, and distribution and management fees paid to M Armor LLC, Uniservice Solution LLC, MCS International LLC, MCS and its affiliates. The service charges are based on comparable or prevailing market rates, where applicable.

(ii) Lease of property, plant and equipment represents rental charges paid properties leased from Shangri-La Ulaanbaatar LLC and its affiliates. The rental charges are based on comparable or prevailing market rates, where applicable.

(iii) Purchase of property and goods represents purchase of furniture from MCS International LLC and its affiliates. The purchasing charges are based on comparable or prevailing market rates, where applicable.

32 Material related party transactions (continued)

(iv) Sales of property represents sale of furniture to MCS and its affiliates in 2020. There is no sales of property in 2021.

(v) Sales of goods represent the coal sales to Risun Supply Management Co., Ltd. The sales are carried out at comparable or prevailing market rates, where applicable.

The Directors are of the opinion that the above transactions were conducted in the ordinary course of business, on normal commercial terms and in accordance with the agreements governing such transactions.

Amounts due from/(to) related parties

	2021 USD'000	*2020* USD'000
Other receivables (Note 21(c))	1	381
Other accruals and payables (Note 24)	(3,870)	(5,019)

(b) Key management personnel remuneration

Key management personnel are those persons holding positions with authority and responsibility for planning, directing and controlling the activities of the Group, directly or indirectly, including the Directors.

Remuneration for key management personnel, including amounts paid to the Directors as disclosed in Note 9, and certain of the highest paid employees as disclosed in Note 10, is as follows:

	2021 USD'000	*2020* USD'000
Salaries and other emoluments	3,048	3,170
Discretionary bonus	170	408
Retirement scheme contributions	250	112
Equity-settled share-based payment expenses	28	113
	3,496	3,803

(c) Applicability of the Listing Rules relating to connected transactions

Certain related party transactions in respect of (a) above constitute connected transactions or continuing connected transactions as defined in Chapter 14A of the Listing Rules. The disclosures required by Chapter 14A of the Listing Rules are provided in section headed "Connected transactions and continuing connected transactions" of the Directors' Report.

33 Company-level statement of financial position

	Note	2021 USD'000	2020 USD'000
Non-current assets			
Interests in subsidiaries		838,650	835,125
Total non-current assets		838,650	835,125
Current assets			
Trade and other receivables		281	-
Cash and cash equivalents		564	5,998
Total current assets		845	5,998
Current liabilities			
Trade and other payables		557	331
Total current liabilities		557	331
Net current assets		288	5,667
Total assets less current liabilities		838,938	840,792
Non-current liabilities			
Senior notes		12,073	12,019
Total non-current liabilities		12,073	12,019
NET ASSETS		826,865	828,773
CAPITAL AND RESERVES	29(a)		
Share capital		103,158	102,918
Reserves		723,707	725,855
TOTAL EQUITY		826,865	828,773

Approved and authorised for issue by the board of directors on 21 March 2022.

Odjargal Jambaljamts
Chairman

Battsengel Gotov
Chief Executive Officer

34 Impacts of the COVID-19 pandemic

The COVID-19 pandemic since early 2021 has brought certain uncertainties in the Group's operating environment and has impacted the Group's operations and financial position. The Group has been closely monitoring the impact of the developments on the Group's business and has put in place contingency measures such as temporary adjustment to levels of production. The Group will keep the contingency measures under review as the situation evolves.

The Group regularly performs assessment on the liquidity risks, where appropriate, to assess the potential impact of business conditions on the Group's capital adequacy and liquidity. The results based on the Group's latest financial position showed that both capital and liquidity levels are sufficient to cope with the impact of the outbreak. Whenever necessary, prompt actions will be undertaken to mitigate potential impacts.

The Group has assessed the accounting estimates and other matters that require the use of forecasted financial information for the impact of the COVID-19 pandemic. The assessment included estimates of the unknown future impacts of the pandemic using information that is reasonably available at this time. Accounting estimates and other matters assessed mainly include the allowance for expected credit losses of receivables from customers, inventory valuation, impairment assessment of mining related assets, valuation of financial assets and liabilities, and the recoverability of tax assets. Based on the current assessment, there was no material impact to these annual financial statements. As additional information becomes available, the future assessment of these estimates, including expectations about the severity, duration and scope of the pandemic, could differ materially in the future reporting periods.

35 Possible impact of amendments, new standards and interpretations issued but not yet effective for the year ended 31 December 2021

Up to the date of issue of these financial statements, the IASB has issued a number of amendments and a new standard, IFRS 17, *Insurance contracts*, which are not yet effective for the year ended 31 December 2021 and which have not been adopted in these financial statements. These developments include the following which may be relevant to the Group.

	Effective for accounting periods beginning on or after
Amendments to IFRS 3, *Reference to the Conceptual Framework*	1 January 2022
Amendments to IAS 16, *Property, Plant and Equipment: Proceeds before Intended Use*	1 January 2022
Amendments to IAS 37, *Onerous Contracts — Cost of Fulfilling a Contract*	1 January 2022
Annual Improvements to IFRSs 2018-2020 Cycle	1 January 2022
Amendments to IAS 1, *Classification of liabilities as current or non-current*	1 January 2023
Amendments to IAS 1 and IFRS Practice Statement 2, *Disclosure of accounting policies*	1 January 2023
Amendments to IAS 8, *Definition of accounting estimates*	1 January 2023
Amendments to IAS 12, *Deferred tax related to assets and liabilities arising from a single transaction*	1 January 2023

The Group is in the process of making an assessment of what the impact of these developments is expected to be in the period of initial application. So far it has concluded that the adoption of them is unlikely to have a significant impact on the consolidated financial statements.

Reference No. GC-23/11
06th February 2023

Dr. Battsengel Gotov
Executive Director and Chief Executive Officer
Mongolian Mining Corporation
16th Floor, Central Tower,
Great Chinggis Khaan's Square, SBD-8,
Ulaanbaatar-210620a, MONGOLIA

Dear Sir

SUBJECT: Baruun Naran and Tsaikhar Khudag Coal Deposits (BN/THG) – Statement of Open Cut Coal Reserves as at 1st January 2023

Glogex Consulting LLC ("**GLOGEX**") has been commissioned by MMC to complete an independent estimate, hereafter referred to as (the "Statement"), of the Open Cut Coal Reserves for the BN/THG coal deposits. The Statement reports the Coal Reserves as at 01 January 2023 and has been undertaken in compliance with the requirements of the reporting guidelines of the 2012 Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australasian Institute of Geoscientists and Minerals Council of Australia ("**JORC Code**"). Detailed data, model, and results in the Glogex report *"Statement of open pit coal reserves as at 01 January 2022, Baruun Naran and Tsaikhar Khudag Coal Mine" dated 25 February 2022.*

GLOGEX has adopted the following terms for the reporting of Coal Reserves:

- ***Coal Resources*** as used in this report are the same as "Mineral Resources" in The JORC Code and "Geological Resources", a common term used in the industry. Coal Resources refers to coal in such form, quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, geological characteristics and continuity are known, estimated or interpreted from specific geological evidence or knowledge, including sampling.

- The ***Coal Resources*** are sub-divided, in order of increasing geological confidence, into ***Inferred***, ***Indicated*** and ***Measured Resources*** to reflect the confidence in the underlying resource data.

Glogex Consulting (Glogex) LLC
Suite-902, 9th Floor, Regis Place building, Chingis avenue, 15th khoroo, Khan-Uul district, Ulaanbaatar, Mongolia
Telephone + 976 70115590, Fax + 976 70125590, Email info@glogex.mn, website: www.glogex.mn

- ***Coal Reserves*** as used in this report are the same as "Ore Reserves" in The JORC Code and "recoverable" coal which are terms in common use in the coal industry. Coal Reserves are the economically mineable part of a Measured and/or Indicated Mineral Resources. The Coal Reserves include diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include the application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.

- ***Coal Reserves*** have been subdivided in order of increasing confidence into ***Probable Coal Reserves and Proved Coal Reserves*** to reflect the confidence in the underlying resource data and mine planning detail. A Proved Coal Reserve can only be based on a Measured Coal Resource. Probable Reserves can be based on Measured and/or Indicated Resources. Inferred Coal Resources cannot be included as a Coal Reserve.

- ***Marketable Coal Reserves*** allow for practical yields in a coal processing plant, which is commonly known in the industry as "product coal"

Geological exploration at BN has identified a total Coal Resource of **414 Mt** (as received moisture basis) of which **332 Mt is** classified as Measured, **51 Mt** as Indicated and **31 Mt** as Inferred and at THG has identified a total Coal Resource of **89 Mt** (as received moisture basis) of which **67 Mt** is classified as Indicated and **22 Mt** as Inferred to a depth of 400m as specified under the Australasian Code for Reporting of Mineral Resources and Ore Reserves 2012 Edition ("**The JORC Code 2012**") (Mr Byambaa Barkhas, MMC, 31 December 2022).

Coal quality studies have identified the potential to produce semi-hard coking, semi-soft coking and thermal coal products. Since completion of the previous Coal Resource estimate, no further resource exploration data has been incorporated into structural or coal quality geological models.

Baruun Naran Coal mine started its operation from 1st February 2012 and total coal production is **5.3** Mt ROM until end of 2022.

As at 1 January 2023, the BN total Open Cut Coal ROM reserves of **280** Mt are shown in Table-1 and the total Marketable reserve of **165 Mt** are shown in Table -2. In this study topographic survey information was only updated to account for depletion as result of 31 December, 2022 and no other changes has been done from previous reserves report.

The previous Coal Reserves Statement for BN was published as at 01 January 2022 by Glogex Consulting LLC ("GLOGEX"). The Coal Reserves estimated in that Statement were 371 Mt. The comparison between two estimates is outlined below in Table-3

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The Tsaikhar Khudag deposit has been optimized for open pit mining, but does not have economically viable reserves.

Table-1. Total coal reserve as at 01 January 2023 (ROM)

Coal type	Reserve category (Mt)		
	Proved	Probable	Total (Proven+Probable)
Coking Coal	246	23	269
Thermal Coal	10	1	11
Total	**256**	**24**	**280**

Notes:

- *Estimate has been rounded to reflect accuracy*
- *Coking coal in-situ total moisture is 1.98%,*
- *Thermal total moisture is 2.62% (ar), Caloric value is 5801kcal/kg)*
- *Coal Reserve above 400m depth limit below topographical surface as at 1st January, 2023*

Table-2. Total Marketable reserve as at 01 January 2023

Coal type	Reserve category (Mt)		
	Proved	Probable	Total (Proven+Probable)
Coking Coal	114	10	124
Midlings	28	2	30
Thermal Coal	10	1	11
Total	**152**	**13**	**165**

Notes:

- *Estimate has been rounded to reflect accuracy*
- *Product Semi Soft Coking coal total moisture is 8%, Ash – 9.5% (dry), G index is 75*
- *Product Semi Soft Coking coal total moisture is 8%, Ash – 11.5% (dry), G index is 89*
- *Product Middlings total moisture is 9%, Ash – 19.6% (dry)*
- *Thermal total moisture is 2.62% (ar), Caloric value is 5801kcal/kg)*
- *Coal Reserve is above 400m depth limit below topographical surface*

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Table-3: Comparison of Coal Reserves to Previous Coal Reserves Statement (Mt)

Coal Reserves as at 01 January 2022 (ROM)	**371**
Coal Mined and depleted 01 January 2022 to 31 December 2022	(0.4)
Increase in Coal Reserves identified in the 2022 Reserves estimate that are economically viable for mining at 01 January 2023	-
Coal Reserves as at 01 January 2023(ROM)	**371**

Notes:

- *Estimate has been rounded to reflect accuracy*
- *Reserve is above 400m depth limit below topographical surface*
- *The estimate of Coal Reserve presented in Tables has been carried out in accordance with the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012). Technical information in the BN/THG Coal Reserve estimation report has been compiled by Mr. Naranbaatar Lundeg, who is a Member of the Australasian Institute of Mining and Metallurgy (MAusIMM No.326646). He is a principal shareholder of Glogex Consulting LLC and also serves as General Director and Executive Consultant of the company. He has Bachelor of Mining Industrial Management and Master of Business Administration in field of financial management. He has extensive experience in the mining industry, working for over 22 years with major mining companies and mining consultants. During this time, he has either managed or contributed significantly to numerous mining studies related to the estimation, pit optimization, mine planning, assessment, evaluation, and economic extraction of coal in Mongolia. He has sufficient experience which is relevant to the style of mineralization and type of deposit under consideration and to the activity he is undertaking to qualify him as a Competent Person as defined under the JORC Code (2012). Mr. Naranbaatar Lundeg consents to the inclusion in the release of the matters based on this information in the form and context in which it appears.*

Best Regards

Naranbaatar Lundeg
General Director and Executive Consultant
Competent Person (member of AusIMM #326646)

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STATEMENT OF OPEN CUT COAL RESERVES

AS AT 1ST JANUARY 2022

BARUUN NARAN MINE AND

TSAIKHAR KHUDAG COAL DEPOSIT

Prepared for

MONGOLIAN MINING CORPORATION

Report No: GC-02-22

Date: 25th February, 2022

Prepared by

GLOGEX CONSULTING LLC

GLOGEX

Geology & Mining Consulting Services

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Statement of Open Pit Coal Reserves as at 1st January 2022	25th February, 2022
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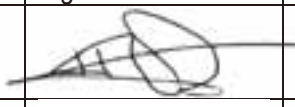
Reviewed by	Naranbaatar Lundeg	Mining management, AusIMM member #326646, General director		25th February, 2022
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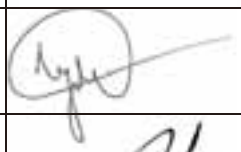
Prepared by	Buyan-Ulzii Narankhuu	Associate consultant, Senior mineral processing engineer, AusIMM member#327826		25th February, 2022
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Executive Summary

Mongolian Mining Corporation ("MMC") is a Hong Kong Stock Exchange listed mining company with high-quality coal assets in Mongolia, where it is a coal producer and exporter. It owns and operates Ukhaa Khudag ("UHG") and Baruun Naran ("BN") open cut coking coal mines located within the Tavan Tolgoi coal formation in the South Gobi desert of Mongolia. UHG is located in the Umnogovi aimag (province) approximately 560 km south of Ulaanbaatar.

Glogex Consulting LLC ("GLOGEX") is commissioned by MMC to complete an independent estimate, hereafter referred to as (the "Statement"), of the Open Cut Coal Reserves of the BN coal deposit. The Statement reports the Coal Reserves as at 1st January 2022 and has been undertaken in compliance with the requirements of the reporting guidelines of the 2012 Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australasian Institute of Geoscientists and Minerals Council of Australia ("JORC Code").

In June 2011, MMC acquired a 100% interest in QGX Coal Ltd from Kerry Mining LLC and indirectly owned its subsidiary Khangad Exploration LLC, the holder of the mining license MV-14493 covering BN coking coal deposit. The mining license covers an area of 4,486 hectares and is valid for a period of 30 years until December 2038. MMC was granted a new mining license MV-017336 on 24 June 2013 by the Mineral Resources Authority of Mongolia ("MRAM").The MV-017336 license covers Tsaikhar Khudag ("THG") coal deposit, western extension of the BN area. It covers an area of 8,430 ha and is valid for 30 years from the date of approval until June 2043.

Geological exploration at BN has estimated a total Coal Resource of 415 Mt (as received moisture basis) of which 333 Mt classified as Measured, 51 Mt as Indicated, and 31 as Inferred to a depth of 400 m. Exploration of the Tsaikhar khudag estimated a total Coal Resource of 89 Mt (as received moisture basis) of which 67 Mt classified as Indicated, and 22 Mt classified as Inferred to a depth of 400 m as specified under the Australasian Code for Reporting of Mineral Resources and Ore Reserves 2012 Edition ("The JORC Code 2012") (Mr Byambaa Barkhas, MMC). Coal quality studies have identified the potential to produce semihard coking, semisoft coking, and thermal coal products from the mine. Further full scale washplant based performance data revealed BN semihard coking coal seams have a potential to be classified as hard coking coal and produce hard coking coal product that meets the customer specifications without significant difficulty when blended with hard coking coal seams of the UHG mine.

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Although, more recently, MMC is adopting a strategy to wash and produce semihard coal seams of the BN mine individually without blending them with UHG coal due to the increased demand and market price of the semihard coking coal. Therefore, the classification of the semihard coking coal seams remain as original (semihard coking coal) in this report.

The BN deposit is a moderate to steeply dipping, high quality coal deposit, consisting predominantly of semihard coking and semisoft coking coal. First production commenced in December 2011 with a small-scale coal production of its higher-quality H and T seams. Production activity between 2011 and 2013 has depleted the stated BN ROM Coal Reserve by 1.3 Mt according to mine survey measurement and is considered to impart no material change.

In 2013, BN mine production was suspended due to the low market coal price. In December 2017, BN mine production resumed utilizing conventional terrace mining techniques with hydraulic excavators and trucks to exploit the complex and highly faulted coking and thermal coal deposit. Run-of-Mine ("ROM") coal production of 4.9 Mt was reported by mine survey measurement until end of 2021.

The process associated with estimating Coal Reserves includes defining viable pit limits and applying various modifying factors including mining recovery, metallurgical, cost, revenue to the Coal Resources.

The slope design criteria was recommended by the Australian Mining Consultants (“AMC”) as part of its geotechnical assessment with overall pit wall slopes range between 30° and 45.

- West pit High wall (north) 45°
- West pit Low wall (South) 35°
- East pit High Wall (north) 30°
- East pit Low wall (South) 35°
- End Wall (north) 30°
- End wall (south) 35°

The mining factors adopted in converting the BN Resource model to a ROM model have been summarized in the table below.

Summary of BN Mining Modifying Factors

Modifying factors	Unit	Value
Roof loss	mm	100
Roof dilution	mm	100
Floor loss	mm	100
Floor dilution	mm	100
Minimum seam thickness	m	0.5
Maximum included ply thickness	m	0.5
Global loss	%	1.0

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Wash plant yield data for a range of cut-point densities were provided by Norwest Corporation ("Norwest") for each major coking seam group. MMC recently modified ash yield curves of extracted coal seams in the mine based on in pit bulk sampling.

A number of iterations were completed in the Datamine Studio NPVS to determine the most suitable coking "ROM Ash – Yield" cut-point density curves to use, based upon achieving a semihard coking product ash of no greater than 11.5% (ar) and semisoft coking product ash of no greater than 9.5% (ar) across all periods.

The Norwest and MMC "ROM Ash – Yield" curves found to achieve these coking product specifications as a weighted average over the entire deposit was at a cut-point density of 1.4 for semihard coking coal and semisoft coking coal. The thermal coal is not planned to be washed and thermal product ash is variable and determined by ROM coal quality.

The mining, hauling, processing, handling, administration, transportation, air pollution, logistic and import duty charges costs were adjusted from actual costs incurred at BN provided by MMC year to date 01 January, 2022 based on 2850 MNT/USD exchange rate. GLOGEX reviewed key cost inputs and concluded these were reasonable to be used for pit optimization.

Semihard Coking Coal were estimated based on 5 years average price forecast of 2022-2025 as provided to MMC by Shanxi Fenwei Energy Consulting Co. Ltd ("Shanxi Fenwei") product value at the DAP Ganqimaodou port of China. The coal selling prices for Semisoft coking coal were estimated based on actual coal price provided by MMC from 2020 to 2021 and 5 year average price forecast of 2022-2025 by Shanxi Fenwei Energy Consulting Co. Ltd ("Shanxi Fenwei"). The selling prices of Middlings coal and Thermal coal were estimated based on 5 year average price forecast of 2022-2025 as provided to MMC by Shanxi Fenwei Energy Consulting Co. Ltd ("Shanxi Fenwei") product value at the DAP Ganqimaodou port of China.

The coal selling prices assigned to each product, were:

- Semihard coking coal < 11.5% ash (dry): US$128.8/t product (ar),
- Semi-soft coking coal < 9.5% ash (dry): US$95.9/t product (ar),
- Middlings coal ~ benchmark CV 6,000 kcal/kg (gar): US$48.8/t product (ar),
- Thermal coal ~ benchmark CV 5,000 kcal/kg (gar): US$30.7/t product (ar).

Datamine Studio NPVS software was used to generate a series of incremental pit shells based on a range of coal selling prices. This is a three dimensional approach which provides a series of pit shells where each increment reflects different economic scenarios such as changes to depth, mining cost or coal price. Through

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the application of mining and metallurgical factors described above, the mineable in situ coal within the pit shell was converted to ROM coal quantities and product coal quantities.

The pit optimization results were examined and the optimal pit shell that determined by the results corresponding to the pit shell with an incremental cash margin of 0 (the difference between incremental revenue and incremental cash cost) was selected as the Optimized Pit Shell. The optimization was not limited to a vertical depth.

The selected pit shell (Optimized Pit Shell) was modified slightly to form a practical shape for mining (Mineable Pit Shell). Measured and Indicated Coal Resources within the optimized Mineable Pit Shell were classified as Coal Reserves. Measured Coal Resources were classified as Proved Coal Reserves and Indicated Coal Resources were classified as Probable Coal Reserves. While Inferred Resource was assigned revenue in the UHG LOM Study pit optimizer to define the Mineable Pit Shells, no Inferred Resources have been reported as Reserves in this statement.

The Coal Reserves by major seam groups for Open Cut Coal Reserves, Marketable Coking Coal Reserves, Marketable Thermal Coal Reserves and Marketable Middlings Coal Reserves are outlined in the tables below.

Total coal reserve as at 01 January 2022 (ROM)

Coal type	Reserve category (Mt)		
	Proved	Probable	Total (Proved + Probable)
Coking Coal	246	23	269
Thermal Coal	10	1	11
Total	**256**	**24**	**280**

Notes:

- *Estimate has been rounded to reflect accuracy*
- *Coking coal in-situ total moisture is 1.98%*
- *Thermal coal in-situ total moisture is 2.62%, Caloric value is 5801kcal/kg)*
- *Coal Reserve above 400m depth limit below topographical surface*

Total Marketable reserve as at 01 January 2022

Coal type	Reserve category (Mt)		
	Proved	Probable	Total (Proved + Probable)
Coking Coal	114	10	124
Middlings	28	2	30
Thermal Coal	10	1	11
Total	**152**	**13**	**165**

Notes:

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- *Estimate has been rounded to reflect accuracy*
- *Product Semi Soft Coking coal total moisture is 8%, Ash-9.5% (dry), G index is 75*
- *Product Semi Soft Coking coal total moisture is 8%, Ash-11.5% (dry), G index is 89*
- *Product Middlings total moisture is 9%, Ash – 19.6% (dry)*
- *Thermal total moisture is 2.62% (ar), Caloric value is 5,801kcal/kg*
- *Coal Reserve is above 400m depth limit below topographical surface*

Comparison of Coal Reserves to Previous Coal Reserves Statement (Mt)

Coal Reserves as at 01 January 2018 (ROM)	**176**
Coal Mined and depleted between 01 January 2018 and 01 January 2022	(3.5)
Increase in Coal Reserves identified in the 2018 Reserves estimate that are economically viable for mining at 01 January 2022	107.5
Coal Reserves as at 01 January 2022 (ROM)	**280**

Notes:

- *Estimate has been rounded to reflect accuracy*
- *Reserve is above 400m depth limit below topographical surface*
- *The estimate of Coal Reserve presented in Tables has been carried out in accordance with the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012). Technical information in the BN Coal Reserve estimation report has been compiled by Mr. Naranbaatar Lundeg, who is a Member of the Australasian Institute of Mining and Metallurgy (MAusIMM No.326646).*
  He is a principal shareholder of Glogex Consulting LLC and also serves as General Director and Executive Consultant of the company. He has Bachelor of mining industrial management and Master of Business Administration in field of financial management. He has extensive experience in the mining industry, working for over 20 years with major mining companies and mining consultants. During this time, he has either managed or contributed significantly to numerous mining studies related to the estimation, pit optimization, mine planning, assessment, evaluation and economic extraction of coal in Mongolia. He has sufficient experience which is relevant to the style of mineralization and type of deposit under consideration and to the activity he is undertaking to qualify him as a Competent Person as defined under the JORC Code (2012). Mr. Lundeg consents to the inclusion in the release of the matters based on this information in the form and context in which it appears.
- *Technical information in this BN Coal Reserve estimation has been peer reviewed by Independent consultant Mr. Gary Ballantine. Mr. Ballantine is a member of the Australasian Institute of Mining and Metallurgy (Member #109105) and has over 32 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012).*

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Total Open Cut Coal Reserves by Seam

Proved+Probable reserves				
Seam	**ROM Coal (Mt)**	**Total Moisture, %**	**Ash (%)**	**Calorific Value (kcal/kg)**
V	1.26	2.88	49.92	3,450
U	14.82	2.56	36.68	4,767
T	23.77	2.03	21.17	6,267
R	11.62	2.20	39.86	4,526
Q	8.92	2.25	39.54	4,591
N	44.02	1.82	34.32	4,975
K	25.94	1.79	37.53	4,794
J	26.67	1.87	28.80	5,628
I	18.10	2.45	26.24	5,832
H	57.93	1.85	19.96	6,477
G	41.18	1.94	38.11	4,777
F	5.54	3.14	26.97	5,706
E	0.40	1.25	35.02	5,194
Total Coal (Mt)	**280.17**	**2.00**	**30.49**	**5,433**
Total Coking (Mt)	**269.56**	**1.98**	**30.65**	**5,418**
Total Thermal (Mt)	**10.61**	**2.62**	**26.28**	**5,801**

(Note: Estimate has been rounded to reflect accuracy)

Marketable Coking Coal Reserves by Seam

Coking	Proved		Probable		Total	
Seam	**Mt (ar)**	**Ash (% ad)**	**Mt (ar)**	**Ash (% ad)**	**Mt (ar)**	**Ash (% ad)**
V	0.22	11.60	0.07	11.60	0.29	11.60
U	4.57	10.60	0.71	10.60	5.28	10.60
T	15.13	8.44	0.55	8.45	15.68	8.44
R	2.35	13.30	0.15	13.30	2.50	13.30
Q	3.29	9.50	0.26	9.50	3.56	9.50
N	17.73	9.50	1.55	9.50	19.27	9.50
K	9.73	9.50	1.07	9.50	10.81	9.50
J	9.73	11.10	1.86	11.10	11.59	11.10
I	10.22	10.70	0.69	10.70	10.90	10.70
H	29.98	11.90	3.21	11.90	33.19	11.90
G	10.69	14.10	0.26	14.10	10.96	14.10
Total	**113.64**	**10.80**	**10.40**	**10.81**	**124.04**	**10.8**

(Note: Estimate has been rounded to reflect accuracy, Product coking coal total moisture is 8%)

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Marketable Middlings Coal Reserves by Seam

Coking	Proved		Probable		Total	
Seam	Mt (ar)	Ash (% ad)	Mt (ar)	Ash (% ad)	Mt (ar)	Ash (% ad)
V	0.00	17.70	0.00	17.70	0.00	17.70
U	2.19	22.20	0.35	22.20	2.54	22.20
T	2.35	19.38	0.09	19.49	2.44	19.38
R	0.08	22.40	0.01	22.40	0.09	22.40
Q	0.04	18.00	0.00	18.00	0.05	18.00
N	0.68	18.00	0.06	18.00	0.73	18.00
K	0.48	18.00	0.05	18.00	0.54	18.00
J	4.20	20.00	0.80	20.00	5.00	20.00
I	2.02	18.20	0.14	18.20	2.16	18.20
H	9.57	17.50	1.02	17.50	10.59	17.50
G	6.13	22.40	0.16	22.40	6.28	22.40
Total	**27.7**	**19.58**	**2.7**	**19.28**	**30.4**	**19.55**

(Note: Estimate has been rounded to reflect accuracy, Product Middlings coal total moisture is 9%)

Marketable Thermal Coal Reserves by Seam

Thermal	Proved		Probable		Total	
Seam	Mt (ar)	Calorific Value (kcal/kg)	Mt (ar)	Calorific Value (kcal/kg)	Mt (ar)	Calorific Value (kcal/kg)
U	0.05	5,339	0.04	5,164	0.09	5,265
T	0.63	6,423	0.13	5,935	0.77	6,338
R	0.11	5,395	0.00	5,112	0.12	5,384
Q	0.07	5,413	0.03	5,229	0.10	5,362
N	0.70	5,435	0.14	5,198	0.84	5,395
K	0.28	5,581	0.03	5,202	0.31	5,542
J	0.42	5,922	0.10	5,697	0.52	5,878
I	0.34	6,219	0.00	5,638	0.34	6,214
H	1.10	6,575	0.08	6,542	1.18	6,572
G	0.40	5,360	0.00	5,164	0.40	5,358
F	5.13	5,719	0.41	5,547	5.54	5,706
E	0.40	5,194	-		0.40	5,194
Total	**9.63**	**5,820**	**0.98**	**5,612**	**10.61**	**5,801**

(Note: Estimate has been rounded to reflect accuracy, Thermal coal total moisture is 2.62%)

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Table of Contents

Executive Summary **5**
1. Introduction **14**
1.1. Overview 14
1.2. Approach 16
1.3. Relevant Report and Studies 17
1.4. Previous Coal Reserve Statements 18
2. Competent Persons Statement **18**
3. Project Description **20**
3.1. General Background 20
3.2. Location and Titles 21
4. Geology, Coal quality and Coal Resource Estimate **23**
4.1. Introduction 23
4.2. Geology Overview 23
4.3. Geological Model 26
4.4. Coal Resources 26
5. Coal Reserves Estimate **29**
5.1. Coal Resources Estimate 29
5.2. Study Status 29
5.3. Geotechnical Criteria 30
5.4. Mining Factors 30
5.5. Metallurgical Factors and Product Specification 31
5.6. Cost Parameters 33
5.6.1. Mining cost 34
5.6.2. Site admin cost 34
5.6.3. Air pollution fee 35
5.6.4. Handling cost 35
5.6.5. Processing cost 35
5.6.6. General administration cost 35
5.6.7. Transportation and logistics cost UHG-GM 35
5.6.8. Custom duty 36
5.7. Marketing and Revenue Parameters 36
5.8. Pit Optimization Results 37
5.9. Categorization 40
5.10. Audits and Reviews 40
5.11. Results 41
5.12. Coal Reserves Reconciliation with Coal Resources 44
5.13. Coal Reserves Comparison to Previous Coal Reserves Statement 45

This report has been prepared for Mongolian Mining Corporation and must be read in its entirety and subject to the third party disclaimer clauses contained in the body of the report.

List of Tables

Table 4-1. BN Coal Resource by Depth (ar) 27
Table 5-1. Summary of BN Mining Modifying Factors 31
Table 5-2. BN Default Dilutant Qualities 31
Table 5-3. Coking Coal "ROM Ash – Yield" Curve (Wash Plant - 1.40 Cut-Point Density) 32
Table 5-4. Middlings Coal "ROM Ash – Yield" Curve (1.40 Cut-Point Density) 33
Table 5-5. Pit Optimization Input Costs 34
Table 5-6. Pit Unit mining cost calculation, per BCM 34
Table 5-7. Transportation and logistics cost per ton product 35
Table 5-8. Coal historical price and benchmark price forecast (DAP Ganqimaodou port, China) 36
Table 5-9. Royalty 37
Table 5-10. Pit Optimization Results – Coal Price Sensitivity 38
Table 5-11. Proved Open Cut Coal Reserves by Seam 41
Table 5-12. Probable Open Cut Coal Reserves by Seam 42
Table 5-13. Total Open Cut Coal Reserves by Seam 42
Table 5-14. Marketable Coking Coal Reserves by Seam 43
Table 5-15. Marketable Middlings Coal Reserves by Seam 43
Table 5-16. Marketable Thermal Coal Reserves by Seam 44
Table 5-17. Reconciliation of Coal Resources and Coal Reserves (Mt) 44
Table 5-18. Comparison of Coal Reserves to Previous Coal Reserves Statement (Mt) 45

List of Figures

Figure 3-1.Baruun naran project location 22
Figure 4-1. Regional geology 24
Figure 5-1. Final Pit ..... **Error! Bookmark not defined.**
Figure 5-2. Optimized Pit Shell 39
Figure 5-3. Mineable Pit Design, cross section (Micromine) 40

List of Graphics

Graph 5-1. Pit Optimization - Coal Price Sensitivity (Datamine Studio NPVS pit shells) 39

List of Appendices

Appendix A - Sampling Techniques and Data
Appendix B - Reporting Exploration Results
Appendix C - Estimation and Reporting of Mineral Resources
Appendix D - Estimation and Reporting of Ore Reserves

This report has been prepared for Mongolian Mining Corporation and must be read in its entirety and subject to the third party disclaimer clauses contained in the body of the report.

1. Introduction

1.1. Overview

Mongolian Mining Corporation ("MMC") is a Hong Kong Stock Exchange listed mining company with high-quality coal assets in Mongolia, where it is a coking coal and thermal coal producer and exporter. It owns and operates the Ukhaa Khudag ("UHG") and Baruun Naran ("BN") open cut coking coal mines located within the Tavan Tolgoi coal formation in South Gobi desert of Mongolia.

In June 2011, MMC acquired a 100% interest in QGX Coal Ltd from Kerry Mining and indirectly owned its subsidiary Khangad Exploration LLC, the holder of mining license MV-14493 for the BN coking coal deposit. The MV-14493 BN mining license covers an area of 4,486 hectares and is valid for a period of 30 years until December 2038. MMC was granted a new mining licence MV-017336 on 24 June 2013 by the Mineral Resources Authority of Mongolia ("MRAM"). The new license covers Tsaihkar Khudag ("THG") coal deposit, the western extension of the BN deposit. It covers an area of 8,430 ha and is valid for 30 years from the date of approval until June 2043.

Glogex Consulting LLC was commissioned by MMC to complete an independent estimate, hereafter referred to as (the "Statement"), of the Open Cut Coal Reserves for the BN coal deposit. The Statement reports the Coal Reserves as at 1st January 2022 and has been undertaken in compliance with the requirements of the reporting guidelines of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves 2012 version ("JORC Code").

GLOGEX has adopted the following terms for the reporting of Coal Reserves:

- ***Coal Resources*** as used in this report are the same as "Mineral Resources" in The JORC Code and "Geological Resources", a common term used in the industry. Coal Resources refers to coal in such form, quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, geological characteristics and continuity are known, estimated or interpreted from specific geological evidence or knowledge, including sampling.

- The ***Coal Resources*** are sub-divided, in order of increasing geological confidence, into ***Inferred***, ***Indicated*** and ***Measured Resources*** to reflect the confidence in the underlying resource data.

- ***Coal Reserves*** as used in this report are the same as "Ore Reserves" in The JORC Code and "recoverable" coal which are terms in common use in the coal industry. Coal Reserves are the

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economically mineable part of a Measured and/or Indicated Mineral Resources. The Coal Reserves include diluting materials and allowances for losses, which may occur while the material is being mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include the application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.

- ***Coal Reserves*** have been subdivided in order of increasing confidence into ***Probable Coal Reserves and Proved Coal Reserves*** to reflect the confidence in the underlying resource data and mine planning detail. A Proved Coal Reserve can only be based on a Measured Coal Resource. Probable Reserves can be based on Measured and/or Indicated Resources. Inferred Coal Resources cannot be included as a Coal Reserve.

- ***Marketable Coal Reserves*** allow for practical yields in a beneficiation plant, which is commonly known in the industry as "product coal",

- ***Coal Resources*** are reported inclusive of Coal Reserves, (that is, Coal Reserves are not additional to Coal Resources).

Additional terminology applied within this report includes the following:

- ***Geological Model*** (or "In Situ" Model) is the computerized, three dimensional representation of the coal deposit based on topographic survey data, coal seam data derived from outcrop, drill hole or other data points, including coal thickness and quality;

- ***Optimizer*** is the use of Datamine Studio NPVS software applied to the geological model to determine the economic pit limits by the application of modifying factors such as practical minimum mining thicknesses, geological as well as mining loss and dilution, geotechnical slope design, and cost/revenue inputs;

- ***Optimized Pit Shell*** is the three dimensional economic pit limit determined by using the Datamine Studio NPVS software;

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- ***Mineable Pit Shell*** is based on an optimized pit shell with modifications to conform to a practical pit design;

- ***Mineable In Situ Coal*** (non-JORC terminology) as used in this report is in situ coal within the mineable pit shell;

- ***Run of Mine ("ROM") Coal*** (non-JORC terminology) as used in this report is the coal within the mineable pit shell after application of geological and mining losses, roof as well as floor loss and dilution. ROM coal may include some Inferred Coal Resources or unclassified coal, i.e. coal not yet assigned to any of the Resource classification.

1.2. Approach

The process adopted for completing the Statement is described below.

1. A Resource block model of the BN deposit was created by MMC by using the Micromine software. This model was based upon an "in situ" geological block model. GLOGEX applied mining parameters, including minimum seam thickness, maximum stone parting thickness, and mining loss and dilution to convert the in situ ply model to the Resource ROM model. MMC provided the original in situ geological ply model in Micromine block model .csv and .dat format to GLOGEX for conversion.

2. Cross sections, plans and deposit characteristics such as structure and seam numbers and thicknesses were examined in conjunction with the proposed equipment and mining method to decide minimum seam thickness, coal loss and dilution factors. These factors were further used to convert the Micromine Resource block model to a Micromine ROM model by using the Micromine software. No further software conversion was required for pit optimization and subsequent mine planning as the Datamine NPVS is compatible with the Micromine model format.

3. The mining, hauling, processing, handling, administration, transportation, air pollution, logistic and import duty charges costs were adjusted from an actual costs incurred at BN provided by MMC year to date 1st January 2022 based on 2850 MNT/USD exchange rate. GLOGEX reviewed key cost inputs and concluded these were reasonable to be used for pit optimization. These were then

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converted to unit rates suitable for Datamine NPVS software and together with other criterion such as geotechnical factors and minimum coal seam mining thickness. A series of pit shells were derived from the software for varying revenue inputs.

4. A pit shell ("Optimized Pit Shell") was selected, and minor adjustments made (as necessary) to accommodate practical pit designs ("Mineable Pit Shell"). This pit shell formed the basis of the subsequent reserve estimate.

5. The Mineable Pit Shell was delineated into a series of strips, blocks and benches to form a block reserve database of quantities and qualities. The reserving of these blocks was undertaken in the Micromine software.

6. The Coal Resource categories (Measured, Indicated, and Inferred) were supplied as a field in the original in situ Micromine block model provided by MMC and were incorporated into the Micromine ROM model during the Resource to ROM model conversion. The Micromine Resource ROM model is directly used in Datamine Studio NPVS as the software is compatible with the model file format. The Resource categories limits were used to report Resource tonnes by classification within the Mineable Pit Shell. While Inferred Resources were assigned revenue in the BN Reserve Study pit optimizer, no Inferred Resource, or unclassified tonnes have been reported as Reserves in this statement.

7. The Coal Reserve was then categorized as Proved or Probable based on the Coal Resource categories and the level of detail in the mine planning.

8. The report and results were reviewed and results and supporting information are included in this report.

1.3. Relevant Report and Studies

The following reports, documents and studies were used as reference material in the preparation of the Statement.

This report has been prepared for Mongolian Mining Corporation and must be read in its entirety and subject to the third party disclaimer clauses contained in the body of the report.

1. "BN Revised Design table for LOM study", AMC Consultants Pty Ltd (February 2013)
2. "Baruun Naran Coal Project – Mine Pre-Feasibility Study", RPM (formerly Minarco-MineConsult) (May 2008)
3. "Statement of Coal Resources – Baruun Naran Coal Project", McElroy Bryan Geological Services Pty Ltd (February 2010)
4. "JORC Reserve Report: Baruun Naran Coal Project, Mongolia", SRK Consulting (July 2011)
5. "Baruun Naran Coal Project Feasibility Study", SRK Consulting (June 2011)
6. "Baruun Naran H and T Seam Test Wash at UHG – 26 June 2012", Norwest Corporation (June 2012)
7. "Baruun Naran Mine Water Management", AquaTerra (November 2009)
8. "Initial geotechnical assessment of Baruun Naran Coal Project", by Seedsman Geotechnics Pty Ltd (November 2007)
9. "JORC (2012) Standard Resource Estimation of Baruun Naran Mining License [14493A] and Tsaikhar Khudag Mining License [M-017336]" prepared by Mongolian Mining Corporation (June 2015)
10. "Baruun Naran Life of Mine Study" prepared by Runge Pincock Minarco (August 2013).
11. "Price Forecast for MMC (Shanxi Fenwei)" prepared by Shanxi Fenwei (March 2021)
12. "Asset Table UHG Fleet at 1 Jan 2022" prepared by Mongolian Mining Corporation (January 2022)
13. Coal Reserves Statement for BN as at 01 January 2013 by RungePincockMinarco (RPM)
14. Statement of open cut coal reserves as at 1st of January, 2018, Baruunnaran and Tsaikhar Khudag coal mine (January, 2022) by Glogex Consulting LLC

1.4. Previous Coal Reserve Statements

The previous Coal Reserve Statement was the Statement of Open Cut Coal Reserves as at 1st January 2021 for Baruunnaran and Tsaikharkhudag coal mines, prepared by Glogex Consulting LLC (as referenced above).

2. Competent Persons Statement

The information in the report, to which this statement is attached, that relates to the Coal Reserves of Mongolian Mining Corporation – Baruun Naran Coal Deposit, is based on information compiled and reviewed by Mr. Naranbaatar Lundeg, who is a Member of the Australasian Institute of Mining and Metallurgy (MAusIMM #326646).

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He is a principal shareholder of Glogex Consulting LLC and also serves as General Director and Executive Consultant of the company. He has Bachelor's degree in mining industrial management and Master of Business Administration in a field of financial management. He has extensive experience in the mining industry, working for over 20 years with major mining companies and mining consultants. During this time, he managed and contributed significantly to numerous mining studies related to the estimation, pit optimization, mine planning, assessment, evaluation, and economic extraction of coal in Mongolia. He has sufficient experience relevant to the style of mineralization and type of deposit under consideration and to the activity he is undertaking to qualify him as a Competent Person as defined under the JORC Code (2012). Mr. Lundeg consents to the inclusion in the release of the matters based on this information in the form and context in which it appears

Naranbaatar Lundeg

General Director and Executive Consultant

Competent Person (MAusIMM #326646)

The estimate of Coal Reserves presented in this Statement has been carried out in accordance with the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves" (December, 2012).

The above-mentioned person has no interest whatsoever in the mining assets reviewed and will gain no reward for the provision of this Coal Reserve Statement. Glogex Consulting LLC will receive a professional fee for the preparation of this statement.

This report has been prepared for Mongolian Mining Corporation and must be read in its entirety and subject to the third party disclaimer clauses contained in the body of the report.

3. Project Description

3.1. General Background

Mongolian Mining Corporation ("MMC") is a Hong Kong Stock Exchange listed mining company with high-quality coal assets in Mongolia. It owns and operates the Ukhaa Khudag ("UHG") and Baruun Naran ("BN") open cut coking coal mines located within the Tavan Tolgoi coal formation in the South Gobi desert of Mongolia.

In June 2011, MMC acquired a 100% interest in QGX Coal Ltd from Kerry Mining and indirectly owned its subsidiary Khangad Exploration LLC, the holder of mining license MV-14493 for the BN coking coal deposit. The BN mining license covers an area of 4,486 hectares and is valid for a period of 30 years until December 2038. MMC was granted a new mining licence MV-017336 on 24 June 2013 by the Mineral Resources Authority of Mongolia ("MRAM"). The new license covers the Tsaikhar Khudag ("THG") coal deposit, the western extension of the BN deposit and located entirely within MMC's current exploration license. It covers an area of 8,430 ha and is valid for 30 years from the date of approval until June 2043.

Glogex Consulting LLC ("GLOGEX") is commissioned by MMC to complete an independent estimate, hereafter referred to as (the "Statement") of the Open Cut Coal Reserves for the BN coal deposit. The Statement reports the Coal Reserves as at 01 January 2022 and has been undertaken in compliance with the requirements of the reporting guidelines of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves 2012 version ("JORC Code"). Detailed data, model, and results in the Glogex report "Statement of open pit coal reserves as at 01 January 2022, Baruun Naran and Tsaikharkhudag Coal Deposit" dated 1 January 2022.

Geological exploration at BN has estimated a total Coal Resource of 415 Mt (as received moisture basis) of which 333 Mt classified as Measured, 51 Mt as Indicated, and 31 as Inferred to a depth of 400 m. Exploration of the Tsaikhar khudag estimated a total Coal Resource of 89 Mt (as received moisture basis) of which 67 Mt classified as Indicated, and 22 Mt classified as Inferred to a depth of 400 m as specified under the Australasian Code for Reporting of Mineral Resources and Ore Reserves 2012 Edition ("The JORC Code 2012") (Mr Byambaa Barkhas, MMC). Coal quality studies have identified the potential to produce semihard coking, semisoft coking, and thermal coal products from the mine. Further full scale washplant based performance data revealed semihard coking coal seams of the deposit have a potential to be classified as hard coking coal and produce hard coking coal product that meets the customer specifications without significant difficulty when blended with hard coking coal seams of the UHG mine.

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The BN deposit is a moderate to steeply dipping high quality coal deposit, consisting predominantly of semihard and semisoft coking coal. BN mine production is conducted by utilizing conventional terrace mining techniques with hydraulic excavators and trucks to exploit the complex and highly faulted and folded coking and thermal coal deposit. First production commenced in December 2011 with a small-scale coal production of its higher-quality H and T seams. Production activity between 2011 and 2013 has depleted the stated BN ROM Coal Reserve by 1.3 Mt according to mine survey measurement and is considered to impart no material change.

In 2013, BN mine production was suspended due to the low market coal price. In December 2017, BN mine production resumed utilizing conventional terrace mining techniques with hydraulic excavators and trucks to exploit the complex and highly faulted coking and thermal coal deposit. The production activity from 2011 to 2022 has depleted the stated BN ROM Coal Reserve by 4.9 Mt according to mine survey measurement. No mining operation activity is at Tsaikhar Khudag deposit.

Previously, in line with the coal quality studies reported previously by RungePincockMinarco (“RPM”), MMC has adopted a strategy to blend BN semihard coking coal seams with UHG hard coking coal seams prior to processing and be washed at the Coal Handling and Processing Plant located at UHG mine (“UHG CHPP”), as the resulting product quality met the hard coking coal customer specifications based on the full scale washplant based performance data. The trial run of the BN H seam was conducted from 23 to 31 January 2018 by blending 10%-20% ROM feed blends of BN H seam and 80%-90% UHG hard coking coal seams (3A, 4A, 4B, 0CU, and 0B). The laboratory results of this trial run revealed a hard coking coal product with uniform quality meeting the target specifications with volatile matter (dry ash free) ranging from 23.56% to 25.81% with an average of 25%.

Although, more recently, MMC is adopting a strategy to wash and produce semihard coal seams of the BN mine individually without blending them with UHG coal due to the increased demand and market price of the semihard coking coal. Therefore, the classification of the semihard coking coal seams of the BN deposit remains as original (semihard coking coal) in this report.

3.2. Location and Titles

MMC’s BN Project is located in the Umnogovi aimag (province) approximately 560 km south of Ulaanbaatar, the capital of Mongolia as illustrated in Figure 3.1. The town of Dalanzadgad (population 28,059), the provincial capital of the Umnugobi aimag is located approximately 60 km to the west of BN mine. BN is

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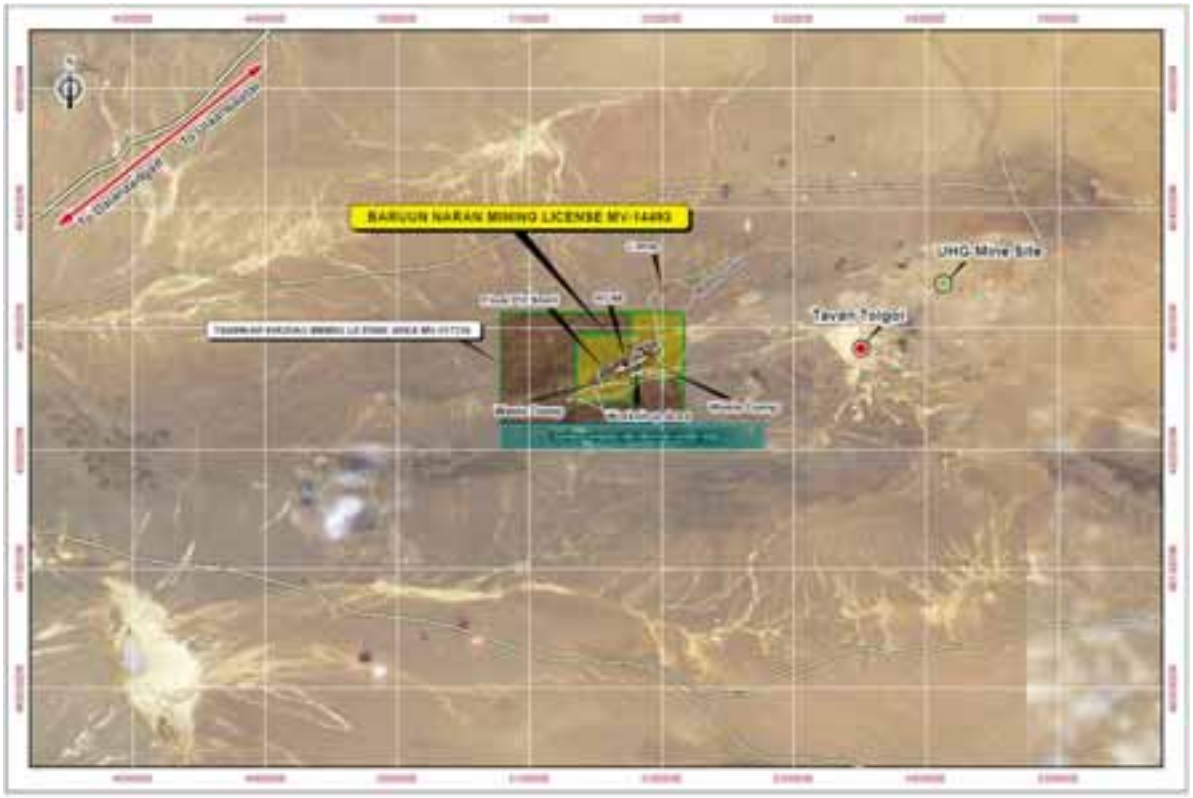
located approximately 32 km southwest of UHG by paved road and 20 km southwest of the Tavan Tolgoi mine, and about 190 km north of the Oyu Tolgoi copper / gold deposit. Ukhaa Khudag ("UHG") is the open pit coal mine also owned and operated by MMC.

The nearest Mongolia-Chinese border of Gashuun Sukhait - Ganquimaodou is located approximately 240 km to the south. The port of Gashuun Sukhait is the Mongolian side of the border and Ganquimaodou is the Chinese side of the border named after the town of Ganquimaodou.

Figure 3-1.Baruun naran project location



In 2006, MMC was granted a mining license for the neighboring UHG coking coal deposit. The waste mining boxcut was commenced in October 2008 and the coal mining operation was commenced in April 2009 at UHG. In June 2011, MMC acquired 100% interests of QGX Coal Ltd, therefore, indirectly owned its subsidiary Khangad Exploration LLC, the holder of mining license MV-14493 of the BN coking coal deposit. In December 2011, the BN mining operation was commenced. Energy Resources LLC, 100% subsidiary of MMC is responsible for operation of the BN mine with an assistance of mining contractors: UARP LLC under an alliance style contract for mining operation and technical services.

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4. Geology, Coal quality and Coal Resource Estimate

4.1. Introduction

The BN coal deposit is the westernmost extension of the greater Tavan Tolgoi coalfield, in south-central Mongolia, within the Ulaannuur Valley of the Gobi Desert. The deposit contains both coking and thermal grade coal.

Coal quality analysis has been conducted for BN to estimate density, moisture (air dried and total), raw ash, volatile matter, calorific value, sulphur as well as CSN, with G index being analysed on composite samples. MMC provided the BN Micromine block model with coal quality parameters including total moisture (%), air dried moisture (%), in situ density (g/cc), raw ash (%), volatile matter (%), fixed carbon (%), calorific value (kcal/kg), and total sulphur (%) on an as received basis.

The most variable coal quality parameter of the deposit is ash ranging between 20% to 50% in the BN Micromine ROM model with a weighted average ROM ash of 30.5%. Ash content was higher in the original in situ model, however, MMC incorporated a maximum ash cut-off of 50% (dry base) when generating the BN Resource model. The ROM model weighted average ash content is higher than the Resource model due to the application of seam aggregation as well as losses and dilution which adjusts the model to include stone partings and dilution with default ROM ash content of 93.86% (ar).

Geological exploration at BN has estimated a total Coal Resource of 415 Mt (as received moisture basis) of which 333 Mt classified as Measured, 51 Mt as Indicated, and 31 as Inferred to a depth of 400 m. Exploration of the Tsaikhar Khudag deposit estimated a total Coal Resource of 89 Mt (as received moisture basis) of which 67 Mt classified as Indicated, and 22 Mt classified as Inferred to a depth of 400 m as specified under the Australasian Code for Reporting of Mineral Resources and Ore Reserves 2012 Edition ("The JORC Code 2012") (Mr Byambaa Barkhas, MMC, January 2021). The coal quality studies have identified the potential to produce semihard coking, semisoft coking, and thermal coal products.

4.2. Geology Overview

“JORC Standard Resource Estimation Report for the Baruun Naran Coal Mine” (MMC, June 2015) provides a comprehensive summary of the regional and local geological setting of the BN deposit. The following summary is based on extracts from this report:

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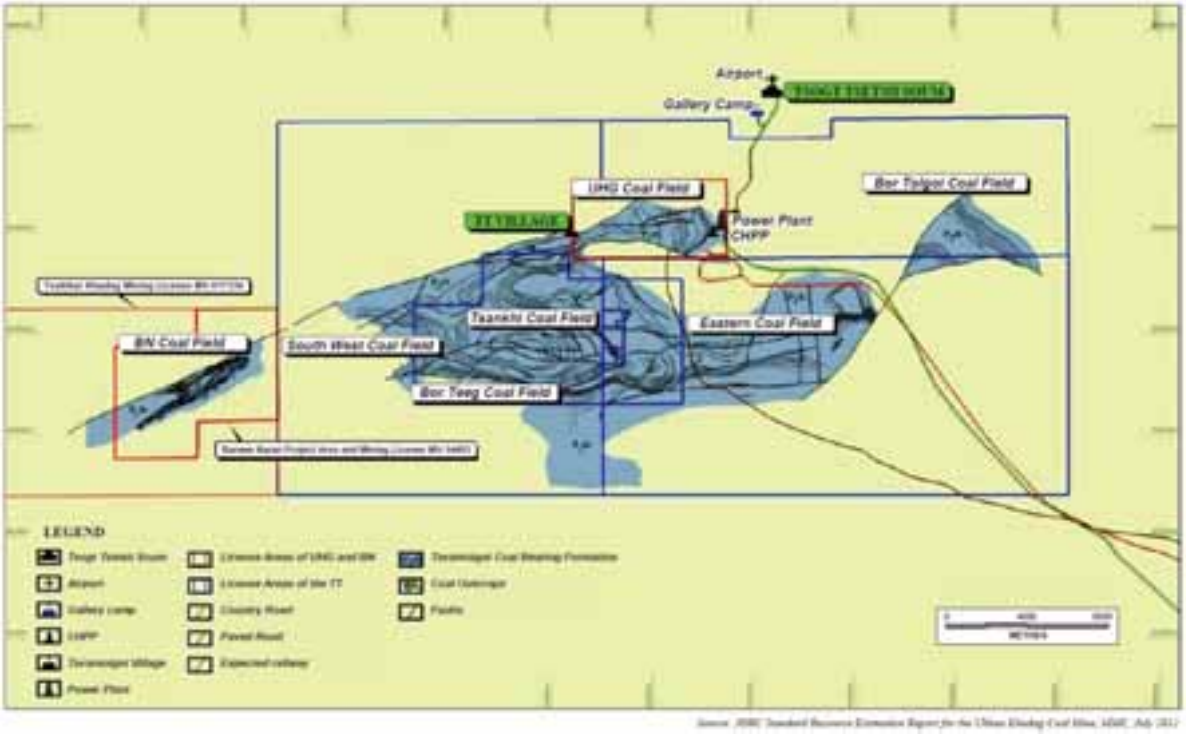
BN deposit consists of 2 mining licenses, BN mining license [MV-14493] (4485.65 hectare), and THG mining license [MV-017336] (8340.01 hectare). Both licenses are valid for 30 years and can be extended twice more for 20 years each. The BN deposit occurs within an Upper Permian clastic sedimentary unit known as the Tavan Tolgoi (TT) formation. The same formation also hosts the larger Tavantolgoi deposit's coking and thermal coal seams. An east-northeast trending belt of TT formation crops out in the Baruun Naran valley representing the westernmost continuation of the Ulaan Nuur coal basin. The Ulaan Nuur basin is an asymmetric fault bounded east-northeast trending syncline, with a very steep northern limb (overturned in part) and more gently dipping southern limb. In addition to this folding of the coal bearing strata, seams are truncated by faults in the north, west, and southwest. Deformation of Permian sediments occurred during the early Mesozoic era. Basement rocks are Carboniferous age on the northern margin of the valley and Devonian on the southern limb. The earliest deposited coal seams are less extensive and on-lap onto older basement rocks.

Figure 4-1. Regional geology



The BN deposit over the licenses of BN and THG have 18 group seams including A, B, C, D, E, F, G, H, I, J, K, L, N, Q, R, T, U, and V. Of these, seams H and T are the best developed, the thickest, and the most continuous and contain a substantial portion of the coking coal resource within the licenses.

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Based on the coal quality data, major seam groups of V, U, T, R, Q, N, and K are classified as semisoft coking coal and seam groups of J, I, H, F, E, and G are classified as semihard coking coal. Additional full scale washplant based tests were performed on the seam H to investigate a potential of blending H seam with the UHG hard coking coal seams to produce hard coking coal product. The trial run of the H seam was conducted from 23 to 31 January 2018 by blending 10%-20% ROM feed blends of BN H seam and 80%-90% UHG hard coking coal seams (3A, 4A, 4B, 0CU, and 0B). The laboratory results of this trial run revealed a hard coking coal product with uniform quality meeting the target specifications with volatile matter (dry ash free) ranging from 23.56% to 25.81% with an average of 25%. Furthermore, the study revealed a semihard coking coal seams of the BN deposit have potential to be classified as hard coking coal when blended with UHG hard coking coal seams with appropriate ROM feed blend ratio.

Although, more recently, MMC is adopting a strategy to wash and produce semihard and semisoft coal seams of the BN mine separately without blending them with UHG coal due to the increased demand and market price of the semihard coking coal. Therefore, the classification of the semihard coking coal seams of the BN deposit remains as original (semihard coking coal) in this report.

The raw coal quality data used for the Resource estimates was collected from 2 exploration drilling programs. Quincunx Gold Exploration Ltd later renamed as QGX LLC (QGX) organized drilling from 2005 to 2010 with a total of 2679 samples for BN and 185 samples for THG collected respectfully. From 2011 until today the MMC geology team conducted drilling in the area with a total of 15181 ply samples for BN. These samples were analysed for total moisture (%), proximate analysis, sulphur, and calorific value. CSN and G-index were analysed on composite samples as the coking properties cannot be calculated by weighted average and merged with BN Micromine model.

A clear disparity of the moisture data was observed from the coal quality analysis results of 2 different drilling programs. With the QGX moisture values being clearly not aligning with associated coal rank and MMC moisture values composing large volume (greater than 50%) of the coal quality datasets, a decision was made by the CP to transform the QGX moisture data to fit the MMC data whereby all the available coal quality data could be used for the resource estimate.

In accordance with the ASTM classification of coal by rank, with the wide range in volatile matter, the coal was classified ranging from high-volatile "A" bituminous coal to low-volatile bituminous coal with most samples in the medium-volatile bituminous group.

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4.3. Geological Model

The BN geological Resource model was prepared by MMC using the Micromine software and was provided to GLOGEX. Then, the BN geological Resource model was converted to BN ROM model by using Micromine software by GLOGEX by incorporating same modifying factors that MMC had applied to the in situ model when generating the Resource model. To account coal loss and dilution of coal from mining processes, GLOGEX applied an additional modifying factors to the BN ROM Micromine model. The BN ROM Micromine model was generated and validated for subsequent mine planning and Reserve estimate by Datamine Studio NPVS software. No software model format conversion is required as the Datamine Studio NPVS is compatible with the Micromine block model .dat format.

4.4. Coal Resources

The BN Resource model provided to GLOGEX contained 18 main seams that further split into 252 plies. The model was provided on an as received basis with a weighted average total moisture of 4.55%. It included full coal quality parameters including total moisture (%), air dried moisture (%), raw ash (%), volatile matter (%), fixed carbon (%), in situ density (g/cc), calorific value (kcal/kg), sulphur (%), G index, and CSN. Coal Resources were estimated by MMC in 31st December 2021 from their geological model based on the following constraints:

- **Measured resources** were estimated with points of observation at 500m and where appropriate were extrapolated half the distance from the last point.
- **Indicated resources** were estimated with points of observation at 1000m and where appropriate were extrapolated half the distance from the last point.
- **Inferred resources** were estimated with points of observation at 2000m and where appropriate were extrapolated half the distance from the last point.

Seam coding was applied to aggregate plies into seams based on a specified minimum coal thickness and a maximum stone parting thickness. The seams were also coded on the basis of resource classification so that only plies of the same resource classification were combined together with their partings. The following modifying factors were used for seam coding:

- No maximum seam thickness;
- Minimum seam thickness to be included in the Resource of 0.5m to 400m depth and then 1.5m below 400m;

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- Maximum parting thickness to be included in the Resource of 0.5m; and
- Coal Quality limit with Ash content greater than 50 percent (dry basis) being excluded from the resource estimate.

Following seam coding, coal quality interpolation was carried out. Only intervals that satisfied Points of Observation (POO) requirements were used for coal quality interpolation. An IDW algorithm with a power of two was used to interpolate the coal quality into the empty block model.

Coal quality interpolation was conducted for each ply separately. One search run at 7,000m radius was used to interpolate all the blocks in each model. Filters were applied to make sure that only POO for the selected ply were used for the interpolation of the blocks for that ply.

Table 4.1 and **Table 4.2** summarises the Coal Resources in terms of resource category and depth and has been reported by major seam group at BN and THG deposits. The total Measured and Indicated Coal Resources of BN were estimated at 384 Mt, comprising 333 Mt of Measured Resources and 51 Mt of Indicated Resources. There is 31 Mt of Inferred Resources. Total Resources are estimated as 415 Mt (as received basis). Tsaikharkhudag has estimated a total of 67 Mt Indicated, 22 Mt of Inferred Resources.

Table 4-1. BN Coal Resource by Depth (ar)

Volume (x1,000,000 м^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Total Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA - BHWE									
4.6	7.3	1.6	29.0	2.3	23.9	5515	1.2	44.8	MEASURED
0.8	1.2	1.6	32.0	2.1	23.6	5205	1.1	42.3	INDICATED
0.5	0.7	1.6	31.1	2.5	24.1	5276	1.1	42.3	INFERRED
5.9	**9.2**	**1.6**	**29.6**	**2.3**	**23.9**	**5457**	**1.2**	**44.27**	**SUBTOTAL**
BHWE - 100m									
39.4	61.9	1.57	28.88	2.16	23.90	5543	1.14	45.07	MEASURED
5.7	9.2	1.61	31.33	2.11	23.65	5287	1.04	42.91	INDICATED
3.1	5.0	1.60	30.44	2.36	24.13	5351	1.09	43.06	INFERRED
48.2	**76.1**	**1.58**	**29.28**	**2.17**	**23.88**	**5499**	**1.12**	**44.68**	**SUBTOTAL**
100 - 200m									
55.9	87.8	1.57	28.55	2.02	24.05	5578	1.12	45.37	MEASURED
7.5	12.0	1.61	30.91	2.11	23.69	5330	1.07	43.29	INDICATED
4.8	7.7	1.60	29.92	2.41	24.30	5397	1.07	43.37	INFERRED
68.2	**107.5**	**1.58**	**28.91**	**2.06**	**24.03**	**5537**	**1.11**	**44.99**	**SUBTOTAL**
200 - 300m									
56.4	88.6	1.57	28.60	1.98	24.01	5574	1.10	45.41	MEASURED
8.3	13.3	1.59	29.99	2.06	23.73	5424	1.10	44.21	INDICATED
5.2	8.2	1.59	29.40	2.37	24.32	5457	1.08	43.91	INFERRED
69.9	**110.1**	**1.57**	**28.83**	**2.02**	**24.00**	**5547**	**1.10**	**45.15**	**SUBTOTAL**
300 - 400m									
55.1	86.5	1.57	28.54	1.94	23.96	5583	1.12	45.56	MEASURED

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9.8	15.7	1.60	30.49	2.07	23.56	5372	1.10	43.88	INDICATED
5.7	9.0	1.58	28.84	2.32	24.30	5518	1.10	44.54	INFERRED
70.6	**111.2**	**1.58**	**28.84**	**1.99**	**23.93**	**5548**	**1.12**	**45.24**	**SUBTOTAL**
262.8	**414.1**	**1.58**	**28.95**	**2.05**	**23.96**	**5534**	**1.11**	**45.03**	**GRAND TOTAL**
264	**415**	**1.6**	**29**	**2.1**	**24**	**5534**	**1.10**	**45**	***Total (Rounded)**

(Source: JORC (2012) Standard Resource Estimation Baruun Naran Coal Mine (MMC,31st of December 2021)

Table 4-2. THG Coal Resource by Depth (ar)

Volume (1,000,000 M^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	ASH (%)	Total Moisture (%)	Volatile Matter (%)	GROSS Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA - BHWE									
0.4	0.7	1.7	38.3	3.8	21.8	4,465	0.9	36.1	INDICATED
0.1	0.2	1.6	36.7	2.9	22.3	4,707	0.7	38.1	INFERRED
0.5	**0.9**	**1.6**	**37.9**	**3.6**	**21.9**	**4,526**	**0.9**	**36.59**	**SUBTOTAL**
BHWE - 100m									
7.8	12.7	1.64	37.12	3.64	22.24	4,577	0.94	37.00	INDICATED
2.4	4.0	1.63	36.58	3.13	22.38	4,721	0.70	37.92	INFERRED
10.2	**16.7**	**1.64**	**36.99**	**3.52**	**22.27**	**4,611**	**0.88**	**37.22**	**SUBTOTAL**
100 - 200m									
10.8	17.8	1.64	37.17	3.33	22.27	4,602	0.82	37.24	INDICATED
2.5	4.1	1.63	36.82	3.09	22.37	4,692	0.63	37.72	INFERRED
13.4	**21.9**	**1.64**	**37.10**	**3.29**	**22.29**	**4,619**	**0.78**	**37.33**	**SUBTOTAL**
200 - 300m									
11.8	19.2	1.63	36.32	3.08	22.66	4,702	0.67	37.94	INDICATED
3.2	5.1	1.61	34.94	3.15	23.14	4,847	0.59	38.78	INFERRED
14.9	**24.3**	**1.62**	**36.03**	**3.09**	**22.76**	**4,733**	**0.65**	**38.12**	**SUBTOTAL**
300 - 400m									
9.9	16.1	1.61	35.43	2.77	23.11	4,820	0.61	38.69	INDICATED
5.5	8.9	1.62	35.80	3.23	22.84	4,750	0.63	38.13	INFERRED
15.5	**25.0**	**1.62**	**35.56**	**2.93**	**23.01**	**4,795**	**0.62**	**38.49**	**SUBTOTAL**
54.5	**88.7**	**1.63**	**36.36**	**3.18**	**22.62**	**4,697**	**0.72**	**37.84**	**GRAND TOTAL**
54	**89**	**1.6**	**36**	**3.0**	**23**	**4,700**	**0.7**	**38**	***Total (Rounded)**

(Source: JORC (2012) Standard Resource Estimation Baruun Naran Coal Mine (MMC, 1st of December 2021)

Note:

(i) *Technical information in this BN Coal Resource estimation has been compiled by Mr. Byambaa Barkhas, Chief Geologist, Mongolian Mining Corporation. Mr. Barkhas is a member of the Australasian Institute of Mining and Metallurgy (Member #318198) and has over 12 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Minerals Resources and Ore Reserves, The JORC Code (2012). Mr. Barkhas consents to the inclusion in the release of the matters based on this information in the form and context in which it appears. The estimate of the Coal Resource set out in Table 1 presented in this report are considered to be a true reflection of the BN Coal Resource as at 1st December 2021, and have been carried out in accordance with the principles and guidelines of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. The JORC Code (2012).*

(ii) *Technical information in this BN Coal Resource estimation has been internally peer reviewed by Mr. Lkhagva-Ochir Said, Executive General Manager for Mining and Production, Mongolian Mining Corporation. Mr.Said is a member of the Australasian Institute of Mining and Metallurgy (Member #316005) and has over 15 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012).*

(iii) *Due to rounding, discrepancy may exist between sub-totals and totals.*

GC-02/FEBRAURY 2022

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5. Coal Reserves Estimate

The following sections describe the processes used to convert the Coal Resources to the Coal Reserves. The order generally follows "Table 1 – Section 4 Check List of Assessment and Reporting Criteria" in the JORC Code 2012 Edition. This process includes defining viable pit limits, applying various modifying factors mining recovery, metallurgical, cost, revenue and similar factors to the Coal Resources to estimate Coal Reserves.

5.1. Coal Resources Estimate

The Coal Resource estimate that is the basis for the Coal Reserves estimate is summarized in Section 4.4 of this report. The Competent person who prepared the Coal Resources estimate is Mr Byambaa Barkhas. Mr Byambaa Barkhas is a full-time employee of MMC and is a member of the Australasian Institute of Mining and Metallurgy. The Coal Resources are reported inclusive of those Coal Resources modified to produce the Coal Reserves.

5.2. Study Status

GLOGEX is completing the Reserve Statement of BN deposit as of 1st of January 2022 based on the BN Coal Resource Estimation as of December 2021.

Figure 5-1. Pit optimization result

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The Competent Person for the Coal Reserves Statement made consecutive site visits since January 2018. His last visit was in November 2021. The competent person believes that further site visit will be in 2022 to review changes in the mining process as well as mining conditions.

5.3. Geotechnical Criteria

The slope design criteria was recommended by Australian Mining Consultants ("AMC") as part of its geotechnical assessment with overall pit wall slopes of ranging from 30° to 45°.

- West pit High wall (north) 45°
- West pit Low wall (South) 35°
- East pit High Wall (north) 30°
- East pit Low wall (South) 35°
- End Wall (north) 30°
- End wall (south) 35°

5.4. Mining Factors

The mining factors adopted in converting the BN Resource model to a BN ROM model have been summarized in the table below (Table 5.1).

- **Minimum Mining Thickness:** Coal working sections with total thickness of less than 0.5 m were excluded as mineable coal;
- **Minimum Parting Thickness:** Partings with thickness less than 0.5 m were aggregated with adjacent coal working sections and included in the ROM coal calculations;
- **Roof and Floor Loss:** It was assumed that approximately 100 mm of loss occur with all coal seams both from roofs and floors.
- **Roof and Floor Dilution:** It was assumed that approximately 100 mm of waste material will be mined with coal seams both from roofs and floors, thereby diluting the working section coal quality. Average dilution percentages of each seam were calculated by assaying the number of potential working sections on a block by block basis. Dilution is applied to the model as a percentage to each working section. Refer to Table 5.2 for the default dilutant qualities.
- **Global Loss:** 1% of all mineable coal has been deducted from the estimate of ROM coal. This global allowance covers both geological and mining losses, including losses which will occur along edges, such as subcrops, faults, wedges, and ramps.

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- **Moisture:** The in situ relative density data in the original BN Micromine resource block model provided by MMC was based on weighted average in situ total moisture of 2.1%. Same principle applies to remaining coal quality parameters. Preston Sanders formula was used to convert relative density to in situ relative density. MMC advised that coking product moisture will be 8%, middlings product moisture will be 9%, and thermal product moisture will be 2.62%.

Table 5-1. Summary of BN Mining Modifying Factors

Modifying Factor / Unit	unit	Value
Roof loss	mm	100
Roof dilution	mm	100
Floor loss	mm	100
Floor dilution	mm	100
Minimum seam thickness	m	0.5
Maximum included ply thickness	m	0.5
Global loss	%	1.0

Table 5-2. BN Default Dilutant Qualities

Default Quality / Unit	As Received Value
Relative Density / g/cc	2.81
Total Moisture / %	2.30
Ash / %	93.86
Volatile Matter / %	3.85
Fixed Carbon / %	0.00
Calorific Value / kCal/kg	0.00
Sulfur / %	0.01

(Source: JORC (2012) Standard Resource Estimation Baruun Naran Coal Mine (License 14493A), MMC, January 2022)

5.5. Metallurgical Factors and Product Specification

The wash plant yield data for a range of cut-point densities was provided by Norwest for each major coking seam group. MMC recently modified ash yield curves of extracted coal seams in the mine based on in pit bulk sampling. A number of iterations were completed in the Datamine NPVS software to determine the most suitable coking "ROM Ash – Yield" cut-point density curve to use in the Statement of Reserve Report on the bases of achieving a semihard coking coal product ash of no greater than 11.5% (dry) and a semisoft coking product ash of no greater than 9.5% (dry) across all periods.

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Previously, in line with the coal quality studies reported previously by RungePincockMinarco ("RPM") and Glogex , MMC has adopted a strategy to blend BN semihard coking coal seams with UHG hard coking coal seams prior to processing and be washed at the Coal Handling and Processing Plant located at UHG mine ("UHG CHPP") as the resulting product quality met the hard coking coal customer specifications based on the full scale washplant based performance data. The trial run of the BN H seam was conducted from 23 to 31 January 2018 by blending 10%-20% ROM feed blends of BN H seam and 80%-90% UHG hard coking coal seams (3A, 4A, 4B, 0CU, and 0B). The laboratory results of this trial run revealed a hard coking coal product with uniform quality meeting the target specifications with volatile matter (dry ash free) ranging from 23.56% to 25.81% with an average of 25%.

Although, more recently, MMC is adopting a strategy to wash and produce semihard coal seams of the BN mine individually without blending them with UHG coal due to the increased demand and market price of the semihard coking coal. Therefore, the classification of the semihard coking coal seams of the BN deposit remains as original (semihard coking coal) in this report.

The Norwest and MMC "ROM Ash – Yield" curves required to achieve coking product specification was at a cut- point density of 1.4 (Table 5.3). Thermal coal of the deposit will not be processed. These curves defined the coal product calculations incorporated to the final Datamine Studio NPVS software which the final BN pit shell design was based on.

Table 5-3. Coking Coal "ROM Ash – Yield" Curve (Wash Plant - 1.4 Cut-Point Density)

Seam	Coking Product		
	ROM Ash - Yield Curve	Product Ash (% adb)	Product Type
Seam V	-0.0116 x ROM Ash% + 0.8769	9.5	Semi-Soft
Seam U	-0.013 x ROM Ash% + 0.9055	9.5	Semi-Soft
Seam T	-0.0128 x ROM Ash% +0.9691	8	Semi-Soft
Seam R	-0.0134 x ROM Ash% + 0.9076	9.5	Semi-Soft
Seam Q	-0.0127 x ROM Ash% + 0.8853	9.5	Semi-Soft
Seam N	-0.0127 x ROM Ash% + 0.8586	9.5	Semi-Soft
Seam K	-0.0122 x ROM Ash% + 0.8569	9.5	Semi-Soft
Seam J	-0.0113 x ROM Ash% + 0.8257	10.5	Hard

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Seam I	-0.0129 x ROM Ash% + 0.8834	10.5	Hard
Seam H	-0.0139 x ROM Ash% +0.8321	10.5	Hard
Seam F	-0.0074 x ROM Ash% + 0.5292	10.5	Hard
Seam E	-0.0074 x ROM Ash% + 0.5292	10.5	Hard
Seam G	-0.0116 x ROM Ash% + 0.6887	14.0	Hard

(Source: Norwest and MMC)

Table 5-4. Middlings Coal "ROM Ash – Yield" Curve (1.4 Cut-Point Density)

Seam	Secondary Middlings Product	
	ROM Ash - Yield Curve	Product Ash (% adb)
Seam V	-0.0003 x ROM Ash% + 0.0224	18
Seam U	-0.0003 x ROM Ash% + 0.0236	18
Seam T	-0.0009 x ROM Ash% +0.0786	18
Seam R	-0.0003 x ROM Ash% + 0.0191	18
Seam Q	-0.0003 x ROM Ash% + 0.0168	18
Seam N	-0.0004 x ROM Ash% + 0.0297	18
Seam K	-0.0005 x ROM Ash% + 0.0384	18
Seam J	-0.0016 x ROM Ash% + 0.1339	18
Seam I	-0.0026 x ROM Ash% + 0.1694	18
Seam H	-0.0042 x ROM Ash% +0.2185	18
Seam F	-0.0054 x ROM Ash% + 0.324	18
Seam E	-0.0054 x ROM Ash% + 0.324	18
Seam G	-0.0029 x ROM ash% + 0.4568	27.5

Moisture conversions were made based on the following parameters:

- *In situ Moisture – no adjustment %,*
- *Product Thermal – no adjustment %,*
- *Product SHCC Coking 8%,*
- *Product SSCC Coking 8%,*
- *Product Middlings 9% (Middlings are a secondary product produced from the washing of coking coal).*

5.6. Cost Parameters

The mining, hauling, processing, handling, administration, transportation, air pollution, logistic, and import duty charges costs were adjusted from actual costs incurred at BN provided by MMC year to date 01 January

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2022 based on 2850 MNT/USD exchange rate. GLOGEX reviewed key cost inputs and concluded these were reasonable to be used for pit optimization. The input costs are summarized in Table 5.5.

Coal handling, processing and transportation cost of BN-UHG and UHG-GM port is based on coal transportation service agreement price between Energy Resources and Khangad Exploration LLC.

Table 5-5. Pit Optimization Input Costs

Item	Unit	Rate
Mining cost per BCM	USD/BCM	2.21
Site admin cost per BCM	USD/BCM	0.02
Waste mining cost-vertical	USD/m.BCM	0.0078
Air pollution fee	USD/t.ROM	0.35
Handling cost (BN-UHG)	USD/t.ROM	1.56
Processing cost	USD/t.ROM	6.35
General Administration cost	USD/t.ROM	1.19
Transportation and logistics cost UHG-GM	USD/t.product	9.25
Custom duty (at GM port)	USD/t.product	0.53

5.6.1. Mining cost

Coal and Waste mining cost is based on contractor companies' agreement price. The UARP LLC is contracted for BN mining operation services by MMC and mining cost per BCM is 1.82 USD/BMC per contract with MMC. Stock blast LLC and Davkhar Tesrelt LLC are contracted for drill and blast services and blasting cost per BCM is 0.39 USD/BCM per contacts with MMC. Based on the costs above, GLOGEX estimated mining cost per BCM as 2.21 USD/BCM.

Table 5-6. Pit Unit mining cost calculation, per BCM

Item	Mining cost, USD/BCM (2020 actual)
Mining cost	1.82
Drill and blast cost	0.39
Total	**2.21**

Source: Actual costs provided by MMC

5.6.2. Site admin cost

The annual actual site admin cost of BN is 252,000 USD or 0.02 USD/BCM. GLOGEX accepted site admin cost provided by MMC.

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5.6.3. Air pollution fee

A thousand tugriks per ROM ton of coal rate is applied per Mongolian Law on Air: Section 7.1. GLOGEX estimated air pollution fee as 0.35 USD/t.ROM after currency exchange.

5.6.4. Handling cost

Handling cost includes costs associated with the transportation of BN coal to UHG. The Enkh Tuguldur LLC is contracted for BN coal transportation service and handling cost per ROM ton is 1.56 USD/ROM ton per contract. GLOGEX accepted handling cost provided by MMC.

5.6.5. Processing cost

BN coal is processed in the CHPP at UHG mine and Khangad Exploration is charged 6.35 USD/ROM ton per ROM feed ton of coal according to the contract with MMC. GLOGEX accepted actual processing cost provided by MMC for pit optimization.

5.6.6. General administration cost

The general administration cost of the BN is 1.19 USD/ROM per ROM. GLOGEX estimated general administration cost of BN mine to be same as UHG and used for pit optimization.

5.6.7. Transportation and logistics cost UHG-GM

The UHG-GM railroad is being constructed by The Tavantolgoi Railroad LLC. GLOGEX estimated railroad transportation cost as 8 USD/t.ROM as provided in the Tavantolgoi Railroad website. GLOGEX estimated logistics cost based on the average actual cost of 2018-2020 and calculated combined transportation and logistics cost as 9.25 USD/product.

Table 5-7. Transportation and logistics cost per ton product

Item	2018	2019	2020	2021H1
Total logistic cost, Millon USD	5.4	6.4	5.6	1.5
Logistic cost, USD/ton product	1.15	1.26	1.33	1.90

Source: MMC annual report 2018-2020, MMC interim report 2021

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5.6.8. Custom duty

A thousand and five hundred tugriks per ROM ton of coal rate is applied for customs duty per Government of Mongolia regulations. GLOGEX estimated customs duty as 0.53 USD/t.ROM after currency exchange.

5.7. Marketing and Revenue Parameters

MMC is the closest coking coal producer to the Baotou in Inner Mongolia, which is the closest railway transportation hub providing access from Mongolia to the largest steel producing provinces in China. In April 2021 Shanxi Fenwei completed an independent market study for both UHG, BN and identified principal coking and thermal coal markets 2022-2025 in Mongolia and China.

Table 5-8. Coal historical price and benchmark price forecast (DAP Ganqimaodou port, China)

USD/t	2020*	2021*	2022**	2023**	2024**	2025**	Average	Royalty exclusive	Note
BN-1/3JM (G75)/SSCC	67.4	81.7	109.4	107.3	105.3	104.4	95.9	91.1	average 2020-2025
BN-1/3JM (G89)/SHCC			132.2	129.7	127.3	126.2	128.8	125.9	average 2022-2025
MMC-6000Kcal/kg			51.3	48.6	48.0	47.3	48.8	46.3	average 2022-2025
MMC-5000Kcal/kg	14.0		37.0	34.6	34.2	33.7	30.7	28.8	average 2022-2025

*Note: *MMC actual price, provided by MMC, ** Price forecast by Fenwei Energy*

DAP price coal quality of MMC coals at Ganqimaodou (excl. customs duty, VAT and prices prior to inspection)

		CV	A	M	V	S	G	CSR	MF (lga)
MMC products	MMC-JM		10.5	9	26	0.7	83		
	BN-1/3JM (G89)/SHCC		11.5	-	30	0.7	89		
	MMC-1/3JM		9.5	10	35	0.7	75		
	MMC-6000 Kcal/kg	6000							
	MMC-5000 Kcal/kg	5000							

Source: Fenwei Energy

The coal selling prices for Semihard Coking Coal were estimated based on on 5 years average price forecast of 2022-2025, as provided to MMC by Shanxi Fenwei Energy Consulting Co. Ltd ("Shanxi Fenwei") product value at the DAP Ganqimaodou port of China. The coal selling prices for Semisoft coking coal were estimated based on actual coal price provided by MMC from 2020 to 2021 and 5 year average price forecast of 2022-2025 by Shanxi Fenwei Energy Consulting Co. Ltd ("Shanxi Fenwei"). The selling prices of Middlings coal and Thermal coal were estimated based on 5 year average price forecast of 2022-2025 as provided to MMC

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by Shanxi Fenwei Energy Consulting Co. Ltd ("Shanxi Fenwei") product value at the DAP Ganqimaodou port of China.

The coal selling prices assigned to each product, were:

- Semihard coking coal < 11.5% ash (dry): US$128.8/t product (ar),
- Semi-soft coking coal < 9.5% ash (dry): US$95.9/t product (ar),
- Middlings coal ~ benchmark CV 6,000 kcal/kg (gar): US$48.8/t product (ar),
- Thermal coal ~ benchmark CV 5,000 kcal/kg (gar): US$30.7/t product (ar).

The royalty provided by MMC was assigned as a percentage of revenue generated by that product coal as summarized in Table 5.9:

Table 5-9. Royalty

Washed coal		
Base royalty	% of DAP price	5.0
Additional royalty		
If DAP GM price 0<100, royalty added by	% of DAP price	-
If DAP price 100=<130, royalty added by	% of DAP price	1.0
If DAP price 130=<160, royalty added by	% of DAP price	1.5
If DAP price 160=<190, royalty added by	% of DAP price	2.0
If DAP price 190=<210, royalty added by	% of DAP price	2.5
If DAP price 210=< , royalty added by	% of DAP price	3.0
Unwashed (row) coal		
Base royalty	% of DAP price	5.0
Additional royalty		
If DAP price 0<25, royalty added by	% of DAP price	-
If DAP price 25=<50, royalty added by	% of DAP price	1.0
If DAP price 50=<75, royalty added by	% of DAP price	2.0
If DAP price 75=<100, royalty added by	% of DAP price	3.0
If DAP price 100=<125, royalty added by	% of DAP price	4.0
If DAP price 125=< , royalty added by	% of DAP price	5.0

5.8. Pit Optimization Results

Datamine Studio NPVS software was used to generate a series of incremental pit shells based on a range of coal selling prices. This is a three dimensional approach which provides a series of pit shells where each increment reflects different economic scenarios such as changes to depth, mining cost or coal price. Through

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the application of mining factors (Section 5.4), and processing factors (Section 5.5) the mineable in situ coal within the pit shell was converted to ROM coal quantities and product coal quantities.

The pit optimization results were examined and the optimal pit shell that is determined by the results corresponding to the pit shell with an incremental cash margin of $0 (the difference between incremental revenue and incremental cash cost) was selected as the Optimized Pit Shell. The optimization was not limited to a vertical depth.

The selected pit shell (Optimized Pit Shell) was modified slightly to conform practical pit for mining (Mineable Pit Shell) as shown in Figure 5.2, Figure 5.3. The Mineable Pit Shells contain a waste volume of 1,640 Mbcm, ROM coal of 286.4 Mt at a Strip Ratio of 5.73:1 (bcm/t ROM). The mineable ROM coal quantity includes Measured, Indicated, and Inferred coal resources within the pit shells.

The pit optimization price sensitivity results are summarized in Table 5.10, which outlines the waste and coal quantities in the optimal pit shell for a range of coal selling prices (labelled as a percentage of the base price, with 100% being equal to the base coal selling prices outlined in Section 5.7).

Table 5-10. Pit Optimization Results – Coal Price Sensitivity

Coal Price as % of Base Price	Waste Mbcm	Coal Mt ROM	Strip Ratio m3/tn
30%	0.9	1.17	0.79
40%	62.5	19.16	3.26
50%	190.7	48.11	3.96
60%	419.2	95.19	4.40
70%	811.4	166.19	4.88
80%	1110.4	213.37	5.20
90%	1408.3	256.05	5.50
100%	**1640.2**	**286.43**	**5.73**
110%	1890.2	317.64	5.95
120%	2036.5	333.14	6.11
130%	2176.2	347.19	6.27
140%	2252.6	353.80	6.37
150%	2328.0	360.25	6.46

Graph 5.1 Illustrates that the BN deposit, while not overly sensitive to an increase in coal sales price, is more sensitive to a drop in coal sales price below the base price. This is evident by the more rapid rate of decrease

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in ROM coal quantities at coal prices below 100% of the base price, as opposed to the rate of increase in ROM coal quantities at coal prices above 100% of the base price.

Graph 5-1. Pit Optimization - Coal Price Sensitivity (Datamine Studio NPVS pit shells)

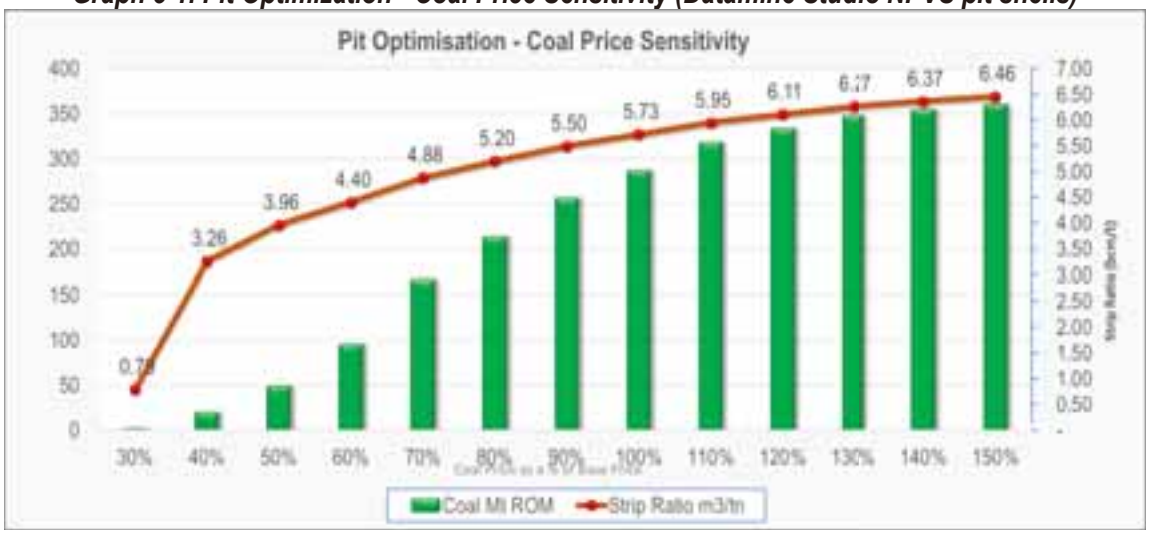

Figure 5-2. Optimized Pit Shell

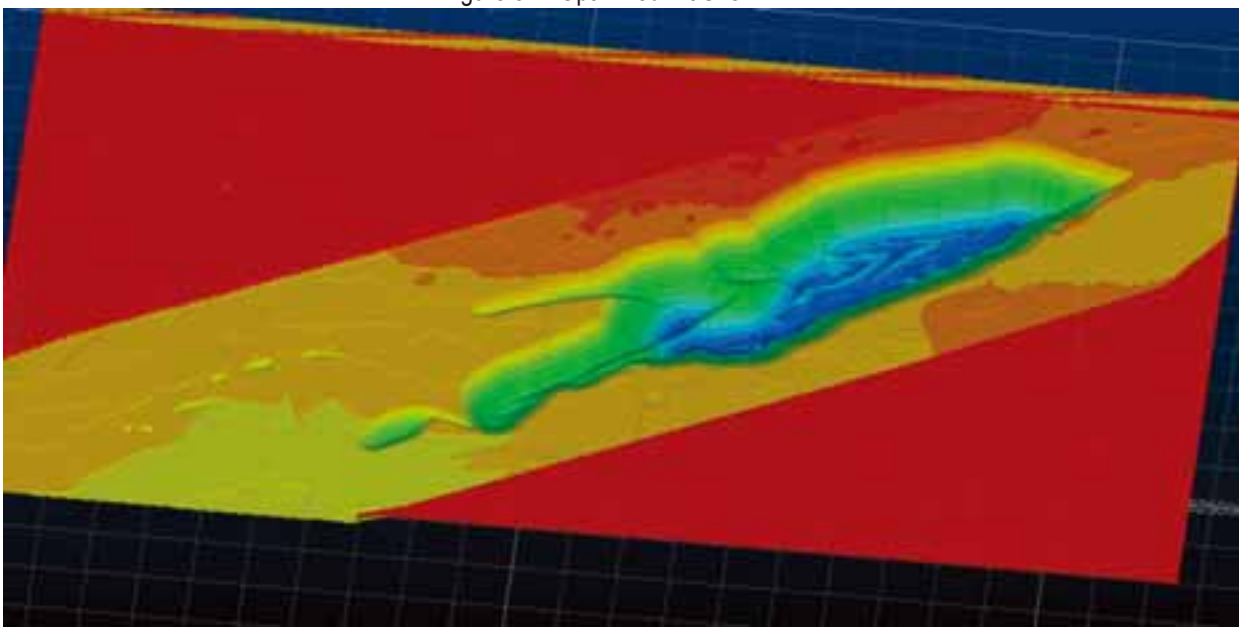

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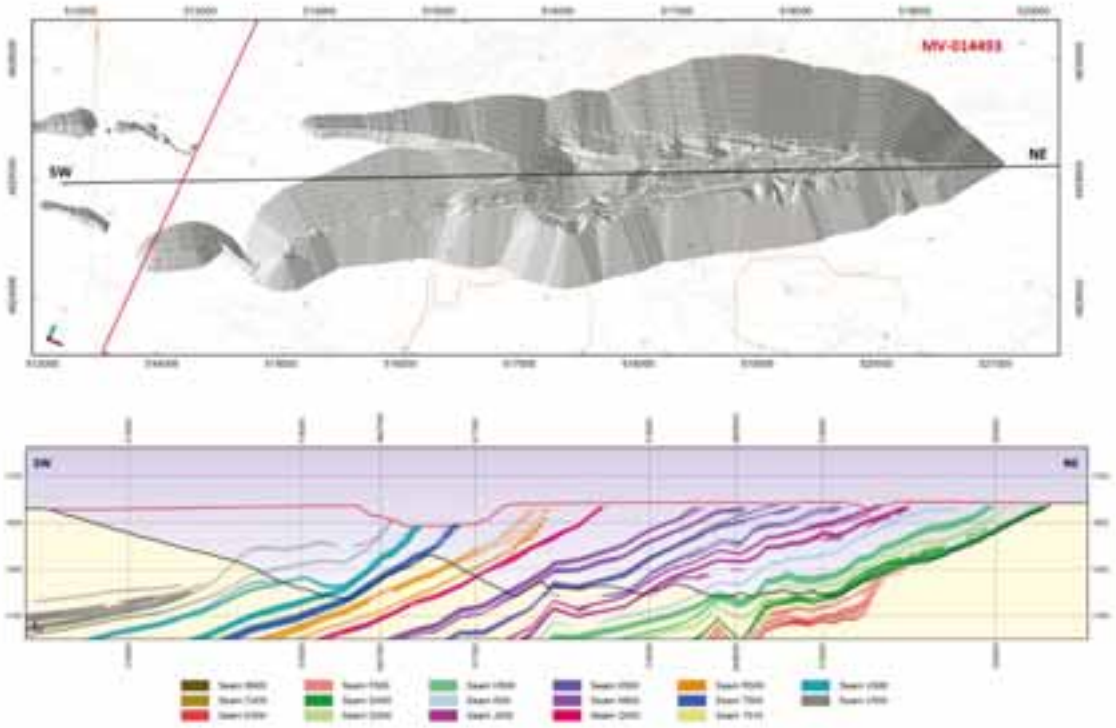
Figure 5-3. Mineable Pit Design, cross section (Micromine)



5.9. Categorization

Measured and Indicated Coal Resources within the Mineable Pit Shells were categorized as Coal Reserves. Coal Reserves have been categorized based on the confidence of the Coal Resources and the level of detail in the mine planning. Measured Resources within the pit shells have been categorized as Proved Reserves. All Indicated Resources have been categorized as Probable Reserves. While Inferred Resources were assigned revenue in the BN Reserve study pit optimizer to generate and define the Mineable Pit Shell, no Inferred Resources have been reported as Reserves in this statement.

5.10. Audits and Reviews

The JORC Code (2012) provides guidelines which set out minimum standards, recommendations, and guidelines for the Public Reporting of exploration results, Mineral Resources and Ore Reserves. Within the code is a “Checklist of Assessment and Reporting Criteria” (Table 1 – JORC Code), encompassing Section

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1- Sampling Techniques and Data, Section 2 - Reporting Exploration Results, Section 3 - Estimation and Reporting of Mineral Resources, and Section 4 - Estimation and Reporting of Ore Reserves.

Sections 1, 2 and 3 of Table 1 have been extracted from the Coal Resource report (JORC (2012) Standard Resource Estimation Baruun Naran and Tsaikharkhudag Coal Mine, MMC, January 2021) which describes in full detail the source of the Resource estimate used for this Reserve estimate.

The CP (Reserves) has previously discussed the Resource estimate with the CP (Resources) and is satisfied that Sections 1, 2, and 3 have been appropriately considered in the Resource estimate. These sections are attached to this Reserves Statement as Appendix B, C, and D respectively. Section 4 of Table 1, completed by the CP (Reserves), is attached in Appendix E.

5.11. Results

The Proved Open Cut Coal Reserves for BN of 256 Mt are shown in Table 5.11, the Probable Open Cut Coal Reserve of 24.2 Mt are shown in Table 5.12 and the Total Open Cut Coal reserves of 280 Mt are shown in Table 5.13. The Proved, Probable, and Total Coal Reserves are also shown by major seam groups in the tables.

Table 5-11. Proved Open Cut Coal Reserves by Seam

Proved reserves			
Seam	**ROM Coal (Mt)**	**Ash (%)**	**Calorific Value (kcal/kg)**
V	0.9	49.71	3,470
U	12.7	36.42	4,793
T	22.7	20.72	6,309
R	10.8	39.63	4,545
Q	8.2	39.58	4,590
N	40.3	34.25	4,980
K	23.0	37.02	4,840
J	22.3	28.78	5,637
I	16.9	26.05	5,850
H	52.4	19.95	6,475
G	40.2	38.09	4,776
F	5.1	26.75	5,719
E	0.4	35.02	5,194
Total Coal (Mt)	**255.9**	**30.37**	**5,443**
Total Coking (Mt)	**246.3**	**30.54**	**5,429**
Total Thermal (Mt)	**9.6**	**26.05**	**5,820**

(Note: Estimate has been rounded to reflect accuracy)

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Table 5-12. Probable Open Cut Coal Reserves by Seam

Probable reserves			
Seam	**ROM Coal (Mt)**	**Ash (%)**	**Calorific Value (kcal/kg)**
V	0.3	50.51	3,395
U	2.1	38.25	4,615
T	1.1	30.22	5,420
R	0.8	42.85	4,274
Q	0.7	39.06	4,613
N	3.7	35.02	4,919
K	2.9	41.51	4,426
J	4.3	28.89	5,577
I	1.2	29.00	5,582
H	5.6	19.96	6,494
G	1.0	38.62	4,794
F	0.4	29.75	5,547
Total Coal (Mt)	**24.2**	**31.68**	**5,320**
Total Coking (Mt)	**23.3**	**31.82**	**5,308**
Total Thermal (Mt)	**1.0**	**28.53**	**5,612**

(Note: Estimate has been rounded to reflect accuracy)

Table 5-13. Total Open Cut Coal Reserves by Seam

Proved+Probable reserves			
Seam	**ROM Coal (Mt)**	**Ash (%)**	**Calorific Value (kcal/kg)**
V	1.3	49.92	3,450
U	14.8	36.68	4,767
T	23.8	21.17	6,267
R	11.6	39.86	4,526
Q	8.9	39.54	4,591
N	44.0	34.32	4,975
K	25.9	37.53	4,794
J	26.7	28.80	5,628
I	18.1	26.24	5,832
H	57.9	19.96	6,477
G	41.2	38.11	4,777
F	5.5	26.97	5,706
E	0.4	35.02	5,194
Total Coal (Mt)	**280.2**	**30.49**	**5,433**
Total Coking (Mt)	**269.6**	**30.65**	**5,418**
Semihard coking	**149.8**	**27.58**	**5,749**
Semisoft coking	**130.3**	**33.83**	**5,070**
Total Thermal (Mt)	**10.6**	**26.28**	**5,801**

(Note: Estimate has been rounded to reflect accuracy)

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The Proved, Probable and Total Marketable Coking Coal Reserves are shown in Table 5.14 by major seam group. Total Marketable Coking Coal Reserves are 114 Mt

Table 5-14. Marketable Coking Coal Reserves by Seam

Coking	Proved		Probable		Total	
Seam	Mt (ar)	Ash (% ad)	Mt (ar)	Ash (% ad)	Mt (ar)	Ash (% ad)
V	0.22	11.60	0.07	11.60	0.29	11.60
U	4.57	10.60	0.71	10.60	5.28	10.60
T	15.13	8.44	0.55	8.45	15.68	8.44
R	2.35	13.30	0.15	13.30	2.50	13.30
Q	3.29	9.50	0.26	9.50	3.56	9.50
N	17.73	9.50	1.55	9.50	19.27	9.50
K	9.73	9.50	1.07	9.50	10.81	9.50
J	9.73	11.10	1.86	11.10	11.59	11.10
I	10.22	10.70	0.69	10.70	10.90	10.70
H	29.98	11.90	3.21	11.90	33.19	11.90
G	10.69	14.10	0.26	14.10	10.96	14.10
Total	**113.64**	**10.80**	**10.40**	**10.81**	**124.04**	**10.8**

(Note: Estimate has been rounded to reflect accuracy, Product Coking coal total moisture is 8%)

The Proved, Probable, and Total Marketable Middlings Coal Reserves are shown in Table 5.15 by major seam group. Total Marketable Middlings Coal Reserves are 30.4 Mt.

Table 5-15. Marketable Middlings Coal Reserves by Seam

Coking	Proved		Probable		Total	
Seam	Mt (ar)	Ash (% ad)	Mt (ar)	Ash (% ad)	Mt (ar)	Ash (% ad)
V	0.00	17.70	0.00	17.70	0.00	17.70
U	2.19	22.20	0.35	22.20	2.54	22.20
T	2.35	19.38	0.09	19.49	2.44	19.38
R	0.08	22.40	0.01	22.40	0.09	22.40
Q	0.04	18.00	0.00	18.00	0.05	18.00
N	0.68	18.00	0.06	18.00	0.73	18.00
K	0.48	18.00	0.05	18.00	0.54	18.00
J	4.20	20.00	0.80	20.00	5.00	20.00
I	2.02	18.20	0.14	18.20	2.16	18.20
H	9.57	17.50	1.02	17.50	10.59	17.50
G	6.13	22.40	0.16	22.40	6.28	22.40
Total	**27.7**	**19.58**	**2.7**	**19.28**	**30.4**	**19.55**

(Note: Estimate has been rounded to reflect accuracy, Product Middlings total moisture is 9%)

The Proved, Probable and Total Marketable Thermal Coal Reserves are shown in Table 5.16 by major seam group. Total Marketable Thermal Coal Reserves are 9.6 Mt.

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Table 5-16. Marketable Thermal Coal Reserves by Seam

Thermal	Proved		Probable		Total	
Seam	Mt (ar)	Calorific Value (kcal/kg)	Mt (ar)	Calorific Value (kcal/kg)	Mt (ar)	Calorific Value (kcal/kg)
U	0.05	5,339	0.04	5,164	0.09	5,265
T	0.63	6,423	0.13	5,935	0.77	6,338
R	0.11	5,395	0.00	5,112	0.12	5,384
Q	0.07	5,413	0.03	5,229	0.10	5,362
N	0.70	5,435	0.14	5,198	0.84	5,395
K	0.28	5,581	0.03	5,202	0.31	5,542
J	0.42	5,922	0.10	5,697	0.52	5,878
I	0.34	6,219	0.00	5,638	0.34	6,214
H	1.10	6,575	0.08	6,542	1.18	6,572
G	0.40	5,360	0.00	5,164	0.40	5,358
F	5.13	5,719	0.41	5,547	5.54	5,706
E	0.40	5,194	-		0.40	5,194
Total	**9.63**	**5,820**	**0.98**	**5,612**	**10.61**	**5,801**

(Note: Estimate has been rounded to reflect accuracy, Thermal product total moisture is 2.62%)

5.12. Coal Reserves Reconciliation with Coal Resources

The Total BN Coal Reserves to 400 m depth at 01 January 2022 are estimated at 280 Mt out of Total Coal Resources to 400 m depth of 384 Mt as at 01 January 2022. The reconciliation between reported Total Coal Resources estimated at January 2022 and Total Coal Reserves estimated at 01 January 2022 is outlined below in Table 5.17.

Table 5-17. Reconciliation of Coal Resources and Coal Reserves (Mt)

Total Coal Resources, 01 January 2018	**302.0**
Total Coal Resources less than 400m	**414.8**
Measured and Indicated Coal Resources less than 400 m	**384.0**
Mining losses and Coal Resources not converting to Coal Reserves	**104**
Coal Reserve 01 January 2022	**280**

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5.13. Coal Reserves Comparison to Previous Coal Reserves Statement

The previous Coal Reserves Statement for BN was published as at 01 January 2018 by GLOGEX. The Coal Reserves estimated in that Statement were 176 Mt. The comparison with the Coal Reserves presented in the 01 January 2018 Statement and the 01 January 2022 Statement are outlined below in Table 5.18

GLOGEX reserve estimation 2022 is increased by 104 million tons compare to the 2018 reserve estimation. Main reasons of this increase include increased geological resource based on 2020 exploration program, coal price of a current state of the market, and changes in the mine cost.

Table 5-18. Comparison of Coal Reserves to Previous Coal Reserves Statement (Mt)

Coal Reserves as at 01 January 2018 (ROM)	**176**
Coal Mined and depleted between 01 January 2018 and 01 January 2022	(3.5)
Increase in Coal Reserves identified in the 2018 Reserves estimate that are economically viable for mining at 01 January 2022	107.5
Coal Reserves as at 01 January 2022 (ROM)	**280**

- *Estimate has been rounded to reflect accuracy*

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APPENDIX A: SAMPLING TECHNIQUES AND DATA,

"CHECKLIST OF ASSESSMENT AND REPORTING CRITERIA" (TABLE 1 – JORC CODE),

Section 1- Sampling Techniques and Data (Source: JORC (2012) Standard Resource Estimation of Baruun Naran Mining License -14493A and Tsaikhar Khudag Mining License MV-017336

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Section 1- Sampling Techniques and Data (Source: JORC (2012) Standard Resource Estimation of Baruun Naran Mining License -14493A and Tsaikhar Khudag Mining License MV-017336

Criteria	Commentary
Sampling techniques	***Nature and quality of sampling.*** · Coal quality samples were collected from HQ3 and some PQ3 sized diamond core. Coal samples once collected were stored in refrigerated containers until required for analysis. · Each coal ply was logged for brightness and sampled separately in intervals of ≤2 metres ("m"). Stone bands ≤2 centimetres ("cm") were sampled with the coal, but stone bands larger than this were sampled separately. Stone bands >50cm were not sampled. · Chip samples from open holes and trench samples were used for continuity purposes and were not used for resource calculations. · Full coal seam samples were taken for the resource calculation and 30cm ply roof or floor samples were taken for inclusion in future work on Reserves, which did not impact the resource calculation methods. · All boreholes were geophysically logged with down-hole wire-line tools with sample spacing's of 1cm, 2cm or 5 cm used. Coal/rock boundaries were well identified from the geophysics. Core boreholes were corrected and checked for core recovery for coal and rock thickness using down-hole geophysics with loss inserted within the lithology record. Open-hole coal ply thickness was corrected to down-hole geophysics.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used. · For cored boreholes, coal plies were fully cored and sampled. · Two calibration boreholes (G02251 and R00020) were setup at UHG coal mine to regularly test all logging tools as they came onto the site and at regular periods whilst onsite. · A central logging facility was designed at BN coal mine where all borehole cores were stored, logged, photographed and sampled. A standard set of rock types and coal lithotypes were collected and displayed for purposes of calibration in logging. · The logging geologists were supervised and regularly tested on performance for procedural compliance by Mr. Barkhas, Chief Geologist, geology and geotechnical, as internal auditor.
	Aspects of the determination of mineralisation that are Material to the Public Report. · Coal was determined in the core by colour, weight, strength and texture (assisted with using a field knife to scratch the core for streak and hand lens to observe texture). · Once the coal/rock boundary was observed, the coal ply was logged for coal maceral and thickness, for changes in coal brightness (maceral – Vitrinite) using a coal brightness chart: - C1 = >90% bright - C2 = 60-90% bright - C3 = 40-60% bright - C4 = 10-40% bright - C5 = 1-10% bright - C6 = <1% bright).

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	· Based on the brightness of coal macerals, similar brightness sections within a ply were sampled together. · These samples would indicate changes in quality i.e. higher ash/higher density. Rock partings ≤50cm within or between plies were sampled separately. · The core coal interval observations were confirmed with down-hole geophysics.
Drilling techniques	***Drill type and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc.).*** · Diamond core and open-hole drilling was completed. All coring was completed with Boart Longyear triple tube split systems to ensure maximum core recovery. Open-hole drilling was 114-152mm hammer until the water table then water circulated blade drilling. · Core was mostly HQ3 size (hole diameter 96.0mm, core diameter 61.1mm) with some PQ3 size (hole diameter 122.6mm, core diameter 83.0mm). · Core bits were diamond impregnated and surface set to maximise recovery and minimise shattering of core. · Generally boreholes were drilled at an angle to optimally intercept the highly dipping coal seams and all had down-hole verticality Logs run.
Drill sample recovery	***Method of recording and assessing core and chip sample recoveries and results assessed.*** · Linear core recovery was calculated initially by the driller's measurement and then confirmed by the rig geologist who calculated the recovered linear length of core for each drill run and expressing it as a percentage of the full core run. · Downhole geophysics was used to further assess the amount and location of linear core loss. · Core photography in boxes also assisted later evaluation of loss. · Linear core loss was recorded in the drill record and inserted into the lithology log at the point of loss. The point of linear loss was determined with photographs and wire-line geophysics by determining the thickness between stone partings within the geophysical log and solid core. · Samples were measured for weight but this mainly served as a cross check with the laboratory. · Linear core loss was mainly attributed to drilling through structural zones. Where poor drilling was deemed as the cause of poor recovery the borehole was redrilled.
	Measures taken to maximise sample recovery and ensure representative nature of the samples. · Modern drilling equipment and trained coal drillers was utilised. · High quality drilling pipe, coring and drilling bits used. · Expected high core recovery particularly in coal plies enforced with drilling contractor where ply sections with less than ≥95% were redrilled. · Chip samples collected on a 1m basis and displayed clearly for rig geologist observation.
	Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material. · High linear core recover was maintained ≥95% therefore, minimising sample bias due to sample mass loss. Core photography and good wire-line geophysics confirmed high linear core recovery and assisted with documentation of actual loss depth recorded within the lithology log.
Logging	***Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.*** · All core was logged geologically and geotechnically and recorded in hard copy and electronic format to the Borehole Data Standard for the Australian Coal Industry ("CoalLog") standard.

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	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography. · Geological and geotechnical logging was qualitative with codes used to describe the different geological and geotechnical aspects of the core as per CoalLog standard. The depths chosen for geological intervals and geotechnical dislocations were quantitative. · Borehole core was photographed in 4-5m boxes (depending PQ3 or HQ3 core size) on a wet and dry basis which included the entire core.
	The total length and percentage of the relevant intersections logged. · All coal plies were fully cored and logged to CoalLog standard. All logged coal cores were fully sampled including rock parting ≤ 50cm.
Sub-sampling techniques and sample preparation	***If core, whether cut or sawn and whether quarter, half or all core taken.*** · The whole core was sampled for coal analysis.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry. · Not applicable for coal.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique. · Coal cores at the rig site, were measured in the splits then gently washed to remove drilling grime. The coal was carefully placed into core boxes with no coal remaining in the splits. The boxes were wrapped securely in plastic for transport to the BN central logging facility. The core boxes were delivered (average distance 2km) to the BN central logging facility at the end of each 10 hour shift. The coal core boxes are stored in refrigerated containers until logging. After logging and sampling, the samples were returned to refrigeration until sent to the Energy Resources Central Chemical Laboratory ("ERCCL"). This laboratory is located at the UHG mine site approximately 30km from the BN central logging facility. · At the BN central logging facility core boxes were placed in the dedicated photography area and photos taken. The core was laid out on specifically designed and built logging tables. The atmospheric environment inside the BN central logging facility was kept to a constant temperature. The cores were re-measured and confirmed with field measurements. Geophysical logs were used to correct for seam thickness, loss and expansion were noted. Based on the brightness of coal macerals, similar brightness sections within a ply were sampled together. Rock partings ≥2cm and ≤50cm within or between plies were sampled separately. Roof and floor material of 30cm in thickness was also sampled. Maximum coal sample thickness was 2m. Identified samples were placed in double plastic bags with sample tags placed inside the coal containing sample bag and then in between the sample bags with finally the sample information written on the outside plastic bag. The sample bag was weighed with weight corrected for the sample bag mass. · Geotechnical rock samples were collected on each change of major lithotype. The samples were wrapped in aluminium foil, then plastic and then water proof tape. The sample number and depth was scribe on the sample. The sample number was digitally recorded in the logging software 'LogCheck'.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples. · All samples were analysed at the ERCCL. With respect to sample preparation, the top size of the sample was reduced and split into two quarters and one half portions. The sample preparation took into account the top size of the sample material required for each of the analytical determinations. One of the quarter portions was used for analysis and the remaining portions were retained. · The ERML was accredited to ISO/IEC 17025:2017 (MNS ISO/IEC 17025:20018) standard in November 2020 and expires in July 2023.
	Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling. · ERML prepared and analysed a number of samples and submitted duplicates of these samples for analysis at the ALS (100 samples) and UUH (615 samples) laboratories in Ulaanbaatar. The ERML analytical results were compared to the other laboratories by means of cross plots and basic statistical parameters.

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	· The ERML generally reported the coal quality parameters lower than the ALS laboratory and generally higher than the UUH laboratory with varying degrees of reproducibility between laboratories. · For work previously completed before 2009, it is unknown if a similar comparison exercise was done.
	Whether sample sizes are appropriate to the grain size of the material being sampled. · Grain size is not applicable to coal sampling.
Quality of assay data and laboratory tests	***The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.*** · Before 2015, Coal samples were analysed for, True Relative Density ("TRD") (GB/T 217:2008), Total Moisture ("TM") (MNS ISO 589:2003), Analytical Moisture ("AM") (MNS ISO 331:2003), Ash (MNS ISO 1171:2009), Volatile Matter ("VM") (MNS ISO 562:2001), Calorific Value ("CV") (MNS ISO 1928:2009), Total Sulphur ("TS") (ASTM D4239:05), Crucible Swelling Number ("CSN") (MNS ISO 501:2003) and Caking Index ("G Index") (MNS ISO 335:2005). · In 2018, Coal samples were analysed for, True relative density (GB/T 217:2015), Total moisture (MNS ISO 589:2003), Analytical moisture (MNS GB/T 212:2015), Ash (MNS GB/T 212:2015), Volatile matter (MNS GB/T 212:2015), Calorific value (MNS ISO 1928:2009), Total sulphur (ASTM D4239:2005), Crucible swelling number (MNS ISO 501:2003) and Caking index (MNS GB/T 547:1997). · The coal analyses are sufficient to determine a Resource. · The laboratory under its certification did regular reproducibility and repeatability samples. Main protocol was that after every 10 samples duplicate tests were done (coal and non-coal samples). For every 30 samples, 1 standard and 1 blank sample was tested for equipment calibration. After each full borehole analyses were completed, regression graphs were constructed for internal checks. When samples deviated from the procedure tolerance the samples were re-analysed from new.
	For geophysical tools, spectrometers, handheld XRF instruments, etc., the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc. · Two calibration boreholes (G02251 and R00020) were setup at the UHG site to regularly test all downhole wire-line logging tools as they came onto the BN and THG sites and at regular periods whilst onsite. · Gradient-array resistivity survey was undertaken by Geomaster LLC ("Geomaster") in July 2005 with more than 13km^2 along Baruun Naran valley. Monmap LLC ("Monmap"), surveyed grid lines. The program was extended in 2006 to extend the gradient-array survey over shallow Permian subcrop to the west of the Baruun Naran valley. This survey covered another 16km^2. The results were high level and provided some guidance with understanding the deposit.
	Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established. · The ERCCL was accredited to ISO/IEC 17025:2017 (MNS ISO/IEC 17025:2018) standard in November 2020 and expires in July 2023. Internal testing protocols are mandatory with accreditation with duplicate testing and round robin testing done. · Laboratory certificates were supplied by ERML. No certificates were supplied by QGX Coal Ltd ("QGX") for testing completed at the SGS or ACIRL laboratories. · ERML prepared and analysed a number of samples from UHG exploration and submitted duplicates of these samples for analysis at the ALS Coal – Mongolia ("ALS") laboratory (100 samples) and the Mining Institute ("UUH") laboratory (615 samples). As the same lab and processes were used for BN and THG as for UHG the following comparison is valid. The ERML analytical results were compared to the other laboratories by means of cross plots and basic statistical parameters. The ERML generally reported the coal quality parameters lower than the ALS laboratory and generally higher than the UUH laboratory with varying degrees of reproducibility between laboratories.

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Verification of sampling and assaying	***The verification of significant intersections by either independent or alternative company personnel.*** · No verification could be made on the pre-QGX boreholes. However Norwest Corporation ("Norwest") twinned a number of these boreholes with no major variation of information stated. · The QGX boreholes 2005-2009 McElroy Bryan Geological Services ("MBGS") and Norwest consultants were involved in the procedures and collection of this data. There data is verified through quality downhole geophysics, core photographs and paper logs. · The MMC drilled boreholes are verified by highly trained geologists following international standards that are regularly reviewed by internal audit. By high quality downhole geophysics, seismic, core photographs, paper and digital logs.
	The use of twinned holes. · A number of pre QGX boreholes were twinned by the Norwest. · MMC did not twin any QGX boreholes.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols. · The pre-QGX (pre 2005) primary data (excluding coal quality) was in the form of hardcopy volumes of longhand drafted graphic profiles with all survey, drilling, recovery, geological, downhole geophysics, raw information, interpreted information and final information. These volumes are securely stored in the company's long term storage archives. The volumes were scanned, translated, coded and uploaded in the LogCheck data management software. Coal quality records were provided on hard copy laboratory certificates. These hardcopies are securely stored in the company's long term storage archives. This data was entered into Excel spreadsheet and once validated was loaded into the LogCheck data management software. · The QGX (2005-2009) primary data was in the form of scanned hard copy survey, drilling and geological logs, wireline geophysics as Log ASCII Standard ("LAS") digital files and coal quality as Excel spreadsheets. The hardcopy logs were already in digital form as Excel spreadsheets. These were re-coded as necessary and with LAS files uploaded the LogCheck data management software. The coal quality results were built into MMC's existing Excel spreadsheets for validation and uploaded into the LogCheck data management software. · The primary data for MMC (2011-2015, 2018) was original hard copy records for survey, drilling, geology, wire-line geophysics, geotechnical and coal quality. This data is securely stored in filing cabinets in the central logging facility at the mine site. All data stored is digital and has been entered and validated by the LogCheck data management software. This data is stored on company servers where the company IT department control the security. Furthermore, all data has been uploaded into the company master database stored on the MICROMINE Geobank ("Geobank") system. All data systems are aligned with the CoalLog coding and form system. · All data from all exploration either historical or current has been coded and converted into the CoalLog coding and form system and resides as one database.
	Discuss any adjustment to assay data. · A number of corrections were made to borehole and sample numbers to the BN coal quality database. No corrections were made to the THG coal quality database. · It was identified that as-received and air-dried moisture from QGX exploration analytical results was significantly higher than MMC's. Expected error was calculated which indicated the QGX data was highly variable and had a distinct population from the MMC data. Using the transformation 'xtran = mnew + sdnew * ((xold – mold) / sdold)', the QGX moisture data was adjusted and remaining QGX coal quality data adjusted to the transformed moisture. This transformation was adjusted for all QGX coal quality data across the BN and THG license areas. · Coal interval thicknesses were matched with wire-line geophysics according to normal industry standards. Expanded coal interval intersections and corresponding sample thickness were reduced in thickness to match the geophysics. Where coal cored interval intersections were less, loss was added

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	in the lithology log at the determined location using comparison thicknesses between observed partings and wire-line rock responses. If the loss occurred within a sample the sample thickness was adjusted to reflect the loss. · All samples once collected at the BN central logging facility were weighed for mass and this mass was matched with laboratory sample mass. · All compositing for the Resource estimate was done mathematically based on sample thickness and TRD. The only composites made by the laboratory were for coke and caking tests. · All sample data and composite data are recorded in the LogCheck data management software and Geobank database.
Location of data points	***Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.*** · The topographic and borehole collar survey was carried out with internal resources using Trimble equipment. · Drill hole collars were surveyed using a Trimble R8 GPS which has a static horizontal and vertical accuracy of ±3mm +0.1ppm RMS, an RTK horizontal measurement of ±3mm +0.1ppm RMS and an RTK vertical measurement ±3.5mm +0.4ppm RMS · Downhole survey was used to control the borehole azimuth and angle. Any variance more than 5 degrees in azimuth and the borehole was redrilled. Downhole surveys, done every 20m or 50m down the drill hole, were also used to locate the boreholes holes with depth.
	Specification of the grid system used. · The grid system coordinates are UTM Zone 48 North. The same system was used for all survey data.
	Quality and adequacy of topographic control. · For the BN and THG licenses the topographic survey was carried out with internal resources using Trimble R8 GPS which has a static horizontal and vertical accuracy of ±3mm +0.1ppm RMS, an RTK horizontal measurement of ±3mm +0.1ppm RMS and a RTK vertical measurement ±3.5mm +0.4ppm RMS. · A difference map comparing the grid based on borehole collars and the grid based on topography was compiled with most differences being less than 1.5m, which is acceptable with a few areas greater than this around the boundaries where there is no borehole control.
Data spacing and distribution	***Data spacing for reporting of Exploration Results.*** · Boreholes within the THG license are roughly spaced on a grid orthogonal to the strike on each limb, with drill lines approximately 500m apart with boreholes 100m to 150m separation. · Boreholes within the northern half of the BN license are roughly spaced on a grid orthogonal to the strike on each limb, with drill lines approximately 150m apart with boreholes 50m to 150m separation. In the southern half of the license, boreholes are roughly spaced on a grid orthogonal to the strike on each limb, with drill lines approximately 300m apart with boreholes 50m to 150m separation.
	Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied. · The data spacing is sufficient to establish a high degree of geological and grade continuity appropriate for the Mineral Resource and classifications applied. · An exercise in geostatistics to calculate estimated error on the estimate was completed which confirms high degree of geological and grade continuity.
	Whether sample compositing has been applied. · Samples within plies were composited for points of observation for the Resource estimate by mathematical method, based on sample thickness and TRD. The only analytical composites made by the laboratory were for coke and caking tests.

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Orientation of data in relation to geological structure	***Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.*** · The BN coal deposit is highly folded with variable ranging dips from flat to vertical so every borehole was planned as practical as possible to intercept the coal seams at angles normal to the coal dip. All boreholes were surveyed down the borehole and where deviation (mainly in the older boreholes) was large were not considered as points of observation. The MMC drilling had strict rules about borehole deviation which were implemented where borehole deviation of more than 5 degrees triggered a redrill. · No evidence of bias due to borehole orientation has been observed.
	If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material. · No evidence of bias due to borehole orientation has been observed.
Sample security	***The measures taken to ensure sample security.*** · For pre-2005 bore cores for the BN deposit, the following is quoted from (Dashkhorol et.al. 1989): *'All coal seams and rocks of the different lithological contents were subjected to sampling. To select cored, coal samples the following method was used: Core was installed in the drill core box in such sequence, for which it will be derived from core barrel. Washing of core with clean water was used only for whole cylinders or large size fragments by hand, but fine-grained and crushed coals are not recommended for washing in the field conditions to avoid distorting of samples because of loss of any lithotypes. Interval length included in the sample has been estimated depending on thickness of a split or coal seam of any lithotype. Usually in average it equals to 1.0-1.5 m, but sometimes was more when really homogeneous components were sampled separately. If drill core contains some intersections of original lithological component, they were selected together in one sample. Then these intersections were verified through logging. Sometimes, if separation of rock intersections from coal splits was not possible they were selected together with coal, which were recorded in appropriate documents. For the calculation of medium-weighed quality indicators of coal for seam intersections, the results of analyses made for such samples were related to appropriate complicated structure interval of a seam without any amendment. In such cases, a complicated structure interval as a rule was defined and accepted through logging. Core recovery for coal was determined with utilization of volumetric and linear methods into sample divisions, which were organized by crew. Coal core documents were also examined there and completed preparation of samples, labelling and packing into the synthetic bags was made. Selected samples were sent monthly to laboratory.'* · The bore cores for the BN coal deposit during 2005 were collected by Norwest and the coal sampling methods were documented in the Norwest core logging manual titled 'Baruun Naran Core Logging Manual, v.5, dated August 9, 2005' and in the October 2005 CAM Report. Designated rig geologists, trained by external consultants, were responsible for collecting these coal samples. Each core sample was bagged and sealed immediately after the coal had been geologically logged and photographed, to minimize coal moisture loss. The coal sampling approach used sometimes introduced substantial non-coal dilution by assuming that non-coal units <0.25 m thick, or any carbonaceous mudstone, could not be discerned or separated from coal during mining. Individual samples were labelled with the drill-hole number, sample number, and depth interval and were placed into cardboard core boxes. All boxes were labelled according to drill-hole number, box number, total sample interval, and sequence of sample numbers and then stored in a secure sample storage facility until ready for shipment. · From 2006 to 2009 MBGS was commissioned to revise and update the sampling methodology. This sampling methodology is dependent upon (i) the reconciliation of geological core logs to geophysical logs prior to sampling (ensuring better allocation of core losses), and (ii) the identification of plies from the geophysical logs. Once this has been done, all sampling is done conforming to these ply boundaries. Stone partings between plies are sampled separately, down to a thickness of a few centimetres. Decisions as to the compositing of plies and parting are made later once basic quality data are acquired on all samples across the seam with the goal of creating meaningful working-section composites for detailed analysis.

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	· From 2011 until present the MMC's Exploration & Geology team has followed procedures based upon the CoalLog system and the Australian Guidelines for the Estimation and Classification of Coal Resources. More specifically, coal cores at the rig site, were measured in the splits then gently washed to remove drilling grime. The coal was carefully placed into core boxes with no coal remaining. The boxes were wrapped securely in plastic for transport to the central logging facility. The core boxes were delivered (average distance 2km) to BN central logging facility at the end of each 10 hour shift. The BN central logging facility is location within the BN mine site. The mine site has 24 hour high level security. The coal core boxes are stored in secure refrigerated containers attached to the BN central logging facility until logging. After logging and sampling, the samples were returned to refrigeration until sent to the laboratory. The laboratory is located at the UHG mine approximately 30km from the BN central logging facility. The core was laid out on specifically designed and built logging tables. The atmospheric environment inside the BN central logging facility was kept to a constant temperature. The cores were remeasured and confirmed with field measurements. Geophysical logs were used to correct for seam thickness, loss and expansion were noted. The identified samples were placed in double plastic bags with sample tags placed inside the coal containing sample bag and then in between the sample bags with finally the sample information written on the outside plastic bag. The sample bag was weighed with weight corrected for the sample bag mass. A sample dispatch form is completed by the geologist, which contains all information on the sample. The form is sent to the laboratory. The laboratory accesses the secure refrigerated container to retrieve the sample as listed on the dispatch form. Confirmation of the correct sample being analysed is through the triplicate sample tag/bag information and double check with the sample weight. · Analytical data was entered into the Geobank database by the laboratory. The Geobank database was first populated with borehole number and sample number from the logged data in the LogCheck software. This data was seamlessly uploaded into the Geobank database for laboratory access. Once the data was entered by the laboratory and validated it could be passed back to Geology for importing into the master Excel spreadsheets for further processing and validation. Final data was seamlessly passed to the LogCheck software for final validation and repository for points of observation.
Audits or reviews	***The results of any audits or reviews of sampling techniques and data.*** · Mr. Ballantine (CP), for inclusion of the UHG JORC (2004) Resource report dated June 2012, thought it prudent to have an independent experienced Competent Person qualified geologist provide a site visit and peer review. This was done by Mr. Todd Sercombe, senior consultant for GasCoal Pty Ltd, and a coal geologist with at the time 18 years coal industry experience. Mr. Sercombe's findings from the site visit were: *'The UHG exploration procedures and practices are of extremely high calibre, exceeding both the Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996) and the benchmark coal industry best practices (as observed by Mr. Sercombe in the Bowen Basin, Australia). The accurate and unbiased assignment of coal core loss to coal samples, achieved in the UHG practices, is commendable. The coding, for modelling, of all significant stone band partings in the seams and of inter-burden units between the seams is also praiseworthy. The Exploration and Geology Department are a group of young enthusiastic geologists who have been well trained and led by Gary Ballantine. I would have high confidence in the reportable results obtained from the UHG exploration procedures.'* · The exploration group and procedures that was present for the UHG JORC (2004) Resource report as at June 2012 has changed little so the independent peer review by Mr. Sercombe is still relevant. · In addition, Mr. Ballantine still holds responsibility for budgeting, planning, training and overall oversight of exploration at UHG and Baruun Naran deposit (BN coal deposit). As part of the ongoing evolution of the MMC Exploration & Geology group and knowledge transfer, supervised and structured succession of capable individuals, is planned. Mr. Ballantine understands that complacency can creep into a well establish team. To prevent this he does frequent site visits with Mr. Said (Competent Person) every few months and they review different member's capabilities against the exploration procedures. As part of Mr. Ballantine's role as mentor and internal auditor, all final data, (i.e. seam thickness, seam correlation, sampling intervals, coal quality analysis, collar survey and LAS quality) are reviewed once the team (supervised by the Competent Person) has done the work. With the above process it is Mr. Ballantine's professional opinion that there is a very high compliance with the team's results and JORC standards.

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	· In 2018, Technical information in this BN and THG Coal Resource estimation has been internally peer reviewed by Mr. Lkhagva-Ochir Said Executive General Manager for Mining and Processing, Mongolian Mining Corporation. Mr. Said is a member of the Australasian Institute of Mining and Metallurgy (Member #316005) and has over 14 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012).

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APPENDIX B: REPORTING EXPLORATION RESULTS

"CHECKLIST OF ASSESSMENT AND REPORTING CRITERIA" (TABLE 1 – JORC CODE),

Section 2- Reporting Exploration Results (Source: JORC (2012) Standard Resource Estimation of Baruun Naran Mining License -14493A and Tsaikhar Khudag Mining License MV-017336

Criteria	Commentary
Mineral tenement and land tenure status	***Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.*** · The BN coal deposit now consists of two mining licenses: - Baruun Naran Mining License 14493A covering 4486 hectares ("ha"), converted from an Exploration License on 01 December 2008; and - Tsaikhar Khudag Mining License MV-017336 covering 8340 ha, partially converted from Exploration License 4326X on 24 August 2013. · These licenses were granted under the Law on Minerals (1997), are valid for 30 years and can be extended twice more for 20 years each.
	The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area. · The licenses are 100% secure and owned by Khangad Exploration LLC.
Exploration done by other parties	***Acknowledgment and appraisal of exploration by other parties.*** · The Tavan Tolgoi coal deposits, of which BN coal deposit is one, were discovered and exploited by the local people since the early 19th century. · During the Mongolian-Russian exploration work at the BN coal deposit in 1983, three shallow vertical boreholes (approximately 70m each) were drilled. Six coal seams with apparent thicknesses of up to 4m were identified in this campaign. The resulting 'prognostic resource' calculations included values of 86 Mt and 10.9 Mt underlying an area of 19.2 km^2 (Khosbayar et al., 1983). · From 1983 to 1993, 21 vertical boreholes (depths range from 33-362m) with total 3,500m depth were drilled across the BN coal deposit. Borehole spacing generally ranged from 250-500m on five north-westerly trending exploration lines spaced approximately 3km. Downhole resistivity, caliper, gamma and density surveys were completed on 19 boreholes. 9 boreholes intersected significant coal thickness. Total 12 coal seams with apparent thickness of 1-30m were identified with 4 of these seams reported metallurgical quality (Gankhuyag, 1990). · From April 2005 to end of 2009 QGX conducted detailed exploration where 524 cored and openhole boreholes were drilled over the BN and THG licenses. A total of 101,916m of HQ3 cored and 23,013m of openhole was completed. · Exploration was sufficient for JORC (2004) Resource and Reserve estimations to be made by MBGS and SRK respectively in 2010.
Geology	***Deposit type, geological setting and style of mineralisation.*** · The late Paleozoic was marked by the continental collision of a number of small micro-continents that came together as convergent margins. As the Siberian Craton and the North China block converged, ancient continental crust was thrust onto the continental margin and small island arcs, subduction wedges, and ophiolitic belts were accreted as pre-existing basement rock was deformed and faulted, and uplift initiated.

	· Island arc geometry, similar to how the Bowen Basin was formed, coincides with the formation of the late Permian systems that formed the belt of Late Permian coal measures that are found in the south and south-west of Mongolia of which the Tavan Tolgoi deposit forms one of. These types of deposits form large basins that have vast lateral continuity. Unfortunately, due to the collision of India in the Tertiary, these basins in the southern regions of Mongolia have undergone later stage deformation, which appears to be more severe in the west and moderates eastward. This also explains the close proximity of large younger rift type basins that contain thick lignite deposits close to these Permian basins.
Drill hole Information	***A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:*** o *easting and northing of the drill hole collar* o *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* o *dip and azimuth of the hole* o *down hole length and interception depth* o *hole length.* · No exploration results are reported. · A total of 570 and 50 for BN and THG licenses respectively, valid boreholes are loaded in the LogCheck data management software and Geobank database. Each borehole contains easting, northing, reduced level, dip, azimuth, lithology, coal intersections, sample number, some geotechnical, wire-line geophysics and coal quality. · Points of observation derived from this data are in Appendix 4A and 4B of this report.
	If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case. · No information was excluded from above criteria.
Data aggregation methods	***In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.*** · No exploration results are reported.
	Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail. · No exploration results are reported.
	The assumptions used for any reporting of metal equivalent values should be clearly stated. · No exploration results are reported.
Relationship between mineralisation	***These relationships are particularly important in the reporting of Exploration Results.*** · No exploration results are reported.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.

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widths and intercept lengths	· No exploration results are reported.
	If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known'). · No exploration results are reported.
Diagrams	***Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*** · No exploration results are reported.
Balanced reporting	***Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*** · No exploration results are reported.
Other substantive exploration data	***Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*** · No exploration results are reported. · Gradient-array resistivity survey was undertaken by Geomaster in July 2005 with more than 13km along Baruun Naran valley. Monmap surveyed the grid lines. This program was extended in 2006 ver shallow Permian subcrop to the west of the Baruun Naran valley. This survey covered another 16km2. The results were high level and provided some guidance with understanding the deposit. · Polaris Seismic International Ltd ("Polaris") was awarded the contract to conduct 2D Land High Resolution Seismic Survey at BN in 2011. The 2D BN 2011 Seismic program recorded 39 dynamite lines totalling 74km using 'Roll On and Roll Off' methodology and dynamite as the source
Further work	***The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).*** · No exploration results are reported.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive. · No exploration results are reported.

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APPENDIX C: ESTIMATION AND REPORTING OF MINERAL RESOURCES

"CHECKLIST OF ASSESSMENT AND REPORTING CRITERIA" (TABLE 1 – JORC CODE),

Section-3: Estimation and Reporting of Mineral Resources (Source: JORC (2012) Standard Resource Estimation of Baruun Naran Mining License - 14493A and Tsaikhar Khudag Mining License MV-017336

Criteria	Commentary
Database integrity	***Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.***
	• For programs pre-2010, hard copy and scanned data was part of the data set supplied to MMC. All care has been taken in the translation, recoding and digitising of this data into the CoalLog format. This data has been loaded into the LogCheck data management software and validated for codes, depth errors and consistency. Where photographs exited then these were checked against the coded data. Final checks were made using sections with wire-line geophysics to show seam consistency. • For 2011-present programs the raw data was captured in forms using codes in the CoalLog format in hard copy format. This data was then entered into the LogCheck data management software which has very strict validation rules. These rules assist in data being correctly entered. The logging is done in a controlled environment in a central logging facility located on the mine site. Analytical data was entered into the Geobank database by the laboratory. The Geobank database was first populated with borehole number and sample number from the logged data in the LogCheck software. This data was seamlessly uploaded into the Geobank database for laboratory access. Once the data was entered by the laboratory and validated it could be passed back to Geology for importing into the master Excel spreadsheets for further processing and validation. Final data was seamlessly passed to the LogCheck software for final validation and repository for points of observation. All systems are designed to only enter data once. Once all validation, correlation and points of observation checks are completed, points of observation are produced by the LogCheck data management software by way of Comma Spaced Variable (“CSV”) files and these files are uploaded to the MICROMINE modelling software. • Within the modelling software once final validation and correlation checks are completed. Anomalous seam thickness is validated and if due to faulting, is taken out of the database. This data is recorded in Appendix 17 in the report.
	Data validation procedures used.
	• The CoalLog codes and forms were used for logging which controlled the format and codes to be used. This data was entered once into the LogCheck data management software which has very strict validation rules on entered data. • Once the coded and depth entered data was validated, borehole profiles were produced with wire-line geophysics. Coal intersections were validated with wire-line geophysics coal intersections and core loss or expansion was noted. Where coal loss occurred it was

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Criteria	Commentary
	entered into the lithology log as a loss. These final boreholes are recorded in Appendix 8 in the report. Borehole sections in southing and northing directions were produced for seam correction. These records are stored in Appendix 9 of the report. Final validation was completed on the block model through boreholes sections and anomalies investigated. • Data was entered once into the LogCheck data management software for geology/header/drilling/LAS/Geotech data and once into the Geobank database for analytical data. Data transfer for analytical data into LogCheck data management software and LogCheck into the MICROMINE modelling software was done by passing csv files seamlessly.
Site visits	***Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*** • An initial site visit was completed by Mr. Ballantine and Mr. Andrew Little (Executive General Manager of Technical Services) on 07 April 2011 as part of the due diligence process that MMC underwent for the purchase of the BN mine. The newly open T seam pit, offices, workshops, mine equipment and camp were inspected. All areas inspected were in alignment with the due diligence information supplied by QGX at the time. • A technical visit was made by Nigel Godfrey of Roctec Pty Ltd on behalf of AMC Consultants during the period of 28 May 2012 to 10 June 2012. The purpose was to provide geotechnical overview. • Mr. Ballantine, for inclusion in the UHG JORC (2004) Resource report dated June 2012, thought it prudent to have an independent experienced Competent Person qualified geologist provide a site visit and peer review. This was done by Mr. Todd Sercombe, senior consultant for GasCoal Pty Ltd, a coal geologist at the time with 18 years coal experience. Mr. Sercombe's findings from the site visit were: *'The UHG exploration procedures and practices are of extremely high calibre, exceeding both the Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996) and the benchmark coal industry best practices (as observed by Mr. Sercombe in the Bowen Basin, Australia). The accurate and unbiased assignment of coal core loss to coal samples, achieved in the UHG practices, is commendable. The coding, for modelling, of all significant stone band partings in the seams and of inter-burden units between the seams is also praiseworthy. The Exploration and Geology Department are a group of young enthusiastic geologists who have been well trained and led by Gary Ballantine. I would have high confidence in the reportable results obtained from the UHG exploration procedures.'* • The exploration group and procedures that was present for the UHG JORC (2004) Resource report as at June 2012 has changed little so the independent peer review by Mr. Sercombe is still relevant.

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Criteria	Commentary
	• In addition, Mr. Ballantine still holds responsibility for budgeting, planning, training and overall oversight of exploration at UHG and BN coal deposits. As part of the ongoing evolution of the MMC Exploration & Geology group and knowledge transfer, supervised and structured succession of capable individuals is planned. Mr. Ballantine understands that complacency can creep into a well establish team. To prevent this he does frequent site visits with Mr. Said (Competent Person) every few months and they review different member's capabilities against the exploration procedures. As part of Mr. Ballantine's role as mentor and internal auditor, all final data, (i.e. seam thickness, seam correlation, sampling intervals, coal quality analysis, collar survey and LAS quality) are reviewed once the team (supervised by the Competent Person) has done the work. With the above process it is Mr. Ballantine's professional opinion that there is a very high compliance with the team's results and JORC standards. • Collar survey is one task that requires a manual audit. Mr. Ballantine on his most recent visit to UHG in mid-November 2014 audited the collar survey for boreholes drilled in the period 2011-2014 with a hand held GPS device. • All GPS coordinates of boreholes and boundary pegs checked were within the tolerance of the GPS device. • In 2018, Technical information in this BN and THG Coal Resource estimation has been internally peer reviewed by Mr. Lkhagva-Ochir Said Executive General Manager for Mining and Processing, Mongolian Mining Corporation. Mr. Said is a member of the Australasian Institute of Mining and Metallurgy (Member #316005) and has over 14 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012). ***If no site visits have been undertaken indicate why this is the case.*** • Not applicable, see above section.
Geological interpretation	***Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.*** • Detailed mapping from the various campaigns from the 1940's. • Gradient-array resistivity survey was undertaken by Geomaster in July 2005 with more than 13km along Baruun Naran valley. Monmap surveyed the grid lines. This program was extended in 2006 over shallow Permian subcrop to the west of the Baruun Naran valley. This survey covered another 16km2. The results were high level and provided some guidance with understanding the deposit. • The 2D High Resolution Seismic Survey recorded 39 lines totalling 73,510m using 'Roll On and Roll Off' methodology with 240 maximum active channels and using dynamite as the source proved invaluable in locating and understanding fault systems but, just as importantly,

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Criteria	Commentary
	showed areas of little to no structure and this is one of the great positives with using Seismic. In addition, the seismic results gave detailed knowledge of the coal basin shallow surface limits, which has now been backed up by drilling. • The Limit of Oxidation ("LOX") was determined by close spaced drilling and confirmed by mapping and sampling from mine geology team. • Seam correlation, continuity and coal quality was confidently predicted by infill drilling of the recent MMC exploration program which confirmed and supported the detailed 2D seismic. The confirmation of the seismic by drilling results gives confidence where drill spacing is less that correlation and continuity in the seismic provides solid evidence that continuity exists. • The continuity of the final computer model provides a high level of confidence. By interrogating the model with all data visible by sections and carefully inspecting allows the Competent Person the confidence to proceed to the final estimate. • As a high level overarching check on the estimate and the confidence of the estimate, expected error on the estimate was used as an aid in understanding the spatial measurements used for the classification categories. As an extension of this the 'loss' function was also estimated determining overall error which, can be used to determine maximum error for Measure and Indicated categories which was 6.5% and 13% respectfully.
	Nature of the data used and of any assumptions made. • The essence of the data used is borehole observations with support from detailed mapping, resistivity and 2D High Resolution Seismic Survey. • No assumption with a material effect to the estimate was made. Notwithstanding, missing or non-analysed coal quality data due to limited sample mass was calculated by regressions and this has been assumed to be adequate for inclusion of the estimate. An exception to this was the moisture results for the QGX drilling data which demonstrated a distinct variance from the expected. Using the transformation 'xtran = mnew + sdnew * ((xold – mold) / sdold)', the QGX moisture data was adjusted and remaining QGX coal quality data adjusted to the transformed moisture.
	The effect, if any, of alternative interpretations on Mineral Resource estimation. • There are no alternative interpretations known to the Competent Person at this time.
	The use of geology in guiding and controlling Mineral Resource estimation.

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Criteria	Commentary
	• The geology was used in understanding deposit limits and structure. The geology was also used to determine deposit type.
	The factors affecting continuity both of grade and geology.
	• The BN coal deposit coal measure was limited by surface outcrop of the seams which was the ultimate upper cut-off and limit. • The seams for BN and THG are tightly folded about an asymmetrical syncline where the northern limb is very steep and borehole data indicates it progressively overturns toward the west, before the coal seams are no longer present. The southern limb has a gentler dip of about 40 degrees near the syncline nose (east) but progressively steepens to 75 degrees dip towards the west. The coal sequence is terminated on the north limb by a sharp fault and by a low angle thrust/shearing event on the southern limb.
Dimensions	***The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.***
	• The coal resource area for BN is oriented generally around a synclinal fold plunging to the southwest approximately 15 degrees and is some 7.5km long and 1 km wide. • The coal resource area for THG is oriented generally around a synclinal fold plunging to the northeast approximately 20 degrees and is some 2.5m long and 1 km wide. • BN Mining License (14493A) has a total area of 4486 ha. • THG Mining License (MV-017336) has a total area of 8340 ha. • Generally there is an average of 10m of unconsolidated Quaternary sediments overlaying the Permian coal measures. The base of weathering is on average between 15 to 30m. • No Resource has been estimates outside of the Lease boundaries.
Estimation and modelling techniques	***The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.***
	• The BN and THG Resource estimates were carried out using MICROMINE's 18.0 and LogCheck Version 7.277 using the CoalLog geology data format as the database.

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Criteria	Commentary
	• The method used for Resource estimation at for BN and THG involved modelling an elevation grid for a commonly distributed ply and modelling thickness grids for the other plies and partings. These thickness grids for the plies and partings were then stacked on top or below of the elevation grid to form a 3D block model. • To create an accurate and reliable 3D model of the coal seams a kriging algorithm with semivariogram modelling for the seam elevation was used. Kriging is a very flexible gridding method that can be custom-fitted to any data set by specifying the appropriate semivariogram model. Kriging incorporates anisotropy and underlying trends. The purpose of geostatistical analysis was to generate a series of semivariograms that could be used as the input weighting mechanism for the Kriging algorithm. To be able to conduct reliable geostatistical analysis there is a requirement to have sufficient number of points. As such a commonly distributed ply was used for geostatistical analysis as it was intersected by the largest number of boreholes and is the most consistent ply across the area. • To create the block model an elevation grid was created for the major lower ply and then the thickness grids for the other plies and partings were stacked above or below this as required. In order to use this method each borehole needed to contain an interval for each ply and parting even if the ply or parting was 'pinched out' and was not intersected by that borehole. Some plies were not intersected by the boreholes and so 'virtual' plies with a thickness of zero were inserted in order to model the seam morphology. The location of these virtual plies was determined by using the MICROMINE extrapolation tool, which used Inverse Distance Weighting ("IDW") with the weighting inversely proportional to the squared distance. Where boreholes intercepted plies, but these plies were not present due to deterioration as a result of changing sedimentary environments then these plies were inserted as zero thickness plies at the roof or floor of a logged ply. Stone parting intervals were logged in the raw database, but where they were missing they were added to all ply groups for each borehole even in cases where the parting thickness was zero. • In order to create a reliable model of the seam morphology a cell size of 10x10m was selected for gridding. Gridding with exact interpolation using ordinary kriging was used to generate grids for the elevation of the mid-point of the plies and IDW with the weighting inversely proportional to the squared distance was used to generate grids for the thicknesses of the plies. To allow the grids to cover the necessary areas, a circular search radius of 10,000m with maximum of 20 points was used to create the elevation grids. The thickness grids were created using a circular search radius of 10,000m with maximum of 20 points per sector. • The base of Quaternary grid was produced using IDW with a power of two search radius of 2000m with maximum of 15 points per sector. The Extremely weathering grid was produced using IDW with a power of two search radius of 2000m with maximum of 15 points per sector. The base of weathering grid was produced using IDW with search radius of 2000m with maximum of 15 points per sector. The base of weathering grid was used in conjunction with mapped LOX lines as the upper most cut-off for coal. Weathered coal can be calculated between the base of weathering and extremely weathering grid. This coal has been successfully mined and has been

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Criteria	Commentary
	commercial sold as Thermal coal. For the purpose of this resource estimate it has been included in the estimate. A Topography surface grid was produced using IDW with a power of two. This was then converted into a Digital Terrain Model ("DTM"). • The 3D gridded seam block model was generated by stacking thickness grids on top or below of the major ply elevation grid. The centroid of the block East and North was the X and Y values from the grid file which was 10x10m (grid cell size), the centroid of the block RL was the Z value from the elevation grid and block size by RL was the Z value from thickness grids. • The Competent Person for this estimate used the expected error in the estimate to support distances for Measured and Indicated categories. For Inferred category the narrow dimensions of the deposit may cause a misleading result using the expected error technique so the experience of the Competent Person and detailed knowledge of the deposit were sufficient for determining this category spacing. In determining extrapolation beyond last data points, half the category distance was applied. Due to the data spacing and deposit dimensions this did not have a major affect. The shapes for the categories was mostly automated with the MICROMINE software, however where this case was not true the edge of the data was manually edited by the Competent Person. • Measured resources were estimated with points of observation at 500m, Indicated resources were estimated with points of observation at 1,000m, and Inferred resources were estimated with points of observation at 2,000m. • Seam coding was applied to composite plies into seams based upon a specified minimum coal thickness and a maximum parting thickness. The seams were also coded on the basis of resource classification so that only plies of the same resource classification were combined together with their partings. The following modifying factors were used for seam coding: - No maximum seam thickness. - Minimum seam thickness to be included in the Resource of 0.5m to 400m. - Maximum parting thickness to be included in the Resource of 0.5m. - Coal Quality limit with Ash content greater than 50% (DRY basis) being excluded from the Resource estimate. • Following seam coding, coal quality interpolation was carried out. Only intervals that were marked as a point of observation were used for coal quality interpolation. IDW with the weighting inversely proportional to the squared distance was used to interpolate the coal quality into the empty block model. Coal quality interpolation was conducted for each ply separately. One search run at 10,000m radius was used to interpolate all the blocks in each model. Filters were applied to make sure that only points of observation for the selected ply were used for the interpolation of the blocks for that ply. • Partings within the model limits but without coal quality were given default coal quality parameters based on rock quality analyses.

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Criteria	Commentary
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.
	• MBGS completed a JORC (2004) Coal Resource estimate for BN in June 2012 and THG in May 2013. This updated JORC (2012) Coal Resource estimation indicates a 17% and 31% increase in the total as-received quantities, excluding mine depletion. • MMC completed a JORC (2012) Coal Resource estimate for BN and THG in June 2015. This updated JORC (2012) Coal Resource estimation indicates a 20% and 18% increase in the total as-received quantities, excluding mine depletion. • The BN mine has produced 5 Mt since October 2010 and the mine geology team completes regular (monthly) reconciliation of model/mined ROM tonnage. Where the model has good borehole control the mine recovery is well aligned, however, once borehole control is less there is a notable variance. The drilling campaigns that this estimate is based on plus the review of category limits under JORC (2012) means this notable variance will be minimised and demonstrates the estimate is valid.
	The assumptions made regarding recovery of by-products.
	• Coal mined from the BN deposit is typically used in blend with coal mined from the UHG deposit. Depending on which seam is being washed, and what blends are being scheduled, three main products are produced. A medium volatile hard coking product, a high volatile semi-soft coking product and a high-ash thermal coal (middling) by-product.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).
	• No work to the knowledge of the CP has been completed for BN or THG licenses.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.
	• In order to create a reliable model of the seam morphology a cell size of 10x10m was selected for gridding. Gridding with exact interpolation using ordinary kriging was used to generate grids for the elevation of the mid-point of the plies and IDW with the weighting inversely proportional to the squared distance was used to generate grids for the thicknesses of the plies. To allow the grids to cover the necessary areas, a circular search radius of 10,000m with maximum of 20 points was used to create the elevation grids. The thickness grids were created using a circular search radius of 10,000m with maximum of 20 points per sector. The 3D gridded seam block model was generated by stacking thickness grids on top or below of the major ply elevation grid. The centroid of the block East and North was

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Criteria	Commentary
	the X and Y values from the grid file which was 10x10m (grid cell size), the centroid of the block RL was the Z value from the elevation grid and block size by RL was the Z value from thickness grids.
	Any assumptions behind modelling of selective mining units.
	• All seams were modelled, therefore there were no 'specific' horizons that were separately modelled.
	Any assumptions about correlation between variables.
	• Missing or non-analysed coal quality data due to limited sample mass was calculated by regressions of determined coal quality data on a seam group basis and this has been assumed to be adequate for inclusion of the estimate.
	Description of how the geological interpretation was used to control the resource estimates.
	• Geological interpretation using the seismic results was critical in identifying major structure and confirming seam correlation and continuity. • Gradient-array resistivity survey was undertaken by Geomaster in July 2005 with more than 13km along Baruun Naran valley. Monmap surveyed the grid lines. This program was extended in 2006 over shallow Permian subcrop to the west of the Baruun Naran valley. This survey covered another 16km2. The results were high level and provided some guidance with understanding the deposit. • The 'limit of oxidation' was determined by close spaced drilling and confirmed by mapping and sampling from mine geology team.
	Discussion of basis for using or not using grade cutting or capping.
	• A greater than 50% ash (DRY basis) cut-off was used to determine what coal was and what rock was.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.
	• The block model was firstly checked to ensure that all blocks were populated and that block values were within the same range as the input values. Following this a visual validation was conducted by loading the block model into the MICROMINE 3D viewer together with borehole traces, plies from the original points of observation file, base of weathering, base of Quaternary and topographic surfaces. Each cross-section was then reviewed to check that the plies from the original points of observation file agreed with the plies in the block model.

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Criteria	Commentary
	• The model was reconciled against the mined area and is closely aligned.
Moisture	***Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.***
	• Moisture was analysed as TM (MNS ISO 589:2003) and Analytical moisture (MNS GB/T 212:2015). TM was assumed to equal in-situ moisture and the Preston Sanders formula was used to convert air-dry TRD to as-received (in-situ) TRD. • The estimated Resource is reported on 'as received' basis and 'air dried' basis
Cut-off parameters	***The basis of the adopted cut-off grade(s) or quality parameters applied.***
	• No maximum seam thickness. • Minimum seam thickness to be included in the Resource of 0.5m to 400m depth. No resources were estimated below 400m as this is considered to be underground and at this stage due to the complexity of the deposit no underground resources are being considered. • Maximum parting thickness to be included in the Resource of 0.5m. • Coal Quality limit with Ash content greater than 50% (DRY basis) being excluded from the Resource estimate.
Mining factors or assumptions	***Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.***
	• The BN mine has produced 5 Mt since October 2010 through 'truck and excavator' style mining operation. No mining assumptions have been applied to the Resource estimate other than minimum coal thickness and maximum in-seam parting thickness which has been taken from engineering operational advice. In the exploration process sufficient roof and floor sampling and analysis has been completed for Reserve estimates of dilution.
Metallurgical factors or assumptions	***The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.***

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Criteria	Commentary
	• The coal mined from the BN deposit typically is used for blending with coal mined from the UHG deposit. Depending on which seam is being washed, and what blends are being scheduled, three main products are produced. A medium volatile hard coking product, high volatile semi-soft coking product and high ash thermal coal (middling) by-product. • The Resource estimate for this report has had no assumptions made on the estimate for beneficiation.
Environmental factors or assumptions	***Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*** • All environmental issues are managed by the Company's environmental department which has operated since the start of mining. • In addition, under the BN and THG mining licences and THG exploration license, there are strict environmental conditions. While these were not reviewed in detail they are relevant to the operation to ensure that waste material is well managed and that what soil profiles are available in the area are used for the rehabilitation process. • During all site visits there have been no obvious environmental issues of leachates emanating from spoil piles or from coal stockpiles.
Bulk density	***Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.*** • TRD was analysed for 13,776 samples, or 90.7% of all samples (GB/T 217:2015). The missing TRD data was calculated using the regression on a seam group basis of TRD v Ash for air dried and as-received samples. • An industry standard method for estimating in situ TRD was applied using the Preston Sanders formula was used to convert air-dry TRD to as-received (in-situ) TRD. ***The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.*** • An industry standard method for estimating in situ TRD was applied using the Preston Sanders formula was used to convert air-dry TRD to as-received (in-situ) TRD.

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Criteria	Commentary
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.
	• Partings within the model limits but without coal quality were given default coal quality parameters based on rock quality analyses.
Classification	***The basis for the classification of the Mineral Resources into varying confidence categories.***
	• The basis for the classification for the Resource estimate is taken from guidance from the Australian Guidelines for the Estimation and Classification of Coal Resources (2014). • The basis of the classification confidence categories is from the results of an investigation of expected error for the 95th percentile through the use of Conditional Simulation Geostatistics.
	Whether appropriate account has been taken of all relevant factors (i.e. relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).
	• Exploration prior to 2005 had been done to good geological standards however, not always to JORC standards. The geological teams of this era were well trained in the collection of geological information and this information has been used affectively for the current Resource estimates and have assisted greatly in the preliminary understands of seam correlation, continuity, coal quality and boundary limits. • The QGX era 2005-2009 was completed by Norwest and MBGS. • Since 2011, the MMC Exploration & Geology team, highly trained to international and Australian standards, has controlled all ongoing exploration. This with the addition of modern drilling methods and equipment, good downhole geophysics, high quality 2D seismic, good survey control for borehole locations and topography, a modern onsite accredited coal laboratory and having an active modern mine, there is great confidence that the resulting Resource estimate for this report is highly reliable. • As a further measure to understand the confidence in the estimate the high level overarching check on the estimate, expected error on the estimate, was used as an aid in understanding the spatial measurements used for the classification categories. As an extension of this the 'loss' function was also estimated determining overall error which, can be used to determine a range that the estimate applies too.
	Whether the result appropriately reflects the Competent Person's view of the deposit.
	• The Competent Person has confidence in the Resource figures reflecting well the contained coal resource.

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Criteria	Commentary
Audits or reviews	***The results of any audits or reviews of Mineral Resource estimates.***

- Mr. Ballantine, for inclusion in the UHG JORC (2004) Resource report dated June 2012, thought it prudent to have an independent experienced Competent Person qualified geologist provide a site visit and peer review. This was done by Mr. Todd Sercombe, senior consultant for GasCoal Pty Ltd, a coal geologist at the time with 18 years coal experience. Mr. Sercombe's findings from the site visit were:

  'The UHG exploration procedures and practices are of extremely high calibre, exceeding both the Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996) and the benchmark coal industry best practices (as observed by Mr. Sercombe in the Bowen Basin, Australia). The accurate and unbiased assignment of coal core loss to coal samples, achieved in the UHG practices, is commendable. The coding, for modelling, of all significant stone band partings in the seams and of inter-burden units between the seams is also praiseworthy. The Exploration and Geology Department are a group of young enthusiastic geologists who have been well trained and led by Gary Ballantine. I would have high confidence in the reportable results obtained from the UHG exploration procedures.'

- The exploration group and procedures that was present for the UHG JORC (2004) Resource report as at June 2012 has changed little so the independent peer review by Mr. Sercombe is still relevant.
- In addition, Mr. Ballantine still holds the position of Executive General Manager, Exploration and Geology and has responsibility for budgeting, planning, training and overall oversight of exploration at UHG and BN coal deposit. As part of the ongoing evolution of the MMC Exploration & Geology group and knowledge transfer, supervised and structured succession of capable individuals, is planned. Mr. Ballantine understands that complacency can creep into a well establish team. To prevent this he does frequent site visits with Mr. Said (Competent Person) every few months and they review different member's capabilities against the exploration procedures. As part of Mr. Ballantine's role as mentor and internal auditor, all final data, (i.e. seam thickness, seam correlation, sampling intervals, coal quality analysis, collar survey and LAS quality) are reviewed once the team (supervised by the Competent Person) has done the work. With the above process it is Mr. Ballantine's professional opinion that there is a very high compliance with the team's results and JORC standards. In addition, Mr. Ballantine has completed an oral review and internal audit with the Competent Person for every step of the data preparation of the points of observation and the modelling stages to the final estimate.
- In 2021, Technical information in this BN and THG Coal Resource estimation has been internally peer reviewed by Mr. Lkhagva-Ochir Said Executive General Manager for Mining and Processing, Mongolian Mining Corporation. Mr. Said is a member of the Australasian Institute of Mining and Metallurgy (Member #316005) and has over 14 years of experience relevant to the style and type of coal deposit

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Criteria	Commentary
	under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012).
Discussion of relative accuracy/ confidence	***Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.***
	• As a measure of relative accuracy and to understand the confidence in the estimate the high level overarching check on the estimate, expected error on the estimate, was used as an aid in understanding the spatial measurements used for the classification categories. As an extension of this the 'loss' function was also estimated determining overall error which, can be used to determine a range that the estimate applies too. • In addition, the 3D model for the estimate was accurate and reliable due to a kriging algorithm with semivariogram modelling for the seam elevation was used. Kriging is a very flexible gridding method that can be custom-fitted to any data set by specifying the appropriate semivariogram model. Kriging incorporates anisotropy and underlying trends. The purpose of geostatistical analysis was to generate a series of semivariograms that could be used as the input weighting mechanism for the Kriging algorithm. To be able to conduct reliable geostatistical analysis there is a requirement to have sufficient number of points. • The use of high level 2D seismic, downhole geophysical data, modern drilling with high core recovery, a modern onsite accredited coal laboratory and highly trained geologists gives high confidence and confirms the existence of location of the coal seams in 3D space. A detailed understanding of the coal seam geometry from trenches and existing operating mine pits, also gives a high level of confidence in the estimate.
	The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.
	• The Resource estimates for this report is a global estimate to international standards and meets all JORC (2012) requirements. • All assumptions and procedures for the Resource estimate are documented within the report sections or as Appendices.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.

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Criteria	Commentary
	• The BN mine has produced 5 Mt since October 2010, and the mine geology team completes regular (monthly) reconciliation of modelled versus mined ROM tonnage. Where the model has good borehole control the mine recovery is well aligned, however, once borehole control is less than ideal there is a notable variance. The drilling campaigns that this estimate is based on plus the review of category limits under JORC (2012) means this notable variance will be minimised and demonstrates the estimate is valid.

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APPENDIX D: ESTIMATION AND REPORTING OF ORE RESERVES

"CHECKLIST OF ASSESSMENT AND REPORTING CRITERIA" (TABLE 1 – JORC CODE),

Section-4: Estimation and Reporting of Ore Reserves (Source: JORC (2012) Standard Resource Estimation of Baruun Naran Mining License -14493A and Tsaikhar Khudag Mining License MV-017336

Appendix D: Estimation and Reporting of Ore Reserves

Section 4: Estimation and Reporting of Ore Reserves

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	• *Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.* • *Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.*	• The Mineral Resource estimate used as the basis of this Coal Reserves Statement is "JORC (2012) Standard Resource Estimation Baruunnaran and Tsaikharkhudag coal mine (Licence MV-14493 and MV-017336)", prepared by Mongolian Mining Corporation, Energy Resources LLC, Geology Department, January 2021. • The Competent Person for the Mineral Resource estimate was Mr. Byambaa Barkhas, a full time employee of Mongolian Mining Corporation in the position of Chief geologist. Mr. Barkhas graduated in 2008 with a "Bachelor of Geology" from the "School of Geology and Petroleum Engineering, Mongolian University of Science and Technology", and is a Member of the Australian Institute of Mining and Metallurgy (#318198). • The Coal Resources are reported inclusive of those Coal Resources modified to produce the Coal Reserves.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• The Competent Person for the Coal Reserves Statement made consecutive site visits since 2017. His last visit was in November 2021. The outcome of these site visits was observation of site and mining conditions and discussion with site operating personnel that contributed to the determination of project parameters used in the BN Life of Mine (LOM) plan update study April 2022. • The competent person believes a further site visit was warranted in 2022 to review changes in the mining progress as well as mining conditions.
Study status	• *The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.* • *The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.*	• A LOM study update, equivalent to a Feasibility Study update was completed in January 2018 by GLOGEX. • GLOGEX is completing preparation of an updated scenario of the Life of Mine ("LOM") Study for the BN deposit. BN design, mine planning has been completed and economic analysis will be completed in March 2022.

This report has been prepared for Mongolian Mining Corporation and must be read in its entirety and subject to the third party disclaimer clauses contained in the body of the report.

Criteria	JORC Code explanation	Commentary
Cut-off parameters	• *The basis of the cut-off grade(s) or quality parameters applied.*	• There are no coal quality cut-off parameters used to eliminate the conversion of Coal Resources to Coal Reserves. Coal Resources have already been determined with an ash cut off of 50% (DRY basis). Pit Optimization and LOM planning has been used to determine whether Coal Resources will convert to Coal Reserves

Mining factors or assumptions	• *The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design).*
	• *The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.*
	• *The assumptions made regarding geotechnical parameters (eg pit slopes, stope sizes, etc), grade control and pre-production drilling.*
	• *The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).*
	• *The mining dilution factors used.*
	• *The mining recovery factors used.*
	• *Any minimum mining widths used.*
	• *The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.*
	• *The infrastructure requirements of the selected mining methods.*
		• Pit Optimization and LOM planning has been used as the basis of converting Coal Resources to Coal Reserves.
		• The selected mining method is that in use in the operating mine, i.e., open cut truck and hydraulic excavator mining for both waste mining and coal mining, with out of pit and in pit dumping of waste.
		• Geotechnical parameters for the design of stable slopes have been provided by Australian Mining Consultants ("AMC").
		• The mining factors used were:
		  ○ Minimum coal mining thickness of 0.5 m.
		  ○ Minimum parting mining thickness of 0.5 m.
		  ○ Mineable coal section roof loss of 100 mm.
		  ○ Mineable coal section floor loss of 100 mm.
		  ○ Mineable coal section roof dilution of 100 mm.
		  ○ Mineable coal section floor dilution of 100 mm
		  ○ Global mining and geological loss 1%.
		  ○ The quality of diluting material is relative density of 2.81 g/cc (ar), and ash of 93.86% (ar).
		  ○ Relative density data in the geological model is based on an average in-situ moisture of 4.55% (ar). ROM model moisture is 2.26% (ar), coking coal product moisture 8% (ar), middlings product moisture 9% (ar), and thermal product coal moisture 2.62% (ar).
		• Inferred Coal Resources are assigned revenue in the Reserve study pit optimizer and included in the LOM production schedule as mineable coal but are not converted to Coal Reserves.
		• The infrastructure requirements are in place at the operating mine comprising offices, workshops, service station and shared CHPP facilities with the UHG mine. The infrastructure will be expanded as BN production expands.

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Criteria	JORC Code explanation	Commentary
Metallurgical factors or assumptions	• *The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.* • *Whether the metallurgical process is well-tested technology or novel in nature.* • *The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.* • *Any assumptions or allowances made for deleterious elements.* • *The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.* • *For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?*	• The metallurgical process for washing the coking coal seams is already in place and being used. It is a low cut high cut dense media processing plant at the UHG mine site. The process is well tested and robust. UHG Coking coal seams 0C, 3A, and 4 have been mined and processed through this plant and the ash-yield curves for these seams have been reconciled and adjusted with the laboratory generated curves from the back analysis of results when these seams were washed. • The process generates primary coking coal product from a low cut point that will produce a 11.5% (ad) ash SHCC and 9.5% (ad) ash SSCC product, and a secondary middlings product of varied ash per customer request produced from a variable high cut point. • International coal processing consultant Norwest Corporation has generated ash-yield curves for major coking coal seams. MMC recently modified ash yield curves of extracted coal seams in the mine based on in pit bulk sampling. • Thermal coal seams to produce a relatively high ash low energy thermal coal product suitable for export or domestic use.
Environmental	• *The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.*	• An Environmental Impact Statement has been prepared and all environmental approvals obtained. • Waste rock characterization results do not require special placement requirements or procedures in the dumps. • Coal processing plant reject is stored appropriately in the waste dumps or storage cells in accordance with the environmental approvals.
Infrastructure	• *The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.*	• All necessary infrastructure to support the BN mine is in place at either the mine site or at the UHG mine industrial area. Power is supplied from an onsite coal fired power station with the transmission line connected to the Mongolian power grid. Water is supplied from a nearby bore field. The workforce is accommodated in a purpose built camp or in housing provided in the nearby communities.
Costs	• *The derivation of, or assumptions made, regarding projected capital costs in the study.* • *The methodology used to estimate operating costs.* • *Allowances made for the content of deleterious elements.* • *The derivation of assumptions made of metal or*	• Project capital cost estimates for mining plant and equipment have been provided by MMC. • The mining, hauling, processing, handling, administration, transportation, air pollution, logistic and import duty charges costs were adjusted from an actual costs incurred at BN provided by MMC year to date 1st January 2022 based on 2850 MNT/USD exchange rate. GLOGEX reviewed key cost inputs and accepted for pit optimization.

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Criteria	JORC Code explanation	Commentary
	commodity price(s), for the principal minerals and co- products. • *The source of exchange rates used in the study.* • *Derivation of transportation charges.* • *The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.* • *The allowances made for royalties payable, both Government and private.*	• Operating cost estimates have been provided from MMC's assessment of actual costs incurring in the operation and as provided by MMC's mining contractor. • Actual mining contractor coal mining costs were provided and applied in the study in $/bcm; however, for presentation in Table 5.5 GLOGEX converted to $/t ROM using the weight average relative density of coal in the pit shells. • Coal processing costs are based on contract price between Energy Resources and Khangad exploration. • Government royalty costs are based on currently legislated rates applicable to the forecast sales prices of BN product coal. There are no private royalties payable.
Revenue factors	• *The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.* • *The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.*	• Shanxi Fenwei Energy Consulting Co Ltd ("Shanxi Fenwei") completed an independent market study for UHG products and identified principal coking and thermal coal markets in Mongolia and China. • The coal selling prices for Semihard Coking Coal were estimated based on on 5 years average price forecast of 2022-2025, as provided to MMC by Shanxi Fenwei Energy Consulting Co. Ltd ("Shanxi Fenwei") product value at the DAP Ganqimaodou port of China. The coal selling prices for Semisoft coking coal were estimated based on actual coal price provided by MMC from 2020 to 2021 and 5 year average price forecast of 2022-2025 by Shanxi Fenwei Energy Consulting Co. Ltd ("Shanxi Fenwei"). The selling prices of Middlings coal and Thermal coal were estimated based on 5 year average price forecast of 2022-2025 as provided to MMC by Shanxi Fenwei Energy Consulting Co. Ltd ("Shanxi Fenwei") product value at the DAP Ganqimaodou port of China. The coal selling prices assigned to each product, were: • Semihard coking coal < 11.5% ash (dry): US$128.8/t product (ar), • Semi-soft coking coal < 9.5% ash (dry): US$95.9/t product (ar), • Middlings coal ~ benchmark CV 6,000 kcal/kg (gar): US$48.8/t product (ar), • Thermal coal ~ benchmark CV 5,000 kcal/kg (gar): US$30.7/t product (ar)

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Market assessment	• *The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.* • *A customer and competitor analysis along with the identification of likely market windows for the product.* • *Price and volume forecasts and the basis for these forecasts.* • *For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.*	• Shanxi Fenwei completed an independent market study for MMC and identified principal coking and thermal coal markets in Mongolia and China in April 2021.
Economic	• *The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.* • *NPV ranges and sensitivity to variations in the significant assumptions and inputs.*	• No economic analysis
Social	• *The status of agreements with key stakeholders and matters leading to social license to operate.*	• *All key stakeholder agreements are in place providing a social license to operate.*
Other	• *To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:* • *Any identified material naturally occurring risks.* • *The status of material legal agreements and marketing arrangements.* • *The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre- Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.*	• All material legal agreements, marketing agreements and government agreements are in place to allow the BN mine to successfully operate. As expansion proceeds it is reasonably expected any modifications to existing agreements or additional agreements that may be required can be obtained in a timely manner.

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Criteria	JORC Code explanation	Commentary
Classification	• *The basis for the classification of the Ore Reserves into varying confidence categories.* • *Whether the result appropriately reflects the Competent Person's view of the deposit.* • *The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).*	• Measured Resources have been classified a Proved Reserves, Indicated Resources have been classified as Probable Reserves. No Probable Reserves have been derived from Measured Resources. • No Inferred Resources have been converted to Reserves (although Inferred Resource was assigned revenue in the pit optimiser and reported as mineable ROM coal in the LOM schedule). • The result reflects the Competent Persons view of the deposit.
Audits or reviews	• *The results of any audits or reviews of Ore Reserve estimates.*	• Internal peer review by GLOGEX CONSULTING LLC of the Reserves estimate has been completed. • Technical information in this UHG Coal Reserve estimation has been peer reviewed by Independent consultant Mr. Gary Ballantine. Mr. Ballantine is a member of the Australasian Institute of Mining and Metallurgy (Member #109105) and has over 32 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012).

This report has been prepared for Mongolian Mining Corporation and must be read in its entirety and subject to the third party disclaimer clauses contained in the body of the report.

Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.* • *It is recognized that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• Coal production at BN commenced in 2011 and since that time some 34 Mbcm of waste and 4.9 Mt of ROM coal has been mined until 1st January 2018. Run-of-Mine ("ROM") coal production of 4.9 Mt was reported by mine survey measurement from 2011 until end of 2021. • Since the preparation of Reserves estimate effective as of 1 January 2018 the BN mine has completed reconciliations of actual coal mined against the geological model for the period January 2017 to January 2018. Last Coal Reserves Statement for BN was prepared as at 1st January 2018 by GLOGEX and reported as 176Mt (ROM). • As a result of the coal recovery reconciliations that have been undertaken by MMC and the observations made associated with the mining activities over this period. The mining modifying factors in this Reserves estimate have been adjusted to accommodate size of the equipment being used in the mine (i.e., excavator) and the reassignment of hard coking coal to semihard coking coal.

This report has been prepared for Mongolian Mining Corporation and must be read in its entirety and subject to the third party disclaimer clauses contained in the body of the report.

MONGOLIAN MINING CORPORATION

Our ref: Ulaanbaatar

Memo To: **MMC Executive Committee**
From: Mr. Byambaa Barkhas (Competent Person)
Date: 17th January 2023
Subject: Baruun Naran JORC Statement 31 December 2022

Estimate of the JORC (2012) compliant Coal Resource within the Baruun Naran ("BN") deposit has been updated as of 31 December, 2022. Total estimate is now 414 Mt, comprising 332 Mt Measured, 51 Mt Indicated and 31 Mt Inferred component quantities.

This memo provides summary information regarding this update, and should be considered in conjunction with detail included in the "JORC Standard Resource Estimation Baruun Naran Coal Mine (License 14493A)" report, released documenting the previous Coal Resource estimate, stated as of 31 December, 2021.

Since completion of the previous Coal Resource estimate, no further resource exploration data has been incorporated into structural or coal quality geological models. To produce the updated Coal Resource estimate, topographic survey information was updated to account for depletion as result of mining between 1 January, 2022, and 31 December, 2022.

The new Coal Resource statement is included in Appendix 1, summarised in 100m depth cut-off intervals, with Coal Resources tonnages reported based upon in situ density on an as received moisture basis.

Regards,

Byambaa Barkhas
Senior Chief Geologist (Geology and geotechnical)

Appendix 1

BN mining license Coal Resource, by depth and category, as at 31 December, 2022:

Volume (x1,000,000 m^3)	Tonnes (x1,000,000)	RD (g/cc)	ASH (%)	TM (%)	VM (%)	CV (kcal/kg)	TS (%)	FC (%)	Classification
BUQA - BHWE									
4.6	7.2	1.6	29.00	2.3	23.9	5515	1.18	44.78	MEASURED
0.7	1.2	1.6	31.97	2.1	23.6	5208	1.06	42.30	INDICATED
0.5	0.7	1.6	31.11	2.5	24.1	5276	1.07	42.33	INFERRED
5.8	**9.1**	**1.6**	**29.55**	**2.3**	**23.9**	**5456**	**1.16**	**44.27**	**SUBTOTAL**
BHWE - 100m									
39.1	61.3	1.57	28.91	2.16	23.88	5541	1.14	45.06	MEASURED
5.7	9.2	1.61	31.32	2.11	23.65	5288	1.04	42.92	INDICATED
3.1	5.0	1.60	30.44	2.36	24.13	5351	1.09	43.06	INFERRED
47.9	**75.5**	**1.58**	**29.30**	**2.16**	**23.87**	**5497**	**1.13**	**44.67**	**SUBTOTAL**
100 - 200m									
55.9	87.8	1.57	28.55	2.02	24.05	5578	1.12	45.37	MEASURED
7.5	12.0	1.61	30.91	2.11	23.69	5330	1.07	43.29	INDICATED
4.8	7.7	1.60	29.92	2.41	24.30	5397	1.07	43.37	INFERRED
68.2	**107.5**	**1.58**	**28.91**	**2.06**	**24.03**	**5537**	**1.11**	**45.00**	**SUBTOTAL**
200 - 300m									
56.4	88.6	1.57	28.60	1.98	24.01	5574	1.10	45.41	MEASURED
8.3	13.3	1.59	29.99	2.06	23.73	5424	1.10	44.21	INDICATED
5.2	8.2	1.59	29.40	2.37	24.32	5457	1.08	43.91	INFERRED
69.9	**110.1**	**1.57**	**28.83**	**2.02**	**24.00**	**5547**	**1.10**	**45.15**	**SUBTOTAL**
300 - 400m									
55.1	86.5	1.57	28.54	1.94	23.96	5583	1.12	45.56	MEASURED
9.8	15.7	1.60	30.49	2.07	23.56	5372	1.10	43.88	INDICATED
5.7	9.0	1.58	28.84	2.32	24.30	5518	1.10	44.54	INFERRED
70.6	111.2	1.57	28.84	1.99	23.93	5548	1.12	45.24	**SUBTOTAL**
262.4	**413.4**	**1.58**	**28.95**	**2.06**	**23.96**	**5534**	**1.11**	**45.03**	**GRAND TOTAL**
264	**414**	**1.6**	**29**	**2.1**	**24**	**5534**	**1.10**	**45**	***Total (Rounded)**

Note:

(i) Technical information in this BN Coal Resource estimation has been compiled by Mr. Byambaa Barkhas, Senior Chief Geologist of Geology and Geotechnical, Mongolian Mining Corporation. Mr. Barkhas is a member of the Australasian Institute of Mining and Metallurgy (Member #318198) and has over 12 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Minerals Resources and Ore Reserves, The JORC Code (2012). Mr. Barkhas consents to the inclusion in the release of the matters based on this information in the form and context in which it appears. The estimate of the Coal Resource set out in Table 1 presented in this report are considered to be a true reflection of the BN Coal Resource as at 31 December 2022, and have been carried out in accordance with the principles and guidelines of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. The JORC Code (2012).

(ii) Technical information in this BN Coal Resource estimation has been internally peer reviewed by Mr. Lkhagva-Ochir Said Executive General Manager for Mining and Processing, Mongolian Mining Corporation. Mr. Said is a member of the Australasian Institute of Mining and Metallurgy (Member #316005) and has over 14 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012).

(iii) Due to rounding, discrepancy may exist between sub-totals and totals.

MONGOLIAN MINING CORPORATION

Our ref: Ulaanbaatar

Memo To: **MMC Executive Committee**
From: Mr. Byambaa Barkhas (Competent Person)
Date: 17th January 2023
Subject: Tsaikhar Khudag JORC Statement 31 December 2022

Estimate of the JORC (2012) compliant Coal Resource within the Tsaikhar Khudag ("THG") deposit has been updated as of 31 December, 2022. Total estimate is now 89 Mt, comprising 67 Mt Indicated and 22 Mt Inferred component quantities.

This memo provides summary information regarding this update, and should be considered in conjunction with detail included in the "JORC Standard Resource Estimation Tsaikhar Khudag (License MV-017336)" report, released documenting the previous Coal Resource estimate, stated as of 31 December, 2021.

Since completion of the previous Coal Resource estimate, no further exploration data has been incorporated into structural or coal quality geological models. No mining related activities has been carried out on the Tsaikhar Khudag since the mining license was issued.

The new Coal Resource statement is included in Appendix 1, summarised in 100m depth cut-off intervals, with Coal Resources tonnages reported based upon in situ density on an as received moisture basis.

Regards,

Byambaa Barkhas
Senior Chief Geologist (Geology and geotechnical)

Appendix 1

THG mining license Coal Resource, by depth and category, as at 31 December, 2022:

Volume (x1,000,000 m^3)	Tonnes (x1,000,000)	RD (g/cc)	ASH (%)	TM (%)	VM (%)	CV (kcal/kg)	TS (%)	FC (%)	Classification
BUQA - BHWE									
0.4	0.7	1.7	38.3	3.8	21.8	4,465	0.9	36.10	INDICATED
0.1	0.2	1.6	36.7	2.9	22.3	4,707	0.7	38.10	INFERRED
0.5	**0.9**	**1.6**	**37.9**	**3.6**	**21.9**	**4,526**	**0.9**	**36.59**	**SUBTOTAL**
BHWE - 100m									
7.8	12.7	1.64	37.12	3.64	22.24	4,577	0.94	37.00	INDICATED
2.4	4.0	1.63	36.58	3.13	22.38	4,721	0.70	37.92	INFERRED
10.2	**16.7**	**1.64**	**36.99**	**3.52**	**22.27**	**4,611**	**0.88**	**37.22**	**SUBTOTAL**
100 - 200m									
10.8	17.8	1.64	37.17	3.33	22.27	4,602	0.82	37.24	INDICATED
2.5	4.1	1.63	36.82	3.09	22.37	4,692	0.63	37.72	INFERRED
13.4	**21.9**	**1.64**	**37.10**	**3.29**	**22.29**	**4,619**	**0.78**	**37.33**	**SUBTOTAL**
200 - 300m									
11.8	19.2	1.63	36.32	3.08	22.66	4,702	0.67	37.94	INDICATED
3.2	5.1	1.61	34.94	3.15	23.14	4,847	0.59	38.78	INFERRED
14.9	**24.3**	**1.62**	**36.03**	**3.09**	**22.76**	**4,733**	**0.65**	**38.12**	**SUBTOTAL**
300 - 400m									
9.9	16.1	1.61	35.43	2.77	23.11	4,820	0.61	38.69	INDICATED
5.5	8.9	1.62	35.80	3.23	22.84	4,750	0.63	38.13	INFERRED
15.5	**25.0**	**1.62**	**35.56**	**2.93**	**23.01**	**4,795**	**0.62**	**38.49**	**SUBTOTAL**
54.5	**88.7**	**1.63**	**36.36**	**3.18**	**22.62**	**4,697**	**0.72**	**37.84**	**GRAND TOTAL**
54	**89**	**1.6**	**36**	**3.0**	**23**	**4,700**	**0.7**	**38**	***Total (Rounded)**

Note:

(i) Technical information in this THG Coal Resource estimation has been compiled by Mr. Byambaa Barkhas, Senior Chief Geologist of Geology and Geotechnical, Mongolian Mining Corporation. Mr. Barkhas is a member of the Australasian Institute of Mining and Metallurgy (Member #318198) and has over 12 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Minerals Resources and Ore Reserves, The JORC Code (2012). Mr. Barkhas consents to the inclusion in the release of the matters based on this information in the form and context in which it appears. The estimate of the Coal Resource set out in Table 1 presented in this report are considered to be a true reflection of the THG Coal Resource as at 31 December 2022, and have been carried out in accordance with the principles and guidelines of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. The JORC Code (2012).

(ii) Technical information in this THG Coal Resource estimation has been internally peer reviewed by Mr. Lkhagva-Ochir Said Executive General Manager for Mining and Processing, Mongolian Mining Corporation. Mr. Said is a member of the Australasian Institute of Mining and Metallurgy (Member #316005) and has over 14 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012).

(iii) Due to rounding, discrepancy may exist between sub-totals and totals.

JORC (2012) Standard Resource Estimation

Baruun Naran Mining Licence [MV-014493]

And

Tsaikhar Khudag Mining License [MV-017336]

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DEC 2021

CONTENTS

1 EXECUTIVE SUMMARY 11

2 INTRODUCTION 17

2.1 SCOPE OF WORK 17
2.2 RELIANCE ON OTHER EXPERTS 18

3 LOCATION, ACCESS AND LICENCE INFORMATION 19

3.1 PROJECT LOCATION 19
3.2 PROJECT ACCESS AND INFRASTRUCTURE 19
3.3 PHYSIOGRAPHY AND CLIMATE 24
3.4 OWNERSHIP AND MINERAL TENURE 27

4 EXPLORATION HISTORY 29

4.1 PREVIOUS REGIONAL EXPLORATION 29
4.2 PREVIOUS BN EXPLORATION 30
4.2.1 PAST EXPLORATION (PRE-QGX) 30
4.2.2 2005-6 EXPLORATION - QGX 31
4.2.3 2007 EXPLORATION (WATER BORES) 36
4.2.4 2008 EXPLORATION (LOX) 36
4.2.5 2009 EXPLORATION 37
4.2.6 2011-12 EXPLORATION 39
4.2.7 2014 EXPLORATION 40
4.3 PREVIOUS RESOURCE AND RESERVE ESTIMATES 41
4.3.1 BARUUN NARAN LICENSE 41
4.3.2 TSAIKHAR KHUDAG LICENSE 42
4.4 PREVIOUS PRODUCTION 43

5 GEOLOGY 44

5.1 REGIONAL GEOLOGY 44
5.2 REGIONAL STRATIGRAPHY 45
5.2.1 Devonian system 45
5.2.1.1 Tsetsgershand formation ($D_{2\text{-}3}cs$) 45
5.2.2 Upper Carbonaceous-lower Permian 45
5.2.2.1 Dushiin ovoo formation (C_3-P_1ds) 45
5.2.2.2 Tsogttsetsii formation (P_1CC) 46
5.2.3 Upper Permian 46
5.2.3.1 Tsankhi formation (P_2ch) 46
5.2.3.2 Tavan Tolgoi formation (P_2tb) 46
5.2.4 Triassic system (T) 46
5.2.5 Cretaceous system 47
5.2.5.1 Sainshand formation (K_2ss) 47
5.2.6 Cenozoic group (Kz) 47
5.2.7 Paleogenic system (P) 47
5.2.7.1 Lower and middle Oligocene ($P_{1,\ 2}$) 47
5.2.8 Neogene system (N) 47
5.2.8.1 Miocene (N_1) 47
5.2.8.2 Pliocene (N_2) 47
5.2.9 Quaternary sediments ($Q_{3\text{-}4}$) 47

5.3 LOCAL STRATIGRAPHY 50
5.4 DEPOSIT TYPE 54
5.5 STRUCTURE 54
5.6 INTRUSIVES 54
5.7 COAL SEAMS 55
5.7.1 Seam/ply Hierarchy 55
5.7.1.1 Seam Group 'A' 55
5.7.1.2 Seam Group 'B' 55
5.7.1.3 Seam Group 'C' 55
5.7.1.4 Seam Group 'D' 55
5.7.1.5 Seam Group 'E' 55
5.7.1.6 Seam Group 'F' 56
5.7.1.7 Seam Group 'G' 56
5.7.1.8 Seam Group 'H' 56
5.7.1.9 Seam Group 'I' 56
5.7.1.10 Seam Group 'J' 56
5.7.1.11 Seam Group 'K' 56
5.7.1.12 Seam Group 'N' 57
5.7.1.13 Seam Group 'Q' 57
5.7.1.14 Seam Group 'R' 57
5.7.1.15 Seam Group 'T' 57
5.7.1.16 Seam Group 'U' 57
5.7.1.17 Seam Group 'V' 58
5.7.1.18 Seam Group 'W' 58
5.7.1.19 Seam Group 'X' 58
5.7.1.20 Seam Group 'Y' 58
5.7.2 Coal Quality 63
5.7.2.1 Database 64
5.7.2.2 Rank of the coal 80
5.7.2.3 Regression formulae to estimate missing coal quality data 81
5.7.2.4 Observations regarding the distribution of CSN values 93
5.7.2.5 Washability and Coke Testing 96
5.8 OUTCROP, SUB-CROP AND OXIDATION 96
5.9 GEOCHEMISTRY 97
5.10 GEOTECHNICAL ISSUES 98
5.10.1 Introduction 98
5.10.2 Pit Stability Observations 98
5.10.3 West Pit 99
5.10.4 East Pit 100
5.10.5 Pit Wall Failures 100
5.10.6 Main Haulage Ramp Conditions 100
5.10.7 Waste Dump Observations 100
5.10.8 BN Back Analysis of Slope Failure, West Pit, Southern Pit Wall 101
5.10.9 Ground Control Districts 101
5.10.10 Geotechnical Domains 101
5.10.11 Stereographic Structural Analysis 102
5.10.12 Kinematic Stability Analysis 104
5.10.13 Slope and Waste Dump Design Review 107
5.10.14 Summary of Current BN Pit Slope Design Specifications 107
5.10.15 Excavators Operating on Top of Coal Benches 110

5.10.16 Pit Slope Stability Monitoring *111*
5.10.17 Future Work *112*
5.10.17.1 Training *112*
5.10.17.2 Ground Stability Management Plan *112*
5.10.17.3 Slope Stability Assessment *112*
5.10.17.4 Pit Wall and Waste Dump Slope Design *112*
5.10.17.5 Rock Mass Classification *112*
5.10.17.6 Geological Structure Model *113*
5.10.17.7 Pit Wall Slope Stability Monitoring *113*
5.11 HYDROGEOLOGY 113
5.12 GAS 113
5.13 MINING POTENTIAL 114
5.14 COAL ECONOMICS 115

6 PEER REVIEW AND SITE VISITS 116

6.1 INITIAL SITE VISIT – APRIL 2011 116
6.1.1 Conclusions of Audit for JORC (2004) Resource Estimate - June 2012 ..... *116*
6.2 SUMMARY OF ONGOING SITE VISITS, COMMENTS AND INTERNAL AUDITS FOR JORC (2012) RESOURCE ESTIMATE - JUNE 2015 117
6.3 INTERNAL PEER REVIEW – 2021 117

7 EXPLORATION 118

7.1 DRILLING 118
7.1.1 Historical Drilling at BND *118*
7.1.1.1 Mongolian-Russian Drilling *118*
7.1.1.2 QGX drilling *118*
7.1.1.3 ER Drilling *121*
7.2 GEOPHYSICS 127
7.2.1 Seismic survey *127*
7.2.2 Downhole Geophysics *128*
7.2.3 Gradient- array resistivity survey *128*

8 QAQC 129

8.1 DRILLING METHOD 129
8.1.1 Drilling Method prior to 1993 ..... *129*
8.1.2 Drilling Method QGX *129*
8.1.3 Drilling Method ER 2011 – 2012, 2014 ..... *129*
8.1.4 Drilling Method ER 2018 ..... *130*
8.2 DOWNHOLE SURVEY 130
8.3 TRENCHING 130
8.4 BOREHOLE COLLAR AND TOPOGRAPHY SURVEY 132
8.4.1 Survey Method prior to 1983 (Khosbayar et.al.) *132*
8.4.2 Survey Method QGX (Norwest 2008) *132*
8.4.3 Survey Method 2009 - present *132*
8.5 GEOPHYSICS 134
8.5.1 Geophysics Method prior to 1993 ..... *134*
8.5.2 Geophysics Method QGX *134*
8.5.2.1 Geophysics QGX 2005-2006 ..... *134*
8.5.2.2 Geophysics QGX 2007-2009 ..... *135*
8.5.3 Geophysics Method ER 2011 – 2012, 2014 ..... *135*

8.5.4 Geophysics Method ER 2018 135
8.6 SEISMIC 136
8.7 GEOLOGICAL LOGGING AND SAMPLING 136
8.7.1 Mongolian-Russian Logging and Sampling prior to 1993 136
8.7.2 QGX Logging and Sampling 137
8.7.3 ER Exploration-Logging and Sampling 137
8.7.3.1 Geological Logging 138
8.7.3.2 Sampling 139
8.8 ANALYTICAL METHOD 139
8.8.1 Analysis before ER 139
8.8.2 Analyses of Energy Resources 140
8.8.3 Accreditation 140
8.9 LABORATORY INSPECTION 142
8.9.1 Laboratory Inspection October 2010 142
8.9.2 Laboratory Inspection March 2012 143
8.10 REPRODUCIBILITY OF ANALYSES BETWEEN LABORATORIES 143
8.10.1 Database 143
8.10.2 ERCCL Laboratory compared with SM Laboratory 143
8.10.2.1 Analysis moisture 146
8.10.2.2 Ash 146
8.10.2.3 Volatile matter 146
8.10.2.4 Total sulphur 147
8.10.2.5 Calorific value 147
8.10.2.6 True relative density 147
8.10.2.7 Free Swelling Index (equivalent of CSN) 147
8.10.3 ERCCL Laboratory compared with UUH Laboratory 151
8.10.3.1 Analysis moisture 153
8.10.3.2 Ash 153
8.10.3.3 Volatile matter 153
8.10.3.4 Total sulphur 153
8.10.3.5 Calorific value 154
8.10.3.6 True relative density 154
8.10.3.7 Three groups of seams according to CSN distributions. Free Swelling Index (equivalent of CSN) 154
8.10.4 Conclusions for reproducibility of analyses between labs 158
8.11 POINT OF OBSERVATION DEFINITION AND CALCULATION 159
8.12 USE OF CONDITIONAL SIMULATION GEOSTATISTICS TO DETERMINE THE EXPECTED ERROR OF ESTIMATION AS AN AID IN THE UNDERSTANDING OF CONFIDENCE IN THE CLASSIFICATION CATEGORIES. 160

9 RESOURCE ESTIMATION METHODOLOGY 165

9.1 RESOURCE ESTIMATION METHODOLOGY - BN 165
9.2 SOFTWARE USED 165
9.3 DATABASE COMPILATION 165
9.4 DATA VALIDATION 165
9.5 EXPLORATORY DATA ANALYSIS 166
9.6 DATA PROCESSING 167
9.7 MODEL GEOSTATISTICS 168
9.8 GRIDDING 168
9.9 BLOCK MODELLING 169

9.10 Resource Classification, Seam Coding and Grade Interpolation 172
9.11 Block Model Validation 173
9.12 Resource Estimation Methodology - THG 174
9.13 Software Used 174
9.14 Database Compilation 174
9.15 Data Validation 175
9.16 Exploratory Data Analysis 175
9.17 Data Processing 176
9.18 Model Geostatistics 177
9.19 Gridding 177
9.20 Block Modelling 178
9.21 Resource Classification, Seam Coding and Grade Interpolation 181
9.22 Block Model Validation 182

10 RESOURCE STATEMENT 183

10.1 Resource BN 183
10.2 Resource THG 185
10.3 Comparison for BN model between New JORC (2012) - 31 December 2021 and Previous JORC (2012) - 30 June 2015 Resource Estimates to 400m 186
10.4 Comparison for THG model between New JORC (2012) - 31 December 2021 and Previous JORC (2012) – 30 June 2015 Resource Estimates to 400m 187

11 CONCLUSIONS AND RECOMMENDATIONS 189

12 DISCLAIMER 195

13 DATE AND SIGNATURE 196

14 STATEMENT OF QUALIFICATIONS 197

15 STATEMENT OF INDEPENDENCE 198

16 REFERENCES 199

17 GLOSSARY OF TECHNICAL TERMS 200

APPENDIX 1: MINERAL TENURE LICENSE 202

APPENDIX 2: PROCEDURES 203

APPENDIX 3: TABLE OF BASE OF WEATHERING AND QUATERNARY FOR ALL BOREHOLES THAT IT WAS LOGGED. 204

APPENDIX 4A: POINTS OF OBSERVATION – (AS-RECEIVED BASIS) 205

APPENDIX 4B: POINTS OF OBSERVATION – (AIR-DRY BASIS) 206

APPENDIX 5: LABORATORY CERTIFICATES 207

APPENDIX 6A: COMPLETE ANALYTICAL DATABASE SHOWING (AS-RECEIVED) COAL QUALITY 208

APPENDIX 6B: COMPLETE ANALYTICAL DATABASE SHOWING (AIR-DRY) COAL QUALITY 209

APPENDIX 7: GRAPHS ON A SEAM BY SEAM BASIS AND FOR EACH COAL QUALITY PARAMETER 210

APPENDIX 8: BOREHOLE PROFILES WITH LAS AND COAL QUALITY 211

APPENDIX 9: BOREHOLE SECTIONS **212**
APPENDIX 10: SEISMIC SECTIONS & MAP **213**
APPENDIX 11A: RESOURCES BY SEAM (AIR-DRY) **214**
APPENDIX 11B: RESOURCES BY SEAM (AS-RECEIVED) **215**
APPENDIX 12: LABORATORY AUDIT REPORTS **216**
APPENDIX 13: SEISMIC REPORTS **217**
APPENDIX 14: PEER REVIEW **218**
APPENDIX 15: GEOTECHNICAL REPORT **219**
APPENDIX 16: LIST OF DOWNHOLE GEOPHYSICAL EQUIPMENT **220**
APPENDIX 17: FAULTED BOREHOLES AND PLIES **221**
APPENDIX 18: INSERTED AND EXTRAPOLATED DATA POINTS **222**
APPENDIX 19: RESOURCE CATEGORY AREAS PER PLY **223**
APPENDIX 20: CAPABILITY STATEMENT **224**
APPENDIX 21: UHG GEOCHEMISTRY **225**
APPENDIX 22: RESERVES **226**
APPENDIX 23: HYDROGEOLOGY **227**
APPENDIX 24: VARIOGRAMS **228**
APPENDIX 25: JORC TABLE 1 ..... **229**

LIST OF FIGURES

FIGURE 3-1: LOCATION OF BARUUN NARAN DEPOSIT 19
FIGURE 3-2: TAVAN TOLGOI AIRPORT 20
FIGURE 3-3: BND INFRASTRUCTURE 21
FIGURE 3-4: UHG INFRASTRUCTURE 21
FIGURE 3-5: UHG CAMP AND TOWN 22
FIGURE 3-6: 'DREAM' EDUCATION COMPLEX 23
FIGURE 3-7: 'TSETSII' APARTMENT COMPLEX 24
FIGURE 3-8: GOBI DESERT LANDSCAPE 25
FIGURE 3-9: GOBI DESERT FAUNA AND FLORA 26
FIGURE 3-10: MMC OWNERSHIP 27
FIGURE 3-11: BARUUN NARAN AND TSAIKHAR KHUDAG MINERAL TENURE 28
FIGURE 4-1: SOVIET-MONGOLIAN DRILL HOLES 31
FIGURE 4-2: RESISTIVITY SURVEY 33
FIGURE 4-3: 2005 BOREHOLES BY TYPE 34
FIGURE 4-4: 2006 BOREHOLES BY TYPE 35
FIGURE 4-5: 2008 BOREHOLES BY TYPE 37
FIGURE 4-6: 2009 BOREHOLES BY TYPE 38
FIGURE 4-7: 2011-12 BOREHOLES BY TYPE 40
FIGURE 4-8: 2014 BOREHOLES BY TYPE 41
FIGURE 5-1: REGIONAL MAP OF THE TAVAN TOLGOI COAL BASIN 44
FIGURE 5-2: REGIONAL GEOLOGICAL MAP OF TAVAN TOLGOI COALFIELD 49

FIGURE 5-3: GEOLOGICAL MAP OF BARUUNNARAN DEPOSIT 51
FIGURE 5-4: GENERAL GEOLOGY BN FROM NORTHEAST TO NORTHWEST 52
FIGURE 5-5: GENERAL GEOLOGY THG 53
FIGURE 5-6: BN AREA SEAM H VARIOGRAM OF GAUSIAN TRANSFORMED MOISTURE ON AIR DRY BASIS 66
FIGURE 5-7: BN AREA QGX DATA SORTED HIGHEST-LOWEST AND ER DATA SHOWED LOWEST-HIGHEST 67
FIGURE 5-8: BN AREA EXPECTED ERROR FOR QGX DATASET AND ER DATASET 67
FIGURE 5-9: BN AREA ER HISTOGRAM- H SEAM COAL SAMPLE MOISTURE (AS-RECEIVED) 68
FIGURE 5-10: BN AREA QGX HISTOGRAM- H SEAM COAL SAMPLE MOISTURE (AS-RECEIVED) 69
FIGURE 5-11: BN AREA ER HISTOGRAM- H SEAM ROCK SAMPLE MOISTURE (AS-RECEIVED) 69
FIGURE 5-12: BN AREA QGX HISTOGRAM- H SEAM ROCK SAMPLE MOISTURE (AS-RECEIVED) 70
FIGURE 5-13: BN AREA ER HISTOGRAM- H SEAM COAL SAMPLE MOISTURE (AIR-DRY) 70
FIGURE 5-14: BN AREA QGX HISTOGRAM- H SEAM COAL SAMPLE MOISTURE (AIR-DRY) 71
FIGURE 5-15: BN AREA ER HISTOGRAM- H SEAM ROCK SAMPLE MOISTURE (AIR-DRY) 71
FIGURE 5-16: BN AREA QGX HISTOGRAM- H SEAM ROCK SAMPLE MOISTURE (AIR-DRY) 72
FIGURE 5-17: BN RELATIONSHIP BETWEEN TOTAL MOISTURE AND AIR-DRY MOISTURE. 74
FIGURE 5-18: BN RELATIONSHIP BETWEEN ASH AND TRUE RELATIVE DENSITY 75
FIGURE 5-19: BN RELATIONSHIP BETWEEN ASH AND VOLATILE MATTER. 75
FIGURE 5-20: BN RELATIONSHIP BETWEEN ASH AND CALORIFIC VALUE. 76
FIGURE 5-21: BN RELATIONSHIP BETWEEN ASH AND TOTAL SULPHUR. 76
FIGURE 5-22: THG RELATIONSHIP BETWEEN MOISTURE AS RECEIVED AND AIR DRY. 77
FIGURE 5-23: THG RELATIONSHIP BETWEEN ASH AND TRUE RELATIVE DENSITY. 78
FIGURE 5-24: THG RELATIONSHIP BETWEEN ASH AND VOLATILE MATTER. 78
FIGURE 5-25: THG RELATIONSHIP BETWEEN ASH AND CALORIFIC VALUE 79
FIGURE 5-26: THG RELATIONSHIP BETWEEN ASH AND TOTAL SULFUR 79
FIGURE 5-27: BN ASTM CLASSIFICATION OF THE COAL BASED ON RANK. 80
FIGURE 5-28: THG ASTM CLASSIFICATION OF THE COAL BASED ON RANK 81
FIGURE 5-29: BN ALL DATA TRANSFORMED MOISTURE AS RECEIVED VERSUS AIR DRY MOISTURE 86
FIGURE 5-30: BN MOISTURE RELATIONSHIP BETWEEN PRE 2018 AND 2018 DRILLING CAMPAIGNS. 86
FIGURE 5-31: BN ASH VERSUS CALORIFIC VALUE REGRESSION. 87
FIGURE 5-32: BN CALORIFIC VALUE RELATIONSHIP BETWEEN PRE 2018 AND 2018 DRILLING CAMPAIGNS. 88
FIGURE 5-33: BN ALL DATA, ASH VERSUS VOLATILE MATTER REGRESSION. 89
FIGURE 5-34: THG ALL DATA, ASH VERSUS VOLATILE MATTER REGRESSION. 89
FIGURE 5-35: BN 2012 JORC REPORT: ARD VERSUS TRD FOR CONVERTION 90
FIGURE 5-36: BN ALL DATA ASH AND TRUE RELATIVE DENSITY REGRESSION 91
FIGURE 5-37: BN SAMPLE RESULTS SELECTED FOR CALCULATION OF MISSING DATA 91
FIGURE 5-38: BN SAMPLE RESULTS SELECTED FOR CALCULATION OF MISSING DATA 92
FIGURE 5-39: CUMULATIVE PERCENTAGE DISTRIBUTION OF CSN VALUES. 95
FIGURE 5-40: THREE GROUPS OF SEAMS ACCORDING TO CSN DISTRIBUTIONS. 95
FIGURE 5-41: DETERMINING LIMITS OF WEATHERING 96
FIGURE 5-42: BN SYNCLINAL STRUCTURE SHOWING PRESENT EXCAVATIONS (SCHEMATIC) 99
FIGURE 5-43: BN EAST PIT, STRUCTURAL ROSETTES BY PIT SECTOR 103
FIGURE 5-44: BN WEST PIT STRUCTURAL ROSETTES BY PIT SECTOR 104
FIGURE 5-45: BN GEOTECHNICAL ZONES FOR LOM STUDY (AFTER RUNGE PINCOCK MINARCO) 110
FIGURE 7-1: QGX 2005- 2006 BOREHOLES 119

FIGURE 7-2: QGX 2008 BOREHOLES 120
FIGURE 7-3: QGX 2009 BOREHOLES 121
FIGURE 7-4: MMC GEOLOGY DEPARTMENT ROLE STRUCTURE 122
FIGURE 7-5: 2011-2012 BOREHOLES FOR BN 123
FIGURE 7-6: 2014 BOREHOLES BY BOREHOLE TYPE FOR BN 124
FIGURE 7-7: 2018 BOREHOLES BY BOREHOLE TYPE FOR BN 125
FIGURE 7-8: ALL BOREHOLES BN AND THG 126
FIGURE 7-9: SEISMIC PROGRAM FOR BN 127
FIGURE 8-1: QGX TRENCHING AT BARUUNNARAN 131
FIGURE 8-2: DIFFERENCE MAP OF COLLAR SURVEY AND TOPOGRAPHY SURVEY GEOPHYSICS OF BN 133
FIGURE 8-3: DIFFERENCE MAP OF COLLAR SURVEY AND TOPOGRAPHY SURVEY GEOPHYSICS OF THG 133
FIGURE 8-4: BN AREA SEISMIC LINES PLAN MAP 136
FIGURE 8-5: EXAMPLE OF CORE PHOTOGRAPHS 138
FIGURE 8-6: PHOTOGRAPH OF FREEZER WHERE COAL SAMPLES WERE STORED WHILE WAITING FOR ANALYSIS 139
FIGURE 8-7: LABORATORY ACCREDITATION CERTIFICATE 141
FIGURE 8-8: COMPARISON OF ANALYSIS MOISTURE DETERMINATIONS. 147
FIGURE 8-9: COMPARISON OF ASH DETERMINATIONS 148
FIGURE 8-10: COMPARISON OF VOLATILE MATTER DETERMINATIONS. 148
FIGURE 8-11: COMPARISON OF TOTAL SULPHUR DETERMINATIONS. 149
FIGURE 8-12: COMPARISON OF CALORIFIC VALUE DETERMINATIONS. 149
FIGURE 8-13: COMPARISON OF TRUE RELATIVE DENSITY VALUES. 150
FIGURE 8-14: COMPARISON OF FREE SWELLING INDEX DETERMINATIONS. 150
FIGURE 8-15: COMPARISON OF ANALYSIS MOISTURE DETERMINATIONS. 154
FIGURE 8-16: COMPARISON OF ASH DETERMINATIONS 155
FIGURE 8-17: COMPARISON OF VOLATILE MATTER DETERMINATIONS. 155
FIGURE 8-18: COMPARISON OF TOTAL SULPHUR DETERMINATIONS. 156
FIGURE 8-19: COMPARISON OF CALORIFIC VALUE DETERMINATIONS. 156
FIGURE 8-20: COMPARISON OF TRUE RELATIVE DENSITY VALUES. 157
FIGURE 8-21: COMPARISON OF FREE SWELLING INDEX DETERMINATIONS. 157
FIGURE 8-22: EXPECTED ERROR FOR SEAM H500 FOR THE 95TH PERCENTILE 161
FIGURE 8-23: BIGGS 2013 EXPECTED ERROR 162
FIGURE 8-24: RESULTING CATEGORY DISTANCES FROM EXPECTED ERROR FOR SEAM H500 163
FIGURE 8-25: RESULTING CATEGORY DISTANCES FROM EXPECTED ERROR FOR SEAM H500 WITH 'LOSS' FACTOR 164
FIGURE 9-1: INTERPOLATED VIRTUAL PLIES 167
FIGURE 9-2: ELEVATION GRID FOR H507 PLY (LOOKING SOUTHEAST) WITH BOREHOLES 169
FIGURE 9-3: MODEL LIMITS FOR PLY H507 (LOOKING SOUTHWEST) WITH RESOURCE CATEGORIES (RED=MEASURED, BLUE=INDICATED AND GREEN=INFERRED) AND BOREHOLES. 170
FIGURE 9-4: WIREFRAME CONSTRUCTED BY BOREHOLE INFORMATION ON THE CONTACT ANGLE OF BASEMENT TO LIMIT THE NORTHERN AND SOUTHERN BOUNDARY FAULTS. 171
FIGURE 9-5: BLOCK MODEL (LOOKING NORTHWEST) FOR EACH PLY WITH BOREHOLES 171
FIGURE 9-6: BLOCK MODEL VALIDATION 173
FIGURE 9-7: INTERPOLATED VIRTUAL PLIES 176
FIGURE 9-8: ELEVATION GRID FOR T507 PLY (LOOKING EAST) WITH BOREHOLES 178
FIGURE 9-9: MODEL LIMITS FOR PLY T515 (LOOKING SOUTHEAST) WITH RESOURCE CATEGORY (BLUE=INDICATED AND GREEN=INFERRED) AND BOREHOLES. 179

FIGURE 9-10: WIREFRAME CONSTRUCTED BY BOREHOLE INFORMATION ON THE CONTACT ANGLE OF BASEMENT TO LIMIT THE NORTHERN BOUNDARY FAULT. 180
FIGURE 9-11: BLOCK MODEL (LOOKING NORTHWEST) FOR EACH PLY WITH BOREHOLES 180
FIGURE 9-12: BLOCK MODEL VALIDATION 182

LIST OF TABLES

TABLE 1-1: TOTAL RESOURCES ON AN AS-RECEIVED (AR) BASIS 14
TABLE 1-2: TOTAL RESOURCES ON AN AIR-DRY (AD) BASIS 14
TABLE 1-3: TOTAL RESOURCES ON AN AS-RECEIVED (AR) BASIS 15
TABLE 1-4: TOTAL RESOURCES ON AN AIR-DRY (AD) BASIS 15
TABLE 3-1: GEOGRAPHICAL COORDINATES OF LICENCE MV-014493 28
TABLE 3-2: GEOGRAPHICAL COORDINATES OF LICENCE MV-017336 28
TABLE 4-1: DRILLING SUMMARY OF SOVIET-MONGOLIAN EXPLORATION PROGRAM 30
TABLE 4-2: DRILLING SUMMARY OF QGX 2005 EXPLORATION PROGRAM 33
TABLE 4-3: DRILLING SUMMARY OF QGX 2006 EXPLORATION PROGRAM 34
TABLE 4-4: DRILLING SUMMARY OF QGX 2008 EXPLORATION PROGRAM 37
TABLE 4-5: DRILLING SUMMARY OF QGX 2009 EXPLORATION PROGRAM 38
TABLE 4-6: DRILLING SUMMARY OF 2011-12 EXPLORATION PROGRAM 40
TABLE 4-7: DRILLING SUMMARY OF 2014 EXPLORATION PROGRAM 41
TABLE 4-8: TOTAL IN PLACE RESOURCES 41
TABLE 4-9: TOTAL IN PLACE RESOURCES 42
TABLE 4-10: TOTAL IN PLACE RESOURCES 42
TABLE 4-11: TOTAL IN PLACE RESERVES 42
TABLE 4-12: TOTAL IN PLACE RESERVES 42
TABLE 4-13: TOTAL IN PLACE RESOURCES 43
TABLE 4-14: TOTAL IN PLACE RESOURCES 43
TABLE 5-1: GENERALIZED STRATIGRAPHIC COLUMN, TAVAN TOLGOI 48
TABLE 5-2: SEAM HIERARCHY FOR BN 59
TABLE 5-3: SEAM HIERARCHY FOR THG 61
TABLE 5-4: SUMMARY OF THE BN ORIGINAL ANALYTICAL DATABASE. 64
TABLE 5-5: SUMMARY OF THE THG ORIGINAL ANALYTICAL DATABASE. 65
TABLE 5-6: SUMMARY OF THE BN ORIGINAL ANALYTICAL DATABASE. 65
TABLE 5-7: SUMMARY OF THE BN TRANSFORMED ANALYTICAL DATABASE 72
TABLE 5-8: SUMMARY OF THE MOISTURE TRANSFORMATION FORMULAS FOR QGX DATA 82
TABLE 5-9: MISSING MOISTURE AS-RECEIVED VALUES 84
TABLE 5-10: MISSING MOISTURE AIR-DRY VALUES 85
TABLE 5-11: DISTRIBUTION OF CSN VALUES BY COAL SEAM. 93
TABLE 5-12: CUMULATIVE PERCENTAGE DISTRIBUTION OF CSN VALUES. 94
TABLE 5-13: BN GEOTECHNICAL DOMAINS, MOHR COULOMB CRITERION 102
TABLE 5-14: STRUCTURAL SUMMARY FOR EAST AND WEST PITS 103
TABLE 5-15: BN EAST PIT, SUMMARY OF KINEMATIC ANALYSIS RESULTS 105
TABLE 5-16: BN WEST PIT, SUMMARY OF KINEMATIC ANALYSIS RESULTS 106
TABLE 5-17: SUMMARY OF CURRENT BN PIT SLOPE DESIGN SPECIFICATIONS 108
TABLE 5-18: BN GEOTECHNICAL DESIGN TABLE FOR LOM STUDY (FEBRUARY 2013) 109
TABLE 5-19: COAL BENCH FOS FOR EXCAVATORS AT VARYING OFFSET DISTANCES FROM THE CREST 111
TABLE 5-20: INDICATIVE GAS BOMB RESULTS 114
TABLE 7-1: QGX 2005- 2006 BOREHOLE DATA SUMMARY 119
TABLE 7-2: QGX 2007- 2009 BOREHOLE DATA SUMMARY 120

TABLE 7-3: ENERGY RESOURCES 2011- 2012, 2014 BOREHOLE DATA SUMMARY 122
TABLE 7-4: ENERGY RESOURCES 2018 BOREHOLE DATA SUMMARY 124
TABLE 8-1: ERCCL LABORATORY AND SM LABORATORY COMPARED. 144
TABLE 8-2: AVERAGE ERCCL VALUES AND DIFFERENCES COMPARED. 144
TABLE 8-3: REPRODUCIBILITY LIMITS BETWEEN LABORATORIES. 145
TABLE 8-4: REPRODUCIBILITY OF RESULTS BETWEEN ERCCL AND SM 146
TABLE 8-5: ERCCL LABORATORY AND UUH LABORATORY COMPARED 151
TABLE 8-6: AVERAGE ERCCL VALUES AND DIFFERENCES COMPARED. 151
TABLE 8-7: SAMPLES EXCLUDED FROM THE COMPARISON IN TABLE 8-6. 152
TABLE 8-8: REPRODUCIBILITY OF RESULTS BETWEEN ERCCL AND UUH 153
TABLE 9-1: SUMMARY OF POINTS OF OBSERVATION FILE 165
TABLE 9-2: SUMMARY OF DATA USED FOR RESOURCE ESTIMATE 166
TABLE 9-3: SUMMARY STATISTICS FOR AS-RECEIVED COAL QUALITY 166
TABLE 9-4: SUMMARY STATISTICS FOR AIR-DRY COAL QUALITY 166
TABLE 9-5: DEFAULT COAL QUALITY VALUES FOR PARTINGS 173
TABLE 9-6: SUMMARY OF POINTS OF OBSERVATION FILE 174
TABLE 9-7: SUMMARY OF DATA USED FOR RESOURCE ESTIMATE 175
TABLE 9-8: SUMMARY STATISTICS FOR AS-RECEIVED COAL QUALITY 175
TABLE 9-9: SUMMARY STATISTICS FOR AIR-DRY COAL QUALITY 175
TABLE 9-10: DEFAULT COAL QUALITY VALUES FOR PARTINGS 182
TABLE 10-1: TOTAL RESOURCES ON AN AS-RECEIVED (AR) BASIS 183
TABLE 10-2: TOTAL RESOURCES ON AN AIR-DRY (AD) BASIS 184
TABLE 10-3: TOTAL RESOURCES ON AN AS-RECEIVED (AR) BASIS 185
TABLE 10-4: TOTAL RESOURCES ON AN AIR-DRY (AD) BASIS 185
TABLE 10-5: COMPARISON OF NEW WITH PREVIOUS JORC RESOURCE ESTIMATES – NON JORC 186
TABLE 10-6: COMPARISON OF NEW WITH PREVIOUS JORC RESOURCE ESTIMATES – NON JORC 188
TABLE 11-1: TOTAL RESOURCES ON AN AS-RECEIVED (AR) BASIS 192
TABLE 11-2: TOTAL RESOURCES ON AN AIR-DRY (AD) BASIS 192
TABLE 11-3: TOTAL RESOURCES ON AN AS-RECEIVED (AR) BASIS 193
TABLE 11-4: TOTAL RESOURCES ON AN AIR-DRY (AD) BASIS 193

1 Executive Summary

This report contains the results of the JORC (2012) resource estimation of the Baruun Naran Deposit (BND) contained in the Baruun Naran mining licence [MV-014493] (BN) and Tsaikhar Khudag mining license [MV-017336] (THG), which are both owned by Energy Resources LLC (ER), a wholly owned company of the Hong Kong listed Mongolian Mining Corporation (MMC).

Mr Byambaa Barkhas is the Competent Person (CP) for this report and meets all requirements under the JORC code (2012). Mr Barkhas, an ER employee since March 2010.

Mr Gary Ballantine (Executive General Manager for Exploration and Geology from January 2008 to 2015) wrote the exploration procedures (Appendix 2), trained and developed the ER geology team and assisted with the setup of the onsite laboratory. Mr Lkhagva-Ochir Said and Mr Ballantine have designed the exploration programs since ER acquired the BND in mid-2011. Mr Enkhbat Chuluunbat (ER employee since October 2009) and Mr Barkhas have designed the exploration programs of 2018.

Mr Byambaa Barkhas was responsible for the revised seam correlation and structural interpretation, current Resource review, approving borehole data for JORC compliance resource estimation. Mrs Tsolmon Adiya an ER employee was responsible for the coal quality section of the report. Mr Bekhbat Purev an ER employee was responsible for block modelling and Resource estimation.

Internal peer review was conducted by Mr. Lkhagva-Ochir Said, the then Executive General Manager of Mining and Processing.

The BND is approximately 12.8 square kilometres (km^2) in area and is located in south-central Mongolia within the Ulaan Nuur Valley of the Gobi Desert. The coalfield is situated within the Khankhongor soum (small town), Omnogobi Aimag (South Gobi province) about 61 kilometers (km) west of Dalanzadgad the provincial capital and around 500km south of Ulaanbaatar, the national capital. The coalfield is 230km from the Gashuun suhait border of the People's Republic of China to the south.

The Baruun Naran area is characterised by gently rolling desert plains with scattered small hills and ridges. The elevations in the region range from 1500m to 1700m.The higher elevations occur on a number of small hills that surround the area, which is a continuation of the Altai Mountains. The annual average maximum/minimum temperatures are 36°C and -38°C respectively.

BND consists of 2 mining licenses, BN mining license [MV-014493] (4485.65 hectare), and THG mining license [MV-017336] (8340.01 hectare). Both licenses are valid for 30 years and can be extended twice more for 20 years each.

BND occurs within an Upper Permian clastic sedimentary unit known as the Tavan Tolgoi (TT) formation. The same formation also hosts the large TT coking and thermal coal deposit. An east-northeast trending belt of TT formation crops out in the Baruun Naran valley representing the western continuation of the Ulaan Nuur coal basin. The Ulaan Nuur basin is an asymmetric fault bounded east-northeast trending syncline, with a very steep northern limb (overturned in part) and more gently dipping southern limb. In addition to this folding of the coal bearing strata, seams are truncated by faults in the north, west and south west. Deformation of Permian sediments occurred during the early Mesozoic era. Basement rocks are Carboniferous age on the northern margin of the

valley and Devonian on the southern limb. The earliest deposited coal seams are less extensive and on-lap onto older basement rocks.

The BND over the licenses of BN and THG have 20 seam groupings which include 'A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'N', 'Q', 'R', 'T', 'U', 'V', 'W', 'X' and 'Y'. Of these, seams 'H' and 'T' are best developed, thickest and most continuous and contain a substantial portion of the coking coal resource within the licenses.

The raw coal quality data used for the Resource estimates was collected from 2 exploration drilling periods. Quincunx Gold Exploration Ltd later renamed as QGX LLC (QGX) organized drilling from 2005 to 2010 with a total of 2679 samples for BN and 26 samples for THG collected respectfully. From 2011 until today the ER geology team conducted drilling in the area with a total of 12,502 samples for BN and 3824 samples for THG collected respectfully. These samples were analysed for total moisture, proximate composition, sulphur and calorific value. CSN and G-index were analysed on composite samples, which matched with modelled seams, as CSN and G-index are coking properties and are non-additive so cannot be calculated by weighted averages.

From the analysis of the 2 different periods the coal quality data collection there was a clear disparity of the old QGX moisture data compared with the newer ER data with the actual QGX values being clearly out of alignment with the coal rank. With such a large (greater than 50%) dataset of the newer ER data, a decision was made by the CP to transform the QGX moisture data to fit the ER data whereby all the available coal quality data could be used for the resource estimate.

In accordance with the ASTM classification of coal by rank, with the wide range in volatile matter, the coal was classified as ranging from high-volatile "A" bituminous coal to low-volatile bituminous coal with most samples in the medium-volatile bituminous group.

Geotechnical data was collected with the current exploration program. AMC consultants have been engaged to provide advice on geotechnical issues at BND. All geotechnical data collected was provided to AMC consultants for their ongoing work.

An initial site visit was completed by Mr Ballantine (Executive General Manager Geology and Exploration) and Mr Andrew Little, Technical Director (at the time) for MMC on 7 April 2011. The purpose of this visit was to form part of the due diligence process for the purchase of BN mine. The visit entailed inspections of the onsite offices, mining equipment, maintenance office and the newly opened 'T' seam pit. Nothing out of the ordinary from the documentation supplied in the data room was determined.

JORC resource estimates require a level of independence and hence Mr Todd Sercombe, senior consultant for GasCoal Pty Ltd and a coal geologist since 1996, provided an independent peer review of the exploration procedures developed by the ER geology team.

Internal peer review of exploration work 2018 was conducted by Mr. Lkhagva-Ochir Said, the then Executive General Manager of Mining and Processing. These peer reviews confirmed compliance of the Group's work to update the Coal Resource estimations in compliance with requirements of the JORC Code (2012).

Initial exploration began in 1983 by Mongolian-Russian teams which intercepted a total of 12 coal seams with apparent thickness of 1 to 30 meters (m) of which 4 reported metallurgical quality. Further more concentrated exploration followed by QGX during

2005 – 2009 that focused its efforts on the main BN license. Some regional work was also completed during this time. The current exploration was completed by ER over BN (2011 – present) and TKG (2012). The Resource estimates are based upon the approximate total amount of drilled and sampled metres over the BN and THG licenses during all periods that is 174,708.4 m of which approximately 141,316.2 m was cored and 33,392.2 m was openhole. In addition, during 2011, Polaris Seismic International completed for the BN license, a 2D high definition seismic program recording 39 lines totalling 73.51km using Roll On and Roll Off methodology and dynamite as the source.

All QAQC methods for drilling, borehole survey, geophysics, logging and sampling were reviewed against current procedures that meet JORC (2012) standards. The analytical methods were also investigated. The QGX analyses were completed by SGS Laboratories, Tianjin, China and ACIRL in the USA. The ER program the analyses were completed by the onsite Energy Resources Central Chemical Laboratory (ERCCL). All laboratories were accredited to the standards of the day with the ERCCL laboratory holding a current accreditation to ISO/IEC 17025:2017(MNS ISO/IEC 17025:2018). The ERCCL laboratory since its inception has undergone 2 audits with both delivering favourable responses. In addition, duplicate samples were sent to 2 laboratories, the Ulaanbaatar based ALS and the Mining Institute (UUH) laboratory. The ERCCL laboratory generally reported the coal quality parameters lower than the ALS laboratory and generally higher than the UUH laboratory with varying degrees of reproducibility between laboratories.

The BN and THG resource estimates were carried out using Micromine version 18.0.1008 and LogCheck version 7.277 using the COALLOG geology data format as the database. The resource estimates were carried out using the Points of Observation (POO) data supplied by the CP.

The method used for estimating resources for BN and THG was the same. It involved modelling an elevation grid for a major ply and then modelling thickness grids for the other plies and partings. These thickness grids for the plies and partings were then stacked on top or below of the elevation grid to form a 3D block model. Gridding with exact interpolation using ordinary kriging was used to generate grids for the elevation of the mid-point of the plies and inverse distance weighting (IDW) with a power of three was used to generate grids for the thicknesses of the plies and partings. The Base of Extremely weathering surface, the base of weathering surface, the base of Quaternary and the topographic surface grids were also produced using IDW with a power of two.

Measured Resources were limited to circles with a radius of 500m, Indicated Resources by a circle with a radius of 1000m and Inferred Resources by a circle with a radius of 2000m. For seam coding there was no maximum seam thickness, a minimum seam thickness of 0.5m to 400m depth, a maximum parting thickness of 0.5m, and an ash content cut-off greater than 50% (dry basis). In addition, core recovery was applied where it was greater than or equal to 95 percent (%) for moderate or high potential coking coal seams and greater than or equal to 90% for low potential or no coking potential coal seams. Coal quality data was interpolated into the block model using IDW with a power of three.

The total resources for the BN license are shown on an as-received basis in Table 10-1 and on an air-dry basis in Table 10-2. It should be noted that these figures have been rounded to reflect the fact that they are estimates and as a result this may cause figures not to sum correctly.

Table 1-1: Total Resources on an As-Received (AR) Basis

Volume (x1,000,000 м³)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Total Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA - BHWE									
4.6	7.3	1.6	29.00	2.3	23.9	5515	1.18	44.79	MEASURED
0.8	1.2	1.6	32.01	2.1	23.6	5205	1.06	42.25	INDICATED
0.5	0.7	1.6	31.12	2.5	24.1	5276	1.07	42.32	INFERRED
5.9	**9.2**	**1.6**	**29.55**	**2.3**	**23.9**	**5457**	**1.16**	**44.27**	**SUBTOTAL**
BHWE - 100m									
39.4	61.9	1.57	28.88	2.16	23.90	5543	1.14	45.07	MEASURED
5.7	9.2	1.61	31.33	2.11	23.65	5287	1.04	42.91	INDICATED
3.1	5.0	1.60	30.44	2.36	24.13	5351	1.09	43.06	INFERRED
48.2	**76.1**	**1.58**	**29.28**	**2.17**	**23.88**	**5499**	**1.12**	**44.68**	**SUBTOTAL**
100 - 200m									
55.9	87.8	1.57	28.55	2.02	24.05	5578	1.12	45.37	MEASURED
7.5	12.0	1.61	30.91	2.11	23.69	5330	1.07	43.29	INDICATED
4.8	7.7	1.60	29.92	2.41	24.30	5397	1.07	43.37	INFERRED
68.2	**107.5**	**1.58**	**28.91**	**2.06**	**24.03**	**5537**	**1.11**	**44.99**	**SUBTOTAL**
200 - 300m									
56.4	88.6	1.57	28.60	1.98	24.01	5574	1.10	45.41	MEASURED
8.3	13.3	1.59	29.99	2.06	23.73	5424	1.10	44.21	INDICATED
5.2	8.2	1.59	29.40	2.37	24.32	5457	1.08	43.91	INFERRED
69.9	**110.1**	**1.57**	**28.83**	**2.02**	**24.00**	**5547**	**1.10**	**45.15**	**SUBTOTAL**
300 - 400m									
55.1	86.5	1.57	28.54	1.94	23.96	5583	1.12	45.56	MEASURED
9.8	15.7	1.60	30.49	2.07	23.56	5372	1.10	43.88	INDICATED
5.7	9.0	1.58	28.84	2.32	24.30	5518	1.10	44.54	INFERRED
70.6	**111.2**	**1.58**	**28.84**	**1.99**	**23.93**	**5548**	**1.12**	**45.24**	**SUBTOTAL**
262.8	**414.1**	**1.58**	**28.95**	**2.05**	**23.96**	**5534**	**1.11**	**45.03**	**GRAND TOTAL**
264	**415**	**1.6**	**29**	**2.1**	**24**	**5534**	**1.10**	**45**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

(Source: Energy Resources LLC)

Table 1-2: Total Resources on an Air-Dry (AD) Basis

Volume (x1,000,000 м³)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Inherrent Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA - BHWE									
4.6	7.4	1.59	29.5	1.0	24.2	5576	0.98	45.34	MEASURED
0.8	1.2	1.64	32.4	1.0	23.9	5253	0.97	42.66	INDICATED
0.5	0.7	1.63	31.6	1.2	24.4	5337	0.99	42.81	INFERRED
5.9	**9.3**	**1.60**	**30.0**	**1.0**	**24.2**	**5517**	**0.98**	**44.81**	**SUBTOTAL**
BHWE - 100m									
39.4	62.40	1.58	29.28	0.97	24.17	5600	0.99	45.58	MEASURED
5.7	9.30	1.62	31.75	1.03	23.89	5337	0.91	43.33	INDICATED
3.1	5.00	1.62	30.92	1.12	24.42	5411	0.98	43.54	INFERRED
48.2	**76.70**	**1.59**	**29.69**	**0.99**	**24.15**	**5556**	**0.98**	**45.17**	**SUBTOTAL**
100 - 200m									
55.9	88.30	1.58	28.92	0.95	24.30	5631	0.96	45.84	MEASURED
7.5	12.10	1.62	31.34	1.02	23.93	5380	0.91	43.71	INDICATED
4.8	7.80	1.61	30.40	1.15	24.59	5459	0.96	43.86	INFERRED
68.2	**108.20**	**1.59**	**29.30**	**0.97**	**24.28**	**5591**	**0.96**	**45.46**	**SUBTOTAL**
200 - 300m									
56.4	89.20	1.58	28.96	0.94	24.24	5626	0.92	45.85	MEASURED
8.3	13.40	1.61	30.42	0.99	23.97	5474	0.91	44.62	INDICATED
5.2	8.30	1.60	29.85	1.13	24.62	5520	0.95	44.40	INFERRED
69.9	**110.90**	**1.59**	**29.20**	**0.96**	**24.24**	**5600**	**0.92**	**45.59**	**SUBTOTAL**
300 - 400m									
55.1	87.10	1.58	28.89	0.95	24.18	5633	0.91	45.98	MEASURED
9.8	15.90	1.61	30.92	0.99	23.79	5421	0.89	44.29	INDICATED
5.7	9.00	1.59	29.27	1.11	24.58	5581	0.95	45.04	INFERRED
70.6	**112.00**	**1.59**	**29.21**	**0.97**	**24.16**	**5599**	**0.91**	**45.66**	**SUBTOTAL**
262.8	**417.1**	**1.59**	**29.34**	**0.97**	**24.21**	**5587**	**0.94**	**45.48**	**GRAND TOTAL**
264	**415**	**1.6**	**29**	**1.0**	**24**	**5587**	**0.90**	**46**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

(Source: Energy Resources LLC)

The total resources for the THG license are shown on an as-received basis in Table 10-13 and on an air-dry basis in Table 10-24. It should be noted that these figures have been rounded to reflect the fact that they are estimates and as a result this may cause figures not to sum correctly.

Table 1-3: Total Resources on an As-Received (AR) Basis

Volume (x1,000,000 м^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Total Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA - BHWE									
0.4	0.7	1.65	38.27	3.82	21.83	4465	0.94	36.08	INDICATED
0.1	0.2	1.63	36.73	2.93	22.26	4707	0.68	38.08	INFERRED
0.5	**0.9**	**1.65**	**37.92**	**3.63**	**21.92**	**4519**	**0.88**	**36.53**	**SUBTOTAL**
BHWE - 100m									
7.8	12.7	1.64	37.12	3.64	22.24	4577	0.94	37.00	INDICATED
2.4	4.0	1.63	36.58	3.13	22.38	4721	0.70	37.92	INFERRED
10.2	**16.7**	**1.64**	**36.99**	**3.52**	**22.27**	**4611**	**0.88**	**37.22**	**SUBTOTAL**
100 - 200m									
10.8	17.8	1.64	37.17	3.33	22.27	4602	0.82	37.24	INDICATED
2.5	4.1	1.63	36.82	3.09	22.37	4692	0.63	37.72	INFERRED
13.3	**21.9**	**1.64**	**37.10**	**3.29**	**22.29**	**4619**	**0.78**	**37.33**	**SUBTOTAL**
200 - 300m									
11.8	19.2	1.63	36.32	3.08	22.66	4702	0.67	37.94	INDICATED
3.2	5.1	1.61	34.94	3.15	23.14	4847	0.59	38.78	INFERRED
15.0	**24.3**	**1.62**	**36.03**	**3.09**	**22.76**	**4732**	**0.65**	**38.11**	**SUBTOTAL**
300 - 400m									
9.9	16.1	1.61	35.43	2.77	23.11	4820	0.61	38.68	INDICATED
5.5	8.9	1.62	35.80	3.23	22.84	4750	0.63	38.13	INFERRED
15.4	**25.0**	**1.62**	**35.56**	**2.93**	**23.02**	**4795**	**0.62**	**38.49**	**SUBTOTAL**
54.4	**88.8**	**1.63**	**36.36**	**3.18**	**22.62**	**4697**	**0.72**	**37.84**	**GRAND TOTAL**
55	**89**	**1.6**	**36**	**3.2**	**23**	**4697**	**0.70**	**38**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

(Source: Energy Resources LLC)

Table 1-4: Total Resources on an Air-Dry (AD) Basis

Volume (x1,000,000 м^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Inherrent Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA - BHWE									
0.4	0.7	1.68	39.3	1.48	22.34	4563	0.98	36.87	INDICATED
0.1	0.2	1.65	37.5	1.13	22.67	4789	0.70	38.74	INFERRED
0.5	**0.9**	**1.68**	**38.9**	**1.40**	**22.41**	**4613**	**0.91**	**37.29**	**SUBTOTAL**
BHWE - 100m									
7.8	12.9	1.67	38.11	1.37	22.75	4674	0.97	37.78	INDICATED
2.4	4.0	1.65	37.38	1.23	22.80	4807	0.72	38.59	INFERRED
10.2	**16.9**	**1.66**	**37.93**	**1.33**	**22.76**	**4705**	**0.91**	**37.97**	**SUBTOTAL**
100 - 200m									
10.8	18.0	1.66	38.06	1.28	22.72	4690	0.85	37.94	INDICATED
2.5	4.2	1.65	37.59	1.22	22.79	4776	0.65	38.39	INFERRED
13.3	**22.2**	**1.66**	**37.97**	**1.27**	**22.74**	**4706**	**0.81**	**38.02**	**SUBTOTAL**
200 - 300m									
11.8	19.4	1.65	37.13	1.19	23.09	4783	0.68	38.59	INDICATED
3.2	5.2	1.62	35.66	1.32	23.56	4931	0.60	39.45	INFERRED
15.0	**24.6**	**1.64**	**36.82**	**1.22**	**23.19**	**4814**	**0.67**	**38.77**	**SUBTOTAL**
300 - 400m									
9.9	16.3	1.63	36.17	1.07	23.49	4893	0.62	39.27	INDICATED
5.5	9.0	1.64	36.58	1.32	23.28	4835	0.65	38.81	INFERRED
15.4	**25.3**	**1.64**	**36.32**	**1.16**	**23.42**	**4872**	**0.63**	**39.11**	**SUBTOTAL**
54.4	**89.9**	**1.65**	**37.19**	**1.24**	**23.05**	**4781**	**0.74**	**38.52**	**GRAND TOTAL**
55	**89**	**1.7**	**37**	**1.2**	**23**	**4781**	**0.70**	**39**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

(Source: Energy Resources LLC)

In view that this Resource estimate forms the basis of a Reserves update, the following recommendations for the project area include, but are not limited to:

1. Drill closely spaced boreholes to determine remaining seam LOX lines.
2. Complete a series of Bulk samples for washability tests on all potential coking seams with blending options with UHG seams.
3. Adopt recommendations from the peer review.
4. A better understanding of the spatial distribution of the coking characteristics of the coal and the geological parameters that affect the coking characteristics will be beneficial for mine planning and production scheduling in order to produce a consistent product and maximising the value of the deposit.
5. A review should be completed where there was some variation in the elevations of the topography survey and the collar survey.
6. The Seismic data is high level data that has been important in locating and defining structural style, but it is highly recommended that mine geologists continue to map and monitor faults within the pit.
7. Continue infill drilling program in front of mining.

2 Introduction

This report contains the results of the JORC (2012) resource estimation as at 31st December 2021, of the BND contained in BN mining licence [MV-014493] and THG mining license [MV-017336], which are both owned by ER, a wholly owned company of the Hong Kong listed Mongolian Mining Corporation.

Mr Byambaa Barkhas is the Competent Person for this report and meets all requirements under the JORC code (2012). Mr Barkhas, an ER employee since March 2010. Mr Gary Ballantine (Executive General Manager for Exploration and Geology from January 2008 to 2015) wrote the exploration procedures (Appendix 2), trained and developed the ER geology team and assisted with the setup of the onsite laboratory. Mr Lkhagva-Ochir Said and Mr Ballantine have designed the exploration programs since ER acquired the BND in mid-2011. Mr Enkhbat Chuluunbat (ER employee since October 2009) and Mr Barkhas have designed the exploration programs of 2018.

Mr Byambaa Barkhas was responsible for the revised seam correlation and structural interpretation, current Resource review, approving borehole data for JORC compliance resource estimation.

Mrs Tsolmon Adiya an ER employee was responsible for the coal quality section of the report.

Mr Bekhbat Purev an ER employee was responsible for block modelling and Resource estimation.

Mr Ballantine worked as an independent consultant employed by GeoCheck Pty Ltd working on Mongolian projects as a coal expert from January 2008 to June 2010. From July 2010, he joined the ER management team as a full time employee in the position, Executive General Manager for Exploration and Geology. Mr. Ballantine was responsible for training, development, and consulting for the geology team. In addition, he provides assisted and peer review for the CP for 2015 resource estimate, approved borehole data for reported in accordance with the JORC Code (2012), designed, budgeted and supervised the exploration programs and results.

Internal peer review of exploration work 2018 was conducted by Mr. Lkhagva-Ochir Said, the then Executive General Manager of Mining and Processing. These peer reviews confirmed compliance of the Group's work to update the Coal Resource estimations in compliance with requirements of the JORC Code (2012).

As stated by the JORC (2012) code *: The Code requires in Clauses 19, 27 and 35 that reporting of first time or materially changed Exploration Results, Mineral Resources or Ore Reserves estimates be accompanied by a technical summary of all relevant sections of Table 1 on an 'if not, why not' basis as an appendix to the Public Report.* The JORC Table 1 can be viewed for this report in Appendix 25.

2.1 Scope of Work

The following outlines the scope of work for the BND:

- Continue to develop an internal geological team for ER and provide procedures, training and mentoring for JORC (2012) compliance.

- Design and budget an exploration program that would provide geological information on infill drilling for coal quality, seam continuity, structure and an update of Resources.
- Review the onsite coal laboratory.
- Perform QAQC analysis, document the laboratory process and determine densities to be used in the resource estimation.
- Complete depth adjustment and seam correlation.
- Establish points of observation (POO).
- Complete resource estimation.
- Write the JORC (2012) standard report including JORC Table 1.

Other study sections such as legal standing, environmental, processing, mine planning and safety are outside of this scope of work.

2.2 Reliance on Other Experts

Mr Byambaa Barkhas has relied upon information that has been prepared by non-qualified persons during the preparation of this report. Mr Barkhas is not in a position to, and does not, verify the accuracy of, or adopt as his own, the information and data supplied by others. All information provided in this report with the exception of observations and interpretations made on the basis of the CP, rely on such data as provided by non-qualified persons.

3 Location, Access and Licence Information

3.1 Project Location

The BND is approximately 12.8km^2 in area and located in south-central Mongolia within the Ulaan Nuur Valley of the Gobi Desert. The coalfield is situated within the Khankhongor soum, Omnogobi Aimag (South Gobi province) about 61km west of Dalanzadgad the provincial capital and around 500km south of Ulaanbaatar, the national capital (Location of Baruun Naran depositFigure 3-1). The coalfield is 230km from the Gashuun suhait border of the People's Republic of China to the south.

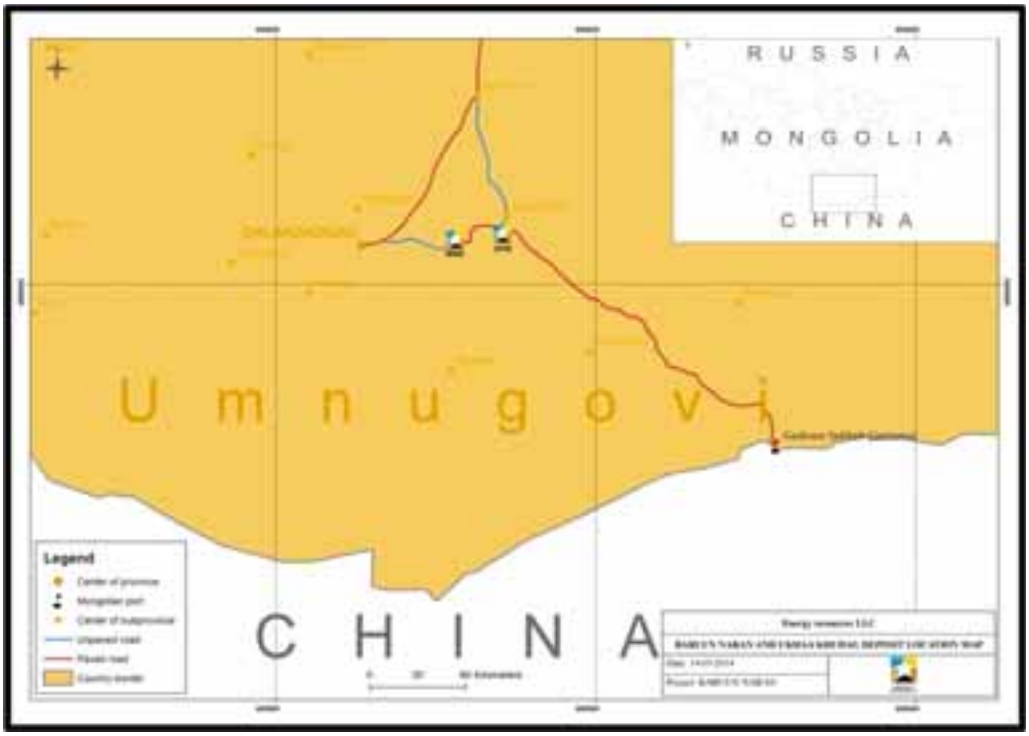


Figure 3-1: Location of Baruun Naran deposit

(Source: Energy Resources LLC)

3.2 Project Access and Infrastructure

The project can be accessed by direct flights or road. Regular direct flights (duration approximately 1 hour) from Ulaanbaatar are available to the Tavan Tolgoi airport (Figure 3-2), located 35km from the Baruun Naran mine site. Other flights to Dalanzadgad (duration approximately 1 hour) are made with an approximately 90-minute drive to the mine site over sealed roads. By road the site can be reached (duration approximately 8 hours) from Ulaanbaatar via a 600km sealed road from Ulaanbaatar to Baruun Naran mine site.

Figure 3-2: Tavan Tolgoi airport

(Source: Energy Resources LLC)

Dalanzadgad is the administrative centre of the "Omnogobi" Aimag and as such contains the regions' major government agencies, transport links, services and industries. The town has a power station, food and produce market as well as smaller businesses such as supermarkets, hotels and restaurants.

Electricity is supplied to Dalanzadgad by the town's thermal coal fired power station. This power station is supplied by coal from the "small" TT mine which is not owned by ER, but is on a separate mining licence to the east of BND.

Overburden removal commenced in October 2010 at BN with coal extraction commencing in 1 January 2012. Mining facilities, offices, contractor camp, ROM stockpiles are located on site (refer Figure 3-3), the CHPP and load out facility is located at the UHG coking coal mine (Refer Figure 3-4). Both mines have excellent communications with full coverage for mobile phone services and high speed internet.

Figure 3-3: BND Infrastructure

(Source: Energy Resources LLC)

A fully sealed 30km two lane road from BND to UHG was constructed to transport ROM coal to UHG for beneficiation (Figure 3-3). A 240km two lane highway was constructed by ER to take coal from UHG to Gashuun sukhait, the Mongolian coal port 30km from the Chinese border. Currently a 240km railway line is under construction.

Figure 3-4: UHG Infrastructure

(Source: Energy Resources LLC)

Tsogttsetsii is a small soum that is located 7km from the UHG mine and 30km from the BND. The soum had basic facilities at the start of mining at UHG but now is growing very quickly. ER has invested in the soums infrastructure to accommodate the majority of staff, their families and supporting businesses that service UHG and BND. The soum has water and power, communications and high-speed internet. The worker's camp constructed early in the development of UHG remains in operation, providing full-service accommodation to the remaining portion of fly-in fly-out employees (Refer Figure 3-5).

Figure 3-5: UHG Camp and Town

(Source: Energy Resources LLC)

A new school, kindergarten and dormitory complex was constructed and put into operation as part of the company's corporate social responsibility commitment. Jointly financed by ER and the local government, the new school and kindergarten complex is a modern facility, comprising a secondary school for 640 children, a kindergarten for 144 children and a dormitory for about 100 children (Figure 3-6). In addition to providing direct educational access to the company employees, the new complex is expected to make a significant contribution in raising the quality of education in the region in which it operates.

Figure 3-6: 'Dream' education complex

(Source: Energy Resources)

To facilitate the relocation of employees from Ulaanbaatar to Tsogttsetsii, ER has also built an apartment complex named 'Tsetsii'. To date, more than 500 families have moved into fully-furnished apartments (Figure 3-7). Given the expanding presence in Tsogttsetsii soum of Omnogobi aimag, ER sees the new facilities as part of its growing commitment to make substantial contribution to the social and educational well-being of the local communities. While encouraging the company employees to move and settle in South Gobi by providing them with complete and comfortable living conditions, the investment is expected to bring lasting value in the host communities where existing social infrastructure is very limited.

Figure 3-7: 'Tsetsii' apartment complex

(Source: Energy Resources)

3.3 Physiography and climate

The Baruun Naran area is characterised by gently rolling desert plains with scattered small hills and ridges. The elevations in the region range from 1500m to 1700m. The higher elevations occur on a number of small hills that surround the area, which is a continuation of the Altai mountain range, which contains mountains with elevation around 3000m such as Gobi Gurvan saikhan, Sevrei, Noyon bogd, Nomgon, Tost, Nemegt and Altan Uul Gilbent. Also, in this area is the 800m high and 150km long Khongor sand dune (Figure 3-8).

The BND is located within a discrete, east-northeast-trending valley, herein referred to as the Baruun Naran valley. This valley, from which the coal deposit takes its name, is approximately 22km long and 2 to 3km wide. The floor of the valley is relatively flat and is bounded to the north and south by low hills and ridges that rise approximately 25m to 100m above the valley floor.

'*Even though Omnogobi aimag doesn't have any big lakes and rivers, it has beautiful oases and small lakes and ponds. The area has many springs such as Khadat, Zuulun, Nemegt, Zuulun, Enger Buleen and Talkhit cold springs, Elgen and Salkhit hot springs. By 2007, the national water department had registered, 3 rivers, 2 lakes, 581 springs, and 1 medical spring. From regional hydrology investigations it had been estimated that underground water reserves are of the order of 260.5 million cubic meters*' [1]

Figure 3-8: Gobi desert landscape

(Source: Energy Resources LLC)

'*The deposits located in the Gobi Desert, where the climate is generally hot and dry in the summer and cold and dry in the winter. The annual average maximum temperatures are 36°C and -38°C respectively.*

The maximum temperature can reach from 32.6°C to 39.9°C in the rest of the aimag. The whole area of the aimag is located in a dry climatic region, and average humidity is around 29% to 50% during the warm season and 50% to 73% during the cold seasons.

Average precipitation received in Dalanzadgad, Noyon, Gurvantes, Khankhongor, Bulgan and Manlai soums is around 102.1 to 132.9mm, in Bayan-Ovoo and Nomgon soums is around 63.2 to 70.9mm and in the rest of the soums is around 80 to 100mm. Monthly average wind speed is the highest in spring and lowest in winter and summer seasons. Average wind speed is 7.5 m/sec and maximum speed is 50.0 m/sec.'[1]

'Medicinal herbs are found in the area and total about 250 species of small leafed, nutritious, short plants and vegetation's that are resistant to hot and dry weather of the

[1] *"Statement of Coal Resources, Baruun Naran Coal Project 2010" by McElroy Bryan Geological Services Pty Ltd.*

desert. Desert and desert steppe plants like stipa, straw, cleistogenes, psammochloa, aphedra, xanthoxylon, anabasis, ceratoides, salsola etc. are found in the area. Plants and vegetation that local people use in their lives are cynomorium; nitraria and a Mongolian onion (refer Figure 3-9).

World and nationwide endangered species like Argali the wild sheep, ibex, leopard, black tailed antelope, mazaalai the Gobi bear, marbled polecat, wildcat, lynx, rock marten, gopher, antelope etc. inhabit the area (refer Figure 3-9).

Sparse, small semi desert shrubs and grasses are typical of the vegetation throughout the region and the soil profile in this area is poorly developed. The thickness of soil cover or other surficial deposits at Baruun Naran typically is only about 4cm to 6cm thick.'[2]

Figure 3-9: Gobi desert fauna and flora

(Source: Energy Resources LLC)

[2] *"Statement of Coal Resources, Baruun Naran Coal Project 2010" by McElroy Bryan Geological Services Pty Ltd.*

3.4 Ownership and Mineral Tenure

Initially, April 2011 the following two licenses in the area of BND were transferred to ER from QGX.

1. MV-014493- Baruun Naran mining license (total area 4485.65 hectare)
2. 4326X- Tsaikhar Khudag exploration license (total area 90772.55 hectare)

The BN mining license MV-014493 was converted to a mining license on 1 December 2008.

On 9 May 2013, based upon part of 4326X THG exploration license, ER applied to the Mineral Resources Authority for granting mining licenses and was granted by decision No.270 of the Head for Geology, Mining Cadastre Unit of the Mineral Resources Authority on 24 August 2013. These licenses were granted based upon the 1997 Mineral Law. The remaining part of the license area remained as it was until 23 April 2014 when it expired.

BND now consists of 2 mining licenses, BN mining license [MV-014493] which covers an area of 4485.65 hectare, and THG mining license [MV-017336] which covers an area of 8340.01 hectare (Figure 3-11). Both licenses are valid for 30 years and can be extended twice more for 20 years each.

Licenses are held by ER, the Mongolian operating company of MMC, a BVI incorporated company, listed on the HK Stock Exchange (refer Figure 3-10).

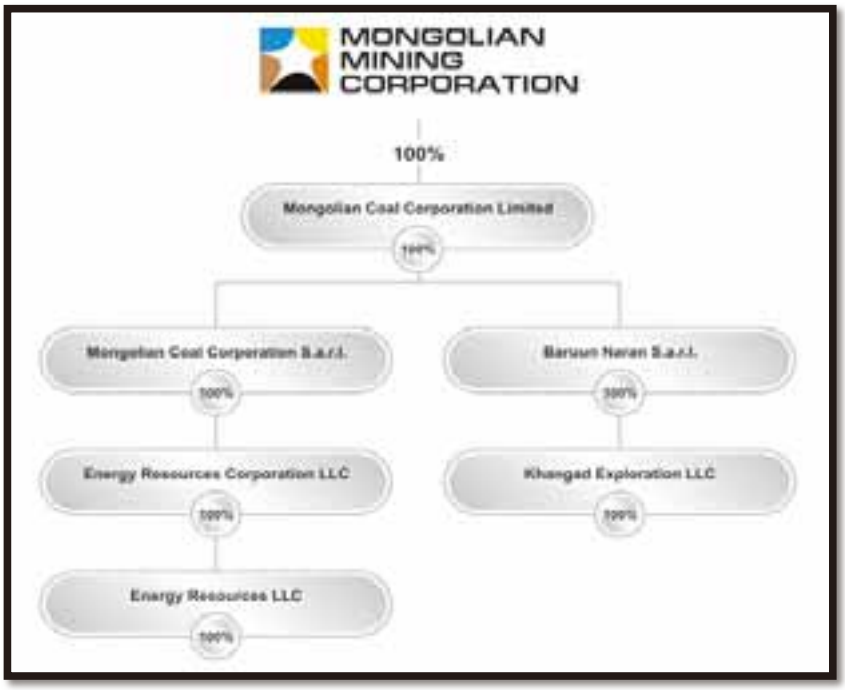


Figure 3-10: MMC Ownership

(Source: Energy Resources LLC)

BND licenses can be viewed in Appendix 1-Mineral Tenure Certificates.

The geographical coordinates for BN mining license [MV-014493] is shown in Table 3-1 and Figure 3-11.

Table 3-1: Geographical Coordinates of licence MV-014493

Point Number	Longitude			Latitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
1	105°	13′	1.24″	43°	34′	1.4″
2	105°	10′	1.23″	43°	34′	1.4″
3	105°	10′	1.25″	43°	37′	1.4″
4	105°	13′	1.24″	43°	37′	1.4″
5	105°	13′	1.24″	43°	38′	1.4″
6	105°	16′	1.24″	43°	38′	1.41″
7	105°	16′	1.24″	43°	35′	1.42″
8	105°	13′	1.24″	43°	35′	1.4″

(Source: Energy Resources LLC)

The geographical coordinates for THG mining license [MV-017336] is shown in Table 3-2 and Figure 3-11.

Table 3-2: Geographical Coordinates of licence MV-017336

Point Number	Longitude			Latitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
1	105°	10′	1.25″	43°	37′	1.4″
2	105°	10′	1.23″	43°	34′	1.4″
3	105°	13′	1.24″	43°	34′	1.4″
4	105°	13′	1.24″	43°	35′	1.4″
5	105°	16′	1.24″	43°	35′	1.42″
6	105°	16′	1.23″	43°	33′	1.4″
7	105°	5′	43.22″	43°	33′	1.56″
8	105°	5′	43.22″	43°	38′	1.4″
9	105°	13′	1.24″	43°	38′	1.4″
10	105°	13′	1.24″	43°	37′	1.4″

(Source: Energy Resources LLC)

Figure 3-11: Baruun Naran and Tsaikhar Khudag Mineral Tenure

(Source: Energy Resources LLC)

4 Exploration History

4.1 Previous Regional Exploration

The following summary was taken from: - Ch. Gankhuyag, Tsader. Z.S and others: *Report of detailed exploration first mining area at the Tsankhi deposit of Tavan Tolgoi coal deposit Mongolia in 1988*.

- *The Tavan Tolgoi group (TT) of deposits of fossilized coal was discovered and exploited by the local people since early 19th century.*
- *The first official information on the deposit appears in reports by geologist K.D.Pomazkov, who studied the coal in a small opencut pit in 1940. The coal of the deposit was surveyed and tested by the geologist N.A.Marinov in 1943-1953. Analyses concluded that the coal of the deposit had good coking properties. In 1953-1956 the western part of the TT deposit of an area of 35 km^2 was explored and 18 seams with total of 2.8 billion tons of reserves were identified (Shklyaev, 1957).*
- *In 1975, from shafts sunk in the deposit, 5 semi-industrial (pilot-plant rank) samples were taken from seams 4A, 4B, 8A, 8B, 8C, 9A, 9B, 9C by Bulgarian geologists. Their tests showed that the deposit bore high value as a source of metallurgical coke, which however, was characterized by "moderately difficult" and "difficult" washability.*
- *In 1977 at the request of the Government, MPR (Mongolian People's Republic), "LENGIPROSHAHT" conducted technical and economic assessment for detailed exploration, upon the condition that the coal of all seams is coking, relying on the results of incomplete exploration works. The assessment established that it would be feasible to operate an opencut mine with the capacity of 20 Mt, if minable reserves of 700-800 Mt of coking coal are to be produced from the lower seams. Also the assessment resolved the issues of centralized water supply. The assessment had also recommended continuing the exploration works.*
- *The protocol of the 20th session of the COMECON (Council for Mutual Economic Assistance) Standing Committee for Cooperation on Planned Activities envisaged that MPR completes the exploration of the deposit in 1981 and update the Technical and Economic Assessment by GIPROSHAHT Institute against the findings of the exploration works by first quarter of 1983.*
- *In 1978, Ts.Nergui and A.Dagvasuren conducted ground geophysical survey around Baruun Naran area and identified 5 coal seams.*
- *In 1982- 1983, 1:50000 scale mapping and preliminary exploration works were conducted around Baruun Naran area. As a result they identified major coal seams in upper Permian sediment and evaluated some seams by core boreholes. (P.Khosbayar et al., 1983)*
- *In 1989- 1990 "3rd branch" of "Central Geological Expedition" conducted exploration and evaluation work in Baruun Naran. Coal seams were evaluated by core boreholes to identify detailed information of the deposit and considered with High Perspective.*

- *In 1990- 1993, two additional phases of drilling were completed in Baruun Naran area by Soviet- Mongolian team. This drilling identified 12 seams ranging from 1 to 30 m in apparent thickness, four of which were reported as having metallurgical coal. The Soviet geologists recognized the deformation present in the coal beds, given the angles of the beds to the vertical drill holes. However, they did not have sufficient information to constrain the geometry, and drew an anticline where the syncline is found, as well as several other folds.*

4.2 Previous BN Exploration

The following summary was taken from: - *Baruun Naran Geology Report,* Internal QGX report, Margaret E Venable (2010).

4.2.1 Past Exploration (Pre-QGX)

- *50000 scale mapping*
- *Aeromag survey*
- *1340 m trenching*
- *Over 3700 m drilling, 24 holes*
- *Result: Discovery of Baruun Naraan deposit, identification of metallurgical quality coal*

Baruun Naran was first discovered by the Soviets in 1983, when air photo interpretation and 1:50000 mapping was followed up by a drill program consisting of three vertical holes of about 70 m depth accompanied by 1340 m of trenching. This program identified six coal seams with apparent thicknesses of up to 4 m. An aeromag survey was also flown in the 1980s, at a height of about 400 m with a line spacing of 2 km.

This was followed in 1990 and 1993 by drill programs consisting of an additional 21 vertical drill holes ranging from 33 to 362m in depth and totalling about 3500m. Fourteen of these were inside the current mining concession, the others east of it in the adjacent concession. These holes were drilled at a spacing of 250 to 500 m along sections about 5 km apart trending NW (perpendicular to the axis of the valley- see Table 4-1, Table 4-1).

Table 4-1: Drilling summary of Soviet-Mongolian exploration program

Year	Company	Drilling type	Borehole	Total depth (m)
1983	Soviet	Vertical hole	3	70
1990-1993	Soviet-Mongolian	Vertical hole	21	3500
Total			**24**	**3570**

(Source: QGX)

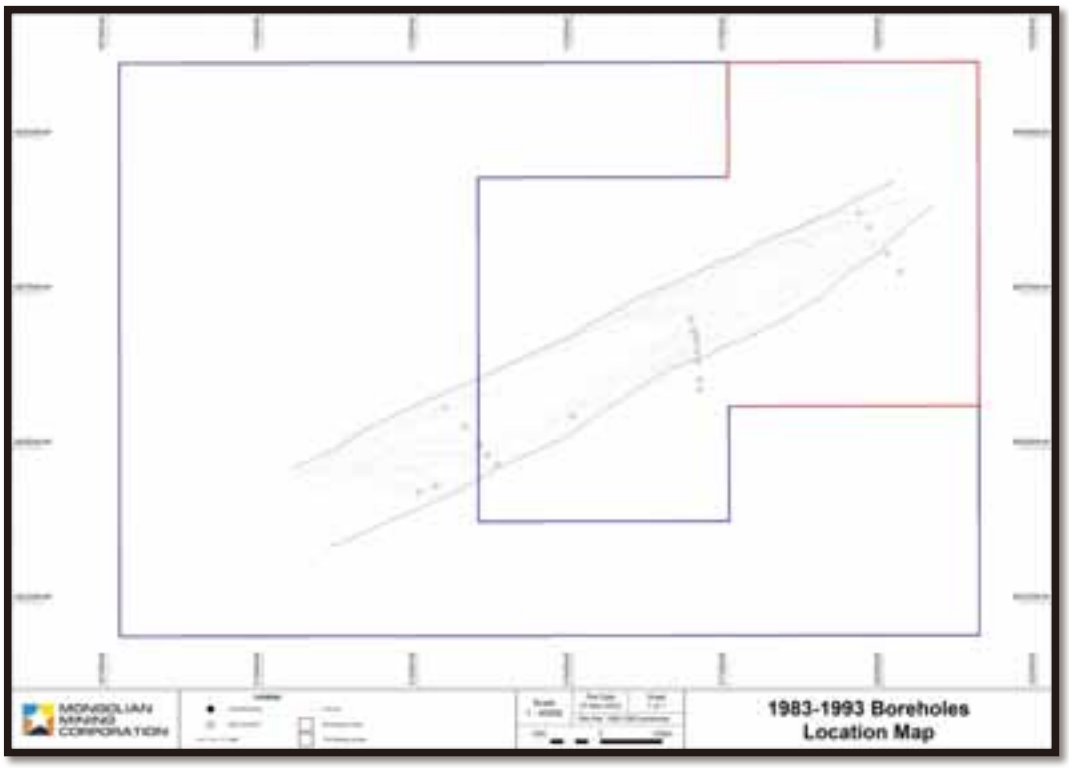


Figure 4-1: Soviet-Mongolian Drill Holes

(Source: Energy Resources LLC)

This drilling identified 12 seams ranging from 1 to 30m in apparent thickness, four of which were reported as having metallurgical coal. The Soviet geologists recognized the deformation present in the coal beds, given the angles of the beds to the vertical drill holes. However, they did not have sufficient information to constrain the geometry, and drew an anticline where the syncline is found, as well as several other folds. The error was in part due to drilling one of their deepest holes (and one of the only two holes drilled on the near vertically dipping north limb of the syncline) straight down the inter-bed without encountering coal. The Soviet drill holes on the eastern end of the deposit are deeper than anything drilled by QGX there, and provide valuable information about the strata beneath the coal beds and confirmation that the coal bearing sequence does not continue to further depths in that area.

4.2.2 2005-6 Exploration - QGX

- *10000 scale mapping*
- *5000 scale mapping in some areas*
- *2000 scale mapping in some areas*
- *Over 19,000 m trenching*
- *Over 95,700 m drilling, 350 holes*
- *Gradient array resistivity survey*
- *Result: Delineation of geometry of syncline, collection of coal quality data confirming metallurgical quality coal*

The larger Tsaikhar Khudag mineral exploration license (4326X) from which the Baruun Naran mining license was formed was originally acquired in 2002 for metals exploration based on interpretation of the Soviet Aeromagnetic data. In 2005 the coal potential of the license was fully recognized. Reconnaissance mapping (1:10000) by Rogowski and Jargalsaikhan in April 2005 accompanied by some surface sampling largely discarded the metallic potential of the license, but did identify some "coal blooms" and outcrops of Permian sandstones and conglomerates in the main valley at Baruun Naran, as well as locating the old Soviet drill holes and trenches. In general surface mapping in the valley is of limited usefulness, given the paucity of outcrop, and identification of "coal blooms" is complicated by the large quantity of coal scattered on the surface and crushed by overloaded coal trucks traveling through the valley from Tavan Tolgoi to the east.

The 2005 program at Baruun Naran included trenching, drilling, and geophysics. The trenching was started on April 18 just prior to the drilling, in order to better understand the coal seams in the Soviet drill holes, and was continued concurrent with drilling through August 2005, with a total of just over 19,000 m. Trenching was done with a back hoe to depths of 4 to 7 m, and most of the 1:400 scale mapping was done from the surface for safety reasons, with examination of material collected by the excavator approximately every 5 m. Some access ramps were dug to examine key features. The usefulness of the trenching was limited by three factors: 1) in some areas cover was too deep to observe the underlying Permian strata, 2) coal seams did not always appear to be coal on surface due to weathering and were sometimes mapped as carbonaceous mudstone or even mudstone, and 3) structural information obtainable was limited by slumping and minor folding probably due to frost heave or other surface processes in the valley. Eventually the trenching was phased out due to objections on the part of the local populace and the success of the resistivity survey that was started in July 2005.

Drilling commenced April 24 2005 with three holes designed to twin the best Soviet holes. Positive results caused QGX to add an additional rig, and three more rigs as the year progressed. The drilling on the south limb of the syncline originally led to an interpretation of the deposit as a gently to moderately dipping monocline, but the ninth drill hole crossed the axis of the syncline, and the combination of this observation with trench data allowed a model of the deposit as a plunging syncline to emerge. This was confirmed by subsequent drilling and was elegantly displayed by the results of the resistivity survey over the valley (see Figure 4-2).

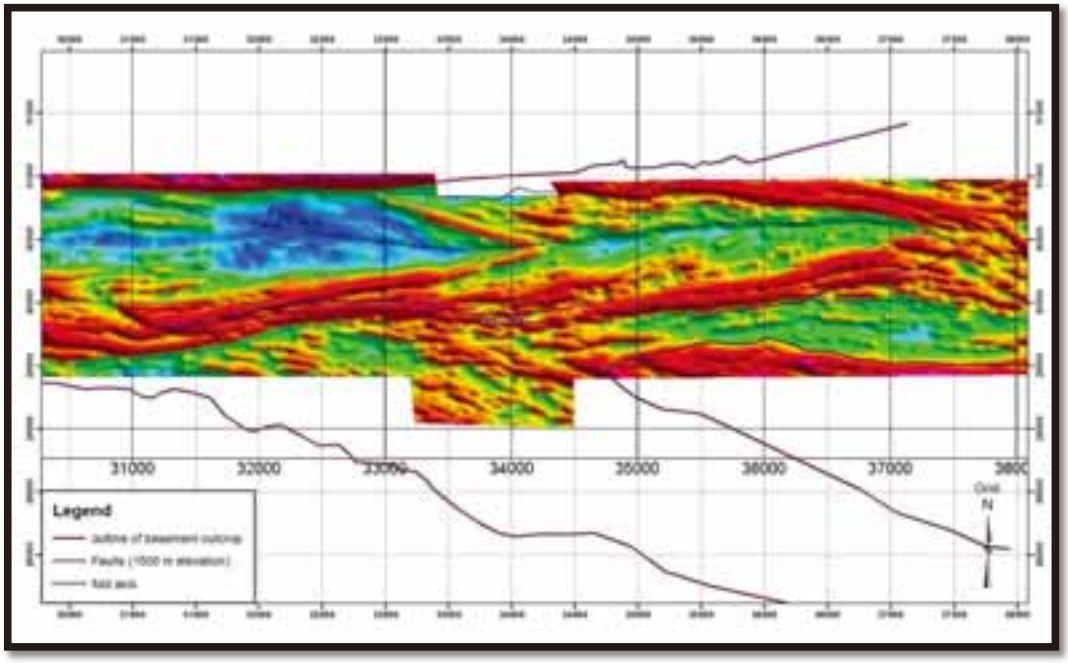


Figure 4-2: Resistivity Survey

(Source: QGX)

Drilling began to be focused on drilling out two major coal seams, H500 and T500, on both limbs along the length of the syncline. By the end of 2005, a total of 34,204 m had been drilled in 137 holes, including HQ coring, PCD (open-hole poly-crystalline diamond), and RC (reverse circulation) drilling (See Table 4-2 and Figure 4-3).

Table 4-2: Drilling summary of QGX 2005 exploration program

Year	Company	Drilling type	Borehole	Total depth (m)
2005	QGX	Core	137	34204.3
		Structure borehole	31	1930
Total			**168**	**36134.3**

(Source: QGX)

Figure 4-3: 2005 Boreholes by Type

(Source: Energy Resources LLC)

This was followed in 2006 by an additional program of 61,582 m of drilling of 213 holes, including HQ coring and PCD (which proved more effective than RC as a drill method given the water encountered in deeper holes). Please refer to Table 4-3, Figure 4-4). While the holes were largely designed to better define the geometry of the syncline and provide better coal quality data, twenty two of the holes were drilled outside of the main syncline to test the valley up to 1 km east (9 holes), 5 km west (10 holes) and 4 km southeast (3 holes) of the main deposit. These holes showed some scrappy coal to the east, resembling the "zone" found on the south side of the deposit and roughly on strike with it, and no coal to the southeast, while to the west coal got thinner and scrappier and eventually disappeared.

Table 4-3: Drilling summary of QGX 2006 exploration program

Year	Company	Drilling type	Borehole	Total depth (m)
2006	QGX	Core	213	61512.7
Total			**213**	**61512.7**

(Source: QGX)

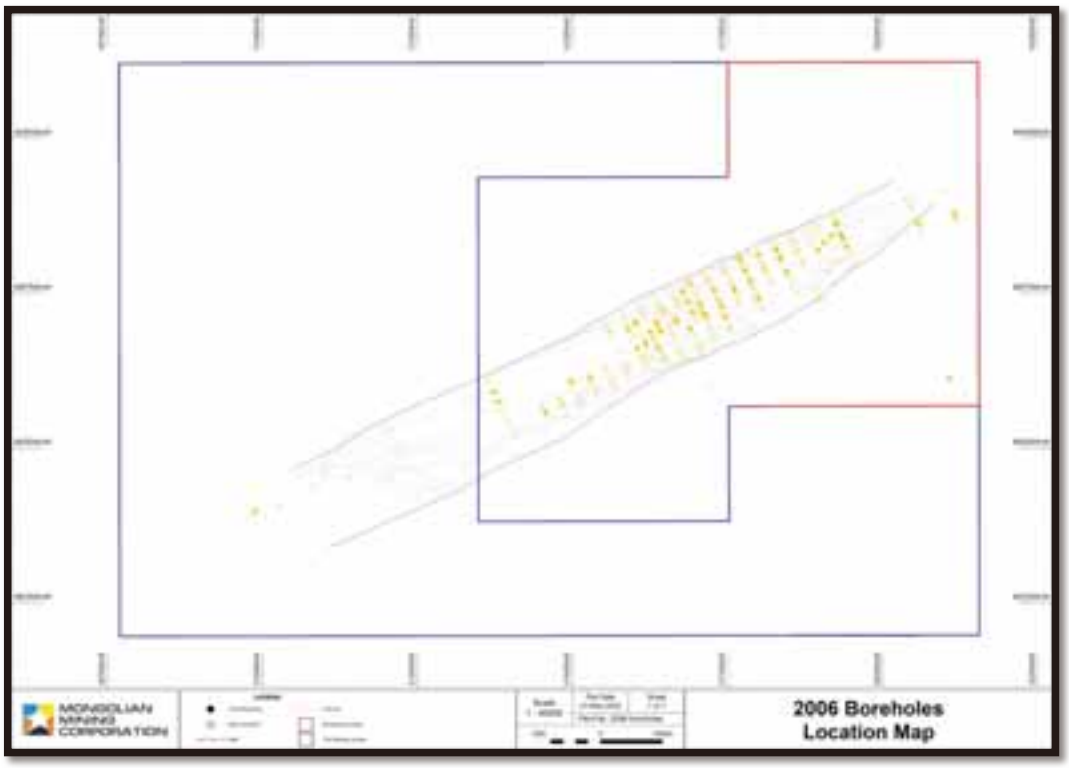


Figure 4-4: 2006 Boreholes by Type

(Source: Energy Resources LLC)

Most holes in the 2005-2006 program were drilled at an angle to try and intercept the dipping strata as close to perpendicular as possible. Core and chips were logged, and down-hole geophysics consisting of density, resistivity, gamma and caliper surveys was done to aid in interpretation. The original surveys (holes BN05001 through BN05016) were done by Mon-Karotaj using analog equipment. Subsequently digital technology and training in its use was provided by Auslog, an Australian company, and all holes from BN05017 on were logged using this technique. While extremely useful, a few difficulties were encountered in the interpretation of this data. The calibration of the instruments was often not well controlled, and outright instrument failure compromised a number of the density logs. Caliper and resistivity data were necessarily collected outside the rods, and are as a result missing from a number of holes that collapsed when the rods were pulled. The range in the cps scale used to measure the density varied from one instrument to another and one time period to another, making comparison difficult. Measurements made through the casing and in the zone of weathering, which could extend up to 40 m depth, were more difficult to interpret. Some of these difficulties were overcome to some degree by processing using WellCad software.

A gradient-array resistivity survey was begun in July 2005 and was extended during 2005 to cover more than 13 km along the valley at Baruun Naran. The data was processed to show coal seams (and other features displaying high resistivity at short wavelengths) as bright red-pink, and was highly successful in outlining the coal seams and displaying the U-shaped patterns associated with the plunging syncline (Figure 4-2). The best seams (H500 and T500) were most prominent, and thinner seams appeared as more intermittent yellow-orange patterns. The basement on either side of

the valley was highly resistive and appeared even brighter pink than the coal. A set of NW trending resistivity anomalies intersect the south limb of the syncline at an angle, suggesting an unconformity. Not all resistive features have proven to be coal seams, however, and outside of the syncline they rarely are; some seem to be associated with conglomerate units, perhaps with carbonate cement, and at least some of them appear to be shallow surface features with no corresponding resistive body at depth.

In late spring 2006 the resistivity survey was extended to cover an additional 15.5 km^2 to the west of the 2005 area, to look for possible extensions of the coal seams in what was thought to be a perspective area (see section on regional exploration below).

4.2.3 2007 Exploration (Water bores)

- *9150 m drilling in 34 holes*
- *Result: Definition of adequate water source for a mining operation*

In 2007 a drill program was carried out to assess water availability in the region to support a mining/processing operation. A total of three holes (1213 m) were drilled inside the mining concession, nine holes (3251 m) were drilled in the southern part of the exploration concession surrounding the mining concession, eight holes (2773 m) were drilled outside of the exploration concession about 30 km NW of the mining concession, and fourteen holes (1912 m) were drilled outside of the exploration concession about 45 km SW of the mining concession. The holes drilled in the southern part of the exploration concession and to the NW were helpful in understanding the regional geology and eliminating certain areas under alluvial cover from consideration for hosting Permian sedimentary rocks and coal, as discussed below under regional exploration. The holes drilled to the southwest identified a potential water source for the mining operation.

4.2.4 2008 Exploration (LOX)

- *Re-evaluation of data*
- *1533 m drilling in 38 holes*
- *Result: Definition of limits of oxidation, improved understanding and definition of the details of deposit geometry*

In January-February 2008 a re-evaluation of all of the 2005-2006 drill data was undertaken to improve the consistency of correlations and produce a coherent set of sections and plan maps at various levels, as well as evaluate possible scenarios for the geometry of the coal seams outside of the syncline and suggest the best way to test these possibilities.

In November 2008 a small drill program was carried out with 38 RC holes totalling 1533 m. (Please refer Table 4-4, Figure 4-5). The purpose of this program was to test the limit of oxidation (LOX) in the H500 and T500 seams within the proposed pit shell. This program included laboratory analyses to investigate the relationship of the thermal LOX and coking LOX to the visual base of oxidation.

Table 4-4: Drilling summary of QGX 2008 exploration program

Year	Company	Drilling type	Borehole	Total depth (m)
2008	QGX	Structure borehole	38	1533
Total			**38**	**1533**

(Source: QGX)

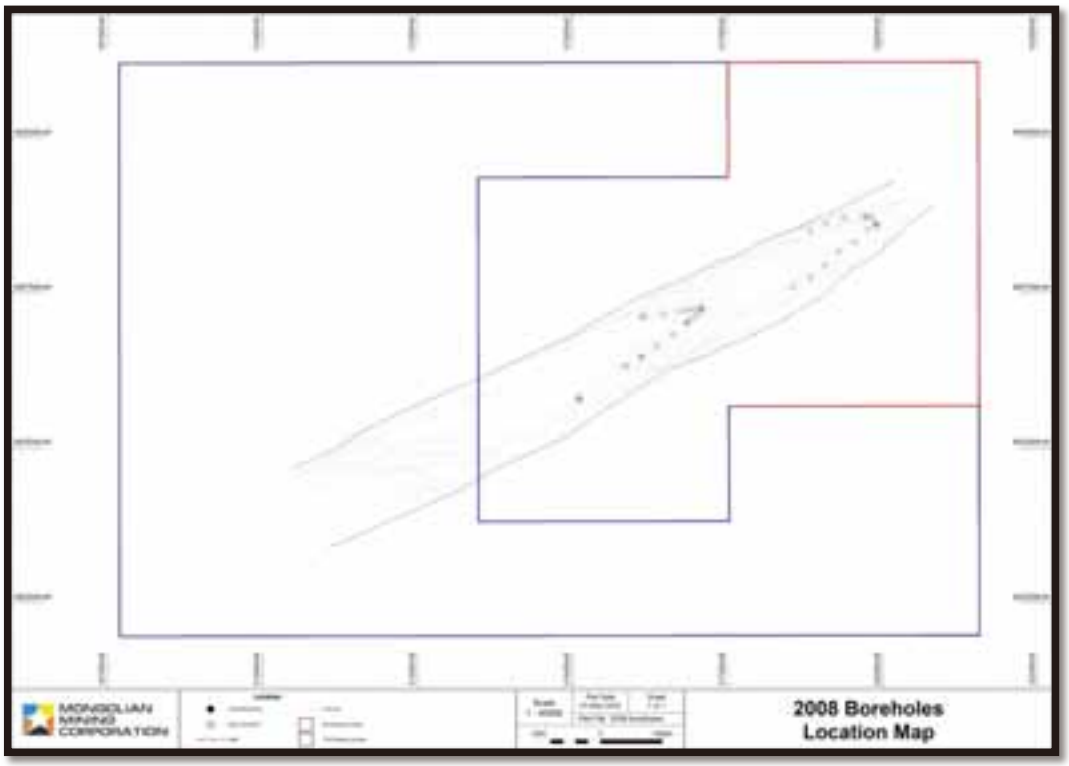


Figure 4-5: 2008 Boreholes by Type

(Source: Energy Resources LLC)

4.2.5 2009 Exploration

- *13200 m drilling in 71 holes on main deposit*
- *Result: Better understanding of geometry of deposit especially around the periphery, additional coal quality samples*
- *LD program of almost 1000 m in 11 holes, 6" and 12" diameter*
- *Result: Bulk coal sample to compare with slim core results*
- *2400 m drilling in 10 holes for regional drilling program*
- *Result: Elimination any strong prospect of additional coal on exploration license*
- *2400 m drilling, 830 m reaming for dewatering assessment*
- *Result: Understanding of dewatering strategy for open pit mine*

Additional drilling was undertaken in the spring and summer of 2009. This program consisted of four parts. In the main body of the drill program, a series of 35 HQ core holes (5200 m) was done to collect coal quality samples (21 holes plus 4 re-drills) and

structural/geotechnical data (10 holes). There was also almost 8000 m of PCD drilling with 36 holes (eight of which had short core segments to measure bedding angles) to collect additional data about the geometry of the deposit around the periphery of the syncline (see Table 4-5, Figure 4-6).

Table 4-5: Drilling summary of QGX 2009 exploration program

Year	Company	Drilling type	Borehole	Total depth (m)
2009	QGX	Core	45	5200
		Structure borehole	46	10400
		Large diameter	11	1000
Total			**102**	**16600**

(Source: QGX)

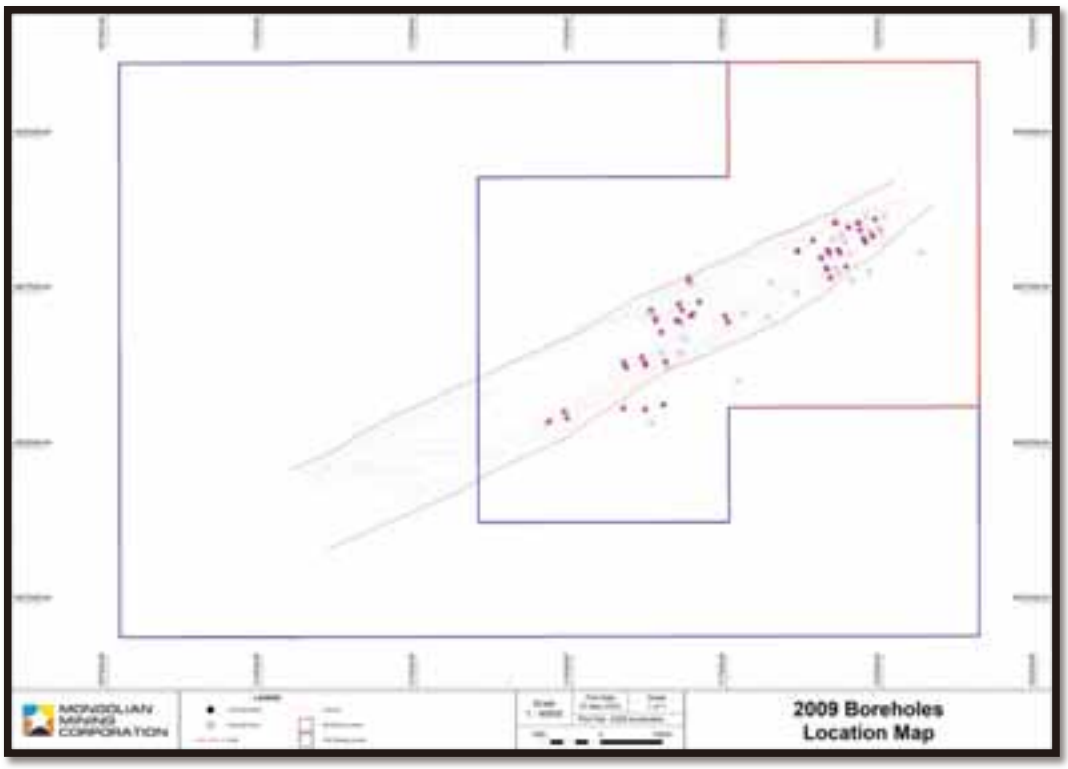


Figure 4-6: 2009 Boreholes by Type

(Source: Energy Resources LLC)

Seven of the holes (six PCD and one core hole) were actually re-entries of old 2005 and 2006 drill holes, with the objective of obtaining samples of and assessing the geometry and continuity of the lower seams (E500 and F500).

A large diameter (LD) drilling program of almost 1000 m including eight 6-inch diameter holes on seam H500 and two 12-inch diameter holes and one 6-inch diameter hole on seam T500 was done in order to collect bulk samples for coal quality testing.

The holes for each seam were clustered around a 2006 coal quality hole, and the object was to compare the bulk sample to the results of the HQ core samples.

A series of 10 PCD holes (with some small segments of core) was done to explore some adjacent areas believed to have coal potential, with 7 holes drilled in an area about 10 km west of the deposit and 3 holes in an area 12 km SE of the deposit (see section on regional exploration below).

Finally, a series of water bores were drilled and monitored to better assess the dewatering needs for the open pit, including 2406 m of RC drilling and 831 m of reaming of old holes from the previous water bore program (2007).

4.2.6 2011-12 Exploration

- *In 2011, 26 fully cored boreholes totalling 4019.5m were drilled.*
- *Result: Better understanding of geometry of deposit especially around the periphery, additional washability samples*
- *LD program of almost 653.5 m in 10 holes, 6" diameter*
- *Result: Better understanding washability of H seam*
- *In 2011, 16 boreholes were drilled by RC method and to confirm the seam H model for the new box-cut. All boreholes were logged and sampled; samples were sent to ERCCL.*
- *Result: Detailed model for seams H and G was constructed and passed the planning engineers.*
- *In 2012, 33 fully cored boreholes totalling 10,355 were drilled.*
- *Result: Detailed model for seams H and T was constructed and passed the planning engineers.*

The geology department of ER conducted an infill drilling program at BND. Bulk drilling was carried out in the deposit area from July 10, 2011 for CTL and washability analysis. Total 10 bulk boreholes were drilled and logged. All samples were collected with special care and sent to the laboratory.

From August 19, 2011, 16 boreholes were drilled by RC method and to confirm the seam H model for the new box-cut. All boreholes were logged and sampled; samples were sent to ERCCL.

From the drilling results, a detailed model for seams H and G was constructed and passed the planning engineers.

In 2011, 26 boreholes were fully cored (HQ3) to identify better define structure.

In 2012, an infill drilling program was completed in the BN mining area to support concurrent mining operations.

Table 4-6: Drilling summary of 2011-12 exploration program

Site	Year	Company	Drilling type	Borehole	Total meter
BN	2011	MMC	Large diameter	10	653.5
			Structure borehole	16	3366
	2012		Core	33	10355
THG			Core	32	9961.7
Total				**91**	**24336.2**

(Source: Energy Resources LLC)

Figure 4-7: 2011-12 Boreholes by Type

(Source: Energy Resources LLC)

4.2.7 2014 Exploration

- *In 2014, 33 fully cored boreholes totalling 13,537m were drilled.*
- *Result: Better understanding of geometry of deposit and Detailed model for seams H and G was constructed and passed the planning engineers.*

The geology department of ER conducted an infill drilling program at BND.

Drilling work continued from May 2014 to December 2014. In 2014, 11 boreholes were drilled by PQ method (7,953m) and 12 boreholes were drilled HQ method (5,584m).

From the drilling results, confirm the seam H seam structure and quality model. All boreholes were logged and sampled; samples were sent to ERCCL.

Table 4-7: Drilling summary of 2014 exploration program

Site	Year	Company	Drilling type	Borehole	Total depth (m)
BN	2014	MMC	Core	33	13537
Total				**33**	**13537**

(Source: QGX)

Figure 4-8: 2014 Boreholes by Type

(Source: Energy Resources LLC)

4.3 Previous Resource and Reserve Estimates

4.3.1 Baruun Naran License

McElroy Bryan Geologic Services (MBGS) estimated, according to NI43-101 standards, the in-place surface mineable coal Resources as of July, 2007, as indicated in Table 4-8.

Table 4-8: Total In Place Resources

Measured (Mt)	Indicated (Mt)	Inferred (Mt)	Total (Mt)
93.3	159.6	11.1	264.0

(Source: MBGS Pty Limited)

During February 2010, MBGS estimated, according to JORC (2004), the in-place surface mineable coal Resources, as indicated in Table 4-9.

Table 4-9: Total In Place Resources

Measured (Mt)	Indicated (Mt)	Inferred (Mt)	Total (Mt)
209	72.6	0.5	282.1

(Source: MBGS Pty Limited)

During July 2015, ER estimated, according to JORC (2012), the in-place surface mineable coal Resources, as indicated in Table 4-10.

Table 4-10: Total In Place Resources

Measured (Mt)	Indicated (Mt)	Inferred (Mt)	Total (Mt)
251.1	51.3	25.9	328.3

(Source: Energy Resources LLC)

During March 2011, SRK Consulting estimated, according to JORC (2004), the coal Reserves, as indicated in Table 4-11.

Table 4-11: Total In Place Reserves

Probable (Mt)	Proved (Mt)	Total (Mt)
37.3	148.0	185.3

(Source: SRK)

During April 2018, GLOGEX consulting estimated, according to JORC (2012), the coal Reserves, as indicated in Table 4-12.

Table 4-12: Total In Place Reserves

Probable (Mt)	Proved (Mt)	Total (Mt)
164	12	176

(Source: GLOGEX)

4.3.2 Tsaikhar Khudag License

During April 2013, MBGS estimated, according to JORC (2004), the in-place surface coal Resources, as indicated in Table 4-13.

Table 4-13: Total In Place Resources

Measured (Mt)	Indicated (Mt)	Inferred (Mt)	Total (Mt)
0	0	55	55.0

(Source: MBGS Pty Limited)

During July 2015, ER estimated, according to JORC (2012), the in-place surface coal Resources, as indicated in Table 4-14.

Table 4-14: Total In Place Resources

Measured (Mt)	Indicated (Mt)	Inferred (Mt)	Total (Mt)
		73	73

(Source: Energy resources LLC)

No Reserves have been previously estimated for THG.

4.4 Previous Production

No mining at the BND had taken place prior to October 2010, which was the start of overburden removal at the BN mine. The following lists the year by year mining schedule achieved by ER to 1st of January 2014 at which point the mine has been on care and maintenance due to short term market conditions;

- October 2010 to end 2011 - 0.025 Mt ROM coal
- 2012 – 0.82 Mt ROM coal
- 2013 - 0.49 Mt ROM coal
- 2017 - 0.11 Mt ROM coal
- 2018 - 1.38 Mt ROM coal
- 2019 - 0.96 Mt ROM coal
- 2020 - 0.75 Mt ROM coal
- 2021 - 0.54 Mt ROM coal
- Total to 31st of December 2021 = 5.08 Mt ROM

(Source: Energy Resources LLC)

5 Geology

5.1 Regional Geology

The BND forms part of the Ulaannuur coal bearing depression which is found in the South Gobi coal bearing basin or otherwise known as the Tavan Tolgoi (TT) coalfield. An east-northeast trending belt of TT formation crops out in the Baruun Naran valley representing the western continuation of the Ulaannuur depression.

The Ulaannuur depression includes the south-eastern continuation of the Ikhshanhai hills which are located between the mountains of Tsetsii and Ikhshanhai in the south and Tsagaan Ovoo and Nariin Har Nuruu in the north (Said L. et.al, 2011) and the Permian continental depositional basin in the Ulaan Nuur basin. This sedimentary sequence is typical fluvial to swampy conditions, with strata including conglomerates, sandstone, siltstone, mudstones and coal[3].

UHG is also owned and operated by Mongolian Mining Corporation (refer Figure 5-1) through Energy Resources LLC.

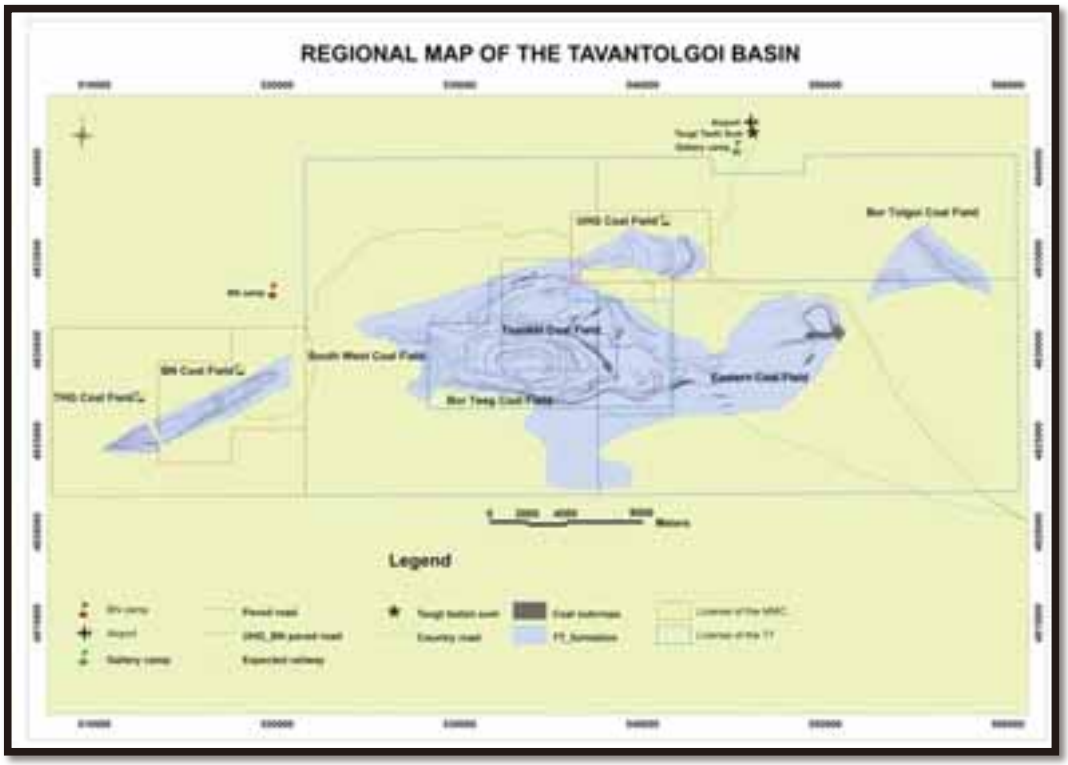


Figure 5-1: Regional map of the Tavan Tolgoi coal basin

(Source: Energy Resources LLC)

[3] BN_Geology Report, Margaret E.Venable

5.2 Regional Stratigraphy

BND occurs within an Upper Permian clastic sedimentary unit known as the Tavan Tolgoi formation. The same formation also hosts the large TT coking and thermal coal deposit. An east-northeast trending belt of TT formation crops out in the Baruun Naran valley representing the western continuation of the Ulaan Nuur coal basin. The Ulaan Nuur basin is an asymmetric fault bounded east-northeast trending syncline, with a very steep northern limb (overturned in part) and more gently dipping southern limb. In addition to this folding of the coal bearing strata, seams are truncated by faults in the north, west and south west. Deformation of Permian sediments occurred during the early Mesozoic era. Basement rocks are Carboniferous age on the northern margin of the valley and Devonian on the southern limb. The earliest deposited coal seams are less extensive and on-lap onto older basement rocks.

QGX LLC drilling at the northeast end of the Baruun Naran valley has shown that the coal bearing sequence is unconformably overlain by a 10 to 30 meter sequence of tufaceous siltstone and mudstones of unknown age that are interpreted to be reworked volcanic rock. The basal contact of this unit appears to be an angular unconformity and the unit clearly post-dates folding of the TT formation. Baruun Naran valley is covered by up to 5m of unconsolidated Quaternary material. Weathering of the underlying Permian strata is variable and early modelling was set at 30 m below the surface level.

The following geological descriptions included within Sections 5.2.1 through 5.2.9 are taken from the *'Report of detailed exploration first mining area at the Tsankhi deposit of Tavan Tolgoi coal deposit Mongolia', (*Gankhuyag C. and Tsader Z. (1988) and translations from the *'Detailed Exploration Results and Resource Estimation of Ukhaa Khudag Coking Coal deposit',* (Said L. et.al, 2011). Refer to Figure 5-2 for a regional geological map.

5.2.1 Devonian system

5.2.1.1 Tsetsgershand formation (D_{2-3}cs)

Sediments of this age are distributed only in a small area at the north-west edge of the Ukhaa Khudag deposit where they were observed in conjunction with the volcanics of Dushiin Ovoo formation and with coal bearing sediments of Tavan Tolgoi formation. The rocks of this formation are siliceous, clay-siliceous siltstones, siliceous cleaving stones with horizontal jasper, ash tuff and limestone.

5.2.2 Upper Carbonaceous-lower Permian

5.2.2.1 Dushiin ovoo formation (C_3-P_1ds)

Sediments of the Dushiin ovoo formation are described as volcanogenic rocks and are distributed throughout the deposit as elevated areas. They were identified in natural outcrops and in borehole cores. They underlie the Tsogttsetsii, Tsankhi and Tavan Tolgoi formations. The rocks of this formation consist of light-grey, rose-coloured lipatites, dacite-lipatitous porphyry, dark-grey and greenish-grey andesite and andesite-porphyry.

5.2.2.2 Tsogttsetsii formation (P_1CC)

Sediments of this formation cover a wide area of the deposit. They are found within the rocks of the Dushiin Ovoo formation at an angular unconformity. The formation consists of pebble sized, poorly sorted, tuff-conglomerates mainly of light-brown and dark green colour, as well as tuffeaous-sandstones and siltstones with plant fragments. In the lower sections there are ash tuffs, tuff breccia and agglomerates of andesites. The thickness of the formation is variable (from 1 to 900 m.) and averages around 250 to 300 m. The formation appears to thicken to the east with a maximum thickness of around 900m.

5.2.3 Upper Permian

5.2.3.1 Tsankhi formation (P_2ch)

Sediments of this formation cover a wide area of the deposit. They were described as mainly black mudstones interbedded with sandstones and siltstones of dark-grey and light-grey colour. Thickness of the formation is variable. At the Ukhaa Khudag deposit this formation varies in thickness from 1 to 48 m.

5.2.3.2 Tavan Tolgoi formation (P_2tb)

Sediments of this formation have been investigated extensively. This formation contains most of the coal seams of interest. The area of distribution within the Ulaannuur depression is 160 km^2 while within the Ukhaa Khudag deposit is 29.5 km^2. The formation is represented mainly with polymictic mono-granular sandstones and psammite siltstones with minor conglomerates, argillite's, carbonaceous rocks and coal seams.

The Tavan Tolgoi formation has been identified into 3 sub-formations; Upper, Middle and Lower (refer Table 5-1).

- *Upper sequence of Tavan Tolgoi formation. Dark grey siltstone, sandstone and coal seams from seams 10 to 15, rare limestone with "cone in cone" texture, fossil vegetation and fauna.*
- *Middle sequence of Tavan Tolgoi formation. Greenish, irregular grained conglomerate, gravel-stone, light grey sandstone. Coal-bearing seams are rich in flora, especially within seams 7 and 9.*
- *Lower sequence of Tavan Tolgoi formation. Dark grey siltstone, carboniferous mudstone and shale, grey-colour sandstone package, and some gravel-stone, coal seams from 0 to 6 (profiles), and fossil-rich limestone's with "cone in cone" texture, rich with fresh water molluscs.*

5.2.4 Triassic system (T)

Sediments of this system are mainly represented by continental red and multi-colour, coarse fragmental rocks.

5.2.5 Cretaceous system

5.2.5.1 Sainshand formation (K_2ss)

Sediments of Sainshand formation are developed in the southern section of the Bortolgoi deposit. They are not found in the Ukhaa Khudag deposit. In the Bortolgoi deposit they have a sharp angular unconformity with the weathered upper Permian sediments. The formation is mainly represented as light-red, red and pink colour clay-stone and break stone's sediments of lacustrine-proluvial genesis.

5.2.6 Cenozoic group (Kz)

Within the contents of these deposits are outlined paleogenic (lower middle-Oligocene), Neogene (upper Miocene and Pliocene) and quaternary sediments.

5.2.7 Paleogenic system (P)

5.2.7.1 Lower and middle Oligocene ($P_{1, 2}$)

Oligocene is attributed to mafic volcanic rocks which intersect upper Permian and lower Mesozoic sediments. The mafic volcanics are represented by olivine basalts with thickness's ranging from 5 to 40 m. They are located at the Tavan Tolgoi hills.

5.2.8 Neogene system (N)

5.2.8.1 Miocene (N_1)

Rocks of this age are scattered as remnants at the Bortolgoi and the Eastern deposits. They are laid with an angle unconformity on the sediments of the Tavan Tolgoi formation. They mainly consist of red colour clays with lenses of sandstone-gravel materials and gypsum with a thickness less than 4.4 m.

5.2.8.2 Pliocene (N_2)

Pliocene sediments are widely distributed at the Eastern and Bortolgoi deposits. They are represented by light-grey fine-pebble conglomerates of poor cementation, sandstones, red clays with marl lenses and marl clays. Thickness of the Pliocene sediments varies greatly.

5.2.9 Quaternary sediments (Q_{3-4})

Quaternary sediments were identified over the majority of the deposit. They are represented by yellowish-grey loams, sandy loams, sands and clays containing fragments of underlying rocks. The transition from unconsolidated sediments to bedrocks is gradual. The Quaternary sediment thickness ranges from 4 to 5m.

Table 5-1: Generalized Stratigraphic Column, Tavan Tolgoi

Period	Unit Name		Description	Thickness
Lower Jurassic			Greenish grey siltstones and mudstones with interbedded yellow sandstones.	Varied
			Conglomerate, conglomeratic sandstone, siltstone and mudstone	Varied
~~ Unconformity ~~~~~~~~~~~~~~~~~~~~				
Upper Permian	Tavan Tolgoi Group	Upper Unit	Dark grey siltstone, sandstone, conglomeratic sandstone; minor calcareous beds; flora fossils; COAL SEAMS X to XV.	965 to 1,990 m
		Upper Part Lower Unit	Greenish conglomerate and conglomeratic sandstone. Light grey, poorly to well sorted sandstones. Grey and dark grey siltstones and claystones. Abundant flora fossils; COAL SEAMS VI to IX.	
		Lower Part Lower Unit	Dark grey to light grey sandstone, occasionally conglomeratic. Coaly sandstone. Abundant flora fossils and fresh water mollusks. COAL SEAMS O to V	
	Tsankhi Group		Vari-colored claystones, paper shales, marly shales, sandstone and conglomeratic sandstone. Calcareous beds, limestone and aragonite. Abundant flora fossils and fresh water mollusks.	200 m to 250 m
	Girem Group		Red to reddish brown conglomerate and breccio-conglomerate, sandstone, siltstone, clayey shale.	300 m to 1,200 m
~~ Disconformity ~~~~~~~~~~~~~~~~~~~~				
Lower Permian	Tsogt-tsetsii Group		Siltstone with flora fossils, andesitic breccia, andesite and dacite.	400 m to 900 m
	Dusino-Ovoo Group		Light green massive andesite, basalt, dacite, tufaceous conglomerate, and tuff.	800 m to 1,100 m

(Source: Norwest 2009)

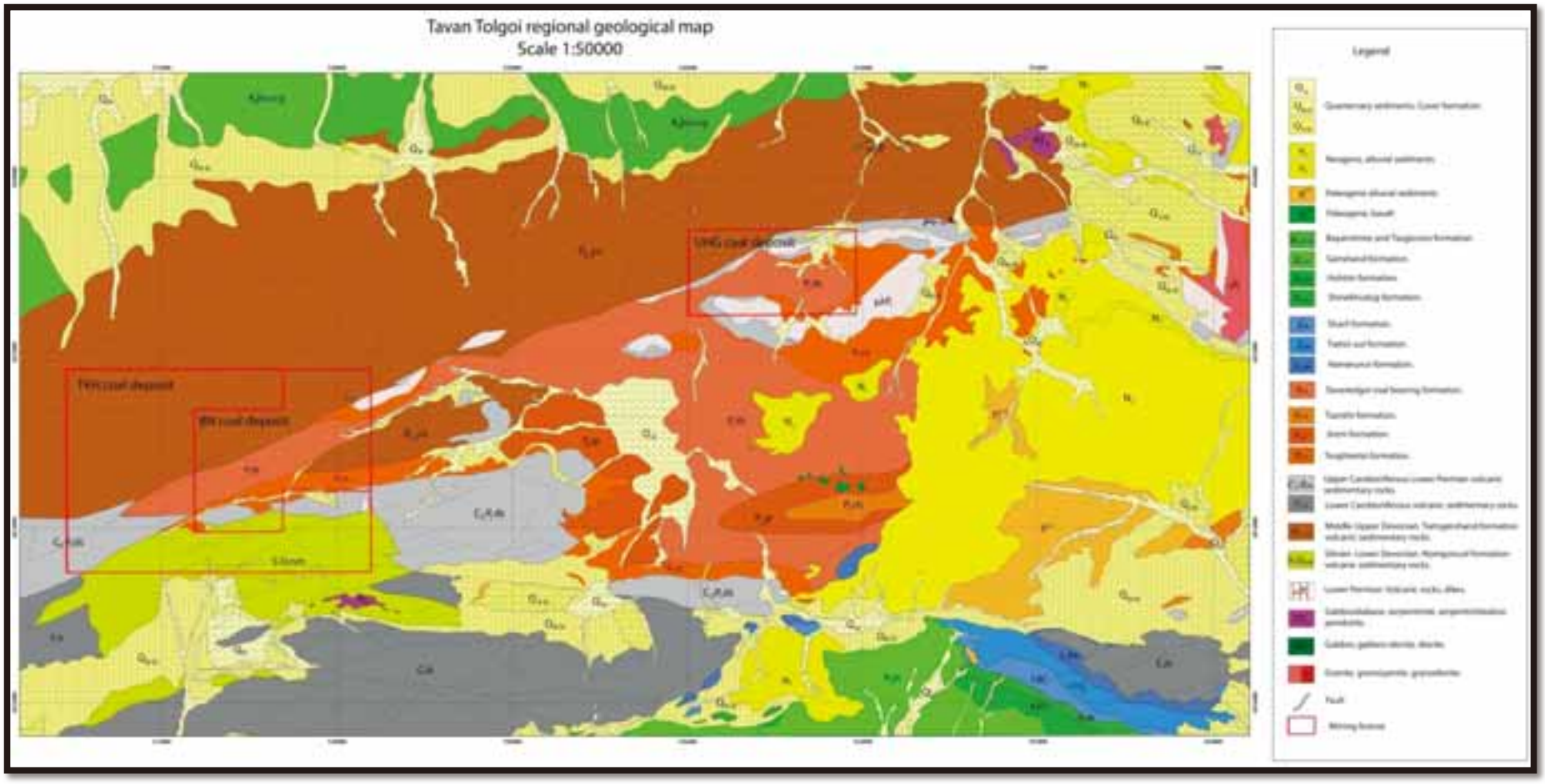


Figure 5-2: Regional geological map of Tavan Tolgoi coalfield

(Source: Energy Resources LLC)

5.3 Local Stratigraphy

The Stratigraphic sequence of BND includes fragments of the Tavan Tolgoi series of upper Permian age. Underlying these sediments are the lower and middle Devonian, upper Carbonaceous and lower Permian aged sediments. In some places they are covered with rock sediments of Triassic and Cretaceous systems, and of middle-upper Oligocene, Miocene, Pliocene and Quaternary ages.

The reference for the detailed descriptions of these formations comes from previous work (P.Khosbayar, B.Byambaa, Ts.Dorj, P.Tumurbaatar "Tavantolgoi Region 1:50 000 scale mapping and preliminary exploration from 1983-1984. Book 1, p23-227).

The formations that have been identified through mapping and bore cores were, Tsetsgershand formation (D_2-3cS), Dusin ovoo formation (C_3-P1ds), Tavan Tolgoi formation (P_2tb) and Quaternary sediments (Q_3-4) (refer Figure 5-3).

The detailed geology of BN and THG can be viewed in Figure 5-4 and 5-5 respectively.

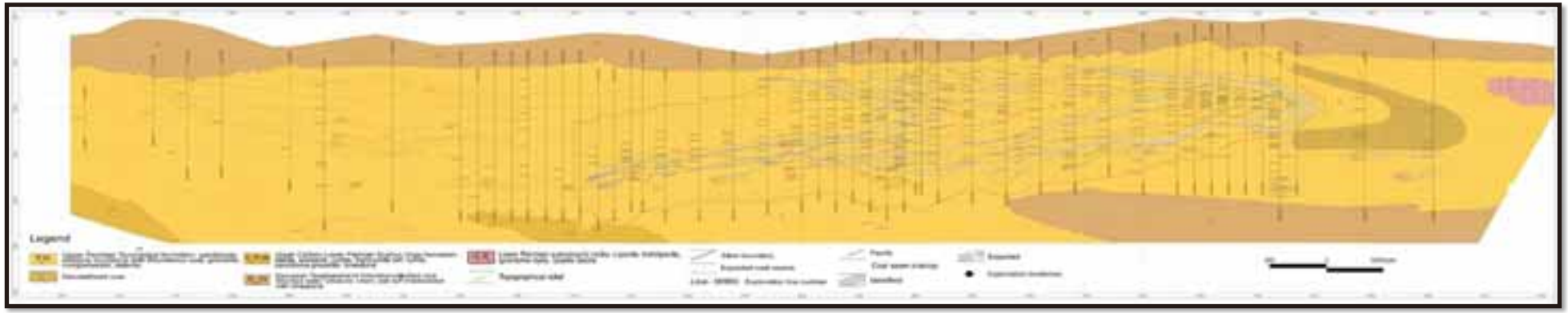


Figure 5-3: Geological map of Baruunnaran deposit

(Source: Energy Resources LLC)

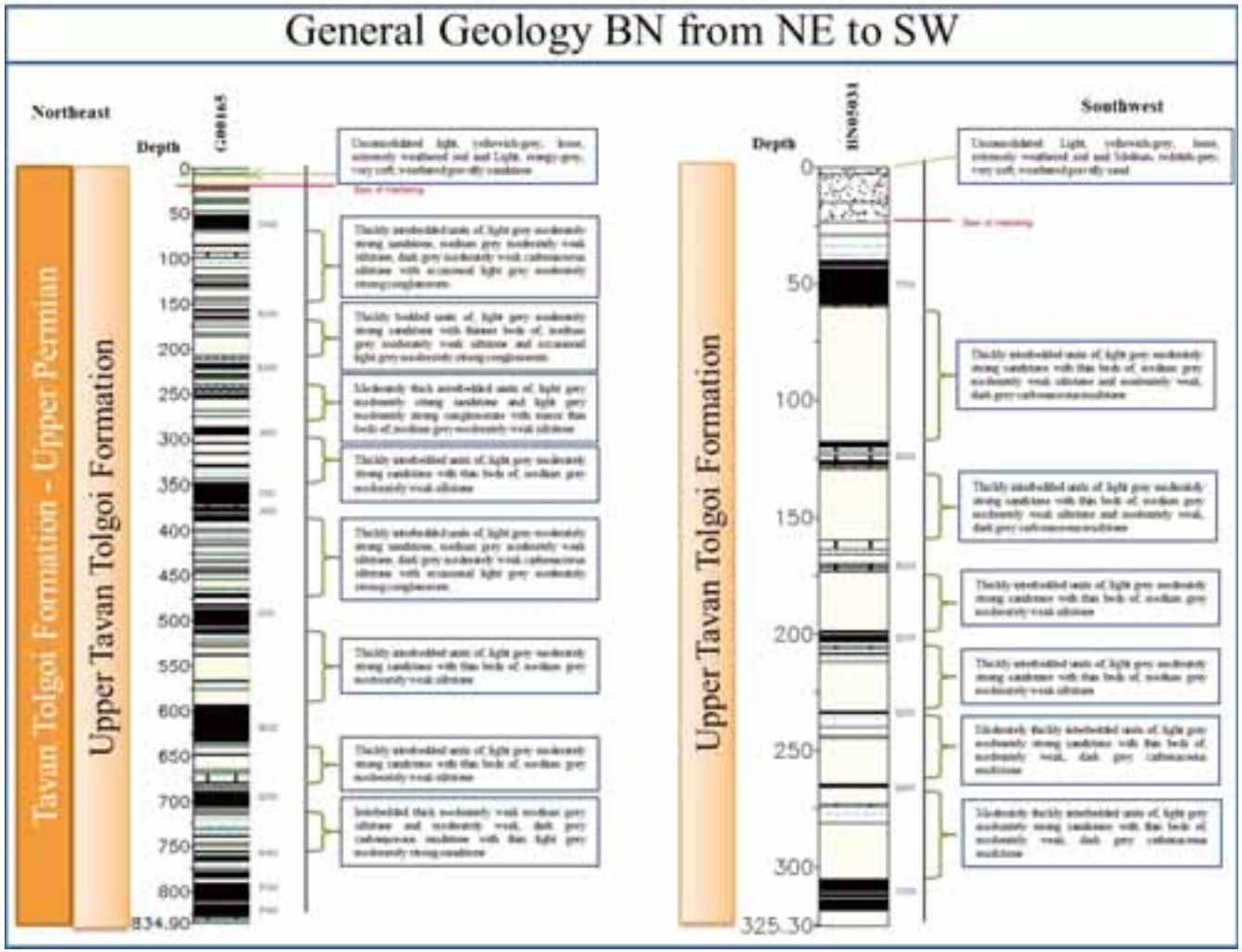


Figure 5-4: General Geology BN from Northeast to Northwest

(Source: Energy Resources LLC)

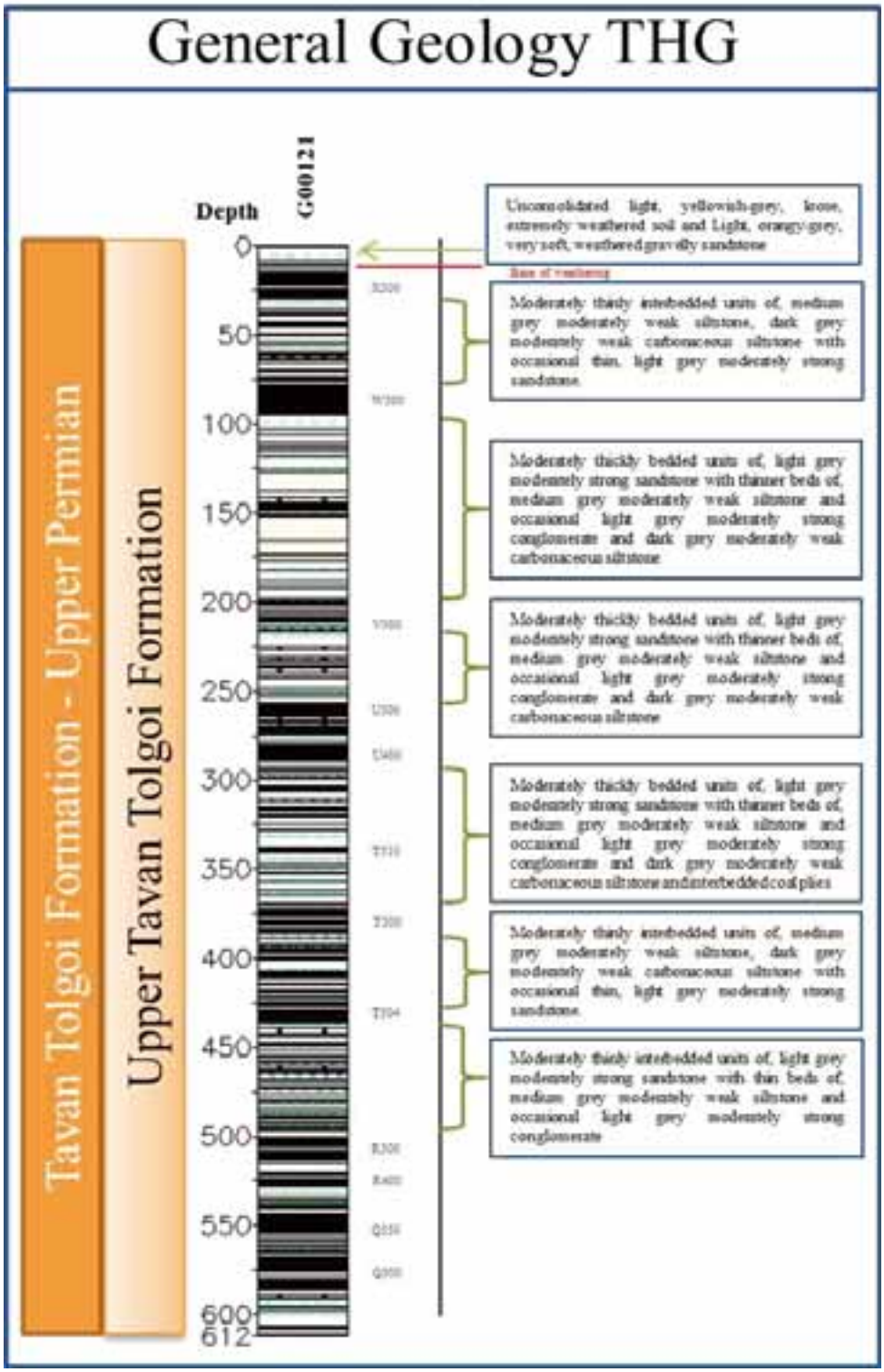


Figure 5-5: General Geology THG

(Source: Energy Resources LLC)

5.4 Deposit Type

The deposit type is an important section to be defined; as it comes under the JORC section 'Competence and Responsibility' more importantly it is one of the defining criteria for the Competent Person:

'A 'Competent Person' must have a minimum of five years' experience, which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which that person is undertaking.'

The late Paleozoic was marked by the continental collision of a number of small micro-continents that came together as convergent margins. As the Siberian Craton and the North China block converged, ancient continental crust was thrust onto the continental margin and small island arcs, subduction wedges, and ophiolitic belts were accreted as pre-existing basement rock was deformed and faulted, and uplift initiated.

Island arc geometry, similar to how the Bowen Basin (Eastern Australia) was formed, coincides with the formation of the late Permian systems that formed the belt of Late Permian coal measures that are found in the south and south-west of Mongolia of which, the Tavan Tolgoi deposit forms one of. These types of deposits form large basins that have vast lateral continuity. Unfortunately, due to the collision of India in the Tertiary, these basins in the southern regions of Mongolia have undergone later stage deformation, which appears to be more severe in the west and moderates eastward. This also explains the close proximity of large younger rift type basins that contain thick lignite deposits close to these Permian basins.

The Competent Person has worked as a coal geologist since March 2010 and is familiar with this deposit type. This style of deposit forms multi-seam environments that have extensive seam formation both along strike and down dip. They offer opportunities for large open-cut mines at shallow depths that allow access to deeper parts of the basin through underground means. Due to the complexity of the structure and multi seam environment, this deposit would be considered complex.

5.5 Structure

The BND coal measures are synformally folded in an asymmetrical shape. The plies are folded about an axis that plunges at 24° towards 240°. The north-western limb is near vertical to overturned and the south-eastern limb steepens from the fold axis to approximately 75° (refer Figure 9-2). The deposit's fold limb boundary limits are fault bounded, but ply's crop at the fold axis. The northern limb has a sharp fault boundary and appears not to have affected ply continuity however the southern limb is highly sheared sub parallel to bedding.

73km of high resolution 2D seismic was completed over the majority of the BN license. No major structures within the license were identified; however, smaller scale faulting was recorded.

5.6 Intrusives

There has been no evidence of volcanic dykes or sills within the coal measure recorded from surface mapping or boreholes.

5.7 Coal seams

5.7.1 Seam/ply Hierarchy

The primary coal seams that have medium or high potential coking properties, which could be considered for mining at BN and THG are seam groups 'G', 'H', 'I', 'J', 'K', 'L', 'N', 'Q', 'R', 'T', 'U' and 'V'. Of these, seams 'H' and 'T' are best developed, thickest and most continuous and contain a substantial portion of the coking coal resource within the license. Seam groups 'A', 'B', 'C', 'D', 'E', 'F', 'W', 'X' and 'Y' show low to no potential for coking coal properties (refer Figure 5-37). Seam groups 'H' and 'T' were targeted for production early in the BN mine development. Table 5-2 and Table 5-3 shows the seam hierarchy and basic seam statistics within BN and THG respectively. A brief description of these 20 seam groupings follows.

The naming nomenclature adopted for the seam groups comes from work done by MBGS and QGX. The same naming convention was continued and is described below;

Baruun Naran have been labelled alpha numerically from oldest to youngest. The major seam in any alphabetic group is designated the "500" seam (e.g., "T500"); Subordinate seams (riders or splits) are numerically greater than "500" if stratigraphically higher in the sequence (e.g., "T510"), or less than "500" if stratigraphically lower in the sequence (e.g., "G400").[4]

5.7.1.1 Seam Group 'A'

This group has only been intercepted at BN and is found in the far north-east of the license. It consists of 3 master seams, A300, A400 and A500. A300 has 4 first order plies and 1 second order ply, A400 has 2 first order plies and A500 has 2 first order plies and 2 second order plies. The group has not been mined, is not continuous and at best will likely make a blended thermal product.

5.7.1.2 Seam Group 'B'

This group has only been intercepted at BN and is found in the far north-east of the license. It consists of 1 master seam, B500 which has 5 first order plies. The group has not been mined, is not continuous and at best will likely make a blended thermal product.

5.7.1.3 Seam Group 'C'

This group has only been intercepted at BN and is found in the far north-east of the license. It consists of 3 master seams, C400, C500 and C600. C400 has 3 first order plies, C500 has 3 first order plies and C600 has 1 first order ply. The group has not been mined, is not continuous and at best will likely make a blended thermal product.

5.7.1.4 Seam Group 'D'

This group has only been intercepted at BN and is found in the far north-east of the license. It consists of 2 master seams, D400 and D500. D400 has 1 first order ply and D500 has 8 first order plies. The group has not been mined, is not continuous and at best will likely make a blended thermal product.

5.7.1.5 Seam Group 'E'

This group has only been intercepted at BN and is found in the far north-east of the license. It consists of 2 master seams, E400 and E500. E400 has 2 first order plies and

[4] Statement of Coal Resources Baruun Naran Coal Project, February 2010 - MBGS

E500 has 6 first order plies. The group has not been mined, is not continuous and at best will likely make a blended thermal product.

5.7.1.6 Seam Group 'F'

This group has only been intercepted at BN and initially outcrops in the north-east of the license but continues at depth, folded about the main basin synformal axis that plunges south-west. It consists of 2 master seams, F400 and F500. F400 has 4 first order plies and F500 has 4 first order plies. The group has not been mined, is relatively continuous and at best will likely make a blended thermal product.

5.7.1.7 Seam Group 'G'

This group has only been intercepted at BN and initially outcrops in the north-east of the license but continues at depth, folded about the main basin synformal axis that plunges south-west. It consists of 2 master seams, G400 and G500. G400 has 8 first order plies, 8 second order plies and G500 has 6 first order plies, 6 second order plies. The group has had minor exploitation as part of extraction of the main target seam 'H'. The group is relatively continuous and has very minor coking properties which could be blended into a coking primary product with a high ash thermal secondary product.

5.7.1.8 Seam Group 'H'

This group has only been intercepted at BN and initially outcrops in the north-east of the license but continues at depth, folded about the main basin synformal axis that plunges south-west. It consists of 1 master seam H500, which has 8 first order plies and 2 second order plies. The group is the main exploited seam which has good continuity. The group has good coking properties and has been blended with other UHG seams to produce a coking primary product with a high ash thermal secondary product.

5.7.1.9 Seam Group 'I'

This group has only been intercepted at BN and initially outcrops in the north-east of the license but continues at depth, folded about the main basin synformal axis that plunges south-west. It consists of 1 master seam, I500 which has 2 first order plies and 2 second order plies. The group has had minor exploitation as part of extraction of the main target seam 'H'. The group is relatively continuous and has moderate coking properties which could be blended into a coking primary product with a high ash thermal secondary product.

5.7.1.10 Seam Group 'J'

This group has only been intercepted at BN and initially outcrops in the north-east of the license but continues at depth, folded about the main basin synformal axis that plunges south-west. It consists of 5 master seams, J400, J500, J600, J604 and J605. J400 has 2 first order plies and J500 has 4 first order plies. The group has had minor exploitation as part of extraction of the main target seam 'H'. The group is relatively continuous and has very minor coking properties which could be blended into a coking primary product with a high ash thermal secondary product.

5.7.1.11 Seam Group 'K'

This group was intercepted at BN and THG licenses. The group outcrops about the axis of the major deposit synformal fold but on the fold limbs is truncated at depth by structure. The group continues at depth, folded about the main basin synformal axis that plunges south-west (BN) and north-east (THG). It consists of 2 master seams, K400 and K500. K400 has 4 first order plies; K500 has 4 first order plies and 4 second

order plies. The group has had minor exploitation at BN as part of extraction of the main target seam 'H'. The group is relatively continuous and has minor coking properties which could be blended into a coking primary product with a high ash thermal secondary product.

5.7.1.12 Seam Group 'N'

This group was intercepted at BN and THG licenses. The group outcrops about the axis of the major deposit synformal fold but on the fold limbs is truncated at depth by structure. The group continues at depth, folded about the main basin synformal axis that plunges south-west (BN) and north-east (THG). It consists of 2 master seams, N400 and N500. N400 has 4 first order plies and 2 second order plies. N500 has 5 first order plies. The group has not been exploited. The group is relatively continuous and has minor coking properties which could be blended into a coking primary product with a high ash thermal secondary product.

5.7.1.13 Seam Group 'Q'

This group was intercepted at BN and THG licenses. The group outcrops about the axis of the major deposit synformal fold but on the fold limbs is truncated at depth by structure. The group continues at depth, folded about the main basin synformal axis that plunges south-west (BN) and north-east (THG). It consists of 2 master seams, Q400 and Q500. Q400 has 1 first order ply and Q500 has 4 first order plies and 2 second order plies. The group has not been exploited. The group is relatively continuous and has minor coking properties which could be blended into a coking primary product with a high ash thermal secondary product.

5.7.1.14 Seam Group 'R'

This group was intercepted at BN and THG licenses. The group outcrops about the axis of the major deposit synformal fold but on the fold limbs is truncated at depth by structure. The group continues at depth, folded about the main basin synformal axis that plunges south-west (BN) and north-east (THG). It consists of 4 master seams, R200, R300, R400 and R500. R200 has 4 first order plies and 2 second order plies. R500 has 1 first order ply. The group has not been exploited. The group is relatively continuous and has minor coking properties which could be blended into a coking primary product with a high ash thermal secondary product.

5.7.1.15 Seam Group 'T'

This group was intercepted at BN and THG licenses. The group outcrops about the axis of the major deposit synformal fold but on the fold limbs is truncated at depth by structure. The group continues at depth, folded about the main basin synformal axis that plunges south-west (BN) and north-east (THG). It consists of 1 master seam which has 8 first order plies and 9 second order plies. The group is the second main exploited seam at BN which has good continuity. The group has good coking properties and delivers a high volatile, low ash coking primary product with a high ash thermal secondary product.

5.7.1.16 Seam Group 'U'

This group was intercepted at BN and THG licenses. The group outcrops about the axis of the major deposit synformal fold but on the fold limbs is truncated at depth by structure. The group continues at depth, folded about the main basin synformal axis that plunges south-west (BN) and north-east (THG). It consists of 2 master seams,

U500 and U600. U500 has 5 first order plies and 8 second order plies. U600 has 1 first order ply. The group has had minor exploitation as part of extraction of the second target seam 'T' which has good continuity. The group has moderate coking properties and when blended with 'T' seam delivers a high volatile, low ash coking primary product with a high ash thermal secondary product.

5.7.1.17 Seam Group 'V'

This group was intercepted at BN and THG licenses. The group outcrops about the axis of the major deposit synformal fold but on the fold limbs is truncated at depth by structure. The group continues at depth, folded about the main basin synformal axis that plunges south-west (BN) and north-east (THG). It consists of 3 master seams, V300, V400 and V500. V300 has 1 first order ply; V400 has 5 first order plies and V500 has 4 first order plies with 12 second order plies. The group has not been exploited. The group is relatively continuous and at best will likely make a blended thermal product.

5.7.1.18 Seam Group 'W'

This group has only been intercepted at the THG license. The group outcrops about the axis of the major deposit synformal fold but on the fold limbs is truncated at depth by structure. The group continues at depth, folded about the main basin synformal axis that plunges north-east at THG. It consists of 1 master seam, W500 which has 8 first order plies. The group has not been exploited. The group is relatively continuous and at best will likely make a blended thermal product.

5.7.1.19 Seam Group 'X'

This group has only been intercepted at the THG license. The group outcrops about the axis of the major deposit synformal fold but on the fold limbs is truncated at depth by structure. The group continues at depth, folded about the main basin synformal axis that plunges north-east at THG. It consists of 2 master seams, X400 and X500. X400 has 5 first order plies and X500 has 13 first order plies. The group has not been exploited. The group is relatively continuous and at best will likely make a blended thermal product.

5.7.1.20 Seam Group 'Y'

This group has only been intercepted at the THG license. The group outcrops about the axis of the major deposit synformal fold but on the fold limbs is truncated at depth by structure. The group continues at depth, folded about the main basin synformal axis that plunges north-east at THG. It consists of 1 master seam, Y400 which has 2 first order plies. The group has not been exploited. The group is relatively continuous and at best will likely make a blended thermal product.

Table 5-2: Seam Hierarchy for BN

№	Seam Master	First Order Ply	Second Order Ply	Minimum Seam Thickness (m)	Maximum Seam Thickness (m)	Average Seam Thickness (m)	Data points	Seam Group	Seam Recovery
1	V500	V555		0.33	1	0.63	7	V500	=>95
		V506	V5069	0.22	2.72	1.33	8		
			V5068	0.3	1.55	0.92	10		
			V5067	0.41	1.66	0.95	8		
			V5066	0.57	2.72	1.46	9		
			V5065	0.35	4.63	1.5	11		
			V5064	0.27	1.99	0.74	9		
		V505	V5059	0.25	1.87	1.01	9		
			V5058	0.69	5.01	1.91	11		
			V5057	0.36	3.75	1.36	13		
			V5056	0.21	2.77	1.27	14		
			V5055	0.56	3.58	1.29	24		
			V5054	0.47	2.02	0.89	28		
		V504		0.23	3.3	1.46	34		
2	U600	U6050		0.03	2.65	1.17	3	U600	=>95
	U500	U506	U5069	0.22	1.45	0.74	7	U500	=>95
			U5068	0.35	4.32	2.1	11		
			U5067	0.01	2.82	1.28	19		
			U5066	0.2	5.46	1.7	76		
			U5065	0.27	4.65	2.06	75		
		U505	U5056	0.17	11.11	1.7	77		
			U5055	0.28	5.09	2.08	82		
			U5054	0.47	2.3	1.05	4		
		U504		0.06	5.76	1.95	84		
		U503	U5036	0.01	1.88	0.43	60		
			U5035	0.01	1.66	0.49	54		
		U502		0.07	0.21	0.14	5		
3	T500	T516		0.5	0.95	0.72	2	T500	=>95
		T515		0.2	3.35	1.1	111		
		T514		0.17	2.44	1.05	111		
		T513		0.32	0.33	0.32	2		
		T507		0.39	3.3	1.81	111		
		T506	T5067	0.2	2.48	0.93	112		
			T5066	0.14	2.33	0.98	107		
			T5065	0.11	2.85	1.1	105		
		T505	T5058	0.2	4.71	1.55	111		
			T5057	0.2	2.62	1.13	111		
			T5056	0.2	3.21	1.03	110		
			T5055	0.21	2.67	1.09	107		
			T5054	0.01	3.3	1.36	110		
			T5053	0.18	3.01	0.94	108		
		T504		0.43	3.67	1.63	111		
4	R500	R506		0.27	9.14	2.45	80	R500	=>95
	R400			0.28	12.6	1.96	85	R400	=>95
	R300			0.17	7.14	2.08	82	R300	=>95
	R200	R206		0.08	3.72	1.02	75	R200	=>95
		R205		0.32	7.3	1.88	61		
		R204	R2045	0.03	2.62	0.87	33		
			R2044	0.23	2.12	0.77	26		
		R203		0.55	1	0.77	2		
5	Q500	Q550		0.3	4.3	1.35	77	Q500	=>95
		Q506		0.12	5.23	1	72		
		Q505	Q5055	0.34	5.05	1.63	31		
			Q5054	0.19	4.01	1.51	29		
		Q502		0.08	4.49	0.82	57		
	Q400	Q400		0.21	1.46	0.88	5	Q400	=>95
6	N500	N507		0.08	1.79	0.77	15	N500	=>95
		N506		0.25	9.57	3.87	94		
		N505		0.21	10.15	2.1	96		
		N504		0.36	9.45	2.11	98		
		N503		0.08	11.67	2.25	35		
	N400	N405		1.04	4.9	3.38	6	N400	=>95
		N404	N4045	0.28	8.26	2.15	72		
			N4044	0.18	4.24	1.22	70		

№	Seam Master	First Order Ply	Second Order Ply	Minimum Seam Thickness (m)	Maximum Seam Thickness (m)	Average Seam Thickness (m)	Data points	Seam Group	Seam Recovery
		N403		0.18	5.86	1.98	83		
		N402		0.23	4.18	1.77	57		
7	K500	K506		2.37	3.07	2.72	2	K500	=>95
		K505	K5055	0.12	14.71	1.97	93		
			K5054	0.21	11.36	2.39	91		
		K504		0.14	7.87	2.36	88		
		K503	K5036	0.14	2.56	0.8	72		
			K5035	0.05	6.42	0.9	80		
	K400	K407		0.15	2.64	1.06	66	K400	=>95
		K406		0.14	2.11	0.53	59		
		K405		0.19	3.68	**1.1**	64		
		K404		0.53	1.97	1.08	9		
8	J605			0.08	1.03	0.48	11	J605	=>95
	J604			0.43	6.09	**2.49**	133	J604	=>95
	J600			0.08	2.46	**0.67**	69	J600	=>95
	J500	J506		0.01	5.91	**1.49**	131	J500	=>95
		J505		0.02	14.61	3.46	134		
		J504		0.36	1.14	0.76	4		
		J503		0.46	0.55	0.5	3		
	J400	J406		0.1	7.61	0.97	69	J400	=>95
		J405		0.01	2.43	**0.92**	62		
9	I500	I506	I5066	0.03	11.26	1.21	160	I500	=>95
			I5065	0.02	6.38	1.38	160		
		I505		0.16	8.94	2.84	168		
10	H500	H508	H5086	0.01	5.07	1.5	213	H500	=>95
			H5085	0.01	8.3	2.09	217		
		H507		0.01	14.96	3.32	223		
		H506		0.01	27.05	3.06	224		
		H505		0.04	16.42	2.73	224		
		H504		0.02	10.13	2.29	220		
		H503		0.01	6.93	2.73	221		
		H502		0.01	2.27	0.42	134		
		H501		0.01	0.97	0.28	84		
11	G500	G506		0.03	1.12	0.33	73	G500	=>90
		G505		0.17	3.54	1.49	178		
		G504		0.23	5.36	1.17	175		
		G503	G5035	0.07	4.9	1.29	172		
			G5034	0.1	2.93	1.04	167		
			G5033	0.04	2.88	0.69	115		
			G5032	0.06	0.55	0.34	13		
		G502		0.04	4.46	0.74	133		
		G501	G5016	0.01	4.3	0.92	116		
			G5015	0.01	2.78	0.64	108		
	G400	G450	G457	0.29	0.45	0.37	2	G400	=>90
			G456	0.14	4.28	0.87	87		
			G455	0.13	0.42	0.27	13		
		G408		0.11	3.48	0.99	117		
		G407		0.01	6.79	1.18	122		
		G406		0.06	4.38	1.02	130		
		G405		0.09	4.95	0.98	157		
		G404	G4045	0.15	3.39	1.28	160		
			G4044	0.26	4.27	1.62	156		
		G403	G4035	0.01	4.86	0.72	146		
			G4034	0.03	5.53	1.79	161		
		G402		0.09	7.43	0.9	95		
12	F500	F506		0.2	3.28	1.03	10	F500	=>95
		F505		0.14	13.45	3.02	96		
		F504		0.16	19.77	3.51	91		
		F503		0.1	7.5	1.89	70		
	F400	F406		0.05	4.83	1.67	16	F400	=>95
		F405		0.17	14.41	2.81	67		
		F404		0.21	15.26	2.26	54		
		F403		0.18	12.76	2.41	37		
13	E500	E508		0.38	1.49	0.82	6	E500	=>90
		E506		0.28	4.6	1.22	12		
		E505		0.12	7.39	2.37	23		

№	Seam Master	First Order Ply	Second Order Ply	Minimum Seam Thickness (m)	Maximum Seam Thickness (m)	Average Seam Thickness (m)	Data points	Seam Group	Seam Recovery
		E504		0.17	6.29	1.92	15		
		E503		0.1	2.91	1.2	8		
		E502		0.34	6.34	1.7	5		
	E400	E405		0.33	7.19	1.76	6	E400	=>90
		E404		0.19	2.39	0.92	5		
14	D500	D555		0.28	0.48	0.41	3	D500	=>90
		D554		0.83	1.48	1.15	2		
		D552		0.52	0.83	0.67	2		
		D507		0.48	1.04	0.7	3		
		D506		1.32	1.43	1.39	3		
		D505		1.06	1.72	1.3	3		
		D504		0.38	4.19	1.88	4		
		D503		0.97	1.55	1.32	3		
	D400	D405		0.43	2.6	1.51	2	D400	=>90
15	C600	C605		2.76	3.13	2.95	2	C600	=>90
	C500	C505		1.09	5.24	2.96	4	C500	=>90
		C504		1.44	1.75	1.59	2		
		C503		0.44	0.68	0.56	2		
	C400	C405		0.42	1.2	0.81	2	C400	=>90
		C404		0.57	1.42	1	2		
		C403		0.36	0.88	0.62	2		
16	B500	B506		1.36	1.65	1.51	2	B500	=>90
		B505		0.77	3.56	2.18	5		
		B504		0.46	1.54	1.01	4		
		B503		0.54	2.4	1.24	4		
		B502		0.47	1.64	0.91	3		
17	A500	A504						A500	=>90
		A503	A5035						
			A5034						
	A400	A405						A400	=>90
		A404							
	A300	A305						A300	=>90
		A304							
		A303							
		A302	A3025						
			A3024						

(Source: Energy Resources LLC)

Table 5-3: Seam Hierarchy for THG

№	Seam Master	First Order Ply	Second Order Ply	Minimum Seam Thickness (m)	Maximum Seam Thickness (m)	Average Seam Thickness	Data Points	Seam Group	Seam Recovery
1	Y500	Y504		4.17	4.17	4.17	1	Y500	=>90
		Y503		7.88	7.88	7.88	1		
	Y400	Y405		0.39	0.39	0.39	1	Y400	=>90
		Y404		0.5	1.39	0.95	2		
		Y403		0.22	1	0.61	2		
2	X500	X513		0.47	5.47	1.5	6	X500	=>90
		X512		0.43	2.49	0.92	5		
		X511		0.2	3.05	1.26	5		
		X510		1.43	3.46	2.49	5		
		X509		1.8	5.32	3.13	6		
		X508		1.44	5.48	3.06	6		
		X507		0.43	1.8	0.99	6		
		X506		0.25	2.55	1.29	6		
		X505		0.52	1.66	0.95	5		
		X504		0.29	1.2	0.65	6		
		X503		0.3	1.45	0.65	6		
		X502		0.25	4.55	0.98	7		
		X501		0.34	1.3	0.63	7		
	X400	X407		3.1	3.1	3.1	1	X400	=>90
		X405		0.4	2	1.05	5		

№	Seam Master	First Order Ply	Second Order Ply	Minimum Seam Thickness (m)	Maximum Seam Thickness (m)	Average Seam Thickness	Data Points	Seam Group	Seam Recovery
		X404		0.65	2.38	1.64	7		
		X403		0.28	4.17	1.83	6		
		X402		0.91	6.59	2.7	6		
		X401		0.61	1.9	1.18	6		
	X300	X305		0.53	0.53	0.53	1		
		X304		0.8	0.8	0.8	1	X300	=>90
		X303		0.25	0.25	0.25	1		
3	W500	W508		0.58	1.1	0.78	3		
		W507		0.25	1.51	0.86	4		
		W506		0.23	2.85	1.46	6		
		W505		0.74	4.41	2.55	5		
		W504		0.24	0.83	0.63	4	W500	=>90
		W503		0.4	1.97	1.21	3		
		W502		0.21	3.88	2.05	2		
		W501		0.49	0.55	0.52	2		
4	V500	V555							
		V506	V5069						
			V5068	1	1	1	2		
			V5065	0.85	0.85	0.85	1		
			V5064	0.41	2.71	1.22	3		
		V505	V5059	0.35	0.78	0.57	2		
			V5058	0.65	6.79	3.11	11		
			V5057	0.33	2.4	1.11	11		
			V5056	0.37	2.2	1.1	11		
			V5055	0.59	4.23	1.71	11		
			V5054	0.4	3	1.21	13	V500	=>95
			V5053	0.6	0.74	0.67	2		
		V504		0.24	6.43	2.72	6		
	V400	V405		0.35	2.28	1.12	8		
		V404		0.1	4.3	2.5	11		
		V403		0.41	6.61	1.89	11	V400	=>95
		V402		0.45	3.81	1.79	7		
		V401		0.3	2.38	0.96	8		
	V300	V307		0.15	2.89	0.77	7		
		V305		0.43	0.43	0.43	1	V300	=>95
		V304		1.51	1.51	1.51	1		
		V303		0.55	0.55	0.55	1		
5	U500	U506	U5069						
			U5068						
			U5067						
			U5066	0.74	3.48	2.11	7		
			U5065	0.4	7.03	2.48	22	U500	=>95
		U505	U5056	1.69	5.06	2.86	6		
			U5055	0.28	6.03	1.76	21		
		U504		0.25	6.62	1.93	17		
		U503	U5035	0.25	9.08	1.73	8		
		U502		0.4	2.4	1.07	6		
	U400	U405		0.25	8.25	2.63	14		
		U404		0.54	12.9	3.07	13		
		U403		0.57	7.17	2.54	10	U400	=>95
		U402		0.3	8.12	2.32	6		
		U401		10.69	10.69	10.69	1		
6	T500	T516		0.4	5.95	1.82	16		
		T515		0.15	3.2	1.02	21		
		T514		0.4	1.7	1.01	19		
		T513		0.18	4.7	1.33	15		
		T512		0.25	10.82	2.23	17		
		T511		0.24	5.02	1.44	15		
		T508		0.5	10.73	2.58	15		
		T507		0.3	5.38	1.66	19	T500	=>95
		T506	T5067	1.1	2.02	1.56	6		
			T5066	1.8	1.8	1.8	1		
			T5065	0.28	6.67	2.02	9		
		T505	T5058	1.1	2.68	1.65	7		
			T5057	1.16	2.4	1.78	2		
			T5056	0.97	4.21	2.1	6		

№	Seam Master	First Order Ply	Second Order Ply	Minimum Seam Thickness (m)	Maximum Seam Thickness (m)	Average Seam Thickness	Data Points	Seam Group	Seam Recovery
			T5055	0.46	5.1	2.15	4		
			T5054	0.26	3.82	1.58	8		
			T5053	0.6	2.6	1.85	6		
		T504	T5046	2.04	2.04	2.04	1		
			T5045	0.82	2.61	1.74	6		
7	R500	R507		0.2	8.3	1.93	18	R500	=>95
		R506		0.44	9.04	1.98	22		
		R505		0.4	5.52	2.03	11		
		R504		0.45	1.59	0.75	6		
		R503		0.63	2.1	1.09	4		
		R502		0.85	0.85	0.85	1		
	R400	R408		0.3	4.03	1.5	16	R400	=>95
		R407		0.5	6.96	1.74	11		
		R406		0.75	2.41	1.36	8		
		R405		0.15	2.07	1	6		
		R404		0.3	2.48	1.12	4		
	R300			0.28	7.05	1.61	13	R300	=>95
	R200	R206		0.94	1.77	1.26	5	R200	=>95
		R205		0.8	0.8	0.8	1		
		R204	R2045	2.22	2.22	2.22	1		
8	Q500	Q550	Q556	0.15	1.86	0.78	12	Q500	=>95
			Q555	0.44	4.43	1.39	12		
			Q554	0.45	3.25	1.52	7		
		Q506		0.2	4.05	1.07	12		
		Q505	Q5055	0.6	0.6	0.6	2		
			Q5054	0.5	4.23	1.89	10		
		Q504		0.5	1.45	0.99	5		
		Q503		0.57	1.54	0.92	3		
		Q502							
		Q501		1.06	1.06	1.06	1		
9	N500	N508		0.24	7.4	1.81	9	N500	=>95
		N507		0.28	1.66	0.81	8		
		N506		0.45	7.29	1.87	8		
		N505		0.37	11.96	4.59	4		
		N504		0.55	14.14	8.32	8		
		N503		1.1	12.97	7.87	5		
		N502		1.9	1.9	1.9	1		
	N400	N408		0.45	4.31	1.63	6	N400	=>95
		N407		0.4	1.7	1.17	6		
		N406		0.5	5.14	2	6		
		N405		0.5	4.54	2.23	6		
		N404	N4044	0.57	7.3	2.9	5		
		N403		0.01	1.08	0.55	5		
		N402		0.85	1.77	1.26	3		
	N300	N356		0.95	0.95	0.95	1	N300	=>95
		N355		0.95	0.95	0.95	1		
10	K500	K506		0.7	5.46	2.32	3	K500	=>95
		K505	K5055	2.74	5.87	4.36	2		
		K504		1.18	6.45	5.06	3		
		K503	K5036	3.47	3.47	3.47	2		
			K5035	1.05	1.05	1.05	1		
			K5034	0.43	0.6	0.52	2		
		K502		1.68	1.68	1.68	1		
	K400	K407		1.69	1.69	1.69	1	K400	=>95
		K406		1.7	1.7	1.7	1		
		K405		5.82	5.82	5.82	1		

(Source: Energy Resources LLC)

5.7.2 Coal Quality

This section was prepared by Tsolmon Adiya after careful deliberation with Byambaa Barkhas (Competent person).

As discussed in section 4 (Exploration history) there were 2 main periods of exploration drilling conducted at the BND. QGX LLC organized drilling from 2005 to 2010 with a

total of 2679 samples for BN and 26 samples for THG collected and tested. From 2011 2015 the ER geology team conducted phases of drilling campaign in the area with a total of 8720 samples for BN and 3824 THG collected and tested.

In this report we report additional 3782 ply sample results from the 2018 BN drilling campaign.

5.7.2.1 Database

The following two Excel files contain the original analytical database and were used for this discussion of the coal quality on a sample basis:

- "BN_model_CQ_ALL" with 11,399 ply samples, which are referred to as the ER and QGX data from the pre 2018 drilling campaign in the BN area;
- "BN Model_CQ_2018" with 3782 ply samples, which are referred to as the coal quality data from the ER 2018 drilling campaign in the BN area;
- "THG_Model_CQ_all" with 3850 ply samples, which are referred to as the ER and QGX data in the THG area.

Laboratory certificates can be found for the ER data in Appendix 5.

The BN original laboratory database, number of samples and the available laboratory determined analytical results are summarised in Table 5-4.

Table 5-4: Summary of the BN original analytical database.

Type		Number	%
Total number of ply samples		15,181	100.0
	True relative density	13,776	90.7
	Apparent relative density	2,670	17.6
	Total moisture	14,870	98.0
	Air-dry moisture	13,777	90.8
	Ash	15,177	100.0
	Volatile matter	13,548	89.2
	Calorific value	8,280	54.5
	Total sulphur	15,165	99.9

(Source: Tsolmon)

The THG original laboratory database, number of samples and the available laboratory determined analytical results are summarised in Table 5-5.

Table 5-5: Summary of the THG original analytical database.

Type	Number	%
Total number of ply samples	3850	100
True relative density	3809	98.9
Total moisture	3837	99.7
Air-dry moisture	3809	99
Ash	3849	100
Volatile matter	3808	98.9
Calorific value	3560	92.6
Total sulphur	2922	76.2
Free swelling index	2,891	75.1
G index	-	

(Source: Pretorius)

In addition, during the drilling period from 2005 to 2018 samples were analysed at 3 different laboratories. Samples from QGX drilling campaign were delivered and tested at SGS and ACIRL international laboratories and ER samples were tested domestically at the company's internal ERCCL. Results from all laboratories are summarized in Table 5-6.

Table 5-6: Summary of the BN original analytical database.

Laboratory	Moisture (%ar)	Moisture (%ad)	Ash (%ar)	Ash (%ad)	Volatile Matter (ar%)	Fixed Carbon (%ar)	Fixed Carbon (%ad)	Calorific Value (kcal/kg, ar)	Calorific Value (kcal/kg, ad)	Total Sulfur (%ar)	Total Sulfur (%ad)	True Relative Density (gr/cm3, ar)	True Relative Density (gr/cm3, ad)	Aparent Relative Density (gr/cm3, ad)
SGS	1399	189	1399	189	0	0	189	0	1399	1399	189	189	0	1588
ACIRL	1087	1089	1087	1089	1089	1087	1089	764	765	1089	1089	1089	1089	1082
ER	8677	8718	8677	8718	8677	8677	8718	2592	2596	8677	8718	8718	8696	0
ER (2018 drilling campaign)	3707	3781	3707	3782	3707	3707	3782	3450	3520	3695	3770	3705	3780	0

(Source: Tsolmon)

It was identified that as-received and air-dried moisture values from the BN exploration analytical results was significantly higher than ER's. The following paragraphs are the investigation that followed to determine the discrepancy. In addition, only the BN area was investigated due to sufficient data but the results were applied to the THG data as the same discrepancy occurred.

The first evidence of a problem was with the study Expected Error for the H seam air-dry moisture values. This result should be less variable than total moisture however; the corresponding Gaussian transformed variogram (Figure 5-6) showed a very high

nugget value (0.7) with a very small sill (0.15). This result indicated that the data was highly variable.

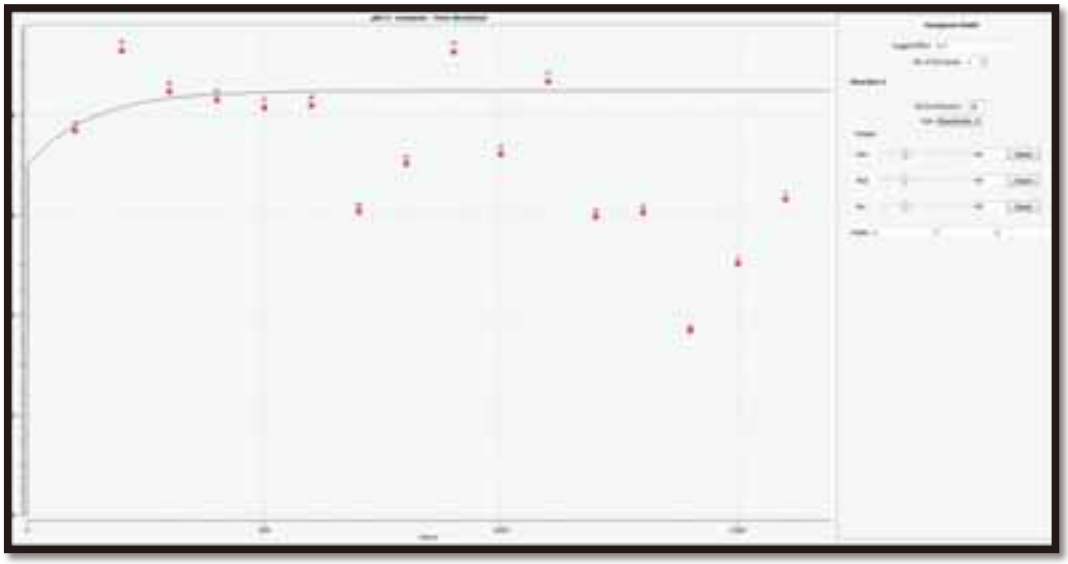


Figure 5-6: BN area Seam H variogram of Gausian transformed Moisture on air dry basis

(Source: Ballantine)

On closer inspection of the H seam data after sorting, two populations could be observed. These populations could be sorted into the older QGX data and newer ER data as shown in Figure 5-7. There is a clear difference in results with the QGX data being much higher than the ER data. Moreover, when considering the expected rank of the coal, the ER results are in line with expected rank for the determined air-dry moisture values with the QGX data more in line with a much lower rank coal so are quite anomolous.

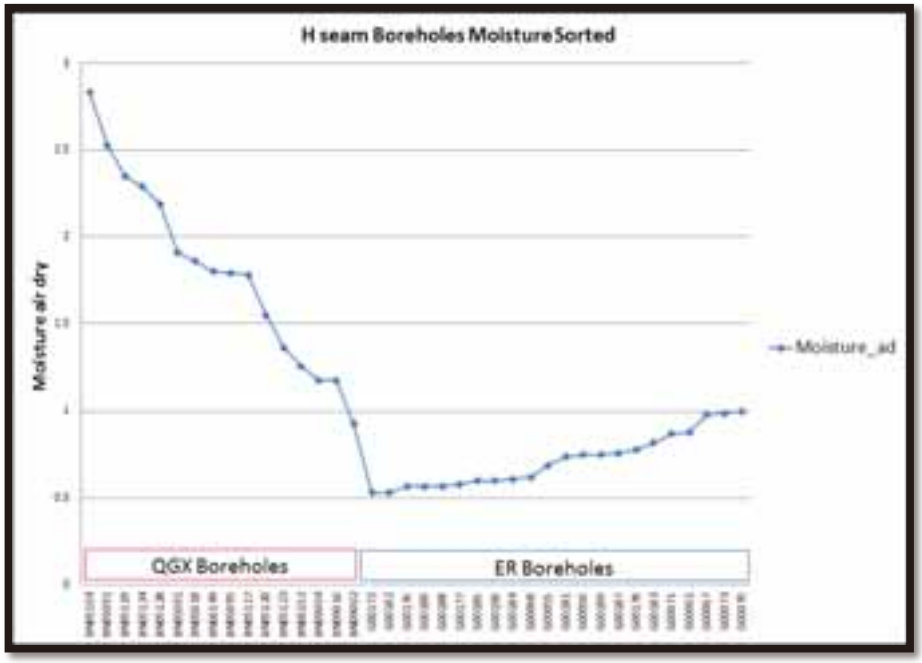


Figure 5-7: BN area QGX data sorted highest-lowest and ER data showed lowest-highest

(Source: Ballantine)

To further evaluate the issue and understand the impact of the two populations, the Expected Error of the current data (combined QGX and ER) and the ER datasets was estimated (Figure 5-8). The current dataset has consistently twice the error of the ER data.

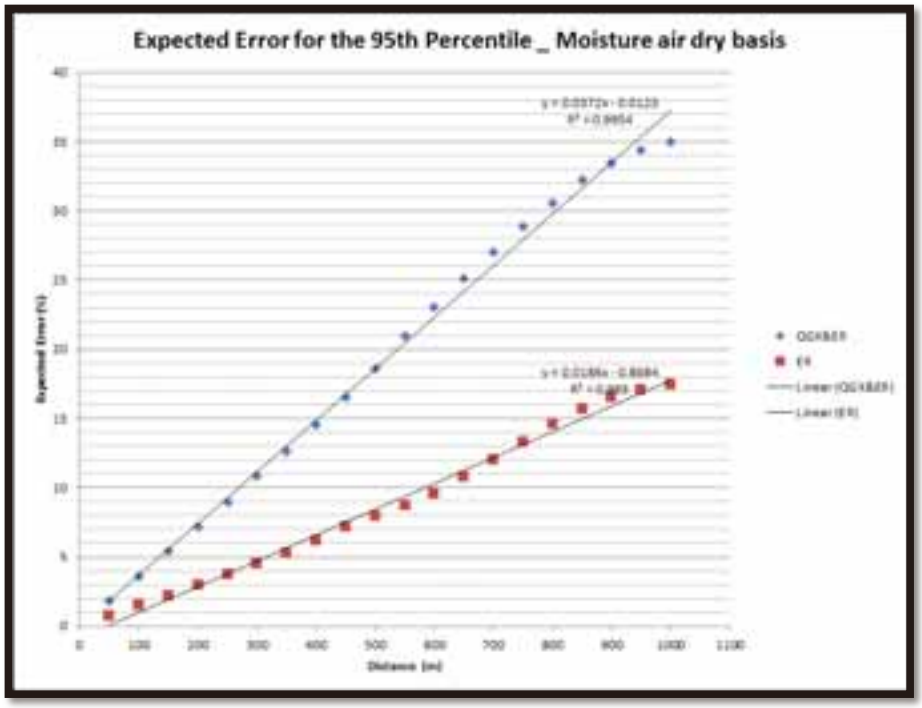


Figure 5-8: BN area Expected Error for QGX dataset and ER dataset

(Source: Ballantine)

Since there was such a clear disparity of the old QGX data compared with the newer ER data with the actual QGX values being clearly out of alignment with the coal rank and with such a large (greater than 50%) dataset of the newer ER data representing the whole database, a decision was made by the CP to transform the QGX moisture data to fit the ER data. The BN coal measure is quite thick and as rank is related to coal depth each seam was treated individually. In addition, for each seam, coal and rock were also treated individually based on coal being less than or equal to 50% ASH dry basis. The transformation compared the mean and standard deviation of the QGX data and transformed it to fit the mean and standard deviation of the ER data for each seam. This allowed the relative quantitative values to be maintain (i.e. large values = large values, small values = small values). The following formula was applied;

- **xtran = mnew + sdnew * ((xold – mold) / sdold)**

Appendix 7b contains the seam histograms which were used in the transformations. The following figures (Figure 5-9– Figure 5-16) and equations illustrate the histograms used for the H seam transformation as an example.

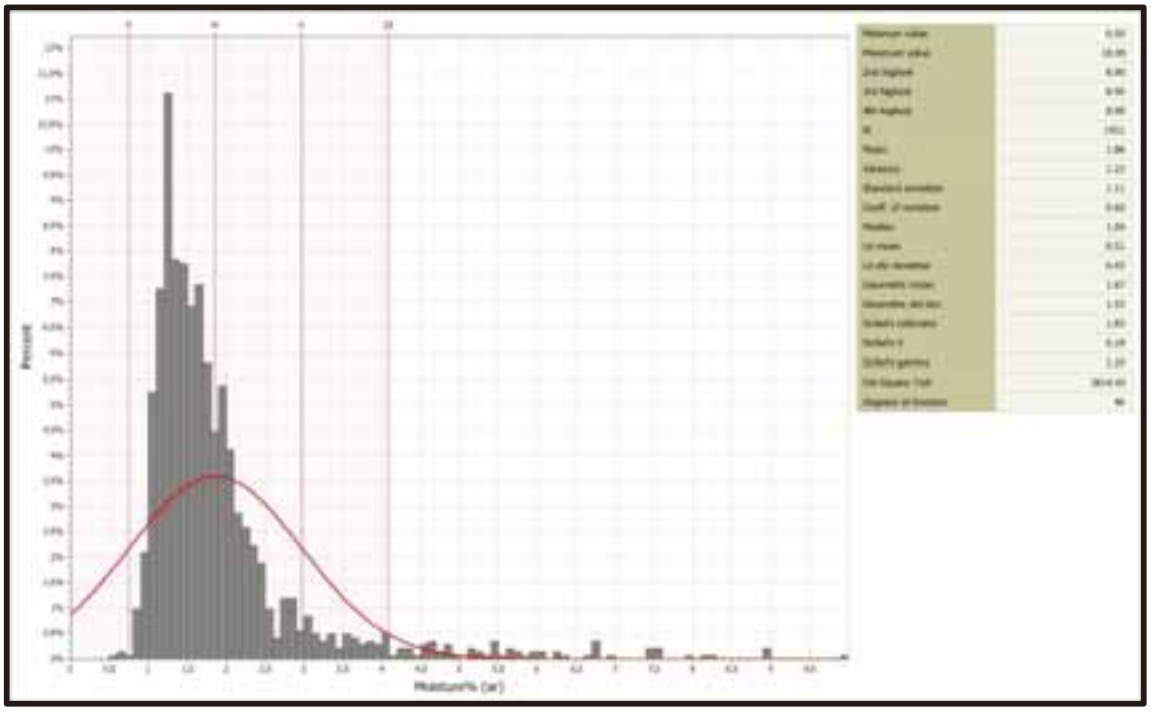
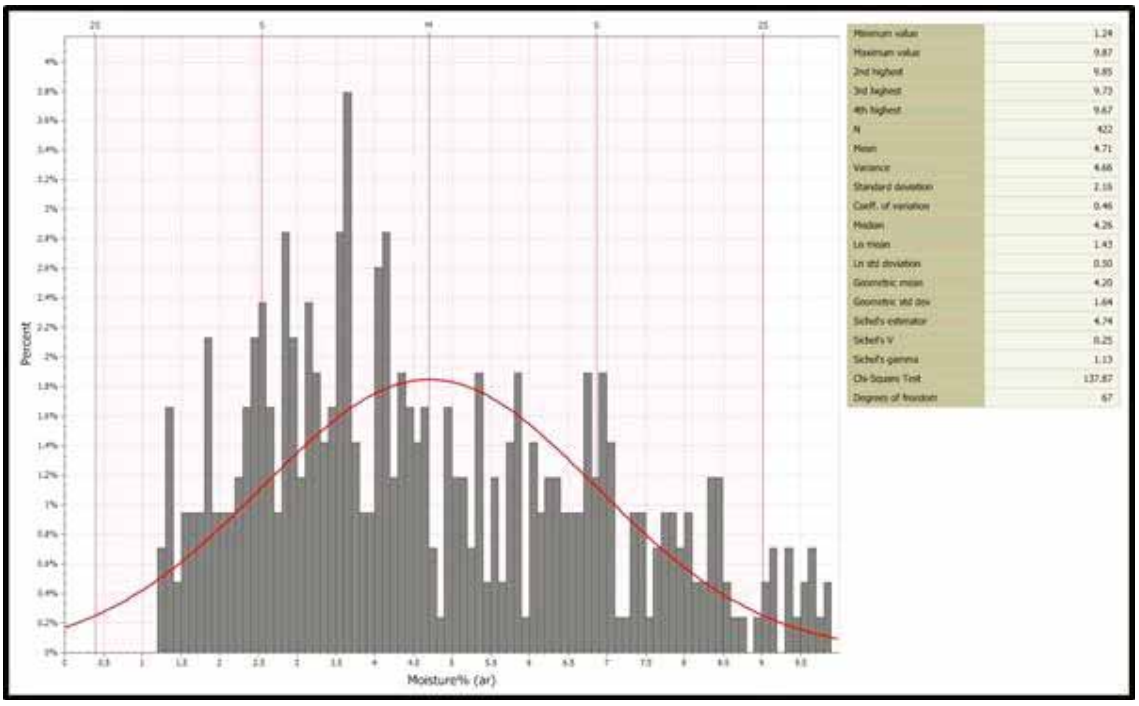


Figure 5-9: BN area ER Histogram- H seam coal sample moisture (as-received)

(Source: Ballantine)



Xtrans = 1.86 + (1.11 x ((Mar – 4.71)/2.16))

Figure 5-10: BN area QGX Histogram- H seam coal sample moisture (as-received)

(Source: Ballantine)

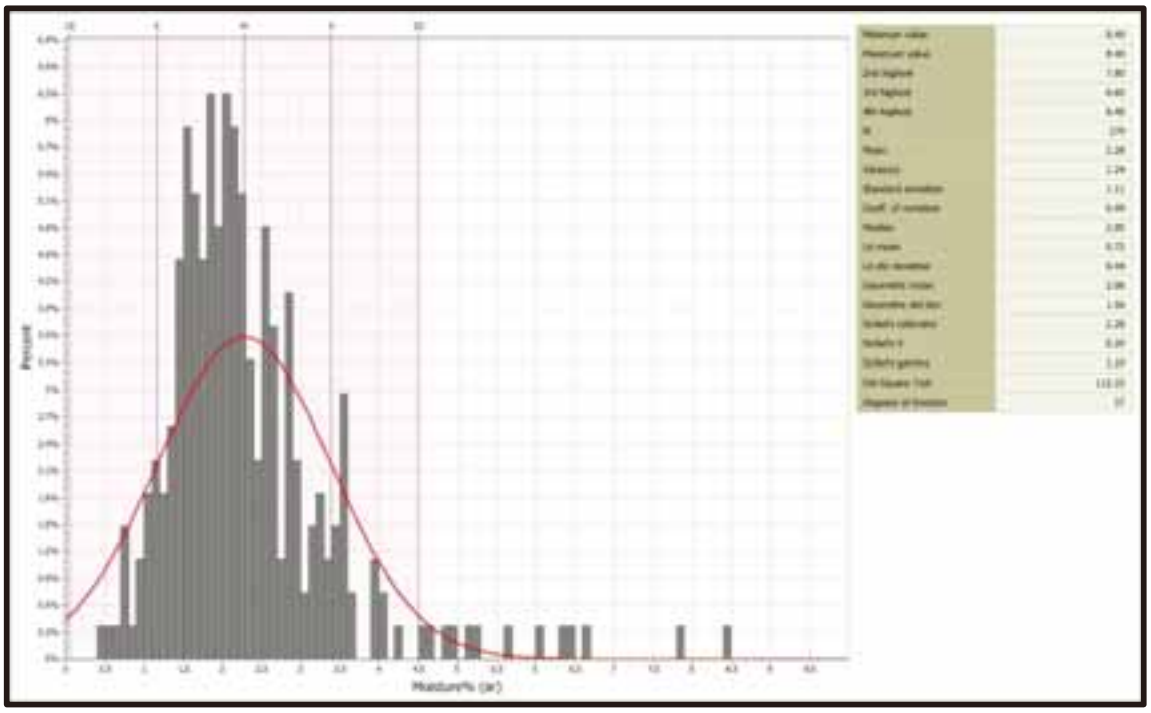
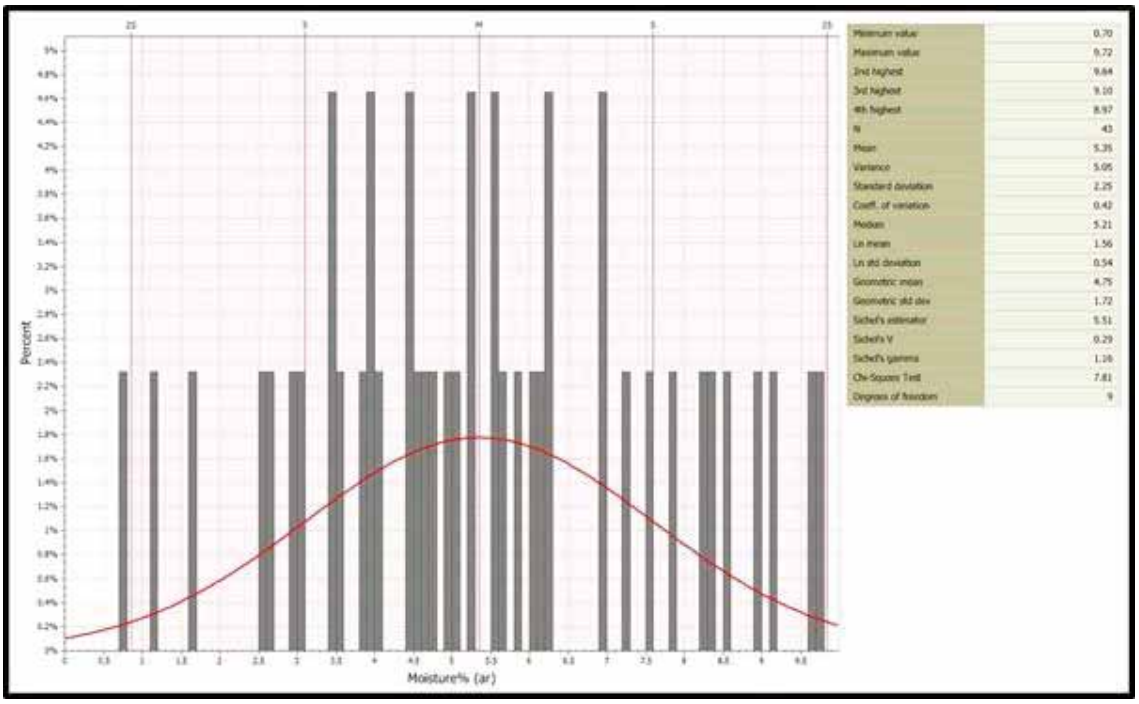


Figure 5-11: BN area ER Histogram- H seam rock sample moisture (as-received)

(Source: Ballantine)



Xtrans = 2.28 + (1.11 x ((Mar – 5.35)/2.25))

Figure 5-12: BN area QGX Histogram- H seam rock sample moisture (as-received)

(Source: Ballantine)

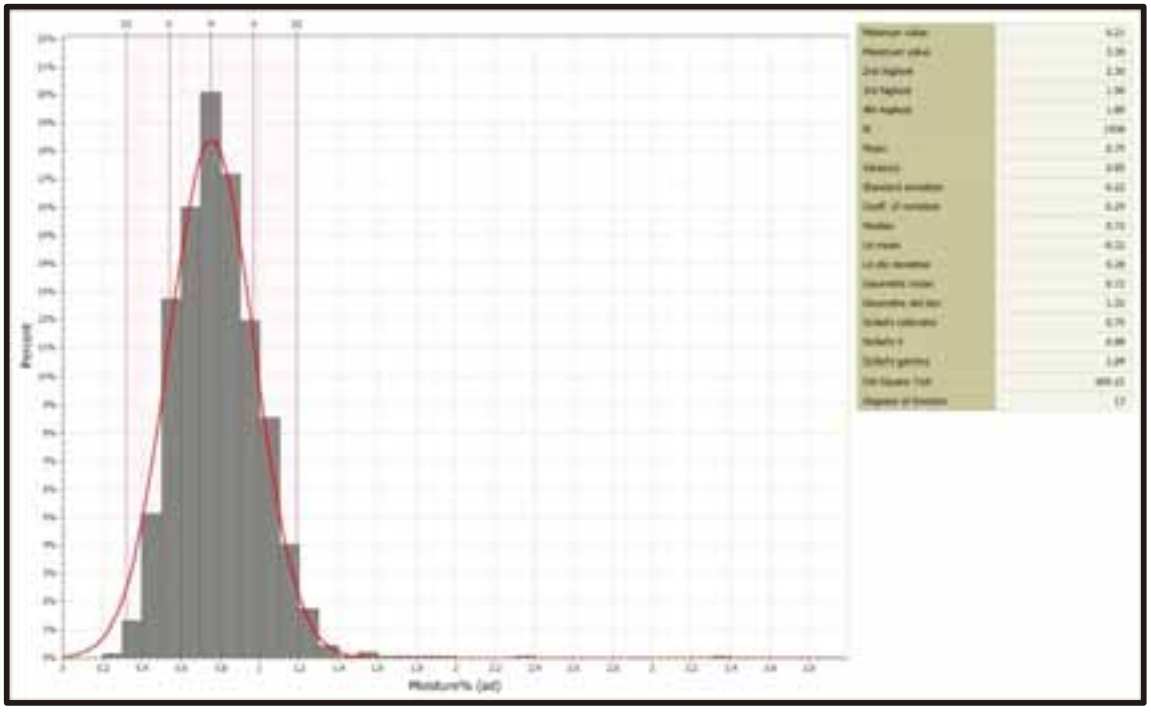
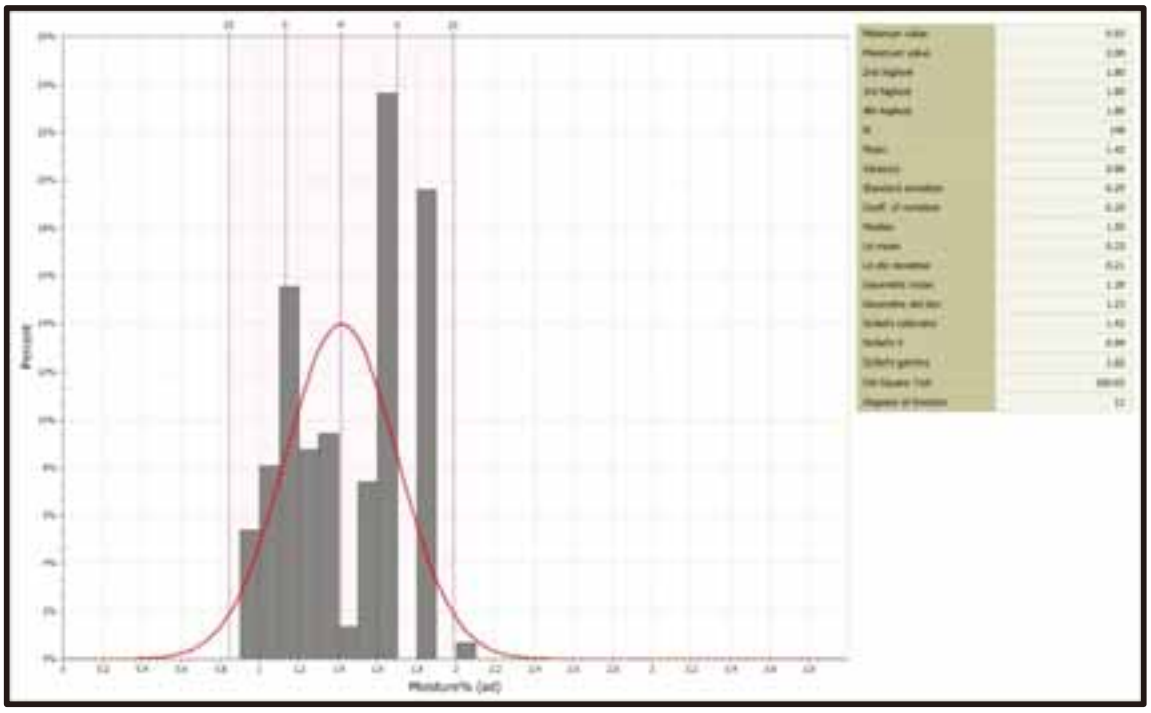


Figure 5-13: BN area ER Histogram- H seam coal sample moisture (air-dry)

(Source: Ballantine)



Xtrans = 0.75 + (0.22 x ((Mad – 1.42)/0.29))

Figure 5-14: BN area QGX Histogram- H seam coal sample moisture (air-dry)

(Source: Ballantine)

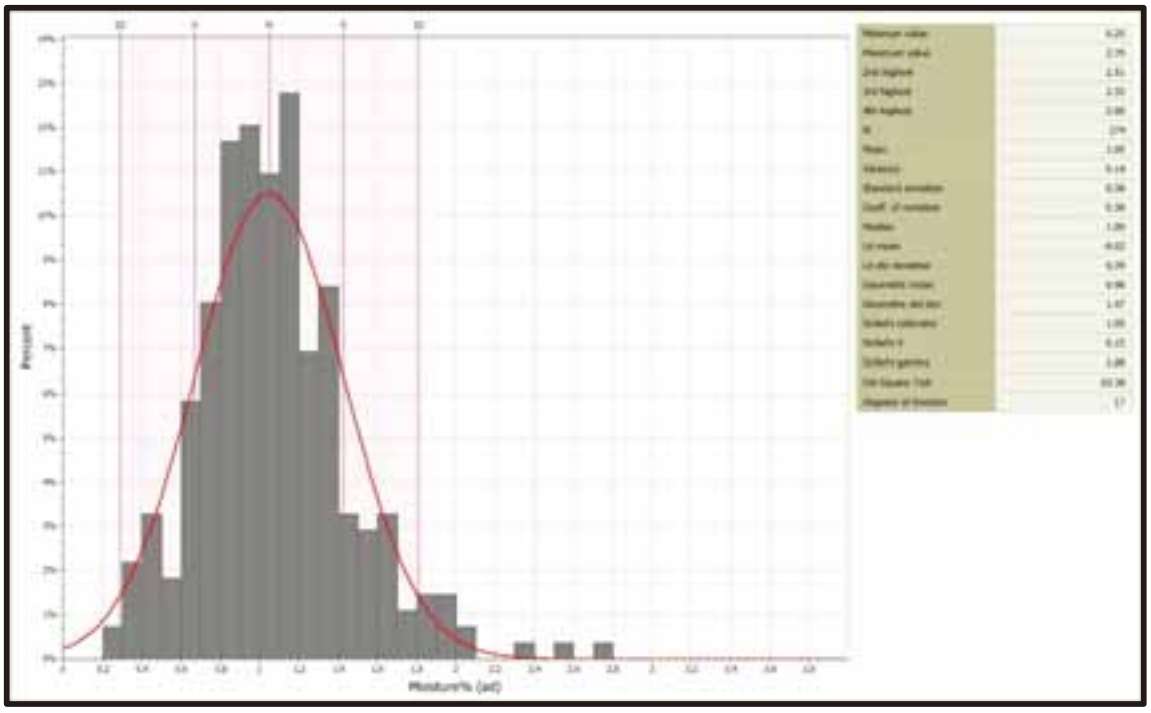
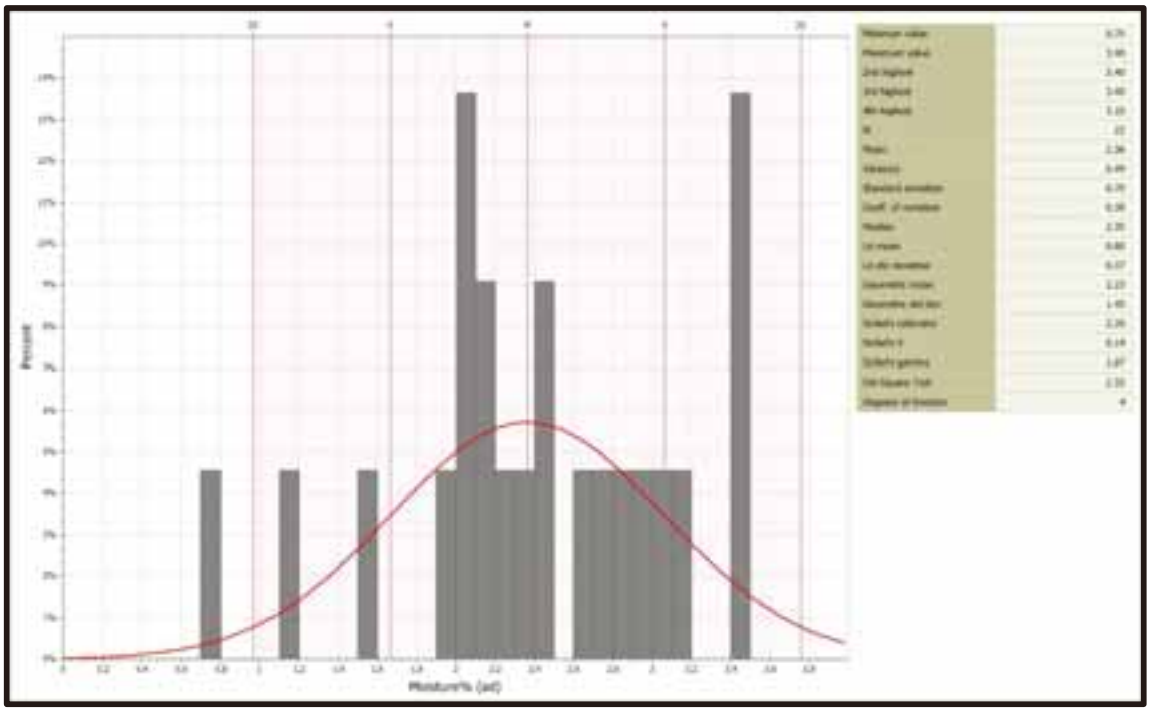


Figure 5-15: BN area ER Histogram- H seam rock sample moisture (air-dry)

(Source: Ballantine)



Xtrans = 1.05 + (0.38 x ((Mad – 2.36)/0.70))

Figure 5-16: BN area QGX Histogram- H seam rock sample moisture (air-dry)

(Source: Ballantine)

Once the QGX moisture data for as-received and air-dry basis was determined, coal qualities for the corresponding basis were adjusted. The resulting dataset was then used for the BN resource estimation (refer Appendix 6a & 6b). Adjusted/Transformed coal quality database is summarized in Table 5-7.

Table 5-7: Summary of the BN Transformed analytical database

Type		Number	%
Total number of ply samples		15,181	100.0
	True relative density	13,745	90.5
	Total moisture	14,829	97.7
	Air-dry moisture	13,777	90.8
	Ash	15,097	99.4
	Volatile matter	13,737	90.5
	Calorific value	8,237	54.3
	Total sulphur	15,085	99.4
	Free swelling index	12,553	82.7
	G index	5,012	33.0

(Source: Tsolmon)

Ply samples mentioned in above tables include a further 12553 samples were analysed for CSN and 5012 samples were analysed for the Chinese G Index.

The objective of this section of the report is to give an overview of the coal quality database with general remarks regarding coal quality characteristics. This is on a sample basis and the methodology used to estimate missing values in order to provide a full set of analytical data for each of the 19,190 samples (BN & THG). This approach maximises the use of the coal quality data and ensures that a full coal quality data set is available at each point of observation, which is used for estimating the coal resource and coal quality. Estimating missing values did not include CSN and Chinese G Index.

For additional coal quality information in particular washability results, the reader is referred to the MBGS Baruun Naran JORC resource estimation (2012).

The sampling procedure for the QGX and ER data required in-seam rock partings were not included with coal samples, but sampled separately. The procedure also required sampling of the immediate roof and floor of each coal seam and it must be noted that the analytical data includes a relatively large number of separate rock sample analyses. These in-seam partings and roof and floor samples were generally analysed for relative density, ash, moisture, volatile, and total sulphur.

The BN QGX and ER data sets were compared by means of several cross plots shown in Figure 5-17 to Figure 5-21. THG QGX and ER datasets are shown in Figure 5-22 to Figure 5-26.

Figure 5-17 shows that the BN transformed analytical database with both of the QGX (SGS and ACIRL) and ERCCL moisture results. Most of the 15181 samples, the air-dry moisture is less than 5% and the total moisture is less than about 16%. Figure 5-17 also shows a number of values outside the ranges mentioned, but in relation to the total population, it is a small percentage. QGX transformed moistures are now showing good correlation with ER moistures, which is proving further the coal quality properties in relation with moistures of BN will be unambiguous.

Figure 5-18 shows the relationship between ash and true relative density for the two data sets. The QGX data shows greater variations in relative density than the ER data. The ER data shows a much better correlation between ash and relative density. In addition, 2005 and 2006 QGX drilling campaign samples were tested for apparent relative density instead of true relative density. Therefore calculation for converting apparent relative true relative density was the main cause of variations. The ER data shows a number of anomalous relative density values that are less than expected for ash values greater than 50%.

In Figure 5-19 the relationship between ash and volatile matter shows some variations in volatile matter. Variation is also possibly caused by analytical data transformation. Again, the ER data shows a number of high volatile matter values for ash values greater that about 40%. This observation illustrates the problem of proximate composition determinations on non-coal samples.

Figure 5-20 shows the relationship between ash and calorific value. The data shows a good correlation between these two parameters. However, a number of samples show anomalous high calorific values. As a percentage of the total population the number is relatively small. A greater number of samples show low calorific values in relation to the ash content and could be indicative of some degree of weathering.

Figure 5-21 shows the relationship between ash and total sulphur. The differences between the data sets are probably a result of different methods for the determination of total sulphur. The QGX and ER data for sulphur is generally less than 2.5%. However, a number of samples show anomalous high calorific values. As a percentage of the total population the number is relatively small.

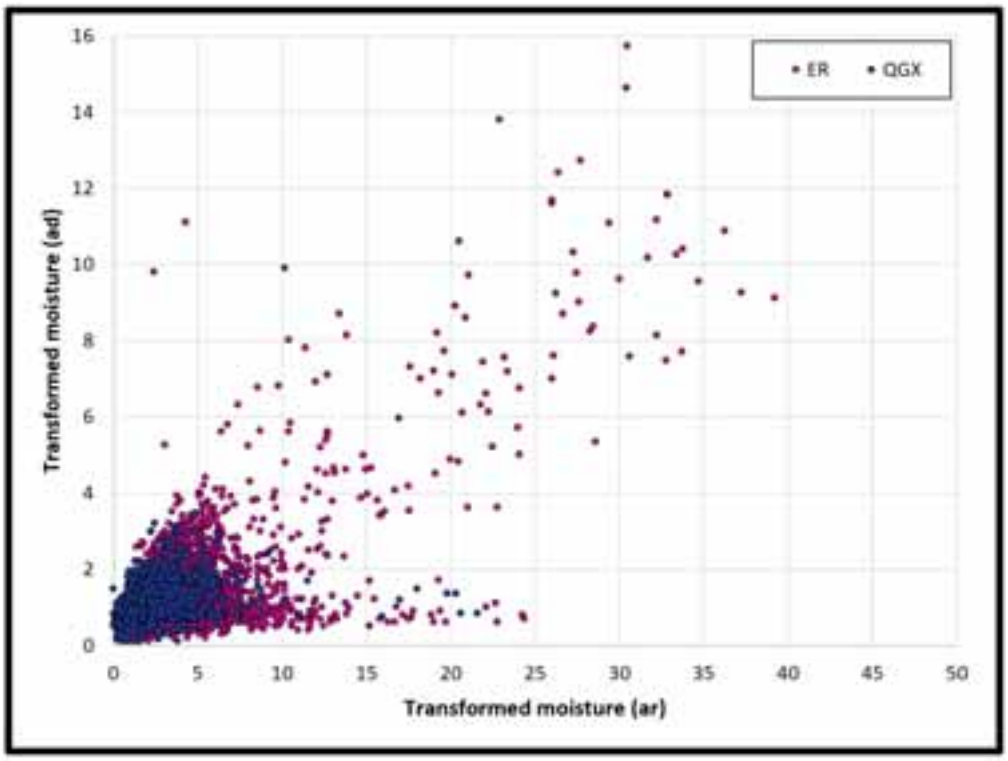


Figure 5-17: BN Relationship between total moisture and air-dry moisture.

(Source: Tsolmon)

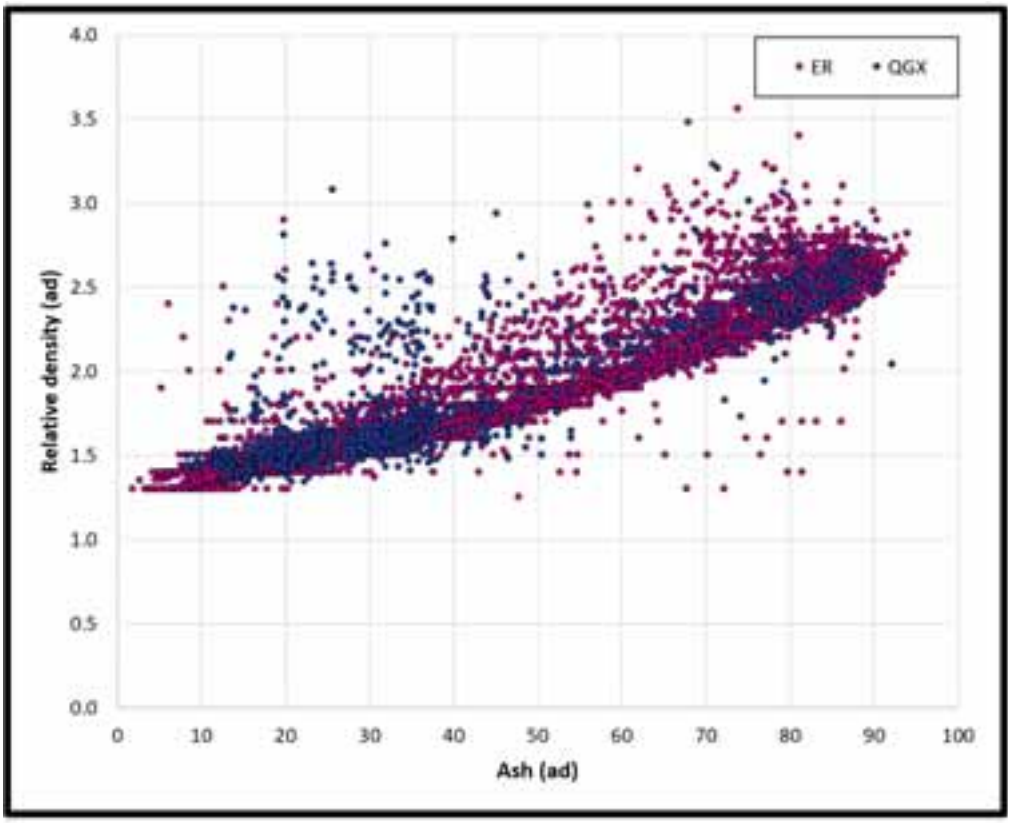


Figure 5-18: BN Relationship between ash and true relative density.

(Source: Tsolmon)

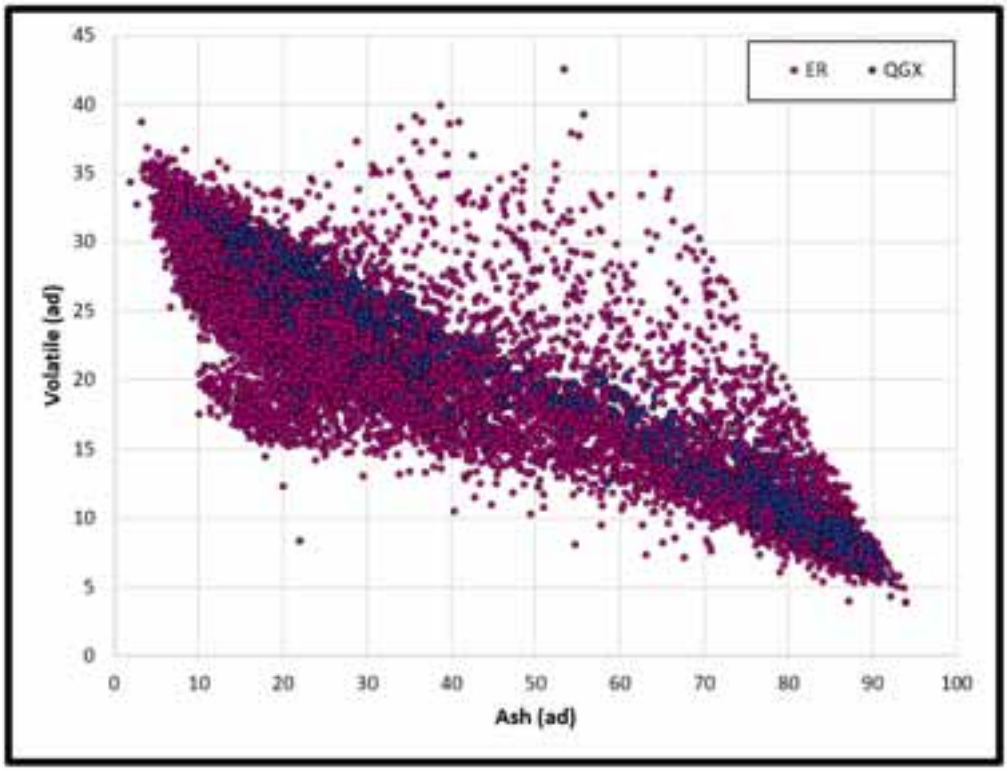


Figure 5-19: BN Relationship between ash and volatile matter.

(Source: Tsolmon)

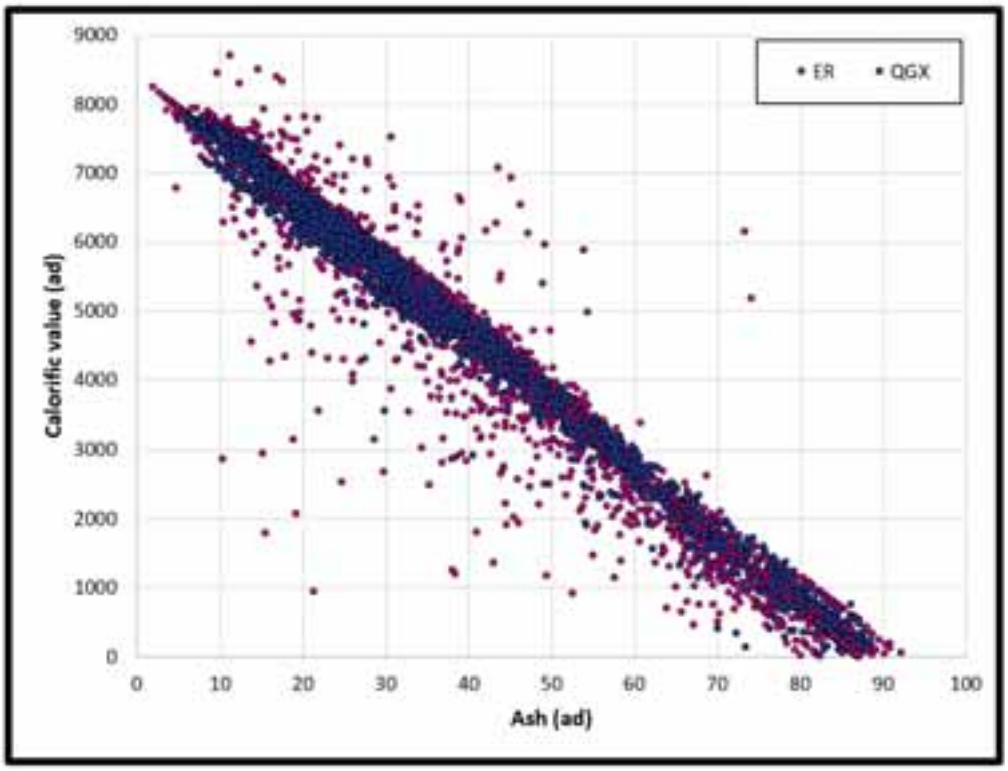


Figure 5-20: BN Relationship between ash and calorific value.

(Source: Tsolmon)

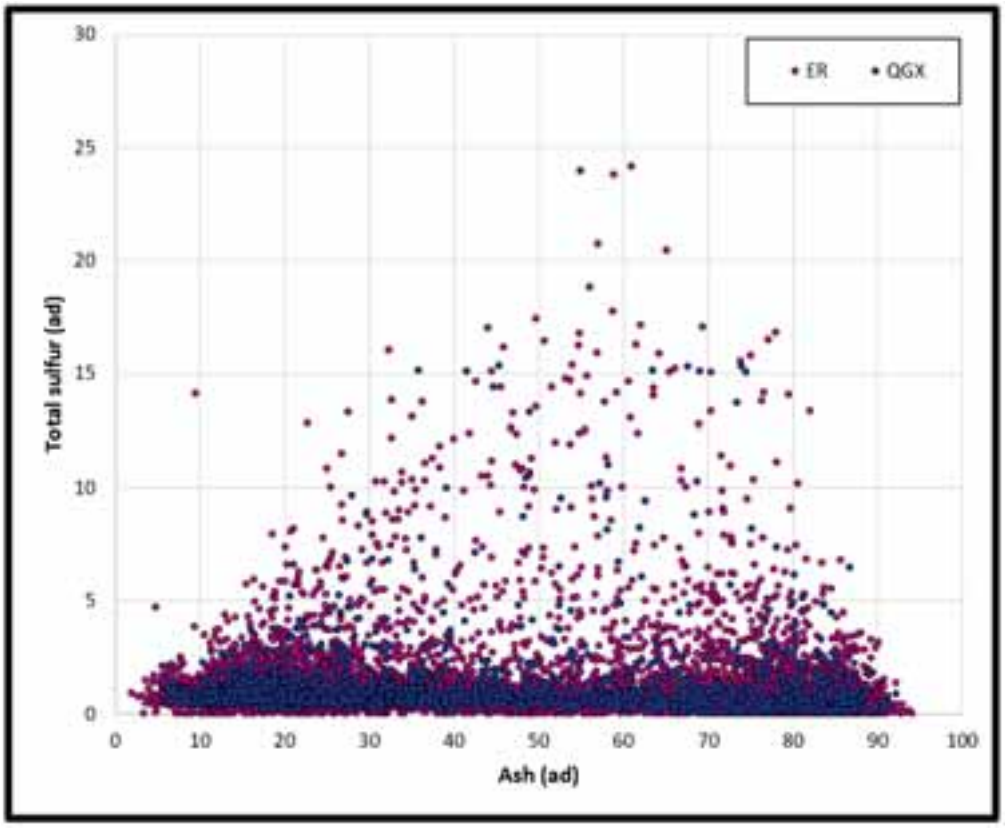


Figure 5-21: BN Relationship between ash and total sulphur.

(Source: Tsolmon)

Figure 5-22 shows that the THG transformed analytical database with both QGX (SGS and ACIRL) and ERCCL moisture results. The air-dry moisture is less than 6% and the total moisture is less than about 16% in majority of the samples. Figure 5-22 also shows a number of values plotted outside of the ranges mentioned above, but in relation to the total population, it is a small percentage. QGX transformed moisture values in a good correlation with ER moisture values which demonstrates the moisture transformation accuracy.

Figure 5-23 shows the relationship between ash and true relative density for the two data sets.

In Figure 5-24 the relationship between ash and volatile matter shows some variations in volatile matter.

Figure 5-25 shows the relationship between ash and calorific value.

The data above shows a good correlation between ash and other quality parameters. Although, there are great number of samples with low calorific values in relation to the ash contents which could be the result of a degree of weathering. Also, a number of samples show anomalous high calorific values. As a percentage of the total population the number is relatively small.

Figure 5-26 shows the relationship between ash and total sulphur. The QGX and ER data for sulphur is generally less than 2.5%. The differences between the data sets are probably a result of different methods for the determination of total sulphur.

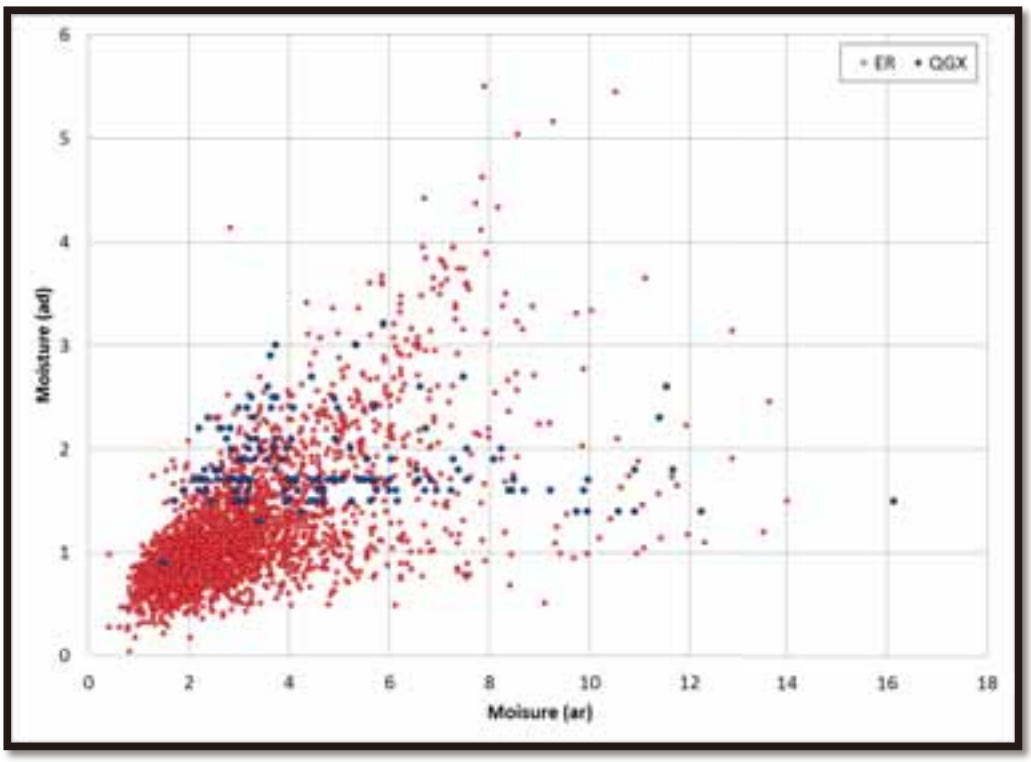


Figure 5-22: THG Relationship between moisture as received and air dry.

(Source: Tsolmon)

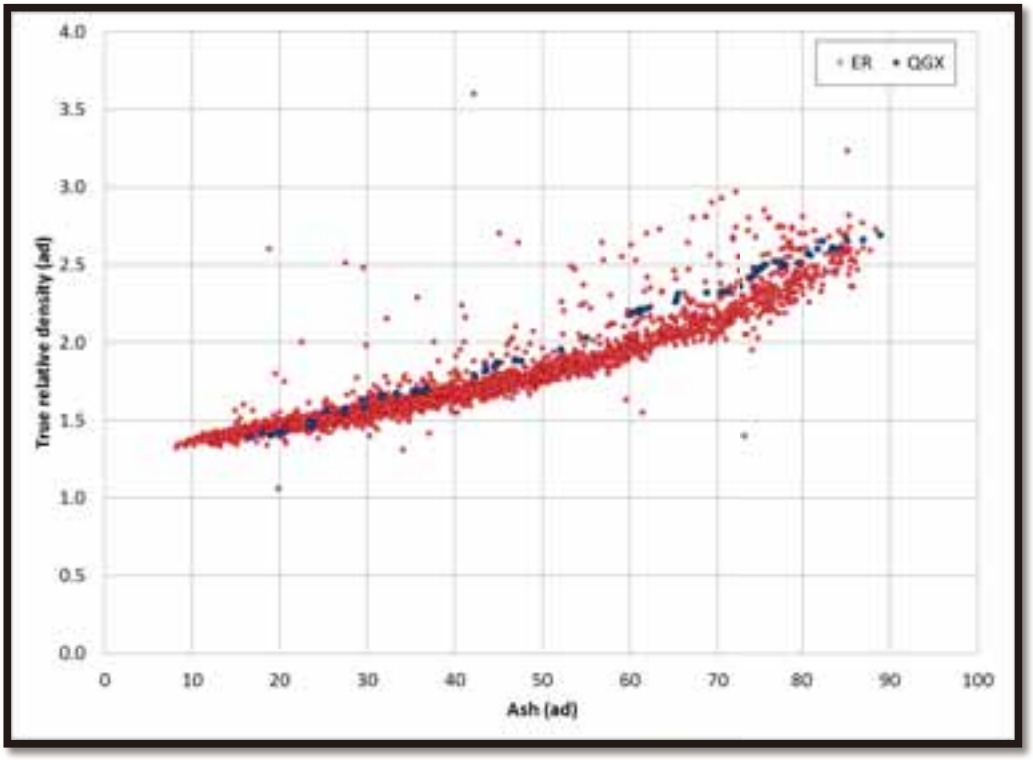


Figure 5-23: THG Relationship between ash and true relative density.

(Source: Tsolmon)

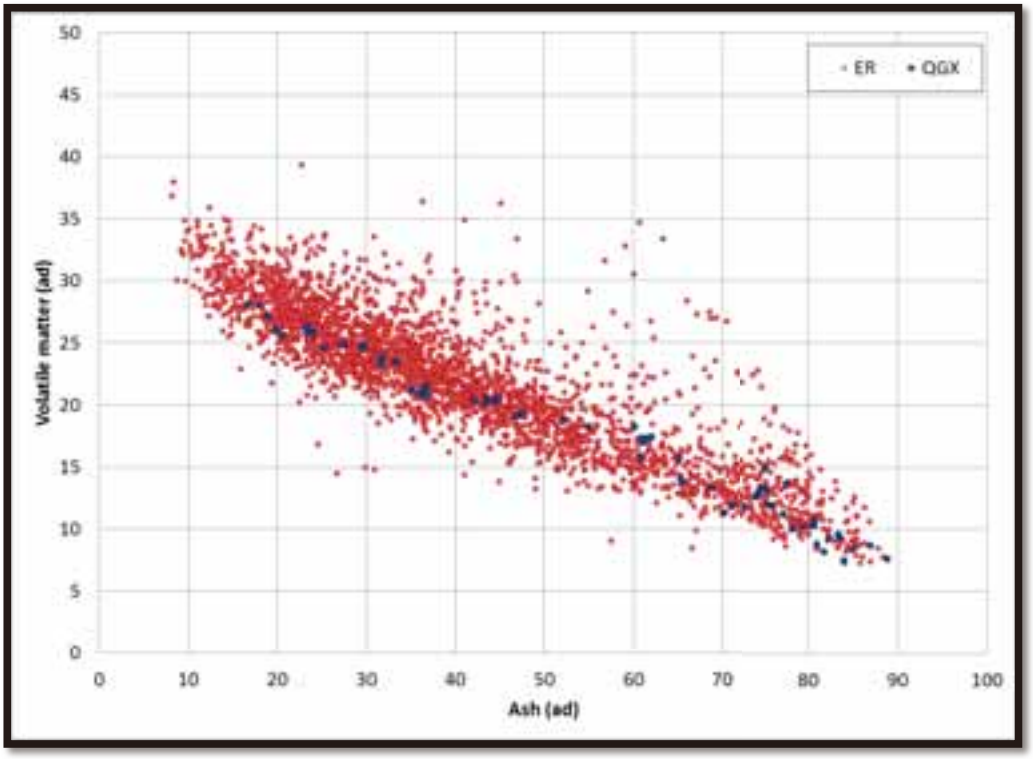


Figure 5-24: THG Relationship between ash and volatile matter.

(Source: Tsolmon)

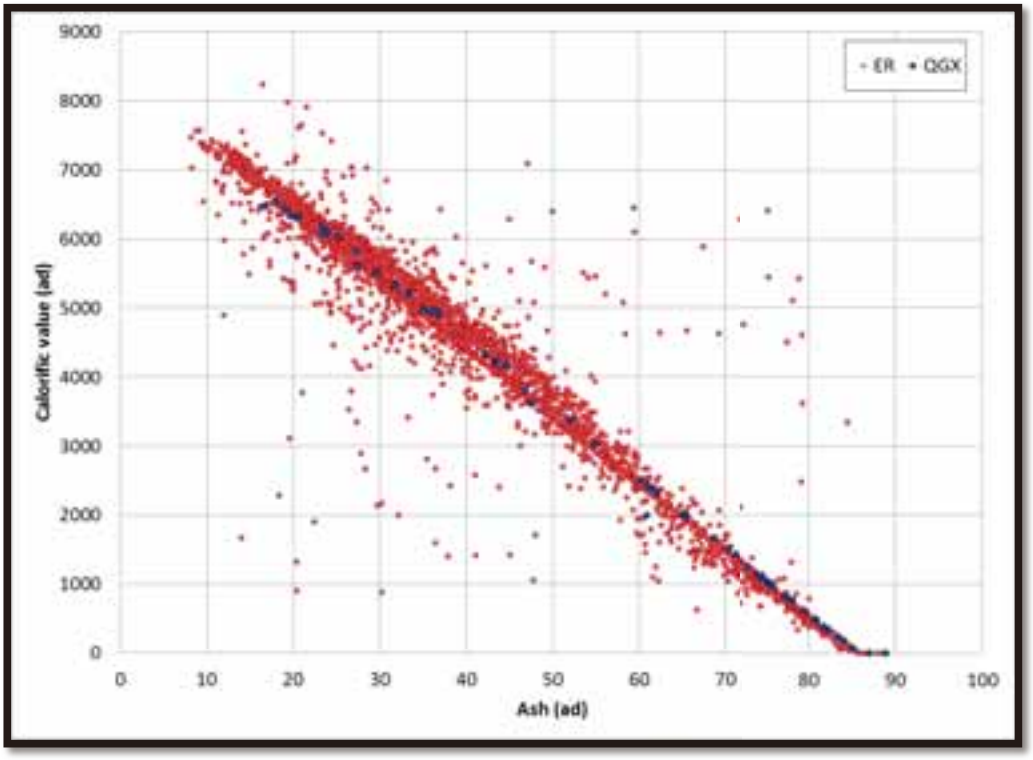


Figure 5-25: THG Relationship between ash and calorific value.

(Source: Tsolmon)

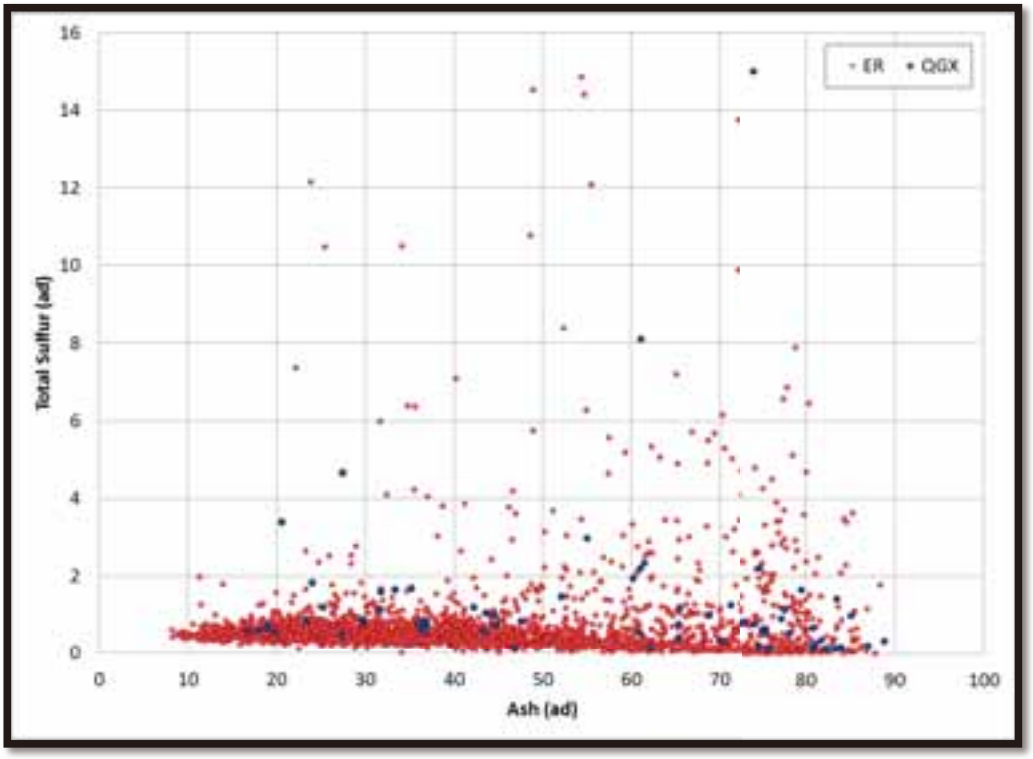


Figure 5-26: THG Relationship between ash and total sulfur.

(Source: Tsolmon)

5.7.2.2 Rank of the coal

The ASTM classification of coal by rank takes into account the fixed carbon content on a dry, mineral matter free basis and the calorific value in Btu/lb on a moist, mineral matter free basis. This classification uses the bed moisture content of the coal, which includes the in-situ moisture of the coal and excludes visible moisture on the surface of the coal. If it is accepted that the total moisture content reported for samples from this deposit, resembles the bed moisture, then the rank of the coal (<35% ash) can be estimated according to the ASTM classification as shown in Figure 5-27 and Figure 5-28.

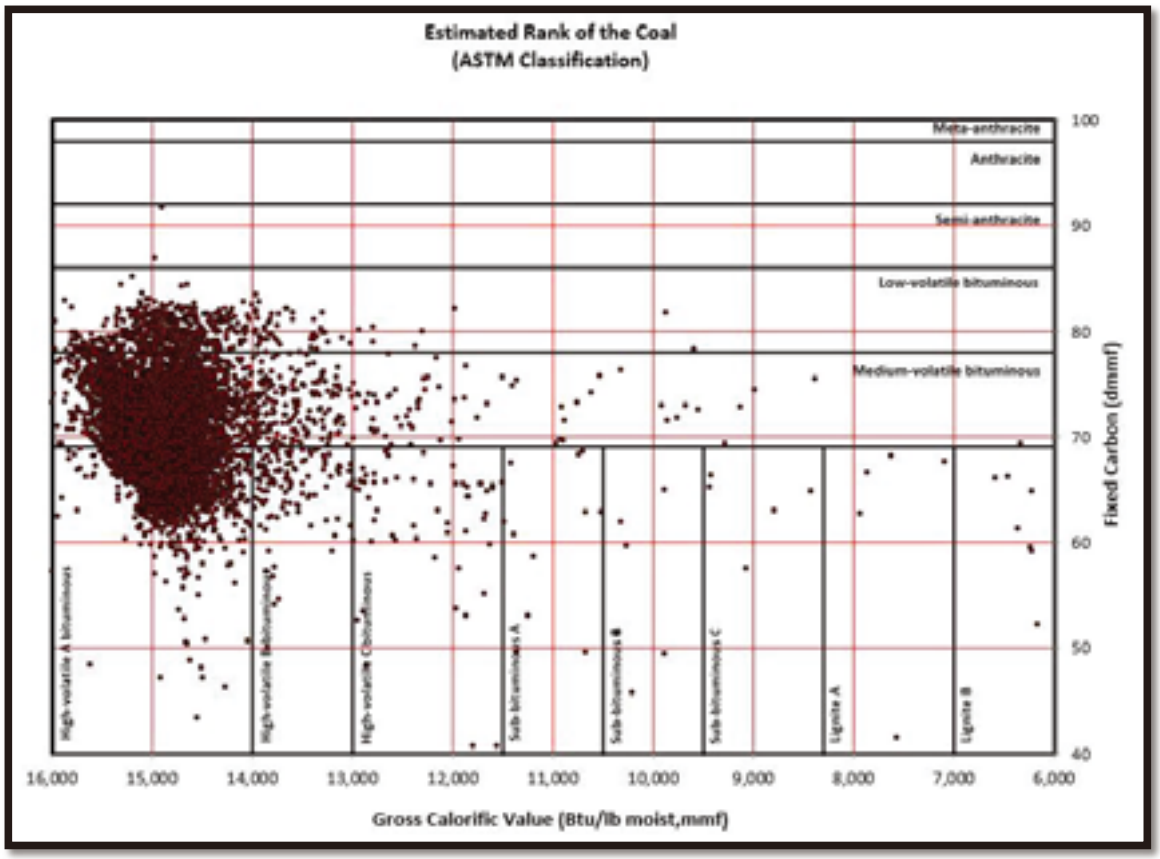


Figure 5-27: BN ASTM classification of the coal based on rank.

(Source: Tsolmon)

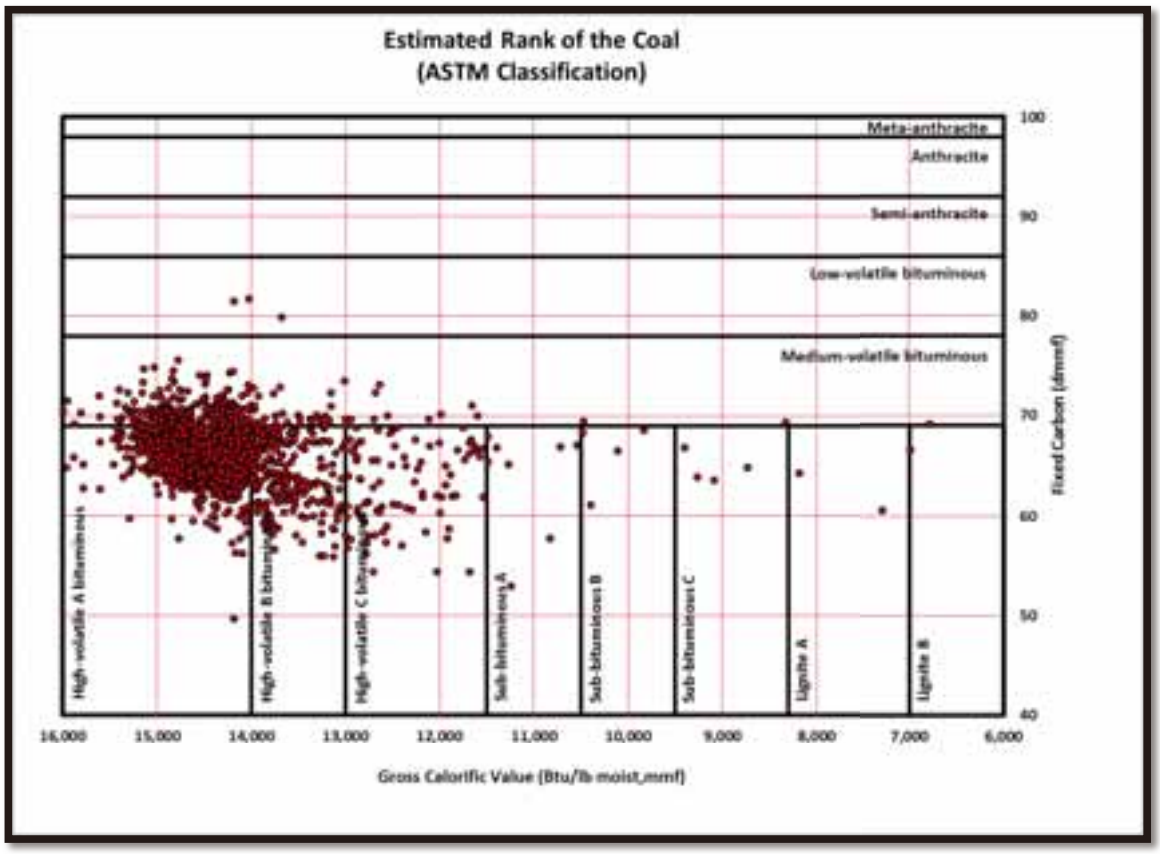


Figure 5-28: THG ASTM classification of the coal based on rank.

(Source: Tsolmon)

The diagram in Figure 5-27 is in accordance with the wide range in volatile matter. According to the rank estimate shown in Figure 5-27, BN coal is classified as ranging from high-volatile "A" bituminous coal to low-volatile bituminous coal with most samples in the medium-volatile bituminous group. In the Figure 5-28, THG coal is ranging from high volatile C bituminous to low volatile bituminous with most samples in the high A bituminous group.

5.7.2.3 Regression formulae to estimate missing coal quality data

As discussed in section 5.6.2, for BN during the drilling period from 2005 to 2018 the samples were analysed at different laboratories and the analytical program was not the same for each year of exploration (Table 5-6).

Therefore, the following steps were taken in order to finalise the POO for BN and THG.

1. Calculate transformed moisture

As discussed earlier, QGX analytical dataset's moisture were transformed according to a geostatistical investigation. Moisture values were transformed on a per seam basis depending on if the sample was coal or rock. Ash of 50% on dry basis was used to separate samples into coal or rock (coal>=50, rock<50). The formula below was used as the main formula:

- **xtran = mnew + sdnew * ((xold – mold) / sdold)**

Code meaning:

- *Xtan- transformed Moisture as-received or air-dry*
- *Mnew- mean moisture as-received or air-dry value of ER*
- *SDnew- standard deviation of ER*
- *Xold- original QGX Moisture as-received or air-dry*
- *Mold- mean moisture as-received or air-dry value of QGX*
- *SDold- standard deviation of QGX*

Table 5-8 summarized formulas used for transforming original QGX moisture.

Table 5-8: Summary of the moisture transformation formulas for QGX data

Seam	Moisture Type	Type	ER		QGX		FORMULA
			Mean	Standard deviation	Mean	Standard deviation	
G	as received	coal	1.70	1.00	3.78	1.83	$TM_2 = 1.7 + (1.0 \times [(MAr - 3.78)/1.83])$
		rock	2.37	0.99	4.27	1.78	$TM_2 = 2.37 + (0.99 \times [(MAr - 4.27)/1.78])$
	air dry	coal	0.71	0.32	1.41	0.82	$MM_2 = 0.71 + (0.32 \times [(MAd - 1.41)/0.82])$
		rock	1.15	0.48	2.38	0.84	$MM_2 = 1.15 + (0.48 \times [(MAd - 2.38)/0.84])$
I	as received	coal	2.10	1.28	5.04	2.17	$TM_2 = 2.10 + (1.28 \times [(MAr - 5.04)/2.17])$
		rock	2.79	1.18	4.77	1.87	$TM_2 = 2.79 + (1.18 \times [(MAr - 4.77)/1.87])$
	air dry	coal	0.93	0.25	1.55	0.51	$MM_2 = 0.93 + (0.25 \times [(MAd - 1.55)/0.51])$
		rock	1.29	0.52	2.39	0.99	$MM_2 = 1.29 + (0.52 \times [(MAd - 2.39)/0.99])$
D	as received	coal	-	-	4.41	1.91	TM_2 = no Transformation (no enough data)
		rock	-	1.90	4.89	1.14	TM_2 = no Transformation (no enough data)
	air dry	coal	0.78	0.00	-	-	MM_2 = no Transformation (no enough data)
		rock	-	-	-	-	MM_2 = no Transformation (no enough data)
E	as received	coal	1.50	0.23	3.58	1.23	$TM_2 = 1.50 + (0.23 \times [(MAr - 3.58)/1.23])$
		rock	2.68	0.43	4.78	1.21	$TM_2 = 2.68 + (0.43 \times [(MAr - 4.78)/1.21])$
	air dry	coal	0.89	0.52	-	-	MM_2 = no Transformation (no enough data)
		rock	1.75	0.55	-	-	MM_2 = no Transformation (no enough data)
F	as received	coal	2.31	1.82	4.38	2.40	$TM_2 = 2.31 + (1.82 \times [(MAr - 4.38)/2.40])$
		rock	2.47	1.26	4.02	1.79	$TM_2 = 2.47 + (1.26 \times [(MAr - 4.02)/1.79])$
	air dry	coal	0.80	0.33	1.12	0.15	$MM_2 = 0.80 + (0.33 \times [(MAd - 1.12)/0.15])$
		rock	1.28	0.51	2.23	0.86	$MM_2 = 1.28 + (0.51 \times [(MAd - 2.23)/0.86])$
H	as received	coal	1.86	1.11	4.71	2.14	$TM_2 = 1.86 + (1.11 \times [(MAr - 4.71)/2.14])$
		rock	2.28	1.11	5.35	2.25	$TM_2 = 2.28 + (1.11 \times [(MAr - 5.35)/2.25])$
	air dry	coal	0.75	0.22	1.42	0.29	$MM_2 = 0.75 + (0.22 \times [(MAd - 1.42)/0.29])$
		rock	1.05	0.38	2.36	0.70	$MM_2 = 1.05 + (0.38 \times [(MAd - 2.36)/0.70])$
I	as received	coal	1.99	1.06	4.41	1.80	$TM_2 = 1.99 + (1.06 \times [(MAr - 4.41)/1.80])$
		rock	3.29	1.37	5.08	2.17	$TM_2 = 3.29 + (1.37 \times [(MAr - 5.08)/2.17])$
	air dry	coal	0.82	0.34	1.74	0.59	$MM_2 = 0.82 + (0.34 \times [(MAd - 1.74)/0.59])$
		rock	1.32	0.38	2.59	0.81	$MM_2 = 1.32 + (0.38 \times [(MAd - 2.59)/0.81])$
K	as received	coal	1.87	0.95	4.44	2.10	$TM_2 = 1.87 + (0.95 \times [(MAr - 4.44)/2.10])$
		rock	3.51	1.33	5.07	1.63	$TM_2 = 3.51 + (1.33 \times [(MAr - 5.07)/1.63])$
	air dry	coal	0.92	0.37	1.68	0.23	$MM_2 = 0.92 + (0.37 \times [(MAd - 1.68)/0.23])$
		rock	1.88	0.63	2.91	0.94	$MM_2 = 1.88 + (0.63 \times [(MAd - 2.91)/0.94])$
N	as received	coal	1.92	0.92	3.96	2.11	$TM_2 = 1.92 + (0.92 \times [(MAr - 3.96)/2.11])$
		rock	3.10	1.29	5.03	2.13	$TM_2 = 3.10 + (1.29 \times [(MAr - 5.03)/2.13])$
	air dry	coal	0.88	0.32	1.80	0.27	$MM_2 = 0.88 + (0.32 \times [(MAd - 1.80)/0.27])$
		rock	1.59	0.61	2.39	1.21	$MM_2 = 1.59 + (0.61 \times [(MAd - 2.39)/1.21])$
Q	as received	coal	1.81	0.77	3.24	2.04	$TM_2 = 1.81 + (0.77 \times [(MAr - 3.24)/2.04])$
		rock	3.55	1.56	6.03	1.61	$TM_2 = 3.55 + (1.55 \times [(MAr - 6.03)/1.61])$
	air dry	coal	1.11	0.39	1.99	0.27	$MM_2 = 1.11 + (0.39 \times [(MAd - 1.99)/0.27])$
		rock	1.90	0.75	4.26	1.28	$MM_2 = 1.90 + (0.75 \times [(MAd - 4.26)/1.28])$
R	as received	coal	1.93	0.80	4.98	2.10	$TM_2 = 1.93 + (0.80 \times [(MAr - 4.98)/2.10])$
		rock	2.89	1.22	4.55	1.91	$TM_2 = 2.89 + (1.22 \times [(MAr - 4.55)/1.91])$
	air dry	coal	1.06	0.31	1.72	0.32	$MM_2 = 1.06 + (0.31 \times [(MAd - 1.72)/0.32])$
		rock	1.89	0.63	3.06	0.94	$MM_2 = 1.89 + (0.63 \times [(MAd - 3.06)/0.94])$
T	as received	coal	1.89	0.93	3.02	1.97	$TM_2 = 1.89 + (0.93 \times [(MAr - 3.02)/1.97])$
		rock	3.13	0.89	4.73	1.64	$TM_2 = 3.13 + (0.89 \times [(MAr - 4.73)/1.64])$
	air dry	coal	1.20	0.40	2.05	0.30	$MM_2 = 1.20 + (0.40 \times [(MAd - 2.05)/0.30])$
		rock	1.23	0.39	2.90	0.93	$MM_2 = 1.23 + (0.39 \times [(MAd - 2.90)/0.93])$
U	as received	coal	2.29	0.92	4.42	1.93	$TM_2 = 2.29 + (0.92 \times [(MAr - 4.42)/1.93])$
		rock	2.89	1.32	4.24	1.58	$TM_2 = 2.89 + (1.32 \times [(MAr - 4.24)/1.58])$
	air dry	coal	1.18	0.34	2.03	0.31	$MM_2 = 1.18 + (0.34 \times [(MAd - 2.03)/0.31])$
		rock	1.47	0.48	2.98	0.84	$MM_2 = 1.47 + (0.48 \times [(MAd - 2.98)/0.84])$
V	as received	coal	5.55	1.56	3.92	0.27	TM_2 = no Transformation (no enough data)
		rock	3.29	0.90	5.17	0.71	TM_2 = no Transformation (no enough data)
	air dry	coal	1.01	0.17	1.70	0.01	$MM_2 = 1.01 + (0.17 \times [(MAd - 1.70)/0.01])$
		rock	1.39	0.34	3.30	0.93	$MM_2 = 1.39 + (0.34 \times [(MAd - 3.30)/0.93])$

(Source: Tsolmon)

2. Calculate dry basis of original database

The preferred analytical method was to analyse total moisture (or as-received), air-dry moisture (or analytical moisture), ash, volatile matter, calorific value and total sulphur all on an air-dry basis. This procedure makes it possible to quote analytical parameters not only on an air-dry basis but also on an as-received, dry or dry, ash-free basis. It was preferred to have a full set of air-dry and as-received analyses available for each sample to qualify as a Point of Observation.

Due to the QGX moisture data issues, all BN and QGX analytical datasets were calculated to a dry basis first in order to calculate the QGX analytical properties on transformed data.

Formula shown below used to convert as-received basis to dry basis:

- *Ad = 100 / (100-Mad) x Aar*
- *Vd = 100 / (100 – Mad) x Var*
- *FCd = 100 – Ad – Vd*
- *CVd = 100 / (100 – Mad) x CVar*
- *TSd = 100 / (100 – Mad) x Tsar*
- *TRDd = 100 / (100 – Mad) x TRDar*

3. Calculate Transformed coal quality dataset

As mentioned above, only QGX datasets were transformed due to the moisture issues discovered. Please note that ER data was copied from original laboratory results (not transformed) however it will be referred to as the transformed database.

Formulas shown below were used for calculating transformed as-received data from original coal quality data on a dry basis:

- $Aar_t = (100 – TM_t) / 100 \times Ad$
- $Var_t = (100 – TM_t) / 100 \times Vd$
- $FCar_t = 100 - TM_t - Aart – Vart$
- $CVar_t = (100 – TM_t) / 100 \times CVd$
- $TSar_t = (100 – TM_t) / 100 \times TSd$
- $TRDar_t = (100 – TM_t) / 100 \times TRDd$

To calculate transformed air-dry data from original coal quality data on dry basis:

- *Aadt = (100 – Madt) / 100 x Ad*
- *Vadt = (100 – Madt) / 100 x Vd*
- *FCadt = 100 - Madt - Aadt - Vadt*
- *CVadt = (100 – Madt) / 100 x CVd*
- *TSadt = (100 – Madt) / 100 x TSd*
- *TRDadt = (100 – Madt) / 100 x TRDd*

Code meaning:

- *TMt – transformed as received moisture*
- *Madt – transformed air dry moisture*

- *Aart/Aadt – as received/air dry ash calculated on transformed moisture*
- *Vart/ Vadt – as received/air dry volatile matter calculated on transformed moisture*
- *FCart / FCadt – as received/air dry fixed carbon calculated on transformed moisture*
- *CVart/ CVadt – as received/air dry calorific value calculated on transformed moisture*
- *TSart/ TSadt – as received/air dry total sulfur calculated on transformed moisture*
- *TRDart/ TRDadt – as received/air dry true relative density calculated on transformed moisture*

4. Estimate missing transformed moisture values

Seam group average transformed air-dry and as-received moisture was used for missing moisture values for the QGX boreholes. In order to be more accurate, rock samples were removed from the calculation.

Where there was insufficient data for a seam the global averages for the coal quality were used. Table 5-9 and Table 5-10 show the values used for the missing moistures for each seam.

Table 5-9: Missing moisture as-received values

Seam	Coal	Rock
E	1.5	2.68
F	2.71	2.47
G	1.72	2.37
H	2.12	2.48
I	2.32	2.76
J	2.09	3.29
K	1.87	3.62
N	1.82	3.34
Q	1.81	3.53
R	1.97	2.97
T	1.78	2.34
U	2.33	2.98

(Source: Tsolmon)

Table 5-10: Missing moisture air-dry values

Seam	Coal	Rock
D	1	1.9
E	0.88	1.35*
F	0.81	1.28
G	0.71	1.21
H	0.75	1.09
I	0.83	1.36
J	0.82	1.41
K	0.93	1.68
N	0.88	1.69
Q	1.11	1.9
R	1.06	1.69
T	1.2	1.23
U	1.18	1.47

(Source: Tsolmon)

5. Validating previous regressions for added coal quality datasets

The regression formulas from the BN JORC 2012 Report of July 2015 were validated for additional 2018 drilling campaign coal quality database added to this report. The calorific value, total moisture, inherent moisture, total sulphur, and true relative density regression formulas for missing values were validated to examine their credibility for new datasets.

To check their credibility, we compare ply sample results from pre 2018 drilling campaign to the 2018 drilling campaign.

a. Missing moisture value calculation

In previous Jorc Report, the moisture regression was created after the previously mentioned moisture transformation of the QGX data. The transformed dataset was used for the regression calculation. The ER and QGX moisture data were used to generate regression formula for moisture values. Figure 5-29 shows moisture as-received versus air-dry from the previous Jorc Report.

Figure 5-30 shows the relationship between total and air-dried moisture from both drilling campaigns. Arguably, the moisture contents of both programs plot within a range, thus, indicated the moisture regressions were valid for the new datasets. Therefore, the moisture formulas from previous JORC Report were used to calculated missing air dried values and inverted formula was used to calculate as received moisture values.

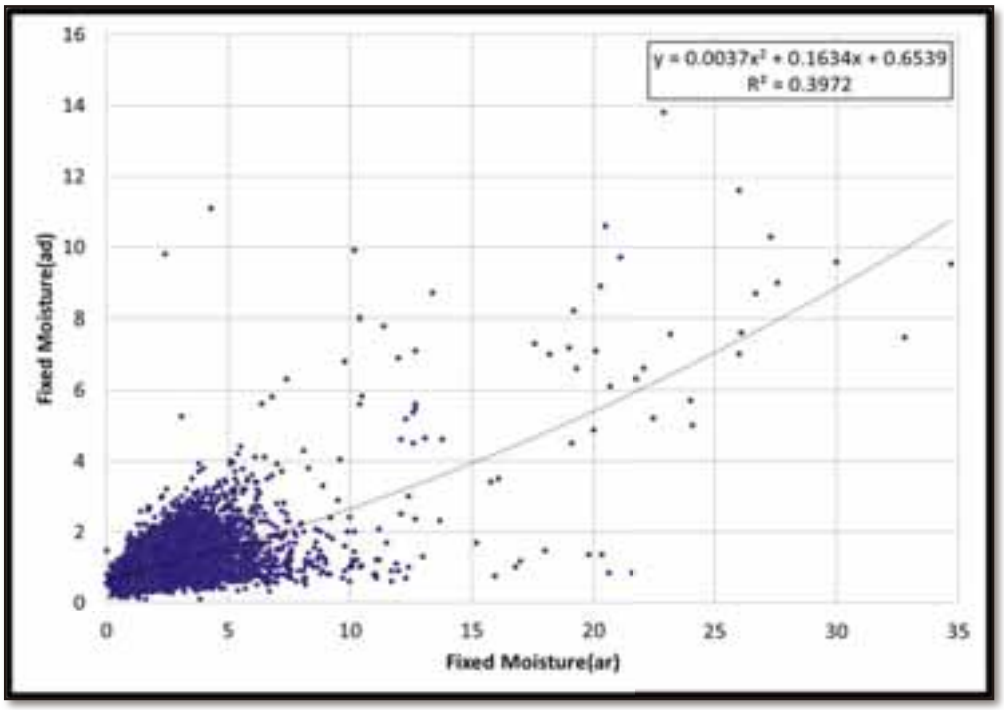


Figure 5-29: BN all data transformed moisture as received versus air dry moisture

(Source: Tsolmon)

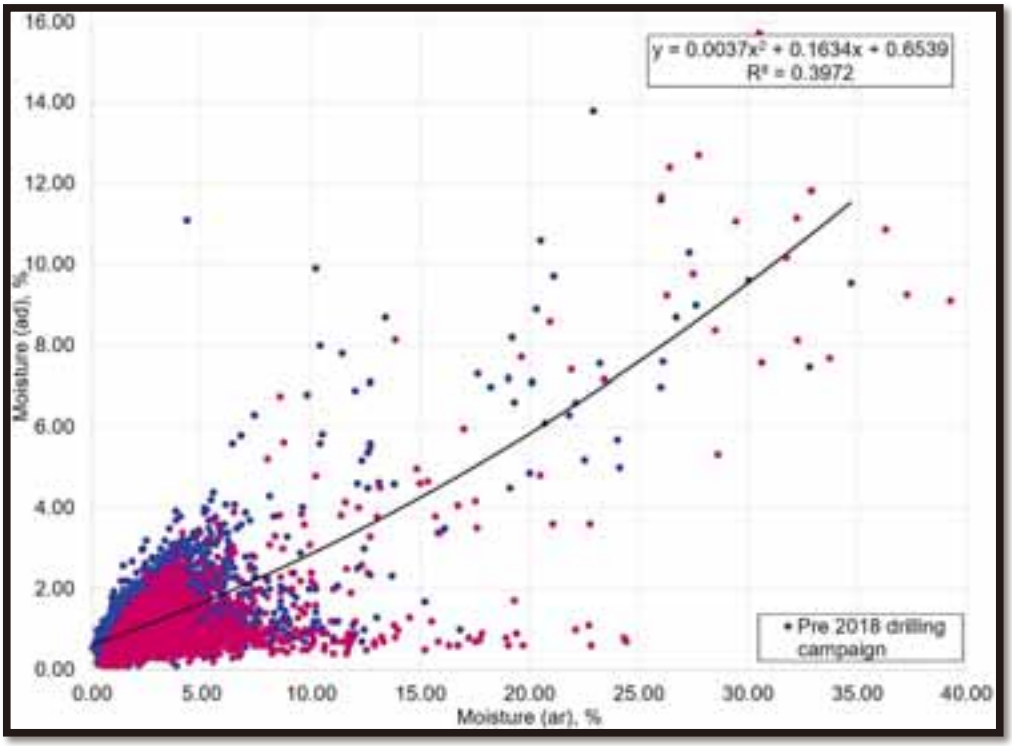


Figure 5-30: BN moisture relationship between pre 2018 and 2018 drilling campaigns.

(Source: Tsolmon)

- **$Madt=0.0037*TMt^2+0.1634*TMt+0.6539$**
- **$TMt=-22.081+0.03822*sqrt(212773+185000*Madt)$**

b. Calorific value calculation

The combination of QGX and ER data from pre 2018 data was used to create the following regression in order to calculate the missing calorific values for the BN dataset (Figure 5-31). To check its credibility, the additional ply sample data from 2018 drilling campaign was plotted on the old data (Figure 5-32).

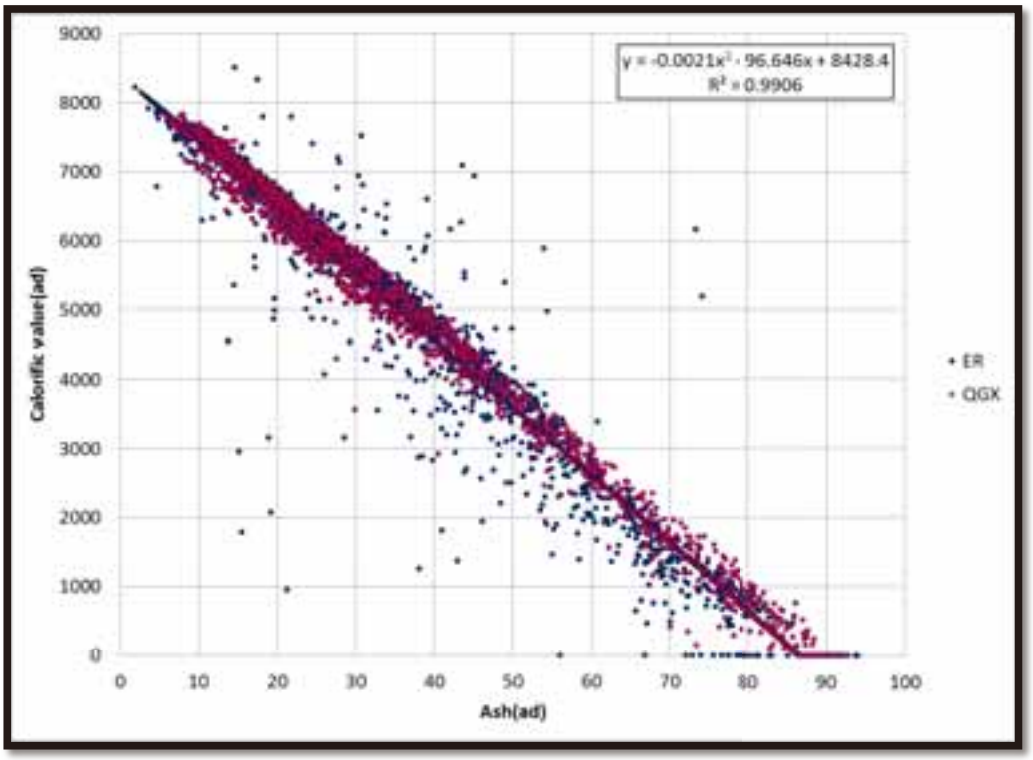


Figure 5-31: BN ash versus calorific value regression.

(Source: Tsolmon)

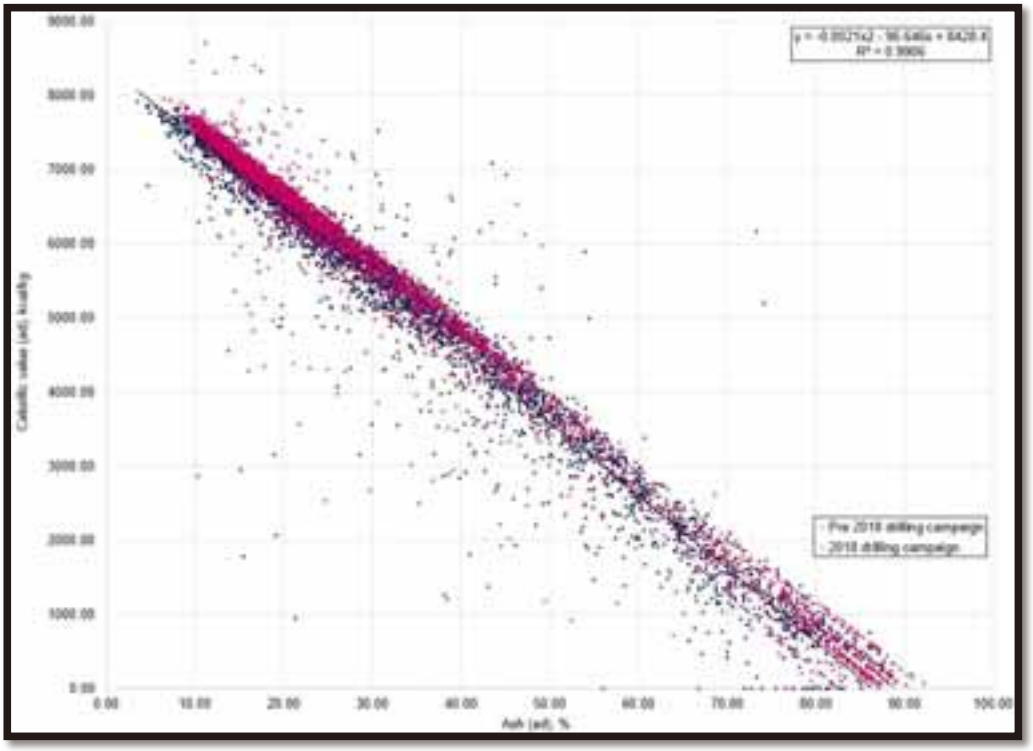


Figure 5-32: BN calorific value relationship between pre 2018 and 2018 drilling campaigns.

(Source: Tsolmon)

- **CVadt = -0.0021 x Aadt 2 - 96.646 x Aadt + 8428.4**

6. Volatile matter calculation

BN ash and volatile matter regression was created to estimate missing volatile matter data. Volatile matter results were missing only in the QGX dataset; therefore the QGX regression was used for the calculation (Figure 5-33 and Figure 5-34).

No volatile matter was missing from the added 2018 data; thus, the formula was not required to be validated.

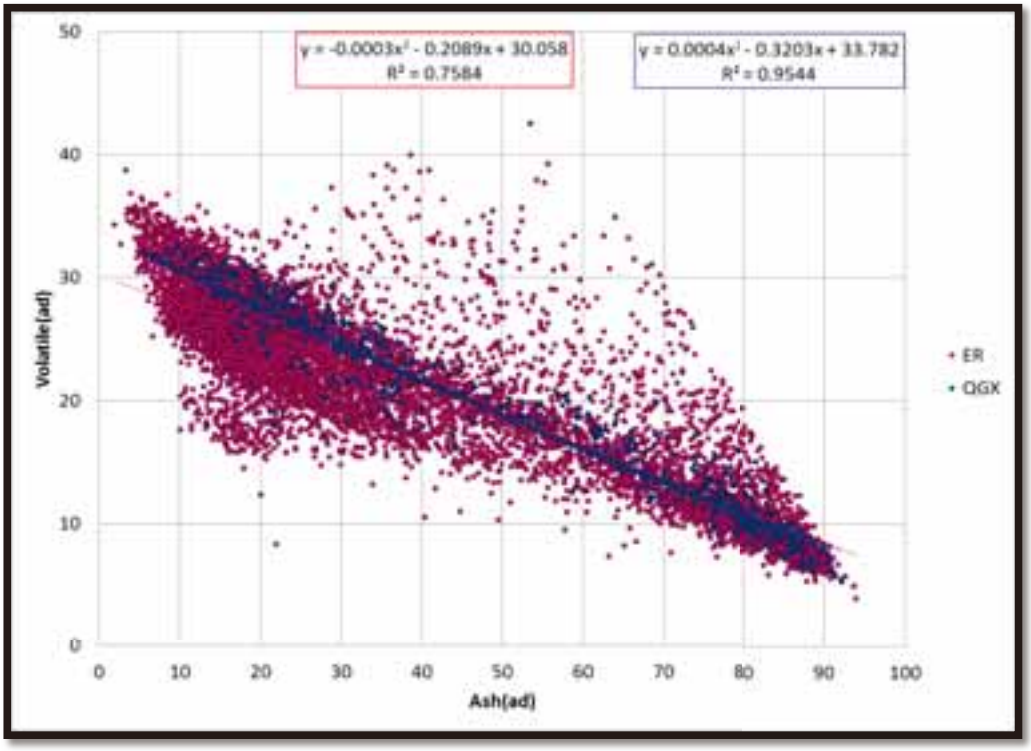


Figure 5-33: BN All data, ash versus volatile matter regression.

(Source: Tsolmon)

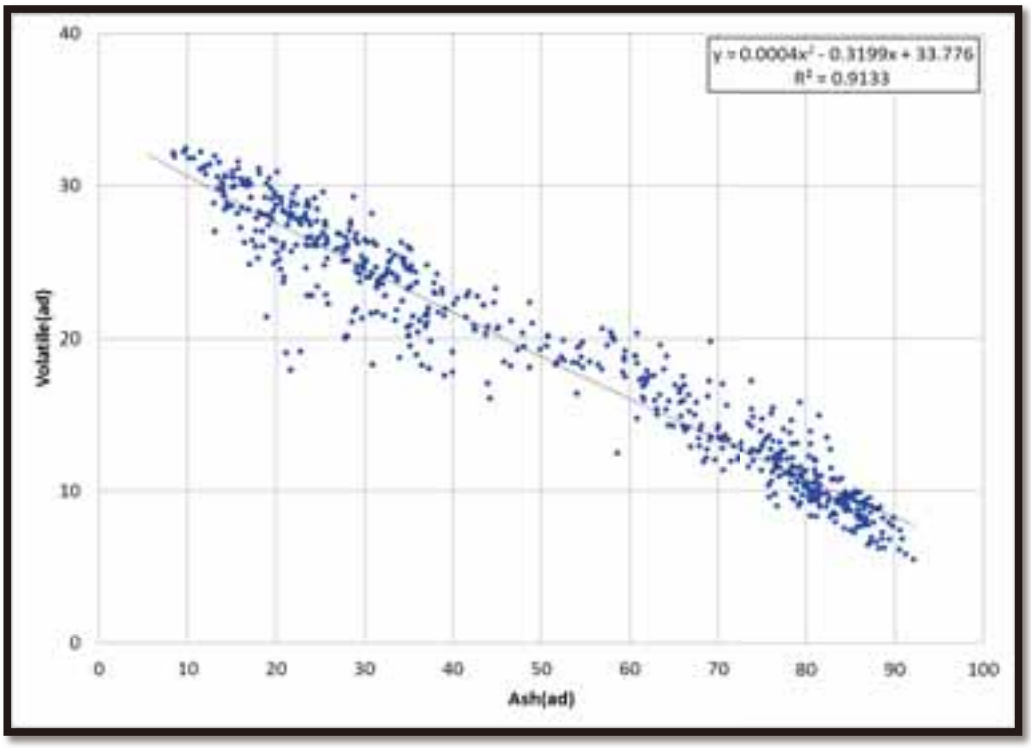


Figure 5-34: THG All data, ash versus volatile matter regression.

(Source: Tsolmon)

- **Vadt=-0.0004xAadt2-0.3199xAadt+33.776**

7. True relative density regression

QGX true relative density (TRD) of 2005 and 2006 was not tested and supplied to ER. Instead apparent relative density (ARD) was tested. Testing method of these 2 types of density is slightly different and there is no direct conversion to estimate true relative density from apparent relative density. For the resource estimate a regression was calculated for the QGX data densities and calculated TRDad from ARD.

Figure 5-35 shows regression between ARD and TRD from Andries Pretorius.

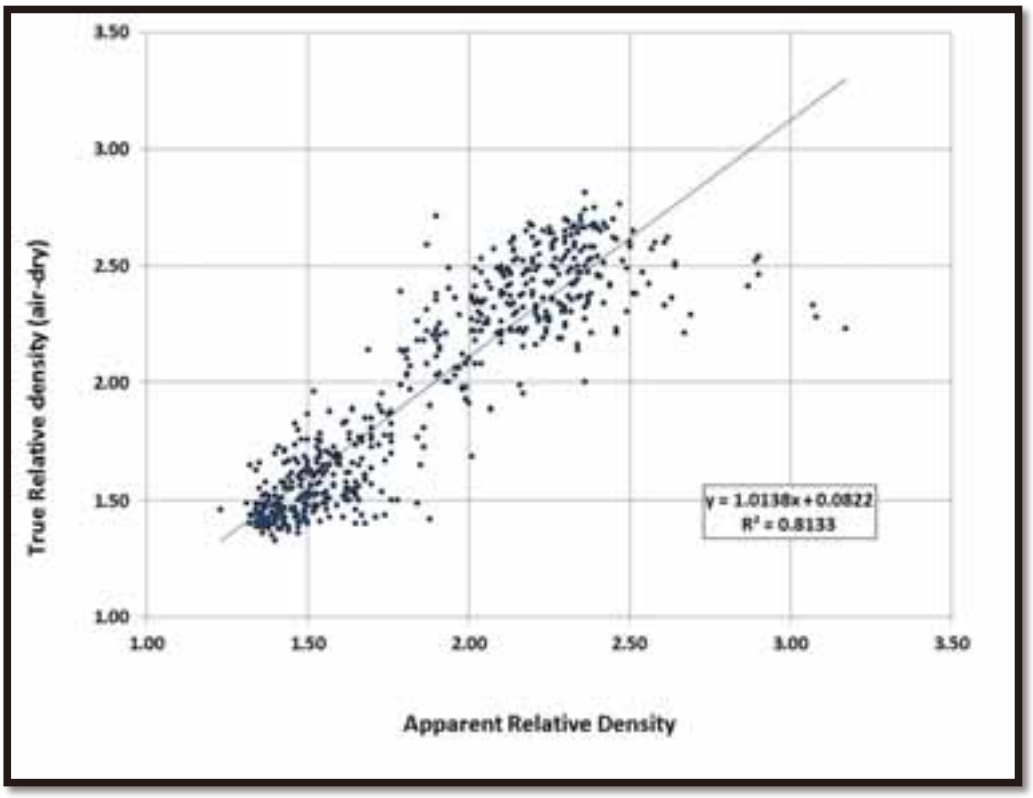


Figure 5-35: BN 2012 JORC report: ARD versus TRD for convertion

(Source: Pretorius)

Formula used:

- **TRDadt = 1.0138 x Aadt + 0.0822**

(Source: Pretorius)

Pre 2018 drilling campaign's ash and TRD regression was created to estimate missing values after converting all ARD into TRD. However, it was observed that a number of spurious values were in the data, which were ignored for this process and most likely were the result of previous calculations.

Figure 5-36 shows the ash versus TRD regression with variables and Figure 5-37 shows datasets used for the calculation.

The 2018 drilling campaign data was plotted against the ash and TRD regression to check its validity as shown in Figure 5-38 and inevitably, the datasets are within the range as the formula is still valid for the added 2018 datasets.

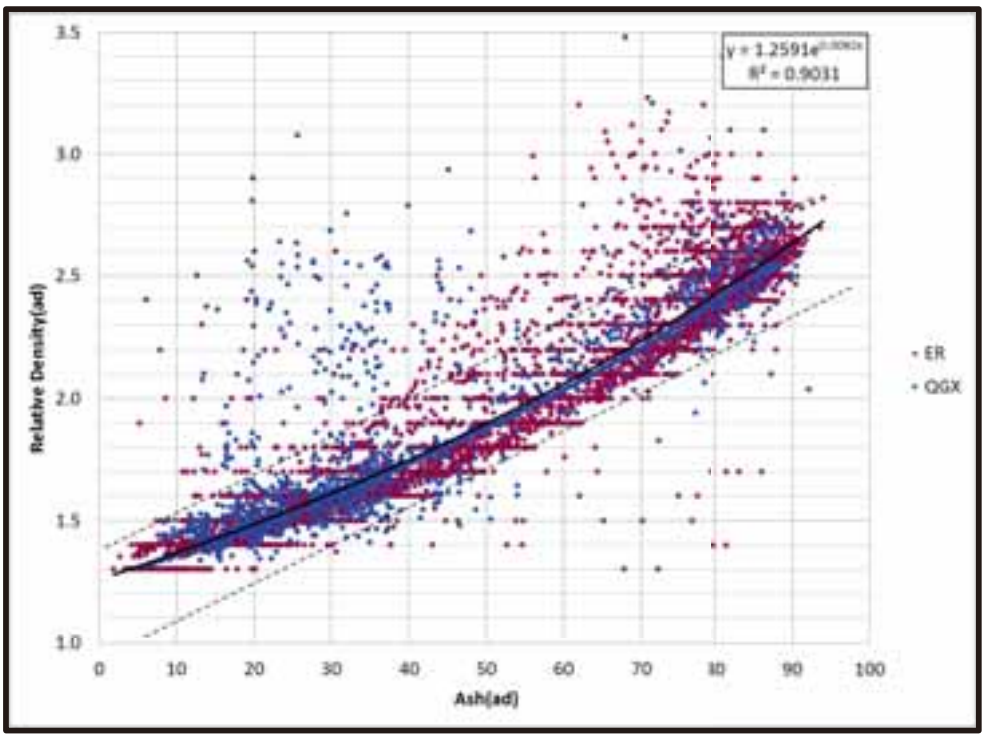


Figure 5-36: BN all data ash and true relative density regression

(Source: Tsolmon)

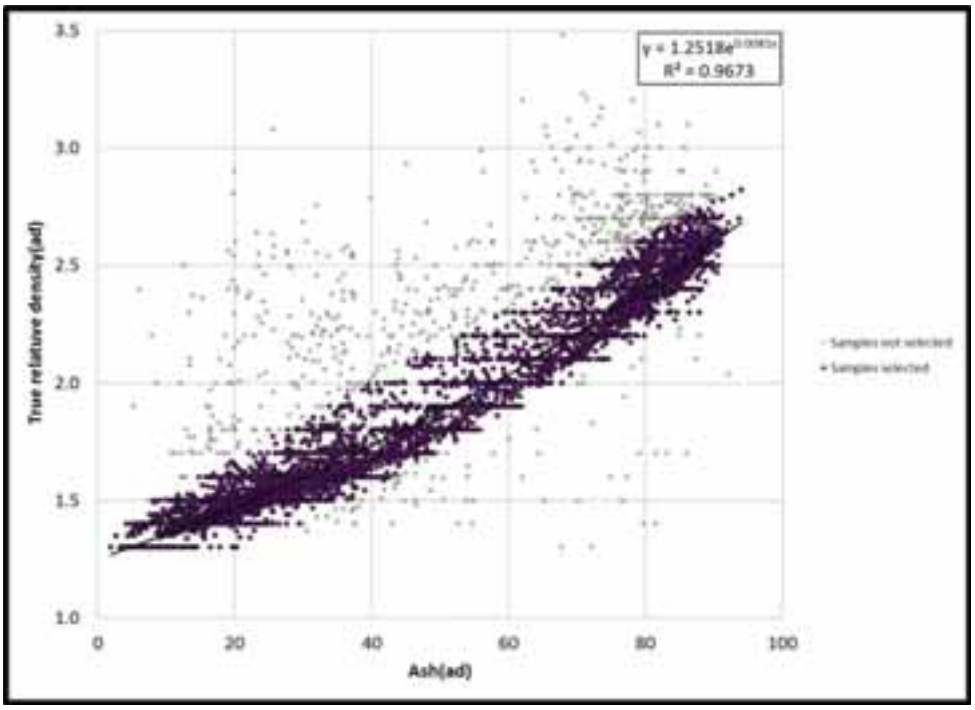


Figure 5-37: BN sample results selected for calculation of missing data

(Source: Tsolmon)

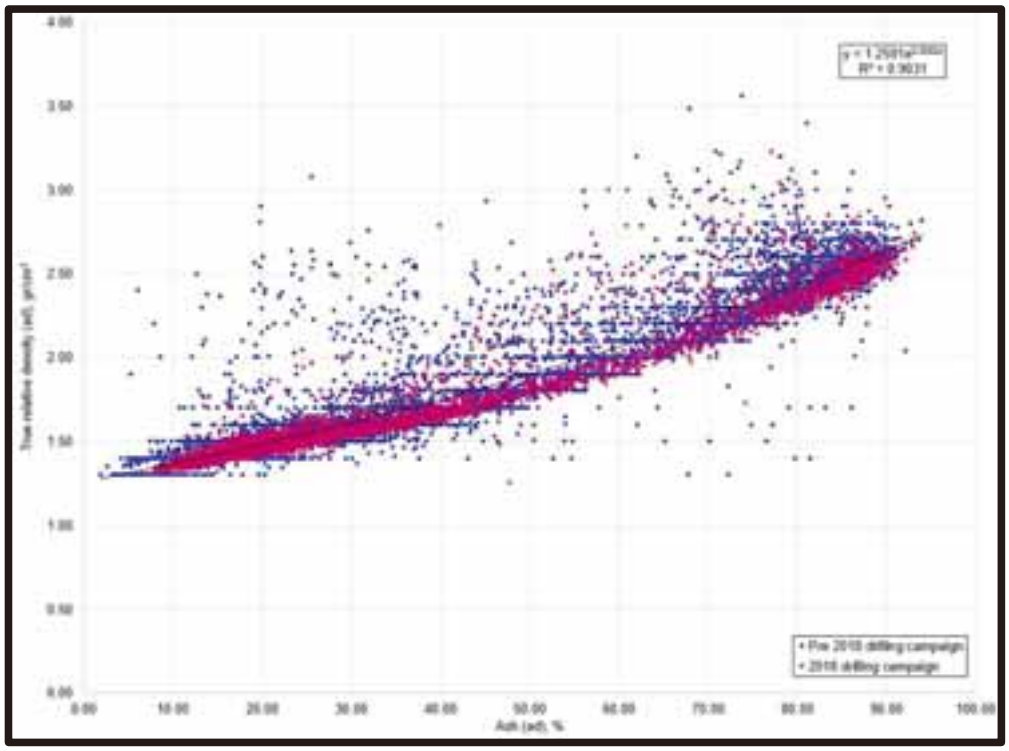


Figure 5-38: BN sample results selected for calculation of missing data

(Source: Tsolmon)

- **TRDadt = 1.2518 x exp (0.0081 x Aadt)**

8. Calculate transformed as-received basis from transformed air-dry basis.

After estimating the missing coal quality values from the above regressions, as-received basis data from the fixed air-dry basis data was calculated.

Please note that some properties were already calculated from the original data, thus these were not adjusted. For samples with some properties missing, these were calculated from air-dry basis data to as-received basis data by the formulas shown below:

- $Aar_t = (100 – TM_t) / (100 – Mad_t) \times Aad_t$
- $Var_t = (100 – TM_t) / (100 – Mad_t) \times Vad_t$
- $FCar_t = 100 - TM_t - Aar_t - Var_t$
- $CVar_t = (100 – TM_t) / (100 - Mad_t) \times CVadt$
- $TSar_t = (100 – TM_t) / (100 - Mad_t) \times TSad_t$
- $TRDar_t = (100 – TM_t) / (100 - Mad_t) \times TRDad_t$

9. Calculate transformed as-received basis from transformed air-dry basis.

As suggested by the Australian coal guidelines, the Preston Sanders method for calculating in-situ relative density was used with the formula below.

- **TRDps = TRDadt * (100 - Madt) / (100 + TRDadt * (TMt - Madt) – TMt**

5.7.2.4 Observations regarding the distribution of CSN values

This study was only done in the BN analytical database. A total of 12,558 samples were analysed for Crucible Swelling Index (CSN) (refer Table 5-7). CSN is an average measure of the potential of a coal to be of coking quality.

Table 5-11 shows the distribution of the CSN values on a seam by seam basis. As an example, for seam H there is one CSN equal to 8.5 and six CSN determinations equal to 7.5.

Table 5-11: Distribution of CSN values by coal seam.

CSN	Seam V	Seam U	Seam T	Seam R	Seam Q	Seam N	Seam K	Seam J	Seam I	Seam H	Seam G	Seam F	Seam E	Seam D	Seam B
9.0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
8.5	0	0	0	0	1	0	0	0	0	4	0	0	0	0	0
8.0	0	0	0	0	0	0	0	6	4	11	1	0	0	0	0
7.5	0	2	1	0	0	1	4	6	4	29	3	0	0	0	0
7.0	0	2	9	1	0	3	1	12	11	74	6	1	0	0	0
6.5	0	10	50	1	1	9	20	37	30	155	23	3	1	0	0
6.0	0	27	47	3	4	10	11	33	48	205	30	6	1	1	0
5.5	0	18	52	5	4	7	4	30	32	176	36	8	0	0	0
5.0	1	26	62	4	7	25	12	33	53	223	53	9	0	0	0
4.5	0	48	63	13	5	30	7	50	35	226	64	11	2	0	0
4.0	0	33	77	9	9	38	15	81	58	264	106	16	1	0	0
3.5	1	39	50	21	10	28	18	63	47	260	92	17	3	0	0
3.0	1	31	76	14	4	47	19	48	48	220	102	17	1	0	0
2.5	0	39	70	14	17	46	8	32	42	103	107	23	1	0	0
2.0	5	28	68	13	16	54	12	49	43	124	150	24	3	0	6
1.5	1	37	49	30	15	35	16	42	41	88	219	38	7	0	0
1.0	5	72	116	111	31	95	47	64	74	192	536	169	15	0	0
0.5	0	23	42	42	12	14	27	27	18	70	185	151	8	0	0
0.0	5	194	144	213	73	173	182	265	104	275	1035	575	39	5	0
Σ	19	630	976	494	209	615	403	878	692	2699	2749	1068	82	6	6

(Source: Tsolmon)

Table 5-12 shows the cumulative percentage of CSN values by seam. As an example, for seam G, one percent of the CSN determinations are equal to 6.0 or higher. Four percent of the CSN values are equal to 5.0 or higher.

Table 5-12 shows that some seams have higher percentages of high CSN values and some seams have less of the higher CSN values.

The data in Table 5-12 is illustrated in the diagram in Figure 5-36 where the seams are colour coded according to the distribution of CSN values as follows:

- Seam groups F and D have very low CSN values, most likely with no potential for coking coal.
- Seam groups I, H and T have high percentages of high CSN values and are most likely the best coking seams of the deposit. These seams are grouped together as a group of seams with the best potential for coking coal (Figure 5-39).

- Seam groups E, G, V, U, R, Q, K, N and J form a transition group of seams with a medium potential for coking coal.

Table 5-12: Cumulative percentage distribution of CSN values.

CSN	Seam V	Seam U	Seam T	Seam R	Seam Q	Seam N	Seam K	Seam J	Seam I	Seam H	Seam G	Seam F	Seam E	Seam D	Seam B
8.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.5	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0
7.0	0	0	0	0	0	0	1	1	1	2	0	0	0	0	0
6.5	0	1	1	0	0	1	1	3	3	4	0	0	0	0	0
6.0	0	2	6	0	1	2	6	7	7	10	1	0	1	0	0
5.5	0	7	11	1	3	4	9	11	14	18	2	1	2	17	0
5.0	0	10	16	2	5	5	10	14	19	24	4	2	2	17	0
4.5	5	14	23	3	8	9	13	18	26	32	6	3	2	17	0
4.0	5	21	29	5	11	14	15	24	31	41	8	4	5	17	0
3.5	5	27	37	7	15	20	18	33	40	51	12	5	6	17	0
3.0	11	33	42	12	20	25	23	40	47	60	15	7	10	17	0
2.5	16	38	50	14	22	32	28	45	53	68	19	8	11	17	0
2.0	16	44	57	17	30	40	30	49	60	72	23	10	12	17	0
1.5	42	48	64	20	37	48	33	55	66	77	28	13	16	17	100
1.0	47	54	69	26	44	54	36	59	72	80	36	16	24	17	100
0.5	74	66	81	48	59	70	48	67	82	87	56	32	43	17	100
0.0	74	69	85	57	65	72	55	70	85	90	62	46	52	17	100
Σ	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

(Source: Tsolmon)

Figure 5-39 and Figure 5-40 shows the three groups of seams based on their potential for coking coal based on CSN indices.

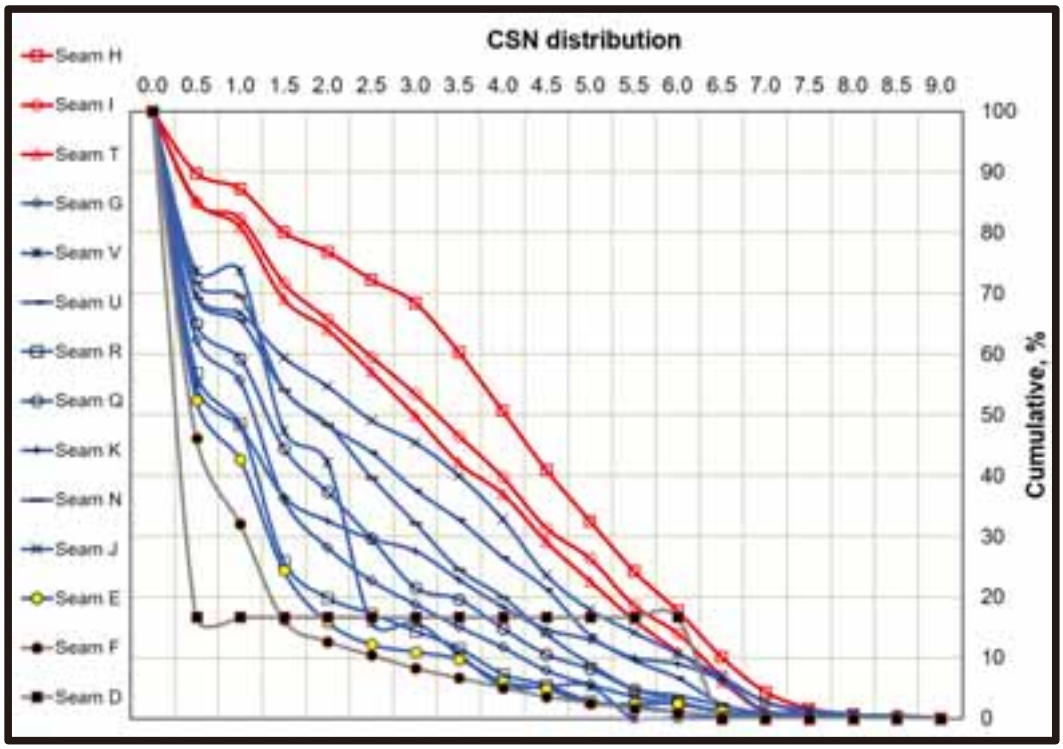


Figure 5-39: Cumulative percentage distribution of CSN values.

(Source: Tsolmon)

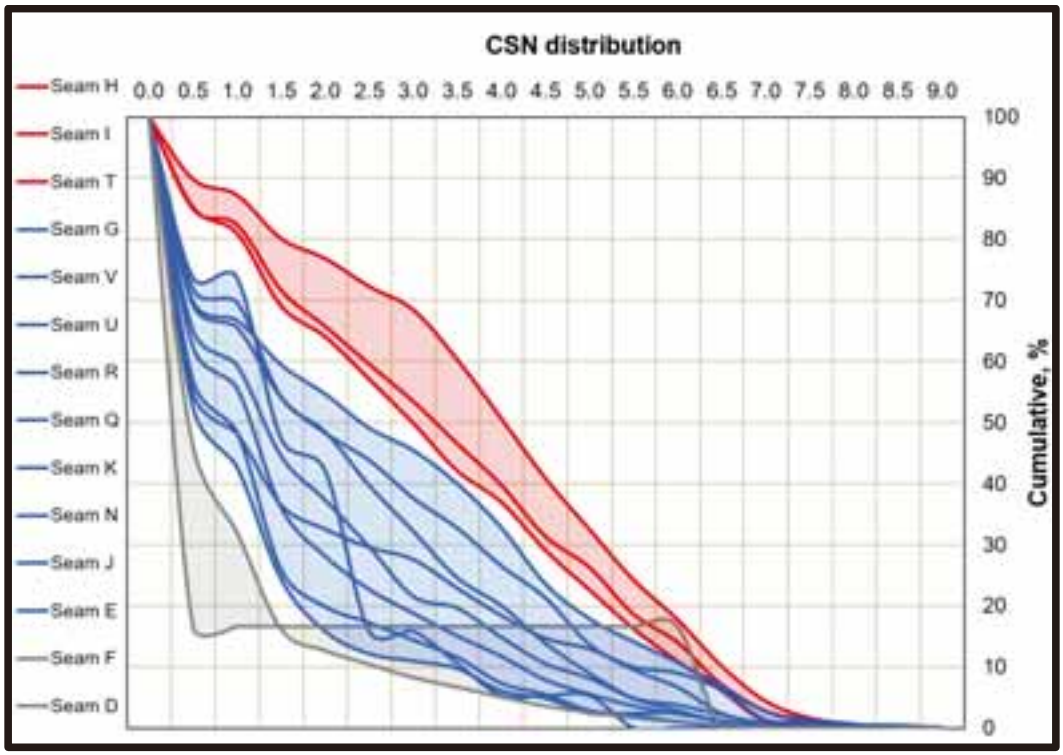


Figure 5-40: Three groups of seams according to CSN distributions.

(Source: Tsolmon)

5.7.2.5 Washability and Coke Testing

QGX commissioned Bob Leach in 2010 to complete a coal quality report which focused on seams H and T. The results of this report were then used in a further study by Sedgman in 2011 which focused on the washability of the coal. Both these reports can be found in Appendix 7b.

However, coal mined from BN has been blended with UHG coal and the final product is based on the UHG products. To better understand the UHG products please refer to the report, 'JORC (2012) Standard Resource Estimation Ukhaa Khudag Coal Mine'.

5.8 Outcrop, sub-crop and oxidation

The coking characteristics of a coking coal are very sensitive to oxidation and the coal will lose its coking propensity when the coal is even slightly oxidised as shown by the position of (A), the limit of oxidation (refer Figure 5-41). This point will be indicated by an increase in the moisture content and a sharp drop in the crucible swelling index (CSN) of the coal. In the case of a coking coal prospect, the depth of weathering at the limit of oxidation (LOX) would be (x) at a point (A) in the diagram.

In the transition zone the coal is only partially affected by weathering and most of the coal seam will still have its combustion properties (volatile matter) un-affected, but with a slightly higher moisture content and slightly weaker in its strength. A thermal coal is less sensitive to oxidation and it is expected that the depth of weathering, shown as (y) will be less than the depth of weathering for a coking coal, which is (x) in the example.

Beyond point (B), in the shallow weathered zone, the weathered coal will be a dark soft clayey material with very high moisture and all its combustion properties destroyed by weathering.

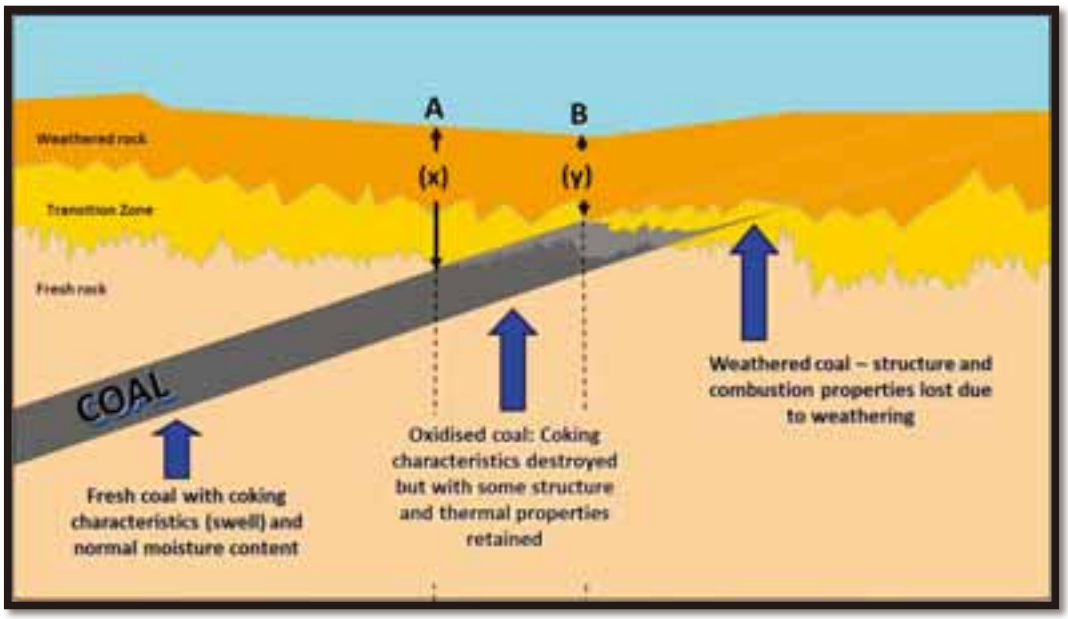


Figure 5-41: Determining Limits of weathering

(Source: Ballantine)

Closely spaced openhole drilling was used to determine the zone of oxidation and weathering. For the current program, 0.5m chip samples were taken and tested for CSN. Where CSN had values above 1 and then dropped to zero, this was the depth defined as the base of oxidation for coking coal ("A" in Figure 5-41). Where the seam thickness has weathered to half the true thickness of the seam, this was defined as the base of weathering and the limit of the Resource ("B" in Figure 5-41). The coal between points "A" and "B" (Figure 5-41), was deemed as thermal coal. Further sampling at the mine face once seams were exposed confirmed the final base of weathering.

5.9 Geochemistry

To the knowledge of the Competent Person no specific work was completed for BN or THG for geochemistry, however, a comprehensive study was completed for UHG by Environmental Geochemistry International Pty Ltd (EGI), April 2012. Since the coal mined from BN was blended and washed with UHG coal and the sediments for BN and THG are of a similar nature to UHG then the findings of EGI would mostly hold true for BN.

The following paragraphs were cited from the *'Geochemical Assessment of Overburden/Interburden from the Ukhaa Khudag (UHG) Coal Project'* completed by Environmental Geochemistry International Pty Ltd (EGI), April 2012. The complete report can be reviewed in Appendix 21

EGI was commissioned by ER in September 2010 to carry out geochemical assessment of overburden/interburden at UHG mine. The objectives of this work were to: assess the acid rock drainage (ARD), salinity and elemental solubility (including neutral mine drainage, NMD) potential of overburden/interburden materials; identify any geochemical issues; and provide recommendations for materials management and any follow up test work required.

A total of 631 samples were tested from these holes, including coal and parting samples. All holes were sampled continuously except where there were missing intervals. Sample intervals were selected by site geologists in conjunction with EGI to match geological boundaries, with intervals ranging from less than 0.5m to over 5m. Standard ARD testing was carried out on these samples by the Stewart Mongolia LLC Ulaanbaatar laboratory, with EGI providing advice on testing methods and carrying out quality control and specialised testing on a sub set of 42 samples.

Results indicate that the vast majority of overburden/interburden and pit floor materials represented by the samples tested are unlikely to be acid producing or release significant salinity. The non-acid forming (NAF) overburden/interburden has excess acid neutralising capacity (ANC), providing a high factor of safety and offering a potential source of materials to mitigate ARD from potentially acid forming (PAF) washery waste materials. PAF low capacity (PAF-LC) samples made up only 2 percent of samples tested and PAF samples accounted for 0.3 percent. PAF/PAF-LC materials occur in the immediate 0.5m of a number of coal seams, and could potentially produce localised ARD if not mixed effectively with the NAF overburden/interburden. Near surface (within 5 to 10m of surface) materials have higher salinity due to salt accumulation.

5.10 Geotechnical issues

As part of the procedures adopted for JORC compliant data collection, all core was logged for natural fractures including joints, bedding breaks, shears and faults (Refer Appendix 2 - Procedures). Rock samples were taken and kept air and water tight for future testing of major rock mass units. This data resides in the geological database.

Once mining began, a geotechnical organisation was commissioned to provide consulting services for the BN mine. The group was AMC consultants and the leader of this team is John Latilla. The latest report on geotechnical issues at BN mine is in Appendix 15. The following is a technical summary as at March 2013 from AMC consultants.

5.10.1 Introduction

This report is a compilation of data, observations, measurements, and modelling carried out during 2011 and 2012 and is designed to indicate where Baruun Naran Mine (BN) stands at present with regards to geotechnical issues and strata control and what work is still required.

The main aim is to flesh out the numerous emails, verbal reports, observations, and discussions that have taken place over the last few months as well as highlight any new areas of concern or interest.

The main items considered are as follows:

- Site visit observations to assess pit and dump conditions.
- Back analysis of recent failures to obtain rock strength properties.
- Rock mass characterization of the various Ground Control Districts (GCDs) at BN.
- Geological structure analysis to better quantify the structure for each GCD.
- Pit slope stability analysis; kinematic analysis and future limit equilibrium analyses required.
- Review of pit slopes and waste dump design requirements.
- An assessment of haulage ramp design requirements.
- Review of progress in the compilation of the mines Ground Stability Management Plan (GSMP).
- Future pit slope stability monitoring methods.
- Geotechnical manning and training.
- Future work required.

5.10.2 Pit Stability Observations

Two major instability mechanisms have been observed at BN, namely:

- Composite failure of the weathered overburden combining planar sliding along steeply dipping bedding planes and circular failure, through intact but weathered overburden. This problem is exacerbated by the steep batter angles

mined during the early days of the operation. The weathered overburden batters are in a better condition now that they are being formed at around 45°.

- Planar sliding along bedding planes and bedding plane shears. In places this is accompanied by shearing of fairly thin (<2m) beds of intact rock (mostly in coal).

The nature of the BN deposit dictates that conditions will be very different on the south-eastern pit walls compared to the north-western ones. This is due to the pit walls and batters being nearly parallel to the bedding and bedding plane shears on the south-eastern side, and prone to plane failure. On the north-western side of the pit the strata generally dips into the pit walls and is inherently more stable. This is illustrated in Figure 5-42.

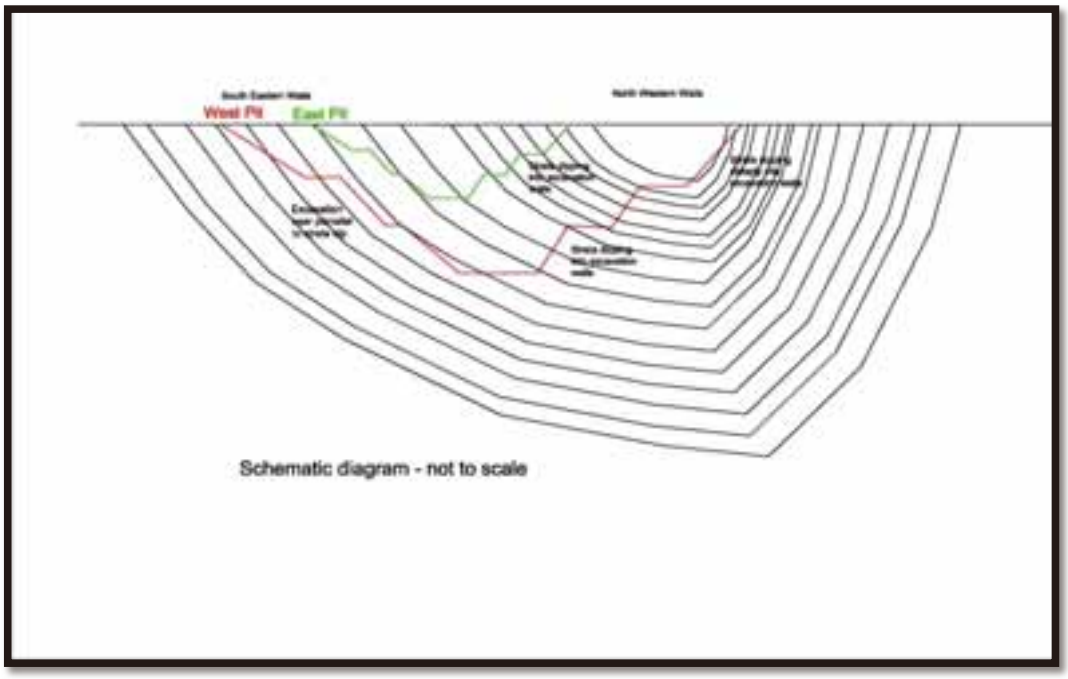


Figure 5-42: BN Synclinal Structure Showing Present Excavations (Schematic)

(Source: AMC)

5.10.3 West Pit

The failure parallel to bedding that occurred in early July 2012 has been back analysed. Of interest is the fact that the batter angle was actually less than the angle of the bedding plane shear along which it occurred. The mechanism is thought to be that the bedding plane shear acted as a release plane and that the subsequent load of the solid rock in front of the bedding plane was then sufficient to cause buckling or shear failure through the solid coal about one third of the way up the batter. This would be more likely where the solid rock is not very strong as is the case for coal. The descriptive term "solid" must not be construed as also meaning strong. In this case, it refers to rock (including coal) which is relatively free of other defects.

It is unclear at this stage whether laying batters back substantially flatter than the bedding will completely eliminate this tendency. This would certainly reduce the frequency. The angle at which this type of failure could be guaranteed not to occur needs to be determined, but it may be so flat as to be economically unviable. Kinematic

analysis indicates that for a batter angle of 50° there would be a 3.2% probability of a critical plane existing.

5.10.4 East Pit

Steep older batters (about 65° in places) exhibit numerous small composite failures (plane and circular), especially in the more weathered overburden as well as on the second batter above the south-east ramp.

The north-eastern corner of the pit generally has steep batters and contains near vertical weathered coal seams and faults. Geotechnical hazards related to these features are shown on the mine hazard plan.

The June 2012 mine geotechnical hazard plan was checked in the field and was found to be accurate.

5.10.5 Pit Wall Failures

Slope failure is most frequent in the south-east pit walls in both the East and West Pits. This is due to bedding and bedding shears generally dipping out of the pit walls in these areas. Numerous small failures (batter scale) have occurred and are likely to occur in future. No slope scale failures have been experienced.

Weak weathered overburden combined with dipping strata and steep pit walls have resulted in numerous circular failures along the crest, mostly along the south-east pit walls, but not confined to them.

In areas where bedding plane shears are likely to be the main contributing factor to slope failure the following needs to be done:

- Ensure that slope batter and overall angles are no steeper than the maximum stipulated.
- All significant geological structures should be incorporated on a structural plan compiled by the site geotechnical engineer and updated regularly.
- Exploration boreholes must be checked closely for any possible bedding plane shears and these must be marked on the structure plan.
- Exploration boreholes should be drilled so that directionally aligned core is obtained. Bedding plane shears and other structural features can then be included into the Dips 6.0 (Rocscience, 2012) database.

5.10.6 Main Haulage Ramp Conditions

During the July site visit all main haulage ramps in and around the perimeter of the pit were visually inspected. No signs of instability were observed e.g. tension cracks in ramp surface, slumping of safety berms, uneven ramp slope, and areas of new ponding.

However, at UHG, the box cut northern ramp failed without any reported prior warning in early August. This failure appears to have occurred along a bedding plane shear and was back analysed.

In light of this, a set of new precautions have been proposed for the design and operation of haulage ramps.

5.10.7 Waste Dump Observations

The waste rock dumps were inspected in July 2012 following unusually heavy summer rainfall. No signs of imminent failure (tension cracks) were observed.

The dumped material all appears to display signs of rapid deterioration due to exposure to the elements, and as such there is probably not a great amount of strong un-weathered material within the matrix. The fact that BN is generally dry and that the dumps are not often saturated and have been constructed on relatively flat ground is probably why no problems have been reported to date.

From site measurements and photographic interpretation, dump slope angles are typically between 35° and 40°.

5.10.8 BN Back Analysis of Slope Failure, West Pit, Southern Pit Wall

A failure along bedding occurred on a dipping coal seam along the southern pit wall in the West Pit early in July and was well-documented by the site geotechnical engineer (Tumur-Ochir, 2012). Apart from sliding along a bedding plane shear and a suspected joint, shearing was also thought to have occurred through the coal. An important aspect of this failure is that the batter angle was less than the angle of the bedding plane shear along which sliding initiated. Failure can occur where the load exerted by the detached block in front of the plane of weakness is sufficient to cause buckling or shear failure through the solid rock especially where the solid rock is weak, for example coal.

The cohesion for a factor of safety (FOS) of one was found to be 30 kPa with a friction angle of 25°. As failure had occurred through the coal, values slightly below that obtained for FOS of one were chosen for fresh coal as shown below:

- Rock density: 15.2 kN/m3
- Cohesion: 29 kPa
- Friction angle: 23.5°

5.10.9 Ground Control Districts

Ground Control Districts (GCDs) have been identified for inclusion in the Ground Stability Management Plan (GSMP) for BN. These are geographical areas of the pit with roughly similar geotechnical conditions and similar slope design requirements. In places, the GCDs have been subdivided into pit wall sectors to accommodate pit wall curvature. This has been done on the north-eastern and south-western ends of both pits.

5.10.10 Geotechnical Domains

The rock properties quoted in Table 5-13 are similar to those for UHG and have been based on data from a number of sources including: field observations and field rock strength tests, back analysis of failures, laboratory test results from Baruun Naran (Seedsman 2010), and published papers by a number of authors. The table represents all the above data plus the experience of AMC, and use was made of the RocData software from Rocscience (2012) to determine many of the cohesion and friction angle values.

Note that the cohesion and friction angle values are obtained from RocData using the failure envelope range for slopes. Adjustments will need to be made to these values for slopes higher than the range indicated in the table.

Table 5-13: BN Geotechnical Domains, Mohr Coulomb Criterion

Geotechnical Domain	UCS (MPa)	GSI*	RD (kg/m3)	Unit Weight	Slope Height (m)	Cohesion (kPa)	Friction Angle (°)	E Rock Mass (GPa)	Remarks
Highly weathered overburden	4	35	2,200	22	20	28	19	0	Obtained by back analysis
Moderately weathered overburden	15	45	2,300	23	30	107	28	0	
Fresh interburden and overburden	30	60	2,500	25	40	298	42	1	
Oxidized and weathered coal	3	20	1,700	17	20	17	20	0	
Fresh coal (sheared)	5	25	1,400	14	20	14	20	0	
Fresh coal (not sheared)	7	30	1,520	15	20	29	24	0	
Boundary fault areas and wide (major) shear zones	5	15	2,000	20	20	36	25	0	Generally steep dipping strata >50°
Strong sandstone	55	65	2,600	26	40	557	51	2	Uncommon
Bedding plane shears	5	15	1,800	18	general	2	14	0	Obtained by back analysis
Blasted rock (buffer blast zones)	NA	NA	1,900	19		50	35		
Waste rock (dumps)	NA	NA	1,800	18		18	24		Obtained by back analysis

Notes: * GSI (Geological Strength Index).

(Source: AMC)

5.10.11 Stereographic Structural Analysis

Structural data collected during July 2011 as well as January, April and July 2012 was analysed using the Dips 6.0 software (Rocscience, 2012).

When all BN structure is considered (both East and West Pits combined), the two main sets consist chiefly of bedding planes and bedding plane shears and have mean dip and dip direction of 54/307° and 63/340°. Set 3 consists chiefly of faults and jointing with a scatter of bedding planes and has mean dip and dip direction of 71/172°.

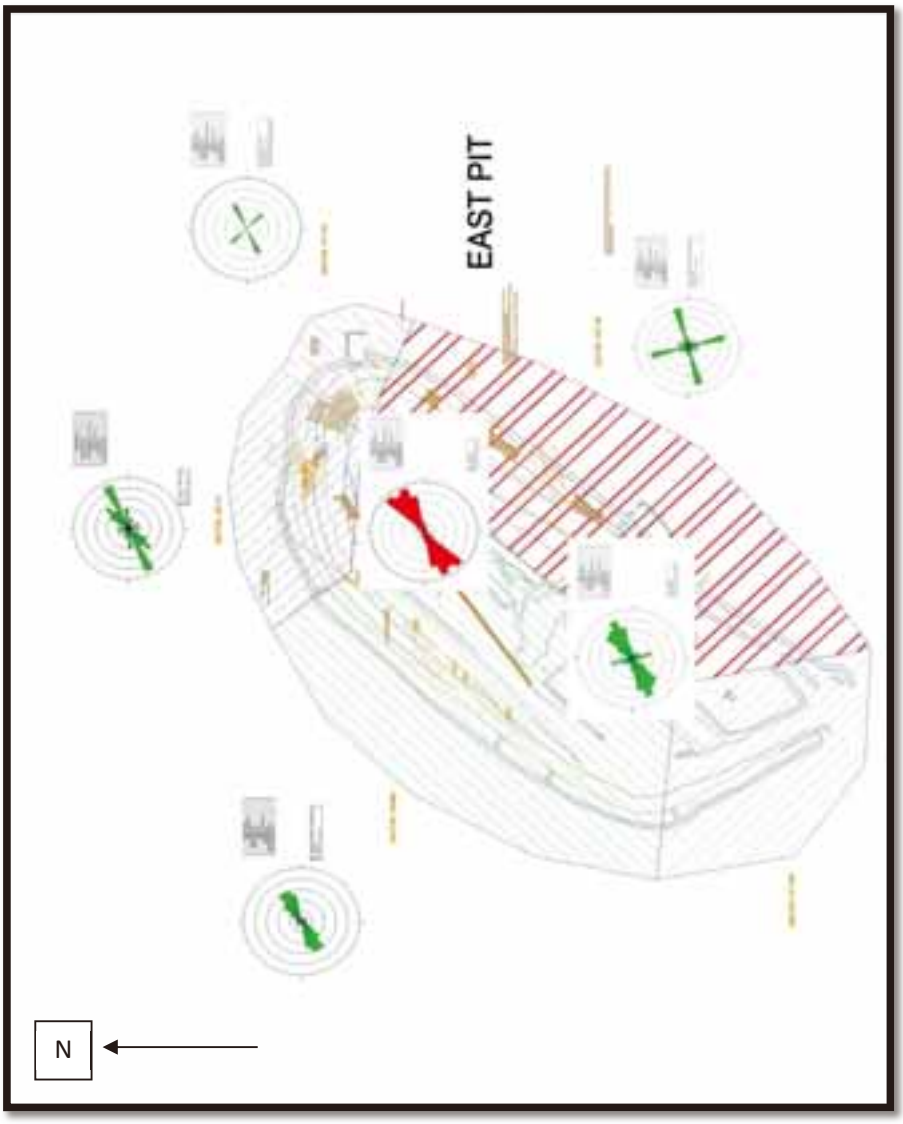
For major structure only (bedding planes, bedding shears, faults, and shear zones), the two main sets are very similar to those described above with dip and dip direction being 54/310° and 65/341° respectively. Set 3 has a dip and dip direction of 74/172°. As can be seen, there is very little difference when major structure only is considered. For this reason, all further kinematic analysis for BN in this report was carried out on all structures.

Considering the East and West Pits separately the major structural orientations are as indicated below in Table 5-14 and Figure 5-43 and Figure 5-44.

Table 5-14: Structural Summary for East and West Pits

Structure	East Pit	West Pit
Set 1 dip/dip direction (°)	52/336	60/342
Set 2 dip/dip direction (°)	77/325	55/303
Set 3 dip/dip direction (°)	70/162	51/125
Set 4 dip/dip direction (°)		79/258
Rosette plots	Major orientation ENE to WSW	More scattered with main orientation NNE to SSW

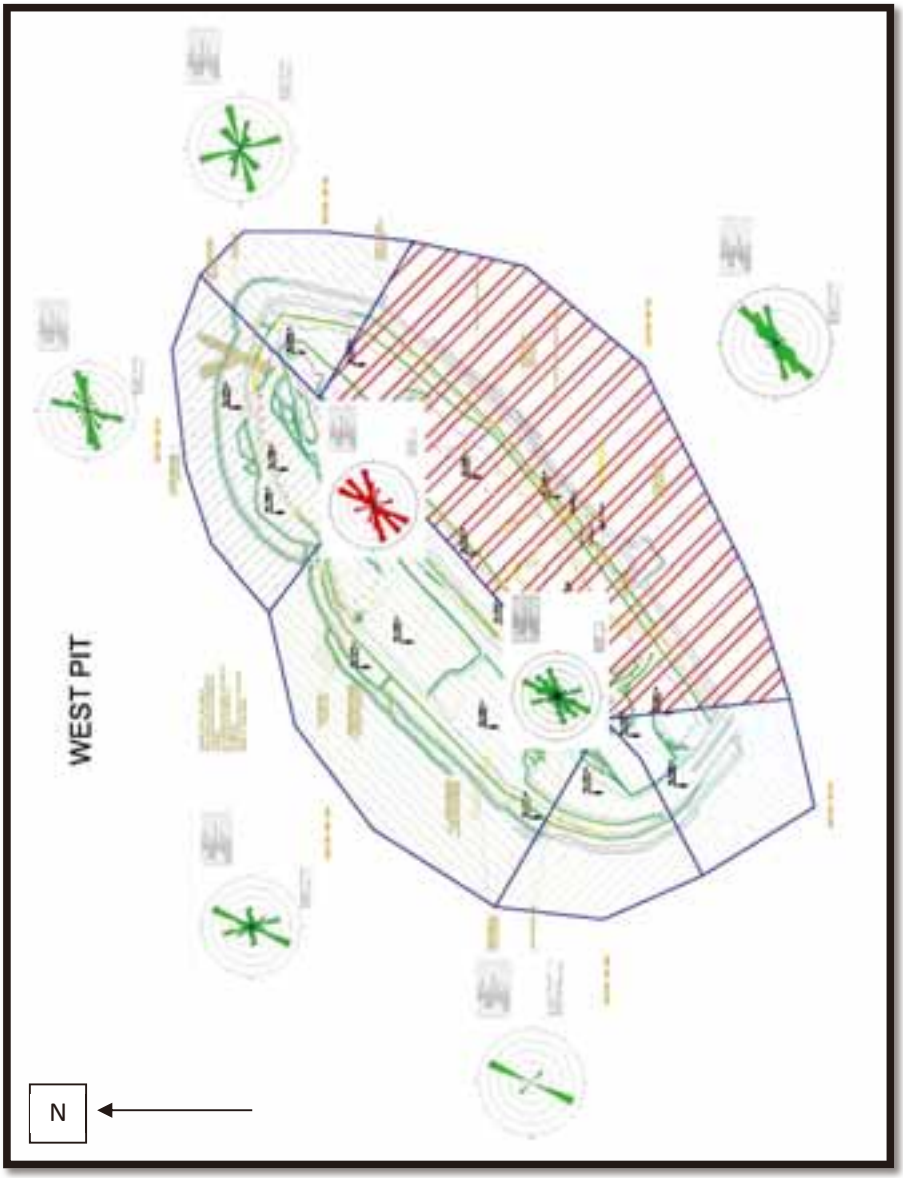
(Source: AMC)



Note: Red rosettes indicate major structure and green are for all structure.

Figure 5-43: BN East Pit, Structural Rosettes by Pit Sector

(Source: AMC)



Note: Red rosettes indicate major structure and green are for all structure.

Figure 5-44: BN West Pit Structural Rosettes by Pit Sector

(Source: AMC)

5.10.12 Kinematic Stability Analysis

A full set of kinematic analyses was done for the majority of pit wall sectors. Slope geometry used for the analysis was the actual batter angle, based on mine survey plans, in the general area where the data was gathered (as at July 2012).

The Dips 6.0 program produced a percentage of critical surfaces for the various types of failure. Where this value was less than 5%, no further analysis was carried out (the likelihood of failure was considered to be sufficiently low). In cases where the percentage of critical surfaces was greater than 5% the slope angle was systematically reduced until the critical surfaces were equal to or below 5%. The value of 5% being

the acceptable cut-off in terms of the critical surfaces is discussed in the main body of the report.

A summary of results, focussing on potential failure modes with critical planes or intersections exceeding 5% is shown in Tables 5-15 and 5-16. Due to bedding and bedding plane shears being the most influential cause of slope instability at BN, the friction angle used for the kinematic analysis was kept at 15°.

Table 5-15: BN East Pit, Summary of Kinematic Analysis Results

		Slope Angle			Critical Surfaces		
Pit Wall Sector*	Wall Section	Batter Scale	Trial Slope	Slope Dip Direction	Analysis Type^	Critical (%)	Remarks
EP/N	West	42		160	WSA	8	
			34		WSA	5	
		42			FTA	8	
			25		FTA	3	
EP/N	East	58			PSA	5	
			50	191	PSA	3	
		58			WSA	27	
			31		WSA	5	
		58			FTA	5	
			46		FTA	3	
EP/NW		44		132	FTA	32	
			24		FTA	4	
		44			DTA	7	Direct toppling
					DTA	6	Oblique toppling
			27		DTA	5	Direct toppling
					DTA	6	Oblique toppling, no change
EP/SE		50		308	WSA	28	
			-36		WSA	12	(Overall slope angle)
			28		WSA	5	
		50			DTA	7	Direct toppling only
			40		DTA	5	Direct toppling only

Note: * EP/N = East Pit, North. | EP/NW = East Pit, North-west. | EP/SE = East Pit, South-east.

^ PSA = Planar sliding analysis. | WSA = Wedge sliding analysis. | FTA = Flexural toppling analysis.

DTA = Direct toppling analysis.

(Source: AMC)

Table 5-16: BN West Pit, Summary of Kinematic Analysis Results

		Slope Angle			Critical Surfaces		
Pit Wall Sector*	Wall Section	Batter Scale	Trial Slope	Slope Dip Direction	Analysis Type^	Critical (%)	Remarks
WP/N	West	66		136	WSA	31	
			34		WSA	5	
WP/N	Central	69		162	PSA	17	
			56		PSA	4	
		69			WSA	33	
			46		WSA	5	
		69			FTA	21	
			30		FTA	0	
WP/N	East	61		189	WSA	21	
			37		WSA	5	
		61			FTA	11	
			43		FTA	4	
WP/NE	North	64		201	FTA	14	
			42		FTA	0	
WP/NW	North	76		165	PSA	15	
			45		PSA	3	
		76			WSA	36	
			32		WSA	4	
		76			FTA	12	
			35		FTA	4	
WP/NW	Central	45		136	WSA	16	
			33		WSA	5	
WP/NW	South	54		124	WSA	21	
			32		WSA	5	
		54			FTA	6	
			47		FTA	3	
WP/SE	North	44		312	PSA	2	
			50		PSA	3	Maximum angle
		44			WSA	6	
			42		WSA	5	
WP/SE	Central	45		321	PSA	2	
			50		PSA	3	Maximum angle
		45			WSA	8	
			42		WSA	4	
WP/SE	South	40		324	PSA	0	
			50		PSA	4	Maximum angle

Note: * WP/N = West Pit, North. | WP/NE = West Pit, North-east. | WP/NW = West Pit, North-west. WP/SE = West Pit, South-east.

^ PSA = Planar sliding analysis. | WSA = Wedge sliding analysis. | FTA = Flexural toppling analysis. DTA = Direct toppling analysis.

(Source: AMC)

As can be seen, batter angles often need to be reduced substantially to reduce the number of critical surfaces to 5% or less. This analysis indicates that batters at BN should be formed in the range of 30° to 37° and that in the majority of cases the critical surfaces were potential wedge sliding surfaces. However, it is considered highly unlikely that two bedding plane shears with 15° friction angles will intersect each other to form potentially unstable wedges. A more likely scenario will be a joint intersecting a bedding plane in which case the friction angle should be taken as the average of the two or around 23° (assuming a 30° friction angle for jointing). Additional analysis of wedge sliding failure for the effected pit wall sectors is recommended.

As the friction angle of jointing will play an important part in further analysis of wedge sliding analysis at BN, the collection of detailed joint wall conditions is planned for the November 2012 routine site visit.

5.10.13 Slope and Waste Dump Design Review

Pit and waste dump slopes require a review of their designs in the light of past experience. In the case of waste dumps, material properties may be revised after back analysis of observed tension cracks at UHG identified on a previous site visit. The cohesion and friction angles obtained in the back analysis may be conservative as failure had not taken place and what was observed may be settling only.

Pit slope modelling will use data from a number of sources during the review, namely:

- The pit GCDs and pit sectors (PS) categorization plus rock strength data for each geotechnical domain refined during recent back analysis of pit wall failures.
- Pit wall geological structure data.
- BN geological report pit cross-sections.
- The latest geohydrological model.
- Local earthquake information for pseudo static analysis using Galena software.
- Ramp designs incorporating learning points from the recent ramp failure at UHG.

In addition, the design of safety berms and safety bunds require optimization once adequate site data has been gathered to carry out RocFall (RocScience, 2012) analysis.

5.10.14 Summary of Current BN Pit Slope Design Specifications

The following table (Table 5-17) is based on the current slope design recommendations (AMC, 2011b).

Table 5-17: Summary of Current BN Pit Slope Design Specifications

Weathered Overburden	
(Minimum depth 30 m): Maximum batter of 45° or bedding dip (whichever is the lower) and minimum 10 m wide catch berm at base of weathering.	
Fresh Overburden	
End walls and low walls, overall slope angles, batter angles, and batter heights	
North limb	Maximum overall slope angle 35° with maximum batter angle of 50°. Maximum batter height 20 m and berm width 9 m.
South limb	Maximum overall slope angle 30° with maximum batter angle of 40° or bedding dip (whichever is the lower). Maximum batter height 20 m and berm width 11 m.
Low walls	Maximum overall slope angle 30° with maximum batter angle of 40° or bedding dip (whichever is the lower). Maximum batter height 20 m and berm width 11 m.
Bedding dip steeper than 80°	Reduce batter height from 20 m to 15 m to cater for increased chance of toppling failure.
Southern limb end walls and low walls (flat seam areas)	Bedding dip 0° to 20° maximum overall slope angle (OSA) 30°. Bedding dip 20° to 25° follow bedding. Bedding dip > 30° maximum OSA 30°.
High walls: maximum overall slope angle 35° with maximum batter angle of 50°. Maximum batter height 20 m and berm width 9 m.	
Interim wall angles: Under review	

(Source: AMC)

Table 5-18 is under review, new modelling is to be carried out by end January 2013 with updated rock mass data. This table was modified to agree with the naming convention used by Runge Pincock Minarco for a life-of-mine (LOM) optimization study during February 2013.

This revised design table is shown in Table 5-18 and shows changes to the naming convention used in the original geotechnical design report (Seedsman, 2010).

Table 5-18: BN Geotechnical Design Table for LOM Study (February 2013)

Weathered Overburden	
(Minimum depth 30 m): Maximum batter of 45° or bedding dip (whichever is the lower) and minimum 10 m wide catch berm at base of weathering.	
Fresh Overburden	
High walls, overall slope angles, batter angles and batter heights	
North and South Limbs	Maximum overall slope angle 35° with maximum batter angle of 50°.
	Maximum batter height 20 m and berm width 9 m.
	Where bedding dip >80° reduce batter height from 20 m to 15 m to cater for increased chance of toppling failure.
Low walls, overall slope angles, batter angles, and batter heights	
North and South Limbs	Bedding dip 0° to 20°: Maximum overall slope angle 30° Bedding dip 20° to 30° develop parallel to bedding.
	Bedding dip >30°: maximum OSA 30°.
	Maximum batter angle of 40° or bedding dip (whichever is the lower).
	Maximum batter height 20 m and berm width 11 m.
End walls, overall slope angles, batter angles, and batter heights	
South limb	Maximum overall slope angle 35° with maximum batter angle of 50°
	Maximum batter height 20 m and berm width 9 m.
North limb	Maximum overall slope angle 30° with maximum batter angle of 45° or bedding dip (whichever is the lower).
	Maximum batter height 20 m and berm width 11 m.
Foot walls, overall slope angles, batter angles, and batter heights	
North and South limbs	Overall slope angle not to exceed 30° or dip of the syncline (whichever is the lower).
	Note: This area is defined by the dip of the floor along the axis of the syncline (roughly orientated SW to NE).
Interim wall angles: Under review	

(Source: AMC)

In the 2010 report the term South Limb was used to describe the shallower dipping (southern) side of the syncline (seam dips 30° to 70° to the north). This area is now referred to as North Limb LW and South Limb LW (Figure 5-45).

In the 2010 report, the term North Limb was used to describe the (northern) steeper dipping side of the syncline (seam dips 70° to vertical). This area is now referred to as South Limb HW and North Limb HW.

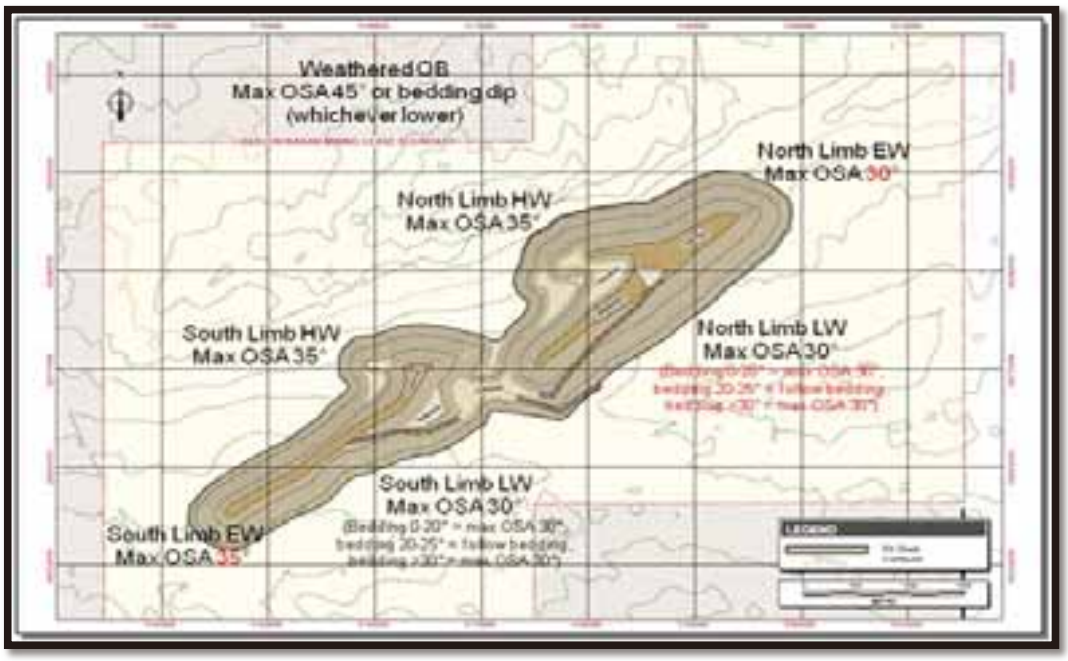


Figure 5-45: BN Geotechnical Zones for LOM Study (after Runge Pincock Minarco)

(Source: AMC)

5.10.15 Excavators Operating on Top of Coal Benches

The FOS of the slope for a Cat 390DL standing on solid coal at BN was found to be 1.15 from Galena modelling.

Sheared coal is much weaker and the FOS of the slope for the 390DL standing on it reduces to 0.57. From field observations so far, the thinner coal seams appear more sheared so at present it would seem that seams in excess of 5 m thick will probably comprise enough solid coal to be stable with a Cat 390DL or equivalent on top.

For the far bigger loads exerted by a Liebherr R4000 the FOS is under 1.0 irrespective of whether the coal is solid or sheared (0.81 on solid coal). The R4000 was used in this analysis as it has the highest ground pressure of the nominal 350 tonne machines being considered.

A subsequent set of analyses indicated that provided the excavator tracks are kept at least 1.5 m from the edge of the crest of a 4 m high coal bench, the largest excavator which can be used is the Hitachi EX3600.

While most of the modelling was done on 70° coal bench slopes at 40 m depth, the EX3600 model was also run for a slope of 40° at 200 m deep.

Solid coal is defined in this case as a seam >5 m thick and comprising mostly (>80%) solid (non-sheared) coal (Table 5-19).

Table 5-19: Coal Bench FOS for Excavators at Varying Offset Distances from the Crest

Excavator and Weight in Tonnes	Ground Pressure Modelled (kPa)		Cover Depth (m)	Seam Dip (°)	Stand-off Distance from Crest (m)	4 m High Bench FOS Solid Coal	4 m High Bench FOS Sheared Coal
	Front 2 m	Rear					
Liebherr R4000 (346)	345	225	40	70	2	1.07	0.53
					1.5	0.97	
					1	0.87	0.42
Hitachi EX3600 (348)	290	200	40	70	2	1.14	0.56
					1.5	1.04	
					1	0.94	0.45
			200	70	1.5	1.04	
			40	40	1.5	2.28	1.09
Hitachi EX2500 (239)	270	190	40	70	2	1.18	0.57
					1.5	1.07	
					1	0.97	0.45
Cat 390DL (90)	160	115	40	70	2	1.47	0.65
					1	1.22	0.53

(Source: AMC)

5.10.16 Pit Slope Stability Monitoring

The following areas require monitoring of some type at BN.

Ramps: the pit side of all ramps and surface haul roads within 50 m of the crest must be regularly monitored at least weekly to detect the first signs of movement.

End walls and low walls: the crests of all end walls and low walls plus selected berms (no more than 30 m apart horizontally), must be monitored at least every week to identify early signs of deformation.

Selected major geological structures as identified by the geotechnical engineer must be monitored weekly. These include bedding plane shears dipping into the pit, major faults, and sheared zones.

The high wall above and below any batter higher than 20 m must be monitored daily.

Any area where the geotechnical engineer, manager mining or technical manager has declared an increased risk of strata instability must be monitored at a frequency to be decided at the time but not less frequently than once per day.

The outcome desired is that the monitoring system accurately picks up movement with a minimum amount of scatter and the persons at risk are timeously warned of the problem so that remedial action can be taken in the interests of safety. “Scatter” in the context of the previous sentence refers to slight but random changes for subsequent readings. This can sometimes mask the first signs of actual movement.

5.10.17 Future Work

5.10.17.1 Training

Assess quality and effectiveness of site geotechnical training for operational personnel.

Assess and make recommendations for continuing training of the senior geotechnical engineer and site geotechnical engineers.

5.10.17.2 Ground Stability Management Plan

Compile GSMP after consultation with BN production and geotechnical personnel, including risk assessment to identify all potential ground related hazards at BN.

Ensure that slope batter and overall angles are no steeper than the maximum stipulated.

5.10.17.3 Slope Stability Assessment

It is suggested that selected portions of the pit are further analysed for the potential of kinematic failure using an AMC in-house three-dimensional kinematic analysis software code.

Carry out a site specific investigation to quantify the risk of possible earthquakes on the UHG and BN pit walls and waste dumps.

Update the geohydrological data (water levels) for both out-of-pit and in-pit areas prior to the review of the pit slope design.

Investigate three-dimensional modelling of horizontal stress around pit corners.

5.10.17.4 Pit Wall and Waste Dump Slope Design

Review pit wall design and produce updated design tables for low wall, end walls and high walls. In addition, review the minimum berm width to safely contain any loose rock dislodged from upper benches. Pit wall design must not rely solely on limit equilibrium analysis (e.g. Galena) and should include at least one other method of appraisal e.g. finite element modelling, kinematic analysis or empirical methods. This is particularly important as the pit becomes deeper.

Review waste dump design and investigate likely footwall conditions with an eye to future in-pit dumping.

Review and optimize safety berm and safety bund designs following collection of site data.

5.10.17.5 Rock Mass Classification

Collect and analyze data to better determine the friction angle, namely:

- Laboratory shear testing of discontinuities
- Large and small scale roughness data (field measurements)
- Length of discontinuity (persistence)
- Fill strength and thickness if applicable

Further investigation on weathering of waste material for design of both waste dump angles (blasted and removed rock) and buffer blasted zones (blasted and left in situ). Literature survey and laboratory testing (e.g. slake durability).

5.10.17.6 Geological Structure Model

All significant geological structures should be incorporated on a structural plan by the site geotechnical engineer and updated regularly. This plan must be either based on pit levels or else three-dimensional as the position of structures will change as they are intersected further down.

Exploration boreholes must be checked closely for any possible bedding plane shears and these must be marked on the structure plan.

5.10.17.7 Pit Wall Slope Stability Monitoring

Assist with the selection of the most cost-effective, robust and practical method of monitoring pit wall displacement and ensure that the time taken to process the raw data and issue a clear warning is minimized.

5.11 Hydrogeology

Based on a translated text (Appendix 23) regional hydrogeological work was undertaken by Mongolian-Russian teams over the BN depression during 1980 through to 1986. Various aquifers through various techniques were discovered.

A feasibility level investigation was undertaken between June and July 2009 by Aquaterra. The findings from this report were;

The scale of mine water inflows predicted, with the exception of possible sustained moderate to high inflows in the early years of development, as well as occasional short-term inflows, are not considered to pose any significant risk to mining operations. Mine water inflows will be managed through in-pit sumps pumping to turkeys nests at natural ground level to provide additional water supply where required (i.e. for dust suppression). Limited dewatering bores will be installed at the pit crest during each phase of mine development to provide limited water supply and some additional advanced dewatering/depressurisation impact. It is anticipated that horizontal drains will be required to establish/maintain appropriate hydrostatic pressures in sediments behind mine wall/faces. In-pit (or ex-pit where feasible) depressurisation bores may be required during later stages of mining to establish/maintain appropriate hydrostatic pressure in sediments beneath the pit floor.

In 2017, an infiltration water calculation study was conducted for the Baruunnaran mine. The findings from this report were;

The amount of hydration groundwater from the open pit was calculated based on the drainage conditions of the aquifer consisting of coal, sandstone and conglomerate at depths of 125 and 225.0 m, respectively, at the East and West mines. According to the above estimates, the groundwater infiltration at the open pit is 88.17 cubic meters per day at the Western mine and 134.26 cubic meters per day at the Eastern mine. Depending on the amount of flood caused by precipitation, it is estimated that it will not exceed 650 m^3/h and 1193.4 m^3/h.

5.12 Gas

As part of the ER exploration program, in the deeper boreholes, gas was observed from the cores. To provide some basic evidence of the size of the gas content, 1 x 1 meter bombs were taken from 5 seams.

Table 5-20: Indicative Gas bomb results

Bhole	Bhole Depth	True Depth	Seam	Total (M^3/T)
G00177	414	408.03	H500	0
G00160	444	385.28	G400	2.64
G00160	468	406.32	G500	7.83
G0138	678	644.81	J500	9.58
G0138	774	736.22	I500	4.41

5.13 Mining Potential

The "Baruun Naran" mine uses conventional truck and excavator mining methods to mine coal and overburden in a terrace style operation.

The Baruun Naran mine consists of the "T" mining sector and the "H" mining sector. Contractor mining operation companies work at the T and the H mining sectors.

Mining organization and planning are provided by Energy Resource employees. On the other hand, operations for executing plans are carried out by the mining contractor companies. The contractor mining companies ensure their own technical availability. Maintenance workers are also contractor company's employees.

The "Baruun Naran" coal mining operation commenced in 2012. It has been operating since the 4th quarter of 2017 depending on recovery in coal market prices. Baruun Naran mine production output was 1.38 Mt in 2018, 0.96 Mt in 2019, 0.75 Mt in 2020 and 0.54 Mt in 2021.

The Main production equipment currently utilised at "Baruun Naran" mine are mentioned below.

The T mining sector has the following equipment.

- 1x Hyundai R1200 excavator
- 1x Hitachi R1200 excavator
- 1x Komatsu 1250 excavator
- 1x Hyundai 1250 excavator
- 1x Doosan DX480 excavator
- 28x Sinotruck 371 rear dump truck
- 9x LGMG MT-86 rear dump truck

The H mining sector has the following equipment.

- 1x CAT 390B excavator
- 2x DX800LC excavator
- 1x Hyundai R1200 excavator
- 13x Sinotruck 371 rear dump truck
- 7x LGMG MT-86 rear dump truck

- 5x SANYA SKT90S rear dump truck

The typical mining process is outlined as follows:

- Topsoil is pushed up by dozers, before loadout by front end loader to haul trucks for storage in temporary topsoil stockpiles.
- Approximately the first 15m of overburden dug by excavator without blasting, loaded into haul trucks and taken to ex-pit waste dump locations.
- Subsequent overburden and interburden materials are drilled and blasted, using ANFO and emulsion explosives, before removal by excavator and truck to ex-pit waste dumps.
- Uncovered coal is mined without blast and hauled into Baruun Naran ROM area. After that, the coal is transported from Baruun Naran ROM area and stocked in UHG then washed from the UHG ROM.
- Waste dumps when complete are reshaped by dozer, before topsoil is rehandled from temporary stockpiles for dumping and spreading across reshaped overburden dump locations, as part of rehabilitation works.

5.14 Coal Economics

The Reserve study (GC-04, GLOGEX consulting, 16 April 2018) (refer Appendix 22) completed by Glogex 1st January 2018, albeit, based on an integrated BN and THG mines made the following observations on 'life of mine' (LOM) economics.

The key results of the BN LOM production scheduling are:

- *BN mine life of 30 years from 1 January 2018, finishing in 2048.*
- *Strip ratio for BN ranges from 4.7 to 6.6 bcm / t ROM, with overall of 5.7bcm / t ROM,*
- *Coking coal ROM output remains constant at 13 Mtpa across 30 years of the BN schedule.*
- *The overall average product split is: 40% hard coking coal, 42% semi-soft coking coal, 18% middlings.*
- *Overall, the product ash achieves or is very close to specification for coking and middlings products:*
    - *Hard coking coal product ash ranges from 10.5% (adb) to 11.4% (adb), average 10.9% (adb)*
    - *Semi-soft coking coal product ash ranges from 8.6% (adb) to 9.5% (adb), average 9.1% (adb)*
    - *Middlings coal product ash average 22% (adb)*
- *Mining operation activities (waste and coal mining, drill and blast, support etc.) costs account for approximately 91% of the Total Integrated Operating Cost.*

6 Peer Review and Site Visits

6.1 Initial Site Visit – April 2011

An initial site visit was completed by Mr Ballantine (Executive General Manager Geology and Exploration) and Mr Andrew Little, Technical Director (at the time) for MMC on 7 April 2011.

The purpose of this visit was to form part of the due diligence process for the purchase of the BN mine.

The visit entailed inspections of the onsite offices, mining equipment, maintenance office and the newly opened 'T' seam pit. Nothing out of the ordinary from the documentation supplied in the data room was determined.

A field visit was completed by Nigel Godfrey, Principal Consultant for Rocktec Pty Ltd on 16 July 2012 for an initial geotechnical review. His memorandum of the details of the visit is in Appendix 14.

For estimation of the maiden UHG JORC Resource, an independent audit and peer review was completed for the ER geology team. This was completed by Mr Todd Sercombe, senior consultant for GasCoal Pty Ltd, a coal geologist with 18 years coal experience. Mr Sercombe's full independent report can be viewed in Appendix 14, which includes his site visit and findings plus recommendations. The following is an excerpt from Mr Sercombe's report, which summaries the results of his peer review.

6.1.1 Conclusions of Audit for JORC (2004) Resource Estimate - June 2012

The UHG exploration procedures and practices are of extremely high calibre, exceeding both the Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996) and the benchmark coal industry best practices (as observed by Mr Sercombe in the Bowen Basin, Australia).

The accurate and unbiased assignment of coal core loss to coal samples, achieved in the UHG practices, is commendable. The coding, for modelling, of all significant stone band partings in the seams and of inter-burden units between the seams is also praiseworthy.

The Exploration and Geology Department are a group of young enthusiastic geologist who have been well trained and led by Gary Ballantine. I would have high confidence in the reportable results obtained from the UHG exploration procedures.

Todd Sercombe

Mr Todd Sercombe – Member AusIMM # 220916 – 17 July 2012

6.2 Summary of ongoing site visits, comments and Internal Audits for JORC (2012) Resource Estimate - June 2015

Mr Ballantine at the time of the report writing was employed by ER in the position of Executive General Manager, Exploration and Geology, and has responsibility for budgeting, planning, training and overall oversight of exploration at BN and THG. As part of the ongoing evolution of the ER geology group and knowledge transfer, supervised and structured succession of capable individuals, is planned.

The exploration group has changed little from that used to prepare the UHG JORC (2004) Resources report in June 2012, so the independent peer review by Mr Sercombe is still relevant. Mr Ballantine took on board all of Mr Sercombe's recommendations. Mr Ballantine understands that complacency can creep into a well establish team. To prevent this he does frequent site visits with Mr Said (Competent Person) and together they review different individual team member's capabilities against the exploration procedures.

As part of Mr Ballantine's role as mentor and internal auditor, all final data, (i.e. seam thickness, seam correlation, sampling intervals, coal quality analysis, collar survey and LAS quality) are reviewed once the team (supervised by the Competent Person) has completed the work. With the above process it is Mr Ballantine's professional opinion that there is a very high compliance with the team's results and JORC standards. Mr Ballantine has completed an oral review and internal audit with the Competent Person for every step of the data preparation of the POO and the modelling stages to the final estimate.

6.3 Internal Peer Review – 2021

Internal peer review of exploration work 2018 was conducted by Mr. Lkhagva-Ochir Said, the then Executive General Manager of Mining and Processing. These peer reviews confirmed compliance of the Group's work to update the Coal Resource estimations in compliance with requirements of the JORC Code (2012).

7 Exploration

7.1 Drilling

7.1.1 Historical Drilling at BND

7.1.1.1 Mongolian-Russian Drilling

During the initial exploration work of BND in 1983, there were three shallow vertical boreholes (approximately 70 meters each) drilled. Six coal seams with apparent thicknesses of up to 4 meters were identified in the programmed. The resulting "prognostic resource" calculations included values of 86 million tons and 10.9 million tons underlying area of 19.2 square km (Khosbayar et al., 1983).

From 1983 to 1993, 21 vertical boreholes (depths range from 33 to 362 m) with a total of 3500 meters depth were drilled on the BND. Borehole spacing generally ranged from 250- 500m on five north-westerly trending exploration lines spaced approximately 3km. Downhole resistivity, caliper, gamma and density surveys were completed on 19 boreholes. 9 boreholes intersected significant coal thickness. Total 12 coal seams with apparent thickness of 1 to 30 meters were identified. 4 of these seams reported metallurgical quality (Gankhuyag, 1990). (BN43-101 Technical Report, 2007)

7.1.1.2 QGX drilling

7.1.1.2.1 2005- 2006 drilling

QGX conducted a drilling program at BND from April 24, 2005 by 2 contractor companies, AIDD and Major drilling company of Mongolia. They used UDR-650, UDR- 1000 and Longyear 44 rigs to drill the deposit. The purpose of this program was to address the issues identified in the previous section and bring the bulk of the BND resource to a level of geological confidence.

By December 15, 2005, QGX had drilled 137 boreholes totalling 34204.3m, using HQ3 core, open- hole poly- crystalline diamond (PCD), and reverse circulation (RC) drilling methods. Cored metres totalled 11,036.0 meters. (BN43- 101 Technical Report, 2007)

By December 5, 2006, QGX had drilled an additional 213 boreholes totalling 61,582.7 meters using HQ3 core and openhole PCD drilling methods. Coring totalled 5,014 meters. Most of these boreholes were drilled in the Norwest program included a total of 121 holes, angle designed to intersect the seams at as close to right- angles as possible, attempting to minimize apparent seam thickness issues. Given the near vertical steepness of the seams on the northern flank comprised of 17 slim gauge core holes (PQ/HQ), 99 slim rotary of the syncline, this was not always possible. Downhole surveys were carried out every 50 m, and these surveys, combined with either the dip of beds in the core, extrapolated from cross sections, and were used to ascertain the true thickness for each seam cut by the boreholes.

Drilling the 2005- 2006 drilling programs a total of 350 boreholes were drilled in BND totalling 95,787m, of which 16,050m were cored, (BN43-101 Technical Repord, 2007).

The details of these programs are shown in Table 7-1. The map in Figure 7-1, illustrates the borehole positions for this program. All coordinates are in Universal Transverse Mercator (UTM) WGS 1984.

Table 7-1: QGX 2005- 2006 borehole data summary

Year	Company	Drilling type	Borehole	Total depth (m)
2005	QGX	Core	137	34204.3
		Structure borehole	31	1930
2006	QGX	Core	213	61512.7
Total			**381**	**97647**

(Source: BN43-101 Technical Report, 2007)

Figure 7-1: QGX 2005- 2006 boreholes

(Source: Energy Resources LLC)

7.1.1.2.2 2007- 2009 drilling

In 2007 a drilling program was carried out to assess water availability in the region to support mining/coal processing operations, (Baruun Naran JORC reserve report SRK_2010). QGX had drilled a total 34 boreholes totalling 9,150m. 3 of these boreholes were drilled within the current BN mining license, 9 holes were drilled in the southern part of exploration license, and the remaining 22 holes were drilled beyond the exploration license. Major Drilling was the drilling contractor and used a Longyear 44 drill rig to drill the boreholes. The program defined an adequate water source for a mining operation and yielded further regional geological information including eliminating some areas then considered prospective for covered Permian sedimentary rocks and coal.

An oxidation drilling program was completed during 2008 (Baruun Naran JORC reserve report SRK_2010). Major Drilling completed 38 boreholes totalling 1,533m using RC (reverse circulation). This program defined the limits of coal oxidation and improved understanding and definition of details of the deposit geometry.

Considerable exploration was carried out in the main deposit during 2009, (Baruun Naran JORC reserve report SRK_2010). During this program QGX drilled 71 boreholes totalling 13,200m. This included 35 HQ core holes totalling 5,200m, 36 PCD openholes totalling 8,000m. QGX also drilled 11 large diameter boreholes totalling 1,000m for washability and coke testing from H500 and T500 seams. QGX contracted AIDD and Tanan Impex companies as drilling contractors. They used UDR- 650 and YDX- 3L drill rigs to drill boreholes. The details of these programs are shown in Table 7-2. The maps in Figure 7-2 and Figure 7-3 illustrate the borehole positions for this program. All coordinates are in Universal Transverse Mercator (UTM) WGS 1984.

Table 7-2: QGX 2007- 2009 borehole data summary

Drilling Type	Drilling Method			TOTAL
	Core	PCD	RC	
2007	0	0	9,150.00	9,150.00
2008	0	0	1,533.00	1,533.00
2009	6,200.00	10,400	0	16.6
Total	6,200.00	10,400.00	10,683.00	27,283.00

(Source: Energy Resources LLC)

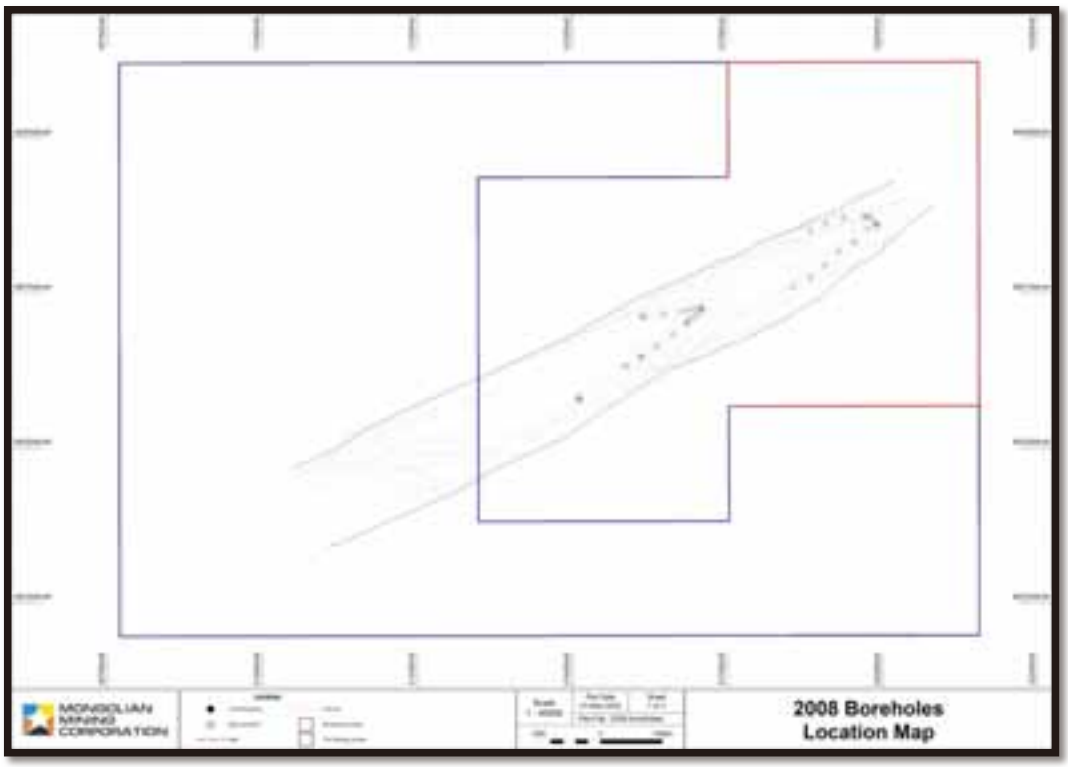


Figure 7-2: QGX 2008 boreholes

(Source: Energy Resources LLC)

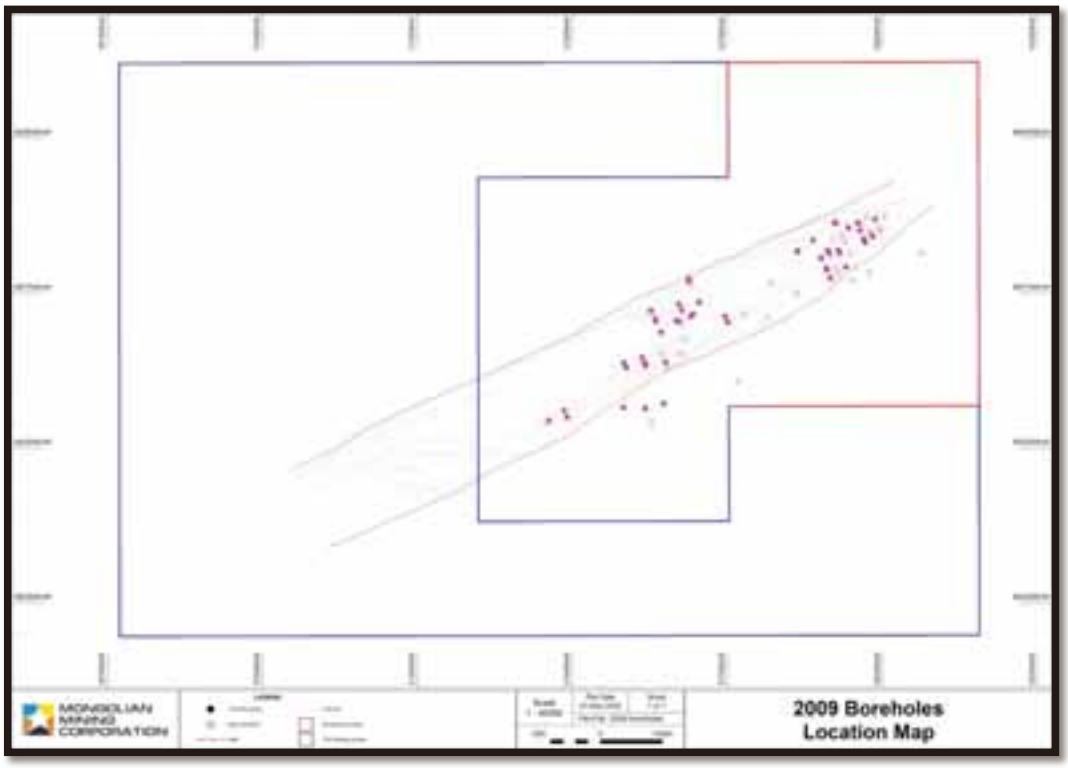


Figure 7-3: QGX 2009 boreholes

(Source: Energy Resources LLC)

7.1.1.3 ER Drilling

7.1.1.3.1 2011-2012, 2014 drilling

The geology department of ER conducted an infill drilling program at BND. Bulk drilling was carried out in the deposit area from July 10, 2011 for CTL and washability analysis. Total 10 bulk boreholes were drilled and logged. All samples were collected with special care and sent to the laboratory.

From August 19, 2011, 16 boreholes were drilled by RC method and to confirm the seam H model for the new box-cut. All boreholes were logged and sampled; samples were sent to ERCCL.

From the drilling results, a detailed model for seams H and G was constructed and passed the planning engineers.

In 2011, 26 boreholes were fully cored (HQ3) to identify better define structure.

In 2012, an infill drilling program was completed in the BN mining area to support concurrent mining operations. 33 fully cored boreholes totalling 10,355 m were drilled. 2011- 2012 exploration work is summarized in Table 7-3. Figures 7-5 illustrates boreholes drilled from 2011 to 2012.

The 2011-2012 drilling program included a total of 91 holes and 24,336.2m drilled.

In 2014, 33 fully cored boreholes totalling 13,537m were drilled.

Drilling work continued from May 2014 to December 2014. In 2014, 11 boreholes were drilled by PQ method (7,953m) and 12 boreholes were drilled HQ method (5,584m). All boreholes were logged and sampled; samples were sent to ERCCL. The details of these programs are shown in Table 7-3.

Table 7-3: Energy Resources 2011- 2012, 2014 borehole data summary

Site	Year	Company	Drilling type	Borehole	Total meter
BN	2011	MMC	Large diameter	10	653.5
		MMC	Structure borehole	16	3366
	2012	MMC	Core	33	10355
	2014	MMC	Core	33	13537
TKH	2012	MMC	Core	32	9961.7
Total				**124**	**37873.2**

(Source: Energy Resources LLC)

The geology team had responsibility for exploration, pit grade-control and setting up of the BNCCL laboratory. Later the laboratory was able to be managed by its own team. Over time other roles have been started on an as-needs basis. These are reconciliation (to support mining), Geotech (to support mining) and coal quality (to support mining and the CHPP at UHG). The Geotech role is now a department by itself. Figure 7-4 illustrates the roles that were introduced to cover "all bases" with exploration and mining.

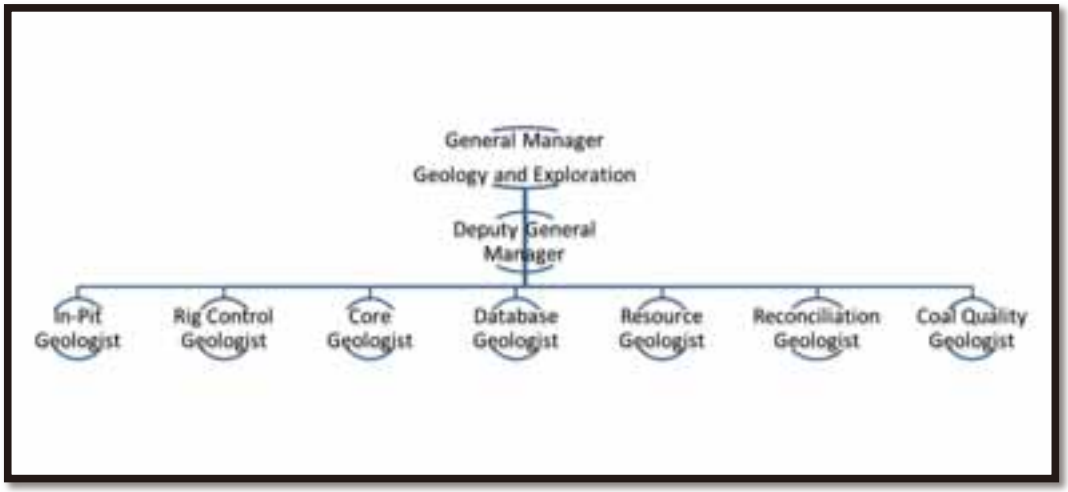


Figure 7-4: MMC Geology department role structure

(Source: Energy Resources LLC)

The results of the 2011-2012 program showed that areas in the mine were very complex in regards to continuity and coal quality. Further work was necessary to understand this complexity and location, versus the remaining deposit and how this would affect future mining and planning.

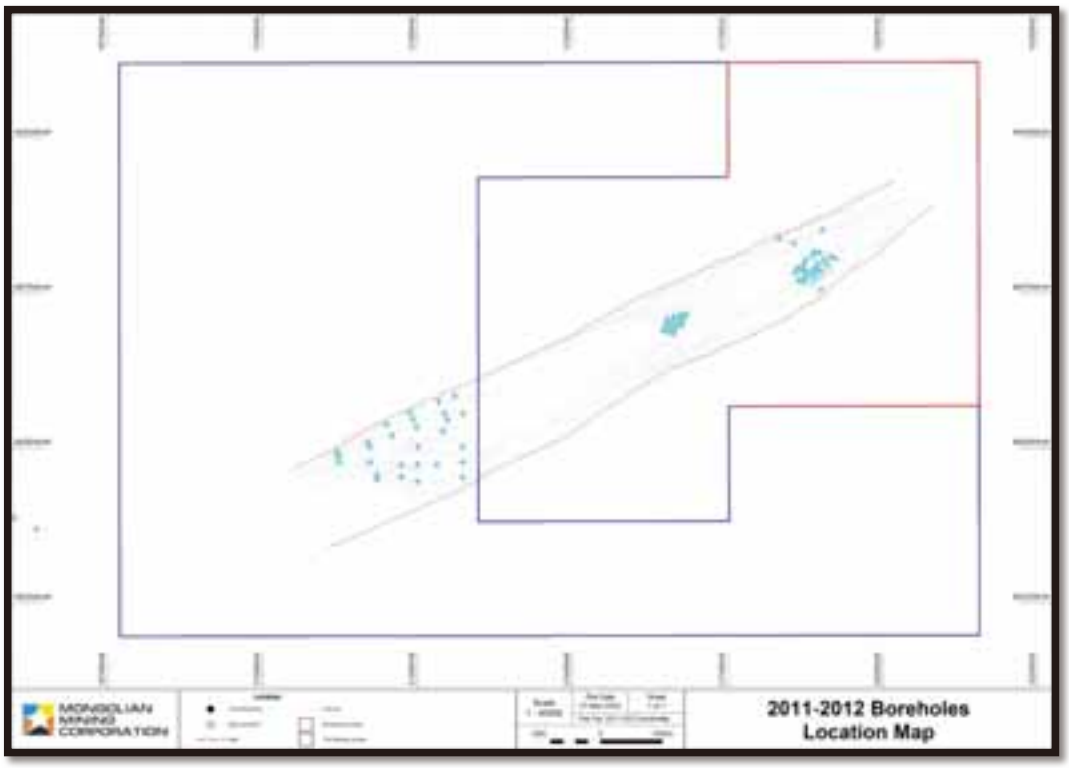


Figure 7-5: 2011-2012 boreholes for BN

(Source: Energy Resources LLC)

The results of the 2014 program, confirm the seam H seam structure and quality model. The maps in Figure 7-6 illustrate the borehole positions for this program.

Figure 7-6: 2014 boreholes by borehole type for BN

(Source: Energy Resources LLC)

7.1.1.3.2 2018 drilling

The geology department of ER conducted an infill drilling program at BND. 2018 drilling was carried out in the deposit area from May 4, 2018 for confirm the base of weathering end of deposit east side. 43 boreholes totalling 8,386m were drilled and logged. All samples were collected with special care and sent to the ER laboratory.

12 boreholes were drilled by RC method and to confirm the seams F, G, H, I and J structure model for the east box-cut.

31 boreholes were drilled by cored (HQ3) method and to confirm the seams F, G, H, I and J model quality for the east box-cut.

From the drilling results, a detailed model for seams F, G, H, I and J was constructed and updated base of weathering end.

2018 exploration work is summarized in Table 7-4. Figure 7-7 illustrates boreholes positions for this program.

Table 7-4: Energy Resources 2018 borehole data summary

Year	Year	Company	Drilling type	Borehole	Total depth (m)
BN	2018	MMC	HQ-3	31	1322.0
			Open Hole	12	7013.2
Total				**43**	**8335.2**

(Source: Energy Resources LLC)

The results of the 2018 program showed that areas in the mine were very complex in regards to continuity and coal quality. Further work was necessary to understand this complexity and location, versus the remaining deposit and how this would affect future mining and planning.

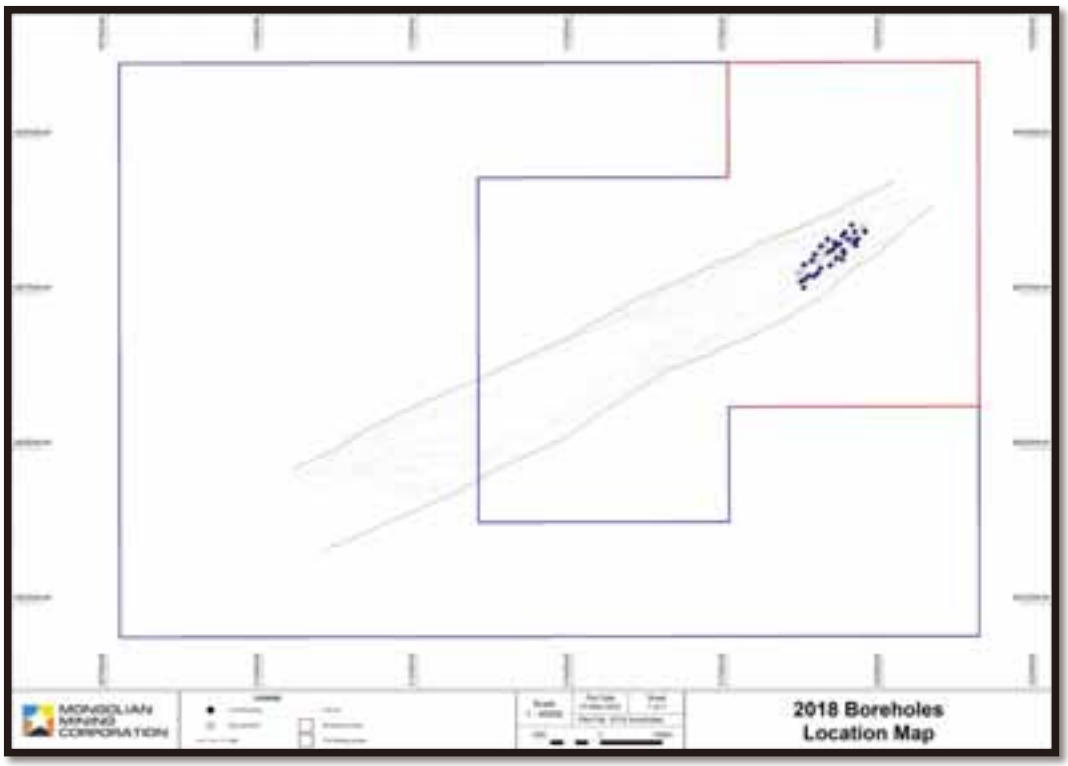


Figure 7-7: 2018 boreholes by borehole type for BN

Including all available data over the various periods of exploration, the database available for modelling the resource estimate consisted of 700 boreholes (refer Figure 7-8). The approximate amount of drilled metres over this period was 174,708 m of which approximately 141,316 m was cored and 33,392 m was openhole.

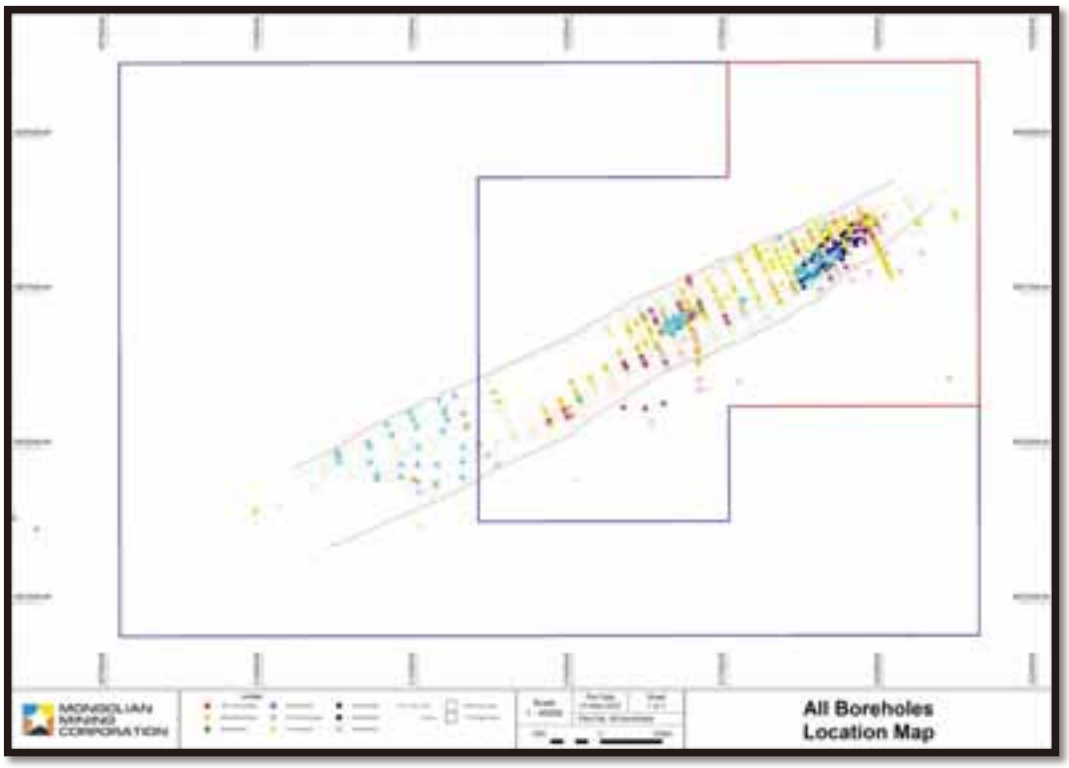


Figure 7-8: All boreholes BN and THG

(Source: Energy Resources LLC)

During 2011, a 2D seismic program was trialled using a Canadian based company, Polaris International (Polaris), to collect the data and Velseis Pty Ltd (Velseis) based in Australia to design, process and interpret the results. The trial was very successful in demonstrating that the area was conducive to acquisition of high resolution 2D seismic. 73.51km of 2D high resolution seismic data was collected in 2011 (refer Figure 7-9 – angled grey lines).

The combined results of the drilling and seismic have provided great confidence with the seam correlations and continuity for this resource estimate. Appendix 13 contains the final reports from Velseis and Polaris for the overall seismic program.

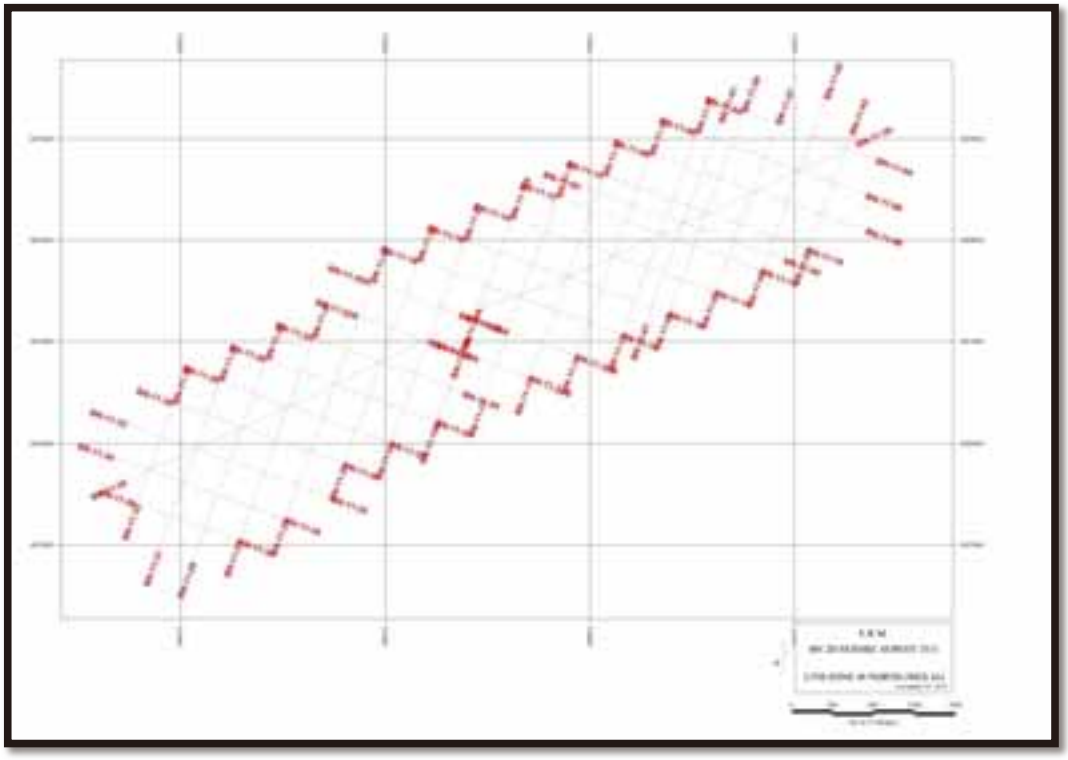


Figure 7-9: Seismic program for BN

(Source: Energy Resources LLC)

7.2 Geophysics

7.2.1 Seismic survey

Polaris Seismic International was awarded the contract to conduct 2D Land High Resolution Seismic Survey at BN in 2011. The objective was to gain information regarding the stratigraphy and structure of the many coal seams and seam splits in this area, as represented in particular by the H, I, J, N and T seams. A particular aim of the interpretation was to determine any major structural or stratigraphic features which could impinge on the deposit's resources and reserves.

The survey area comprises a tightly folded coal measures sequence, with very steeply dipping limbs and an inclined fold axis. In particular, the northern limb which may be overturned in places.

The 2D BN 2011 seismic program recorded 39 dynamite lines totalling 73.51km using Roll On and Roll Off methodology and dynamite as the source (refer Figure 7-9). The reports for both programs can be viewed in Appendix 13.

Once the raw seismic data was collected, it was passed onto Velseis Processing Pty Ltd for final processing and migration with subsequent interpretation. All the final interpreted seismic lines are shown in Appendix 10. The final report for this exercise can be found in Appendix 13.

7.2.2 Downhole Geophysics

All geophysical downhole borehole surveys of 2005-2018 drilling were carried out by Monkarotaj LLC with the 2012 and 2014 program completed by Lithopro LLC. The logging system used by Monkarotaj and Lithopro were made by Auslog Pty Ltd (Australia) and the full details of the equipment can be found in Appendix 16. The geophysical logs produced include gamma, density, resistivity and calliper. Hard copy logs were supplied to the field geologists with a set of digital Log ASCII Standard (LAS) files. The standard of this service has been average at best.

7.2.3 Gradient- array resistivity survey

A gradient-array resistivity survey was undertaken by Geomaster LLC in July 2005 with more than 13km along the BN valley. Monmap, a surveying company from Ulaanbaatar, Mongolia, surveyed the grid lines.

The program was extended in 2006 to extend the gradient array survey over shallow Permian subcrop to the west of the BN valley. This survey covered another 15.5km^2 area. The results were high level and provided some guidance with understanding the deposit.

8 QAQC

8.1 Drilling Method

8.1.1 Drilling Method prior to 1993

The drilling equipment used during this time of exploration prior to 1993 were, stationary drilling machines ZIF-650M and ZIF-1200 MR, assembled on metal sledges with a tower of MRUGU- category.

Drilling pumps NB 32 or 2 GRI, pipe rotating machine RT 1200 M and power unit DESS 60P assembled on a portable trailer.

Drilling work at all deposits was undertaken with utilization of hard-alloy crowns of SA-3, 4 categories combined to steel drilling unit of 50 mm diameter, connected by clutch-lock coupler. Elevator of MZ-50/80 category with diving heads was also used.

8.1.2 Drilling Method QGX

8.1.2.1 Drilling 2005-2006

AIDD and Major Drilling were contracted to complete this drilling program. The drilling equipment used was a UDR-650, UDR-1000 and Longyear 44. Openhole drilling and coring (HQ and PQ) were completed by these rigs. Openhole boreholes were drilled by poly-crystalline diamond (PCD) and reverse circulation (RC) drilling methods. *Most of the holes were drilled at an angle designed to intersect seams at as close to right angles as possible, attempting to minimize apparent thickness issues, (NI 43-101 Technical Report, 2007).*

Borehole completion reports were completed for each borehole, which recorded all drilling and recovery information for the borehole.

Core recoveries were generally high with boreholes with poor recoveries re-drilled.

8.1.2.2 Drilling 2007-2009

Drilling in 2007-2009 was carried out by AIDD, Major drilling and Tanan Impex companies to complete the drilling program for the deposit. Drilling equipment used were Longyear 44, UDR 650 and YDX-3L and drilled HQ sized core holes and openholes by PCD and RC methods.

8.1.3 Drilling Method ER 2011 – 2012, 2014

Drilling in 2011-2012 was carried out by Elgen LLC's drillers using diamond drill rigs. The rigs used were manufactured by Hanjin Drilling Co. Ltd in South Korea and PQ and HQ sized core was attained. At any one time up to 2 drilling rigs were being operated. Total 10 bulk boreholes were drilled with 6 inch core.

Drilling in 2014 was carried out by Gandrilling LLC to complete the drilling program for the deposit. Drilling equipment used were PW7000, PW9000 and PQ and HQ sized core was attained.

Initial core recoveries were measured at the rig by the drillers and confirmed by the rig geologist. These recoveries were recorded in the drilling sheet. Once the core was

being logged, the thickness of the core was measured against the geophysical logs and loss was logged in the lithology sheet.

8.1.4 Drilling Method ER 2018

Drilling in 2018 was carried out by Elgen LLC's drillers using diamond drill rigs. The rigs used were manufactured by Hanjin Drilling Co. Ltd in South Korea and PQ and HQ sized core was attained. Total 12 boreholes were drilled with RC.

Initial core recoveries were measured at the rig by the drillers and confirmed by the rig geologist. These recoveries were recorded in the drilling sheet. Once the core was being logged, the thickness of the core was measured against the geophysical logs and loss was logged in the lithology sheet.

8.2 Downhole Survey

8.2.1 Downhole survey QGX 2005-2006

Downhole survey was carried out by Monkarotaj LLC by geophysical method. All boreholes inclination and cavernometer was measured by Auslog geophysical equipment. WellCad software was used to process raw measurement data. Corresponding exploration geologists supplied basic inclination and azimuth information to the geophysical team before geophysical measurements. Inclination equipment was entered to the borehole after resistivity and gamma.

8.2.2 Downhole survey QGX 2007-2009

Downhole survey of BN from 2007 to 2009 was also carried out by Monkarotaj LLC by geophysical method same as 2005- 2006 program. Same equipment was used to measure inclination of the borehole.

8.2.3 Downhole survey ER 2011-2012, 2014

Downhole survey of BN from 2011-2012 was carried out by Elgen Drilling LLC's drilling team under the instruction of ER geologists.

Downhole survey of 2014 was carried out by Gandrilling LLC's drilling team under the instruction of ER geologists.

Survey equipment used was Reflex EZ-Trac 6620 from Australia. Azimuth, inclination, magnetic field, mag.dip, gravity and temperature C° every 20 meters were recorded.

8.2.4 Downhole survey ER 2018

Downhole survey was carried out by Elgen Drilling LLC's drilling team under the instruction of ER geologists.

Survey equipment used was Reflex EZ-Trac 6620 from Australia. Azimuth, inclination, magnetic field, mag. dip, gravity and temperature C° every 20 meters were recorded.

8.3 Trenching

8.3.1 Previous trenching (Khosbayar et.al.)

During the exploration program in 1983, the Soviet Mongolian Team dug three trenches with a total length of 1,340m to understand setting of the coal seams. Six coal

seams with apparent thickness of 4 meters were identified during preliminary exploration program.

8.3.2 Trenching QGX (2005-2009)

On 18 April, 2005 QGX started trenching in BN deposit to expose and map coal seams along strike from previous boreholes in preparation for the QGX drilling program (Figure 8-1).

Total 40 trenches, ranging from 20 to 2,600m in length, were excavated by QGX for a total length of 19,026m. Trench depths ranged from 4 to 7m. For safety reasons, trenches were mapped using sample rock piles collected by the excavator approximately every 5 meters. Access ramps were excavated at roughly 50 m intervals, or wherever there were key exposures, to collect more precise structural measurements and lithological data. A bulldozed was dedicated to each excavator so that trench could by reclaim on a daily basis immediately after trenches were mapped. Typically no more than 100m trench remained open at any one time.

Trench exposures were mapped at a scale of 1:400 for lithology and structure. Because of the highly weathered nature of trench exposures, coal samples were not collected for quality analysis. Trenching was initially intended for locating coal seams and guiding drilling during the early stages of the project. Given the success of gradient-array surveys, trenching was phased out by the end of August 2005 (NI 43-101, Technical Report, 2007).

Figure 8-1: QGX trenching at Baruunnaran

(Source: QGX)

8.3.3 Trenching ER (2011-2012)

No trenches were excavated in BN area during ER exploration work. However, in 2012 a total of 3,330.5m which included 7 trenches were excavated in the THG area to understand the structural setting of the coal outcrop.

8.4 Borehole Collar and Topography Survey

8.4.1 Survey Method prior to 1983 (Khosbayar et.al.)

The Tavan Tolgoi deposit area was provided with topographical map of 1:100000 scale with relief sections in each 20m. In the area of prospected deposits there were second category posts of the national ground triangulation. Moreover, in this area mapping of 1:25000 scale had been carried out involving an area of 700km^2 with horizontal relief sections provided to 5 metre intervals. Topographical maps of the Ukhaa khudag, The Eastern and Bortolgoi deposits were drafted from an enlargement of the regional 1:25000 scale topographic map. All geology-exploration work was coordinated in accordance to GUGK of MPR (Coordinate catalogue) and was captured using the "Tpeo 020a" category theodolite and theodolite motion method of mapping.

8.4.2 Survey Method QGX (Norwest 2008)

Monmap Engineering Services Co. Ltd. (Monmap) was used for all survey requirements for this program. Monmap is a reputable Mongolian land survey company. The surface topography data was comprised of digital AutoCAD format surface contours at 2m elevation intervals. The data was spatially referenced using the UTM (WGS84 projection) and all elevation contours were in meters above mean sea level. Topographic data was obtained using real time kinematic GPS ground survey on a dense grid and closely spaced data points on crests and toes of surfaces showing more than the relatively flat relief characteristic of the resource area.

During the 2008 drilling program Norwest geologists conducted field surveys to confirm the surface exposure (or absence) of coal bearing sediments as mapped and interpreted by previous geologists. Norwest did not identify any surface geology that departed from available geological maps and interpretations. Publically available satellite imagery (Google Earth) was used in validating the previous Russian surface geology mapping. Additionally, approximately 80% of the historic Russian drill locations were relocated during field mapping and staked for GPS base station surveys along with the borehole locations from the 2008 program.

8.4.3 Survey Method 2009 - present

The topographic and borehole collar survey was carried out by ER Mining's own survey team using Trimble equipment. The topographic survey was carried out in 2008 and the borehole collar survey was carried out during the exploration period in 2009-2014 and 2018. Figure 8-2 and 8-3 shows a difference map comparing the grid based on borehole collars and the grid based on topography.

Most differences in BN are less than 1.5m, which is acceptable with a few areas greater than this around a couple of borehole sites and the boundaries where there is no borehole control, specifically in 2 pits. It is recommended that the few areas where there is a larger than 1.5m difference be resurveyed for topography and borehole collar (Figure 8-2).

There is no difference in more than 1.5m in the THG area, which is very acceptable. It is not recommended to resurvey borehole collars in THG area (Figure 8-3).

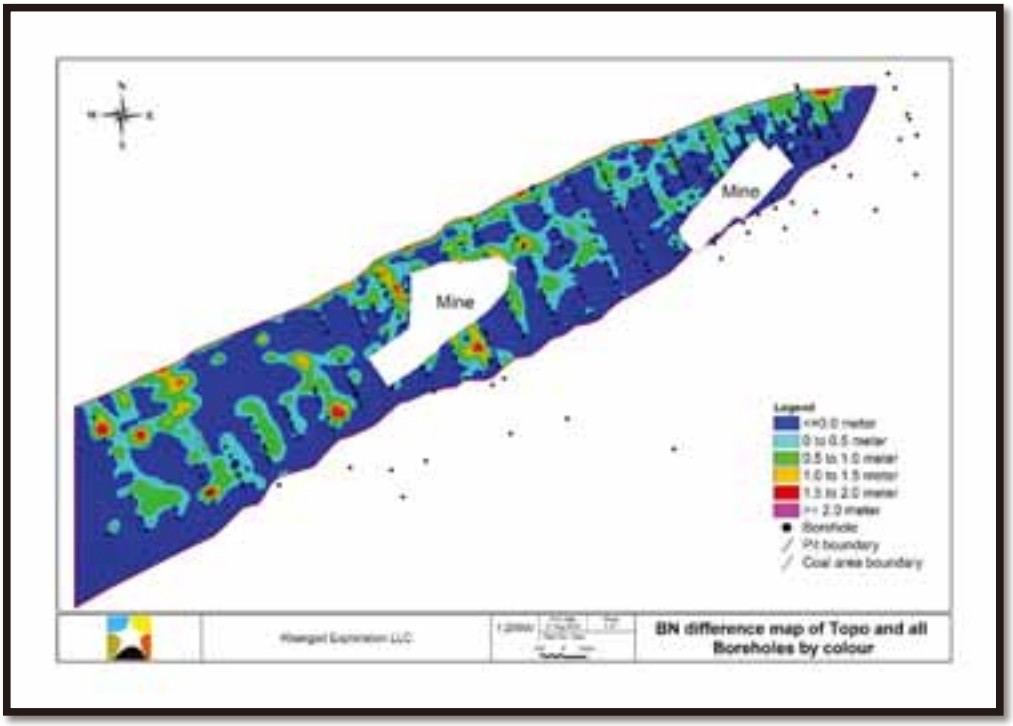


Figure 8-2: Difference map of Collar survey and Topography survey Geophysics of BN

(Source: Energy Resources LLC)

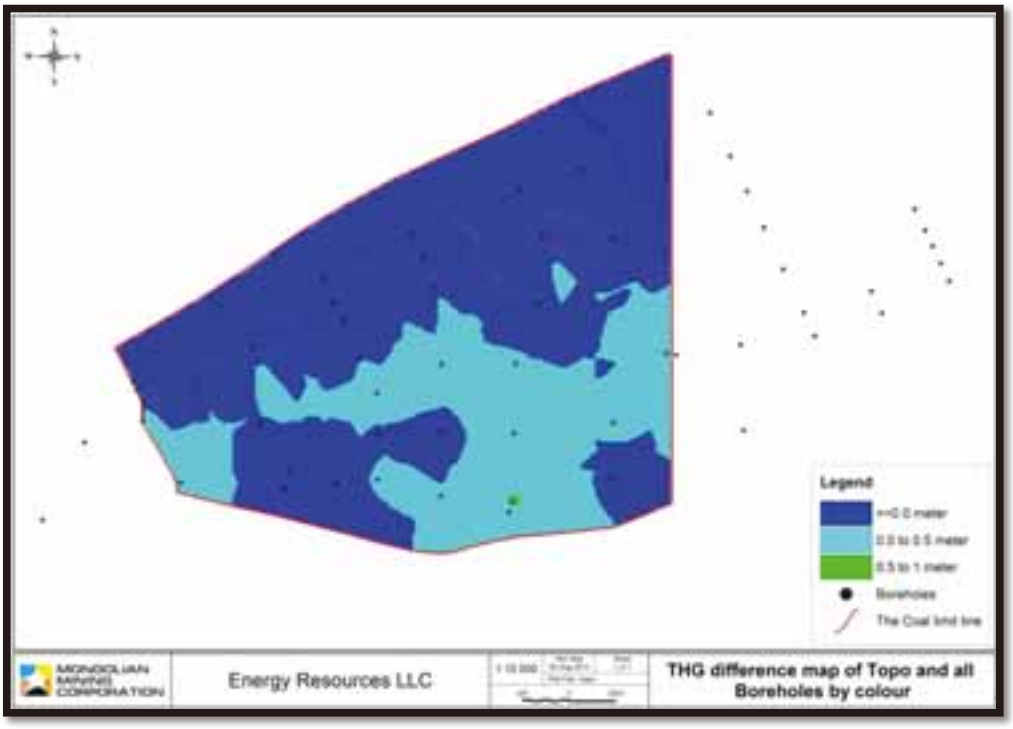


Figure 8-3: Difference map of Collar survey and Topography survey Geophysics of THG

(Source: Energy Resources LLC)

8.5 Geophysics

8.5.1 Geophysics Method prior to 1993

Surveys of seams were carried out with utilization of logging station SK-1-74 combined with stationary apparatus and equipment. Cable of KTZ-67-180 type graduated with depth identifiers for every 10 m. Calibration and graduation of radiometric (KURA-2) and inclinometer apparatus were made in conformity with instruction for geo-physical survey of boreholes", so calibrations were made once a quarter or after each repair. Diagrams were registered in 1:200 surveyed scale and in 1:50 detailed scale. Quality and accuracy of measurements were evaluated visually in comparison with basic examination records. Records on examinations of graduation were made once a quarter in presences of officials from geological team of the crew. Logging surveys were carried out to decide the following geological tasks:

Identification of coal seams within the boreholes sections and definition of thickness and depth of their location,

- *Determination of symmetry of coal seams and correlation of the sections,*
- *Lithological differentiation of mine rocks,*
- *Study of the tectonic conditions of borehole's wall,*
- *Determination of spatial location of borehole's bore.*

To decide the above geological tasks following sets of geophysical methods were use:

- *Method of pseudo resistance (KS),*
- *Method of natural radioactivity (GK),*
- *Method of infused gamma ray (GGK-P),*
- *Inclinometer (IK),*
- *Zawn-meter (KM)*

After completion of measurements in boreholes, preliminary data related to depth and structure of coal seams was given to geological authority and then results of the complete interpretation of logging diagram as geology-geophysical sections for each borehole were transferred within the defined term of time.

8.5.2 Geophysics Method QGX

8.5.2.1 Geophysics QGX 2005-2006

Iin April 29, 2005, drillholes BN05001C through BN05061RC were logged for downhole gamma, density, resistivity and caliper using analog equipment and staff provided by Monkarotaj, a wire-line logging company based in Ulaanbaatar. In July 3, 2005, all drillholes were subsequently logged using digital downhole technology provided by Auslog, an Australian wire-line logging company. Mr.Chris Brazel of Auslog trained Monkarotaj surveyed all holes using Auslog digital equipment. This system has remained standard throughout the rest of the 2005 and 2006 drilling

campaigns. Some post-processing of these logs has been carried out using WellCad software to standardize their appearance and minimize the dampening effects of density logs having been run inside the drilling rods, (NI 43-101, Technical Report, 2007).

8.5.2.2 Geophysics QGX 2007-2009

Geophysical logging of the exploration boreholes between 2007- 2009 were also measured by Monkarotaj LLC. Same with the previous years of exploration, gamma, density, resistivity, caliper and inclinations were measured. QGX followed the rule of not inserting radio-active elements using equipment without metal pipe, therefore all radio-active equipment was inserted within pipes into the ground.

8.5.3 Geophysics Method ER 2011 – 2012, 2014

Geophysical logging was carried out by Monkarotaj LLC in 2011 and Lithopro LLC in 2012. The curves that were used were natural gamma, gamma-gamma, density, resistivity, sonic and caliper.

The consistency of all geophysical data in LAS format supplied by both companies was reviewed prior to being processed in LogCheck software. This generally occurs through various audit functions within LogCheck software. The audit revealed that the LAS data resolution varied between 5cm, 2cm and 1cm for the various parameters.

LAS thickness for various coal sequences were then compared to the lithology log thicknesses (and where necessary coal core photography). Where there were differences, the lithology data was corrected (adding core loss) to match the LAS thickness for various coal seams to ensure the lithology data matched the LAS. In general, this would mean the addition of a core loss code to ensure that the original lithology log was not altered in any 'drastic' manner. The drilling records were also referenced to ensure integrity in the final production of the lithology log.

Two calibration boreholes in UHG (G02251 and R00020) were setup to regularly test all logging tools as they came onto the site and at regular periods whilst onsite.

8.5.4 Geophysics Method ER 2018

Geophysical logging was carried out by Monkarotaj LLC. The curves that were used were natural gamma, density, resistivity and caliper.

The consistency of all geophysical data in LAS format supplied by Monkarotaj LLC was reviewed prior to being processed in LogCheck software. This generally occurs through various audit functions within LogCheck software. The audit revealed that the LAS data resolution varied between 5cm, 2cm and 1cm for the various parameters.

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Two calibration boreholes in UHG (G02251 and R00020) were setup to regularly test all logging tools as they came onto the site and at regular periods whilst onsite.

8.6 Seismic

In 2011, 2D high resolution seismic study was done in the BND. Polaris Seismic International LLC (Canadian hosted company) was used to acquire raw data from BND from August to September 2011 and comprised 39 dynamite lines with total length of 73.51km (Figure 8-4). All raw measurements were processed and interpreted by Velseis Processing Pty from September to November 2011.

The purpose of the seismic survey was to gain information regarding the stratigraphy and structure of the many coal seams splits in BND, as represented in particular by the H, J, T and N seams. A particular ain of the interpretation was to determine of there are any major structural or stratigraphic features which could impinge on the deposit's resource and reserve. The survey area comprises a tightly folded coal measures sequence, with very steeply dipping limbs and an inclined fold axis. In particular, the northern limb is often vertical and maybe overturned in places. In order to reduce the apparent steepness of the fold limbs the seismic lines were inclined at about 45 degrees to the fold axis, a produce of benefit mainly in the region south of the axis. Further, nearly all drillholes are steeply deviated up dip to the north of south. These factors in combination have made seismic/drilling correlation difficult. (BN 20 Seismic Survey 2011, Velseis Processing Pty, 2011)

For additional information, please refer Appendix 13 and 10

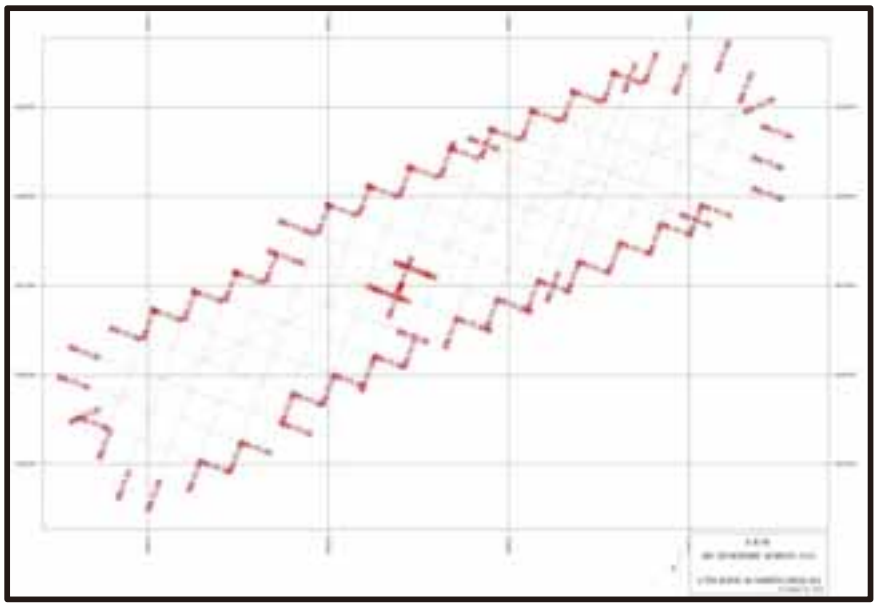


Figure 8-4: BN area seismic lines plan map

(Source: Velseis Processing Pty)

8.7 Geological Logging and Sampling

8.7.1 Mongolian-Russian Logging and Sampling prior to 1993

Sampling work had been provided to identify the banded contents and group of coal seams and to define the variation rules of the basic quality indicators of coal: ash-contents, volatiles, and thickness of plastic rock beds for simple samples for all seam-intersections and investigation of petrographic contents of coal, physical and mechanical properties of included rocks.

Collection of samples was made from all surveying boreholes. Testing has been undertaken with utilization of differential or differential-sectional methods. All coal seams and rocks of the different lithological contents were subjected to sampling. To select cored, coal samples the following method was used: Core was installed in the drill core box in such sequence, for which it will be derived from core barrel. Washing of core with clean water was used only for whole cylinders or large size fragments by hand, but fine-grained and crushed coals are not recommended for washing in the field conditions to avoid distorting of samples because of loss of any lithotypes. Interval length included in the sample has been estimated depending on thickness of a split or coal seam of any lithotype. Usually in average it equals to 1.0-1.5 m, but sometimes was more when really homogeneous components were sampled separately. If drill core contains some intersections of original lithological component, they were selected together in one sample. Then these intersections were verified through logging. Sometimes, if separation of rock intersections from coal splits was not possible they were selected together with coal, which were recorded in appropriate documents. For the calculation of medium-weighed quality indicators of coal for seam intersections, the results of analyses made for such samples were related to appropriate complicated structure interval of a seam without any amendment. In such cases, a complicated structure interval as a rule was defined and accepted through logging. Core recovery for coal was determined with utilization of volumetric and linear methods into sample divisions, which were organized by crew. Coal core documents were also examined there and completed preparation of samples, labelling and packing into the synthetic bags was made. Selected samples were sent monthly to laboratory.

8.7.2 QGX Logging and Sampling

All field logging and sampling was undertaken and supervised by QGX. Only borehole core samples were assayed. Coal assays were separated into the following:

- *Field samples, usually no more than 0.5m of core length.*
- *Incremental samples consisting of combined groups of field samples based on consistent lithological units interpreted from core and geophysical logs.*
- *Physical composite samples, consisting of combined incremental sample intervals representing logical mining or integral coal seam units.*
- *Large diameter (150mm) core samples of key seams for washability analyses, processing plant simulation and metallurgical characterization.*
- *Geotechnical rock strength samples taken of waste (non-coal) and coal core.*
- *Acid Generating Potential (AGP) samples taken of waste (non-coal) core.*

All coal quality analyses of incremental and physical composite samples were performed by SGS Laboratories, Tianjin, China and ACIRL. SGS Tianjin was also charged with the washability and metallurgical characterization analyses.

8.7.3 ER Exploration-Logging and Sampling

Core logging and sampling procedures were developed by Mr Ballantine and include procedures for drilling, core handling, geological and geotechnical logging, sampling and data recording and data entry (Appendix 2).

The following process was carried out by the Energy Resources Geologists:

- Core pumped into PVC split.
- Core marked up (if drilling at night and coal is intersected core secured in the PVC split to be processed the next day in better light).
- Core cleaned.
- Recovery measured.
- Core geologically and geotechnically logged.
- Core photographed wet and dry in core box.
- Coal, rock (Geotech), roof and floor samples collected.
- Geophysically logged.
- Reconciled coal depths and sample intervals against the geophysical log.

8.7.3.1 Geological Logging

Geologists carried out detailed lithological and coal logging, which included descriptions of the depth, lithotype, colour, estimated strength, weathering, bedding, sedimentary structures, fossils and minerals (Appendix 2). Photographs were taken of all the cored sections. An example can be viewed in Figure 8-5.

Figure 8-5: Example of core photographs

(Source: Energy Resources LLC)

Once all logging was completed and corrected to the geophysical data such that the two datasets were consistent, the downhole coal data was correlated by the CP to ensure that coal seams were consistently correlated across the deposit. This process is generally a sectional process where the various boreholes were plotted along section lines and the neighbouring holes were checked for seam correlation. The correlation is built up in a multi-directional sense to ensure that the seam consistencies are valid in all directions. The LogCheck software is a very powerful tool for doing this work quickly and accurately. Northeast-southwest sections created from LogCheck can be viewed in Appendix 9.

8.7.3.2 Sampling

Coal intervals of 0.50m or less, not including any rock partings, were considered to be coal plies and were sampled. Each coal sample and rock parting was sampled separately. Individual coal samples (without rock partings) had a maximum length of 2.0m. Coal samples were selected on coal brightness to reflect differences in CQ.

The geological procedures (Appendix 2) required rock partings of 0.02m to be sampled with the coal and rock partings over 0.02m were to be sampled separately. Rock partings equal to or less than 0.02m with coal on either side were considered to be in-seam rock partings and were to be sampled. Rock partings greater than 0.50m in thickness were considered to be a parting between two coal seams and were not sampled. In addition, a 0.30m sample of the immediate roof and the immediate floor of each coal seam were collected. These were analysed to estimate the effect of diluting the coal if some roof or floor rock was mined with the coal. This data will be used in the reserve estimate.

All samples were wrapped in double plastic bags, which were securely closed with zip ties. The plastic bags were marked with the borehole number, the sample number, the sample interval and the sample type (i.e. rock or coal). A sample ticket with the same information was also placed between the two sample bags. The samples were stored in a freezer (Figure 8-6) before being analysed by the onsite ER laboratory.

Figure 8-6: Photograph of freezer where coal samples were stored while waiting for analysis

(Source: Energy Resources LLC)

Lithology logs were updated with the sample number as despatched to the laboratory. These sample numbers were then cross referenced (by depth and thickness) to the coal quality data once it was received from the laboratory. For further information review Appendix 2.

8.8 Analytical Method

8.8.1 Analysis before ER

Research of coal quality of BN deposit before ER was executed by SGS laboratory in Tyanjin, China and ACIRL in USA. Detailed coal analysis, washing characteristics was also tested in SGS and ACIRL.

Crushing and processing of coal samples were carried out in the SGS and ACIRL in accordance with the scheme developed in advance and immediately sent to the coal

chemical division and to the section responsible for enrichment. There after crushing and processing backup samples were selected from the original ones which were kept at the storage of central geological crew.

Coal and petrographic explorations of coal were executed by American accredited petrographers at ACIRL laboratory.

8.8.2 Analyses of Energy Resources

All samples were analysed at the Energy Resources Central Chemical Laboratory (ERCCL), which is located onsite at BN and UHG mines. With respect to sample preparation, the top size of the sample was reduced and split into two quarters and one-half portions. The sample preparation took into account the top size of the sample material required for each of the analytical determinations. One of the quarter portions was used for analysis and the remaining portions were retained.

Coal samples were analysed for:

- True relative density MNS GB/T 217: 2015
- Total moisture MNS ISO 589:2003
- Analytical moisture MNS GB/T 212: 2015
- Ash MNS GB/T 212: 2015
- Volatile matter MNS GB/T 212: 2015
- Calorific value MNS ISO 1928:2009
- Total sulphur ASTM D4239:2005
- Crucible swelling number MNS ISO 501:2003
- Caking index MNS GB/T 547:1997

Rock samples were analysed for:

- True relative density MNS GB/T 217: 2015
- Total moisture MNS ISO 589:2003
- Analytical moisture MNS GB/T 212: 2015
- Ash MNS GB/T 212: 2015
- Total sulphur ASTM D4239:2005
- Volatile matter MNS GB/T 212: 2015

Under an instruction from the Coal quality specialist Tsolmon Adiya and Competent Person the coal quality data was checked for basic integrity, typing errors and poor data in general. Poor data was retested using residual sample material.

8.8.3 Accreditation

The ER Central Chemical Laboratory was accredited to ISO/IEC 17025:2017(MNS ISO/IEC 17025:2018) standard on May 2012 and this accreditation was renewed on November 2020 till 2023. Laboratory audits were completed in October 2010 and March 2012 by competent independent bodies to assure training, standards and procedures were being met. These audits are described in the following section and the

full reports appear in Appendix 12. Figure 8-7 is the current accreditation certificate provided from The Mongolian Accreditation Center.

ИТГЭМЖЛЭЛИЙН ГЭРЧИЛГЭЭ

Дугаар **TL 24-04**

ISO/IEC 17025:2017 (MNS ISO/IEC 17025:2018)
стандартын шаардлагыг хангасан

"Энержи ресурс" ХХК-ийн
Өмнөговь аймгийн Ухаа худаг
дахь Төв лабораторийг

хавсралтад заасан итгэмжлэлийн хүрээнд
сорилт гүйцэтгүүлэхээр итгэмжлэв

Анх итгэмжлэл авсан огноо
2012.05.02

Олгосон огноо: 2020.11.05
Дуусах огноо: 2023.07.07

ДАРГЫН АЛБАН ҮҮРГИЙГ
ТҮР ОРЛОН ГҮЙЦЭТГЭГЧ

С.СОРОНЗОНБОЛД

0000044

APAC

Figure 8-7: Laboratory Accreditation Certificate

(Source: MNAS)

8.9 Laboratory Inspection

The previous Mr Gary Ballantine, the former General manager of the Geology and Business Development assisted and then managed the setup of the ERCCL, Energy Resources LLC onsite laboratory. All mine pit, stockpile and borehole core samples collected were analysed using the onsite laboratory. The current Competent person succeeded in assisting the onsite laboratory.

The Mr Gary Ballantine, the previous Competent Person thought it was prudent to have lab audits done as he was not a laboratory expert, and an independent party should provide this service. The laboratory was audited twice during the ER exploration programs to provide confidence in the laboratory results. The laboratory was accredited to ISO/IEC 17025:2005(MN ISO/IEC 17025:2007) standard in May 2012, May 2017, and November 2020 (refer Figure 8-7). A summary of these inspections follow and the full reports from these inspections are found in Appendix 12

8.9.1 Laboratory Inspection October 2010

The first audit was carried out from 12th to 14th October 2010 by John Snijders, QHSE-Manager from the Stewart Inspection and Analysis B.V. located at Rotterdam, the Netherlands and part of the Stewart Group. John Snijders leads the quality team in the Netherlands which are ISO 17025 accredited on Solid Fuels by the Dutch Accreditation Council as from 27 June 2003.

The general results from the inspection follow and the whole report can be viewed in Appendix 12.

- *I was impressed by the structured way of working and documenting. If this lab should apply for an accreditation, it would probably be certified with only some small adjustments which have to be made.*
- *The objectives as mentioned in the introduction can be concluded as follows:*
- *Procedures and manuals are present for all machines, ovens, scales and methods. These procedures have also been evaluated and found in accordance with the present standards.*
- *All procedures as set on paper are carried out as mentioned by the analysts. All is done in a very clean environment which is cleaned on a regular base by a special crew. Health & Safety is a big item in which everybody has to work with the rules set by Energy Resources LLC.*
- *Machines are not older than 2 years and therefore in perfect condition. All analysts have had sufficient training before performing analysis on their own.*
- *The packing of the taken samples outside and the open window in de preparation shed are the only majors which we can address while an analyses result can never be accurate is the sample is contaminated by outside influences.*
- *Therefore if we look back to the key objective we can say that with reference to our recommendations the quality level is already on a high level and would only be even better when our recommendations are followed up.*

8.9.2 Laboratory Inspection March 2012

The second audit was carried out between 12th – 13th March 2012 by Barry Drew, Project Manager, from ALS Mongolia, located in Ulaanbaatar, Mongolia and ALS Coal Brisbane, located at Richland's, Australia.

The purpose of this visit was to evaluate the methods and quality system used at the laboratory in preparation for the upcoming application for ISO17025 accreditation. This report will focus on the methods used at the Central Coal Laboratory. The key objective in this work was to provide Energy Resources LLC with recommendations to improve their business practices and to help achieve their ISO17025 accreditation. Within this objective the following tasks were set up:

- Audit the existing procedures for sample preparation and analysis to the relevant standards.
- Audit the procedures against the actual work in progress.

The general results from the inspection follow and the whole report can be viewed in Appendix 12.

- *Work being performed at the Central Coal Laboratory was generally of excellent standard. I would like to thank all staff there, especially Mr Ganbat, Mrs Khantantuul and Mrs Temuulen whose assistance was much appreciated.*
- *I was most impressed with the dedication to accuracy and proper adherence to standard methods. The laboratory also has a well set out documentation layout which was examined and details provided in a separate audit.*
- *Staff was very friendly and it was a pleasure working with them.*
- *When this laboratory applies for accreditation, I have no doubt that it will most likely be certified with minor changes being required. If the work practices in the existing laboratory are carried over to the new site, Energy Resources will certainly have a high-class facility for their quality testing.*

8.10 Reproducibility of Analyses between Laboratories

8.10.1 Database

ERM laboratory prepared and analysed a number of samples and submitted duplicates of these samples for analysis at the SM Laboratory (ALS) (100 samples) and the UUH (The Mongolian Mining Institute) Laboratory (615 samples).

The ERM analytical results were compared to the other laboratories by means of cross plots and basic statistical parameters tabulated in Tables 8-3 and 8-4.

8.10.2 ERCCL Laboratory compared with SM Laboratory

The average, minimum and maximum values reported by the two laboratories for 100 samples are shown in Table 8-1. The average values and ranges of values compare as expected and both data sets show wide ranges in total sulphur values.

Table 8-1: ERCCL Laboratory and SM Laboratory compared.

Dry basis	ERM Laboratory			SM Laboratory		
	Av	Min	Max	**Av**	Min	Max
Analysis moisture	**0.90**	0.07	3.12	**1.09**	0.60	2.34
Ash	**31.54**	7.59	80.24	**32.01**	7.63	80.80
Volatile matter	**19.90**	8.90	31.66	**19.42**	8.62	31.13
Total sulphur#	**1.12**	0.15	14.76	**1.21**	0.15	25.19
Calorific value	**5736**	1063	8143	**5874**	1478	7848
True relative density	**1.65**	1.35	2.81	**1.70**	1.39	3.06
Free swelling Index	**2.2**	0.0	7.0	**2.6**	0.0	7.5

**Note: Free Swelling Index (FSI) = Crucible Swelling Number (CSN)*

(Source: Pretorius)

Table 8-2 shows the average values reported by ERCCL and the percentage point differences between the ERCCL and SM values. A negative average difference indicates that the ERCCL values are higher, or overstated when compared to the SM values.

Table 8-2 shows that the ERCCL values for volatile matter were overstated and all the other parameter values were under stated when compared with the SM results.

Table 8-2: Average ERCCL values and differences compared.

	Average value	Average difference *	Minimum difference	Maximum difference
Analysis moisture	**0.90**	**0.20**	-1.07	1.08
Ash	**31.54**	**0.47**	-1.00	3.61
Volatile matter	**19.90**	**-0.48**	-1.40	0.72
Total sulphur	**1.12**	**0.09**	-2.86	19.62
Calorific value	**5736**	**140**	-3333	5896
True relative density	**1.65**	**0.04**	-0.08	0.24
Free swelling Index	**2**	**0**	-2	3
*Negative difference = ERM values are lower				

**Note: Free Swelling Index (FSI) = Crucible Swelling Number (CSN)*

(Source: Pretorius)

Various analytical standards list the limits of acceptable differences of analytical results between laboratories.

For a comparison of the analytical results, the limits of acceptable differences between laboratories as shown in Table 8-3 were used (Queensland Coals, Physical and chemical properties and colliery and company information, 12th edition).

Table 8-3: Reproducibility limits between laboratories.

Analytical parameter	AS 1038	BS 1016	ISO
Ash (10 – 20%)	0.25	0.40	3% of average
Volatile matter (>10%)	1.00	1.00	0.50
Sulphur (<1.5%)	0.08	0.10	0.10
Calorific value	72	72	72
True relative density	0.03		
CSN	1	1	1/2

*Note: Crucible Swelling Number (CSN) = Free Swelling Index (FSI)

(Source: Pretorius)

Note that these limits apply to certain ranges – only ash values in the range 10 – 20% are compared and values should be reproducible within 0.25 percentage points according to AS 1038.

Table 8-4 shows the percentages of the values that are within the acceptable limits of reproducibility of analyses between laboratories. In Table 8-4, the second column shows "n", which indicate the number of samples that were used according to the applicable ranges shown in the first column. As an example, in Table 8-4 for ash values n = 42. This indicates that 42 of the 100 samples have ash between 10 and 20% and that 52%, 81% and 83% of the results are within the acceptable range of reproducibility defined by the three standards respectively.

In theory all the samples should fall within the limits of reproducibility. However, the relative results indicate a high level of confidence (say about 90%) for sulphur reproducibility and a moderate level of confidence (say about 80%) for ash, volatile matter, and CSN reproducibility. The confidence in the reproducibility of the true relative density and calorific value is poor. On average the ERM Laboratory under states these quality parameters, except volatile matter, when compared to the SM Laboratory.

Table 8-4: Reproducibility of results between ERCCL and SM

Analytic parameter	n	AS 1038	BS 1016	ISO
Ash (10 – 20%)	42	52	**81**	**83**
Volatile matter (>10%)	96	**83**	**83**	**48**
Sulphur (<1.5%)	87	**90**	**92**	**92**
Calorific value	77	39	39	39
True relative density	100	32		
CSN	100	**86**	**86**	**66**

**Note: Crucible Swelling Number (CSN) = Free Swelling Index (FSI)*

(Source: Pretorius)

The ERCCL values are on average lower than the SM Laboratory results (except volatile matter) and are therefore considered to be more conservative or probably under estimated in the Coal Resources and Coal Quality Statement.

8.10.2.1 Analysis moisture

Figure 8-8 shows a comparison of analysis moisture determinations. Analysis moisture is the moisture content (air-dry) of the coal sample at the time of the analysis.

The average analysis moisture value reported by the ERCCL Laboratory is 0.90% and the SM Laboratory reported values that are on average 0.20 percentage points higher. In the range of 0 to 1.5% analysis moisture, the SM Laboratory reported higher moisture values and in the range 1.5 to 3.5% the SM laboratory reported lower moisture values

It can be expected that the reproducibility of analysis moisture values in different laboratories will vary according to the prevailing humidity conditions at the time of analysis. It is therefore necessary to compare the rest of the analyses on the same moisture level – in this exercise the coal quality parameters will be compared on a dry basis to exclude the effect of varying moisture content. The true relative density values were adjusted according to the Preston Sanders formula from an air-dry to a dry basis.

8.10.2.2 Ash

Figure 8-9 shows a comparison of ash determinations. The average ash value reported by the ERCCL Laboratory is 31.54% and the SM Laboratory reported values that are on average 0.47 percentage points higher. Of the total number of samples there were 5 samples that the SM Laboratory reported values that were more than 2 percentage points different from the ERCCL Laboratory results.

8.10.2.3 Volatile matter

Figure 8-10 shows a comparison of volatile matter determinations. The average volatile matter value reported by the ERCCL Laboratory is 19.90% and the SM Laboratory reported values that are on average 0.48 percentage points lower.

8.10.2.4 Total sulphur

Figure 8-11 shows a comparison of total sulphur determinations. The average sulphur value reported by the ERCCL Laboratory is 1.12% and the SM Laboratory reported values that are on average 0.09 percentage points higher. It appears that one of the laboratories made a typing error in the sulphur value for sample G332A-50P – a difference of 19.62 percentage points.

8.10.2.5 Calorific value

Figure 8-12 shows a comparison of calorific value determinations. The average calorific value reported by the ERCCL Laboratory is 5,736 cal/g and the SM Laboratory reported values that are on average 140 cal/g higher. There are 8 samples with differences between 1,000 and 6,000 cal/g.

8.10.2.6 True relative density

Figure 8-13 shows a comparison of true relative density determinations. The average true density value reported by the ERCCL Laboratory is 1.64 and the SM Laboratory reported values that are on average 0.04 units higher.

8.10.2.7 Free Swelling Index (equivalent of CSN)

Figure 8-14 shows a comparison of CSN values. The average CSN reported by the ERM Laboratory is 2.0 and the SM Laboratory reported values that are on average 0.5 units higher. All the SM Laboratory values differ by at least 1 unit form the ERCCL Laboratory values.

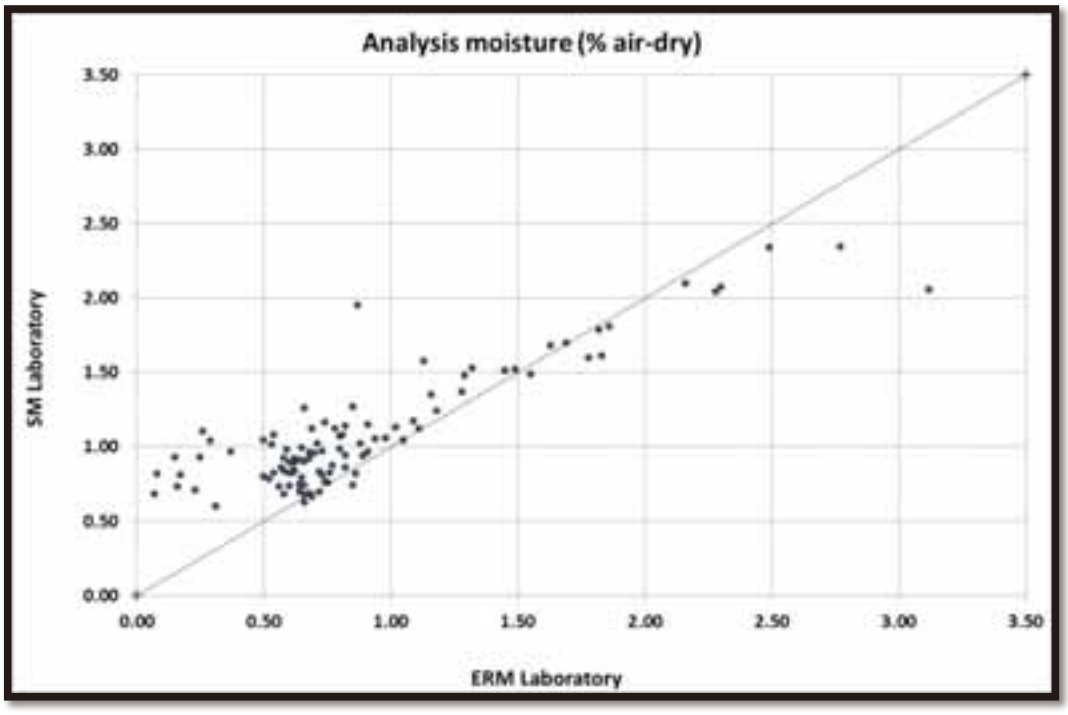


Figure 8-8: Comparison of analysis moisture determinations.

(Source: Pretorius)

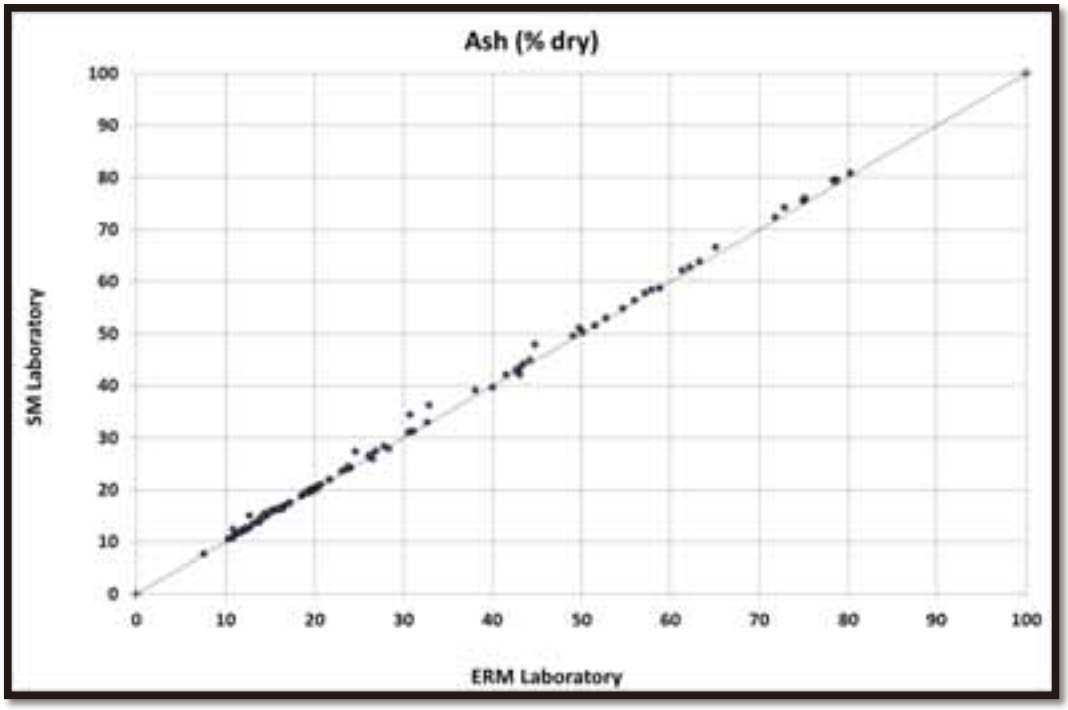


Figure 8-9: Comparison of ash determinations.

(Source: Pretorius)

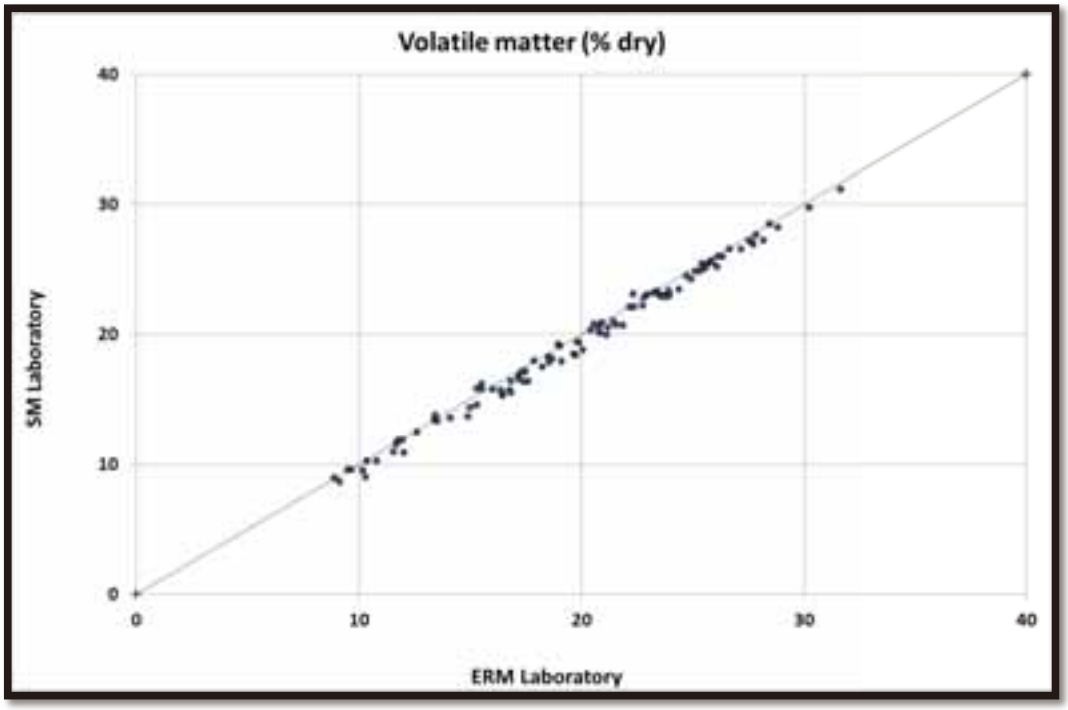


Figure 8-10: Comparison of volatile matter determinations.

(Source: Pretorius)

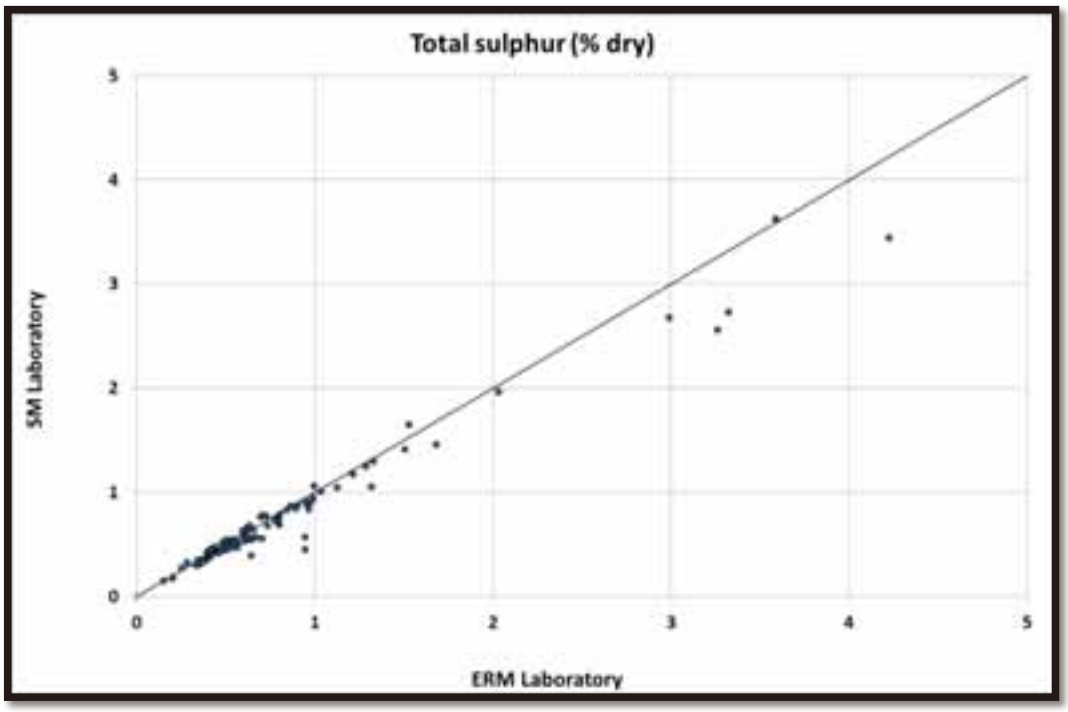


Figure 8-11: Comparison of total sulphur determinations.

(Source: Pretorius)

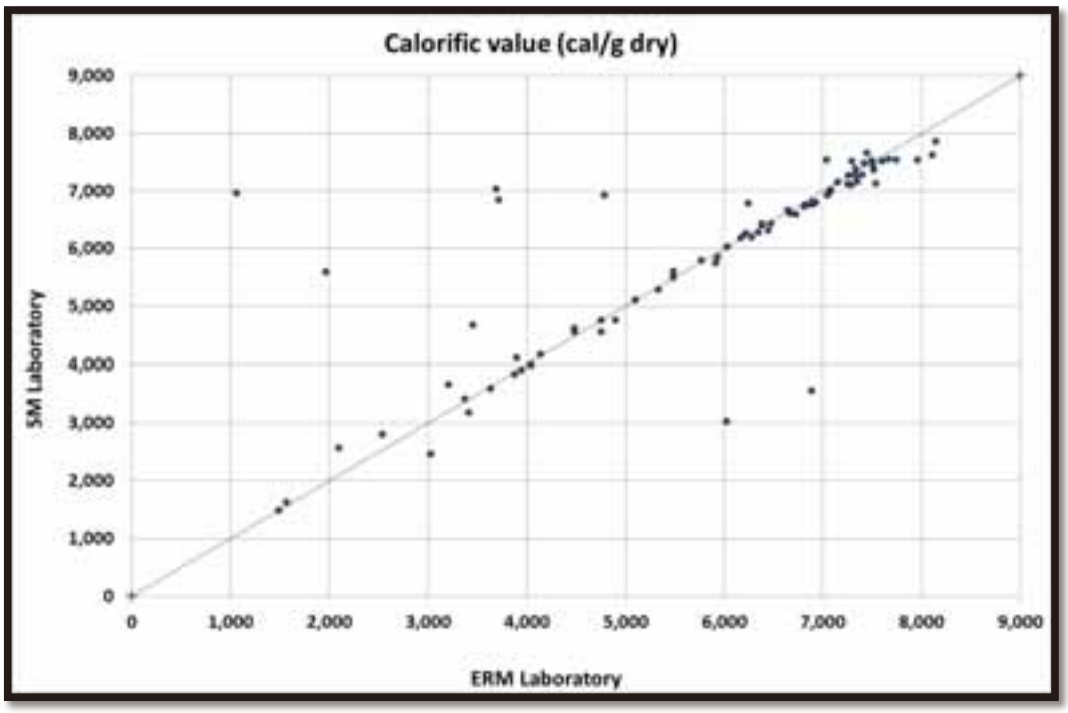


Figure 8-12: Comparison of calorific value determinations.

(Source: Pretorius)

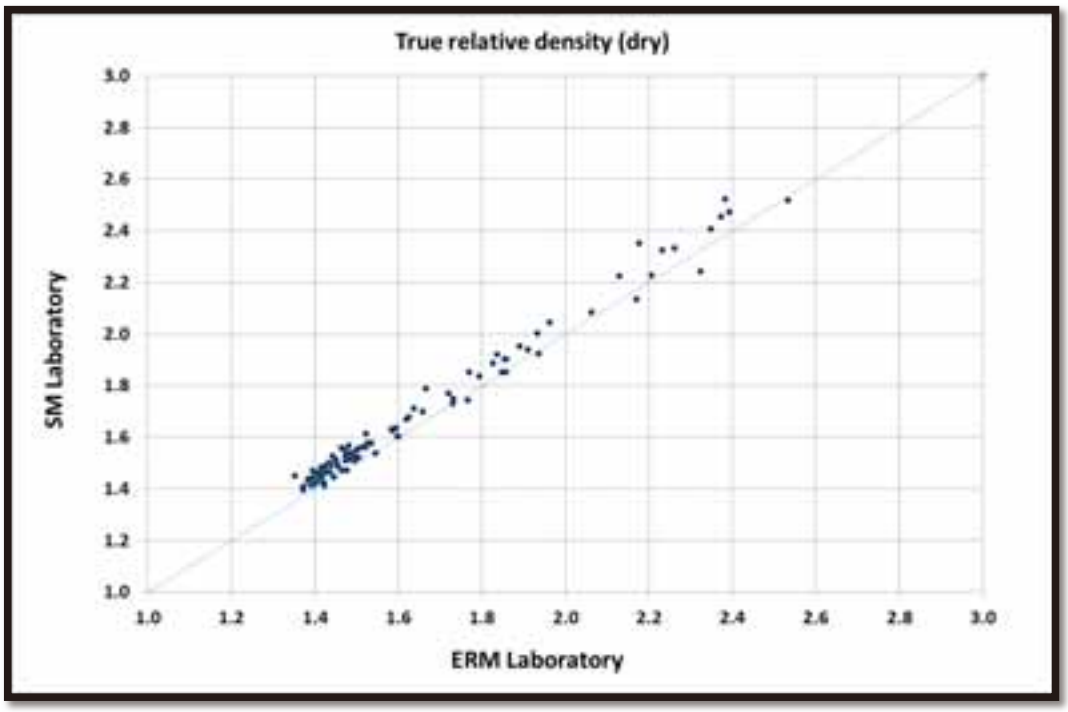
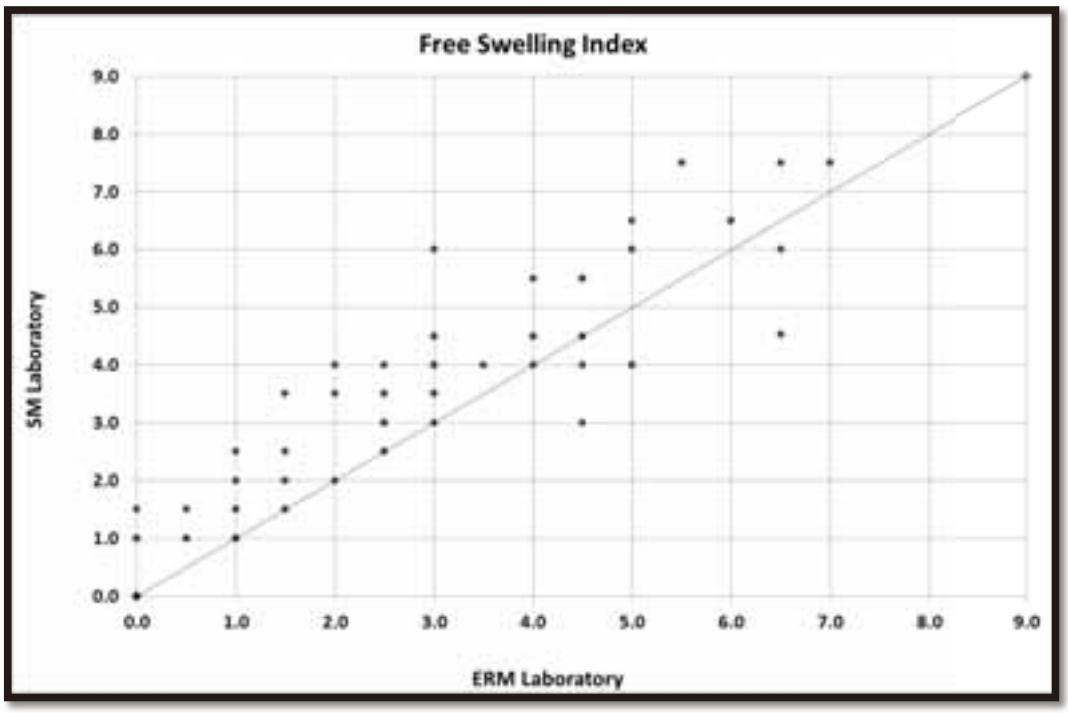


Figure 8-13: Comparison of true relative density values.

(Source: Pretorius)



Note: Free Swelling Index (FSI) = Crucible SwellingNumber (CSN)

Figure 8-14: Comparison of Free Swelling Index determinations.

(Source: Pretorius)

8.10.3 ERCCL Laboratory compared with UUH Laboratory

The average, minimum and maximum values reported by the two laboratories for 615 samples are shown in Table 8-5. The average values and ranges of values compares as expected, but the ERM shows a very wide range in total sulphur values.

Table 8-5: ERCCL Laboratory and UUH Laboratory compared.

Dry basis	ERM Laboratory			UUH Laboratory		
	Av	Min	Max	**Av**	Min	Max
Analysis moisture	**0.97**	0.11	5.49	**0.98**	0.10	5.73
Ash	**43.43**	6.15	93.96	**43.73**	6.02	96.79
Volatile matter	**20.10**	3.22	39.48	**19.71**	2.02	35.16
Total sulphur#	**1.04**	0.02	21.77	**0.49**	0.12	1.95
Calorific value	**5263**	442	7913	**4863**	405	7693
True relative density	**1.86**	1.34	3.30	**1.85**	1.16	3.41
Free swelling Index	**2.2**	0.0	8.0	**1.6**	0.0	6.5

**Note: Free Swelling Index (FSI) = Crucible Swelling Number (CSN)*

(Source: Pretorius)

Table 8-6 shows the average values reported by ERCCL and the percentage point differences between the ERCCL and UUH values. A negative average difference indicates that the ER values are higher, or over stated when compared to the UUH values.

Table 8-6 shows that the ER values for analysis moisture, volatile matter, total sulphur, calorific value, true relative density and CSN are higher or probably over stated when compared with the UUH results.

Table 8-6: Average ERCCL values and differences compared.

	Average value	Average difference *	Minimum difference	Maximum difference
Analysis moisture	**0.97**	**-0.01**	-0.86	0.90
Ash	**43.43**	**0.30**	-38.34	55.57
Volatile matter	**20.10**	**0.40**	-8.18	6.07
Total sulphur#	**0.73**	**0.31**	-3.70	1.15
Calorific value	**5263**	**-193**	-4368	3511
True relative density	**1.86**	**0.02**	-0.81	2.37
Free swelling Index	**2**	**-1**	-7	6

**Note: Free Swelling Index (FSI) = Crucible Swelling Number (CSN)*

(Source: Pretorius)

Also note that the ER laboratory values for sulphur included a number of very high values above 4% dry for which UUH reported values less than 1.5%. These samples listed in Table 8-7 were excluded from the comparison of differences in Table 8-6.

Borehole number	Sample number	Sulphur (% dry)	
		ERM lab	UUH lab
G01901	G1901_14	13.1	0.58
G01901	G1901_23	6.35	0.73
G01901	G1901_30	4.34	0.9
G01901	G1901_38	8.55	0.33
G01901	G1901_57	5.13	0.25
G01901	G1901_58	4.75	0.63
G02045	G2045_34	4.78	0.48
G02071	G02071_8	8.1	0.66
G02071	G02071_2	7.8	0.41
G02071	G02071_2	7.02	0.32
G02071	G02071_3	4.01	0.24
G02071	G02071_3	5.17	0.47
G02071	G02071_3	21.77	0.42
G02071	G02071_5	17.1	0.57
G02096	G2096_6	13.12	0.63
G02096	G2096_12	8.24	0.38
G02096	G2096_23	21.62	0.52
G02096	G2096_24	7.41	0.21

Table 8-7: Samples excluded from the comparison in Table 8-6.

(Source: Pretorius)

Table 8-8 shows the percentages of the values that are within the acceptable limits of reproducibility of analyses between laboratories. In Table 8-8, the second column shows "n", which indicate the number of samples that were used according to the applicable ranges shown in the first column. As an example, in Table 8-8 for ash values n = 156. This indicates that 156 of the 615 samples have ash between 10 and 20% and that 49%, 69% and 71% of the results are within the acceptable range of reproducibility defined by the three standards, respectively.

In theory all the samples should fall within the limits of reproducibility. However, the relative results indicate a high level of confidence (say almost 90%) for volatile matter. The reproducibility of ash and FSI (equivalent of CSN) between the two laboratories is poor (say about 70%) and the reproducibility of sulphur; calorific value and true relative density are very poor.

The ERM values are on average higher than the UUH values (except for ash) and are therefore considered to be less conservative or probably over estimated in the Coal Resource and Coal Quality statement.

Table 8-8: Reproducibility of results between ERCCL and UUH

Analytic parameter	n	AS 1038	BS 1016	ISO
Ash (10 – 20%)	156	49	69	71
Volatile matter (>10%)	516	**88**	**88**	**54**
Sulphur (<1.5%)	437	14	17	17
Calorific value	464	20	20	20
True relative density	614	36		
Free Swelling Index	615	69	69	58

**Note: Free Swelling Index (FSI) = Crucible Swelling Number (CSN)*

(Source: Pretorius)

8.10.3.1 Analysis moisture

Figure 8-15 shows a comparison of analysis moisture determinations. Analysis moisture is the moisture content (air-dry) of the coal sample at the time of the analysis.

The average analysis moisture value reported by the ERCCL Laboratory is 0.97% and the UUH Laboratory reported values that are on average 0.01 percentage points lower. It can be expected that the reproducibility of analysis moisture values in different laboratories will vary according to the prevailing humidity conditions at the time of analysis. It is therefore necessary to compare the rest of the analyses on the same moisture level – in this exercise the coal quality parameters will be compared on a dry basis to exclude the effect of varying moisture content. The true relative density values were adjusted according to the Preston Sanders formula from an air-dry to a dry basis.

8.10.3.2 Ash

Figure 8-16 shows a comparison of ash determinations. The average ash value reported by the ERCCL Laboratory is 43.43% and the UUH Laboratory reported values that are on average 0.30 percentage points higher. Although the correlation between the two data sets is generally moderate, there are a number of anomalous values, which could indicate errors.

8.10.3.3 Volatile matter

Figure 8-17 shows a comparison of volatile matter determinations. The average volatile matter value reported by the ERCCL Laboratory is 20.10% and the UUH Laboratory reported values that are on average 0.40 percentage points lower.

8.10.3.4 Total sulphur

Figure 8-18 shows no comparison of total sulphur determinations, even after the +4.0% values were removed from the ERCCL data set. The average sulphur value reported by the ER Laboratory is 0.73% and the UUH Laboratory reported values that are on average 0.31 percentage points lower.

8.10.3.5 Calorific value

Figure 8-19 shows a comparison of calorific value determinations. The average calorific value reported by the ER Laboratory is 5263 cal/g and the UUG Laboratory reported values that are on average 190 cal/g lower.

8.10.3.6 True relative density

Figure 8-20 shows a comparison of true relative density determinations. The average true density value reported by the ER Laboratory is 1.86 and the SM Laboratory reported values that are on average 0.02 unit points lower.

8.10.3.7 Three groups of seams according to CSN distributions. Free Swelling Index (equivalent of CSN)

Figure 8-21 shows a comparison of CSN values. The average CSN reported by the ER Laboratory is 2.0 and the UUH Laboratory reported values that are on average 1 unit points lower. All the SM Laboratory values differ by at least 1 CSN unit form the ER Laboratory values.

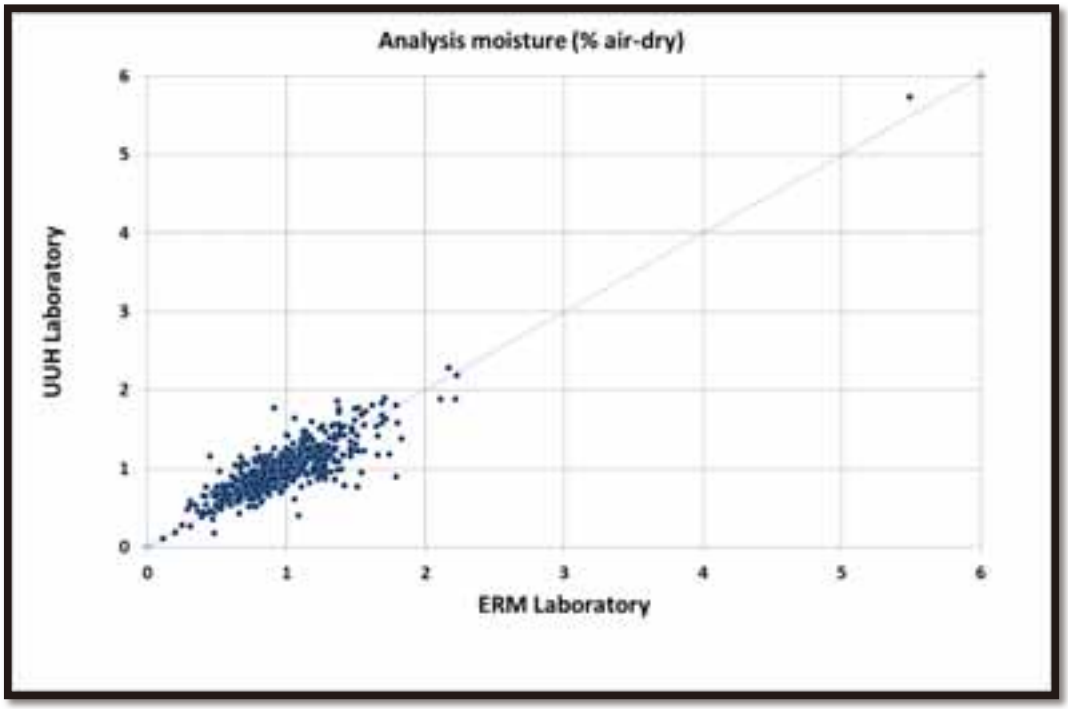


Figure 8-15: Comparison of analysis moisture determinations.

(Source: Pretorius)

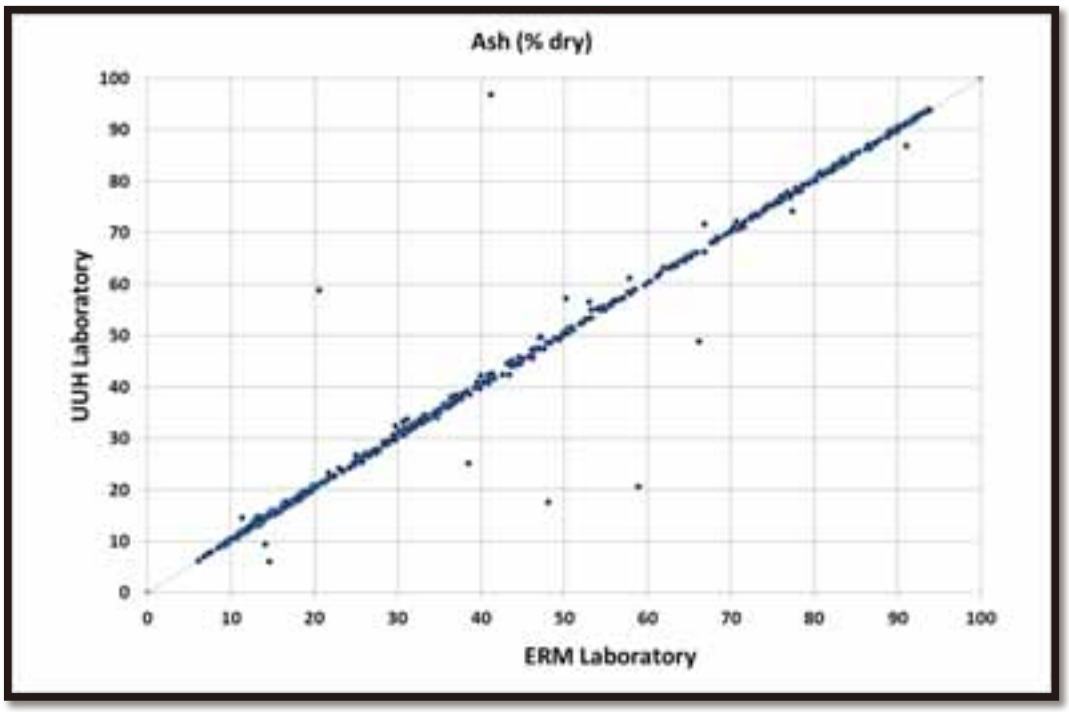


Figure 8-16: Comparison of ash determinations.

(Source: Pretorius)

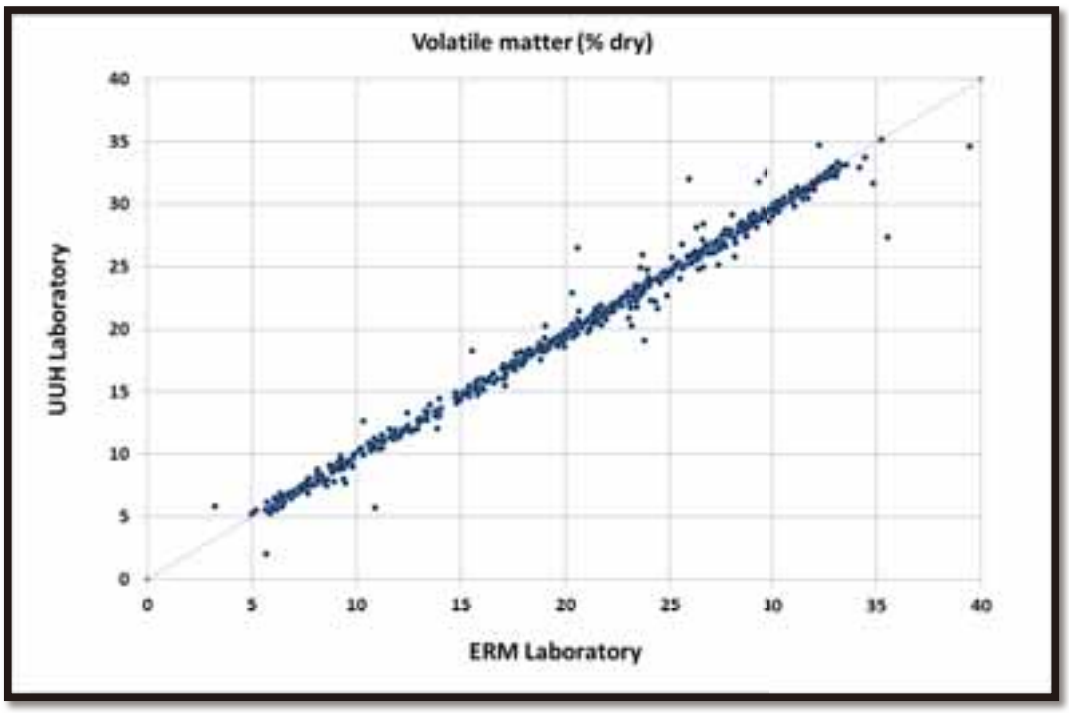


Figure 8-17: Comparison of volatile matter determinations.

(Source: Pretorius)

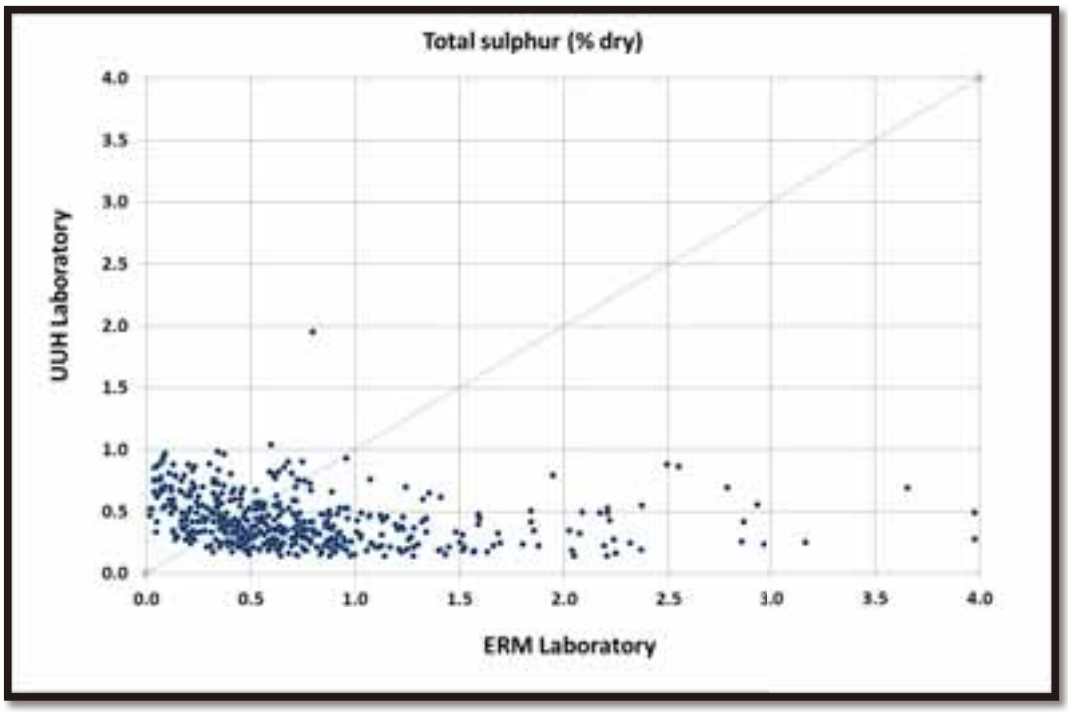


Figure 8-18: Comparison of total sulphur determinations.

(Source: Pretorius)

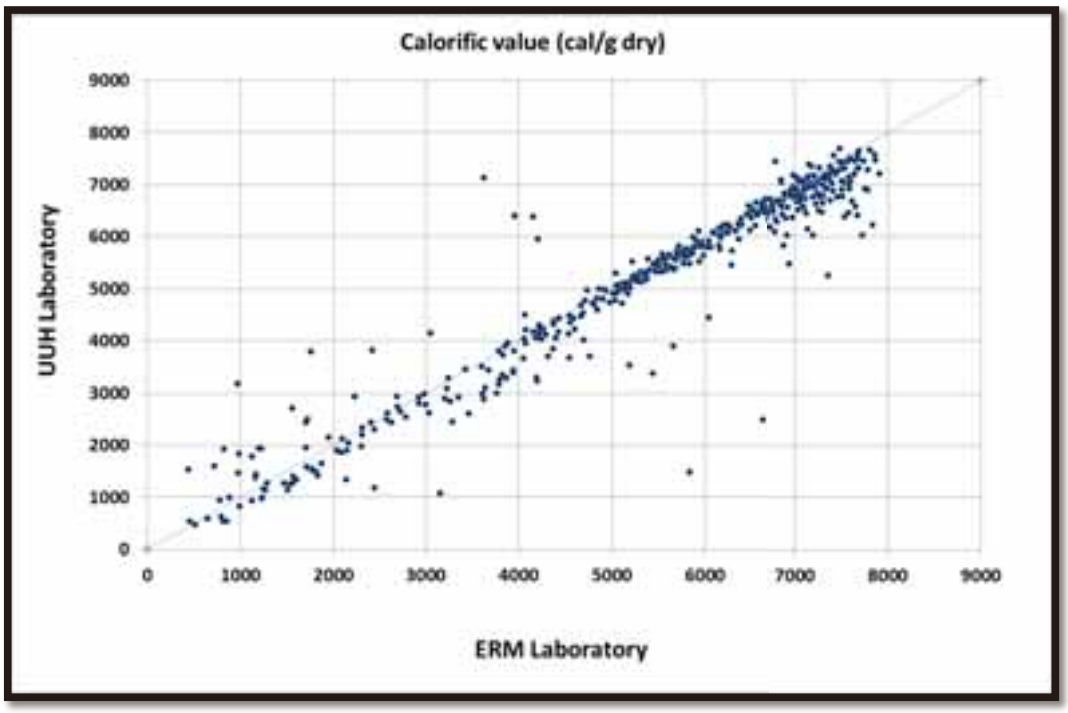


Figure 8-19: Comparison of calorific value determinations.

(Source: Pretorius)

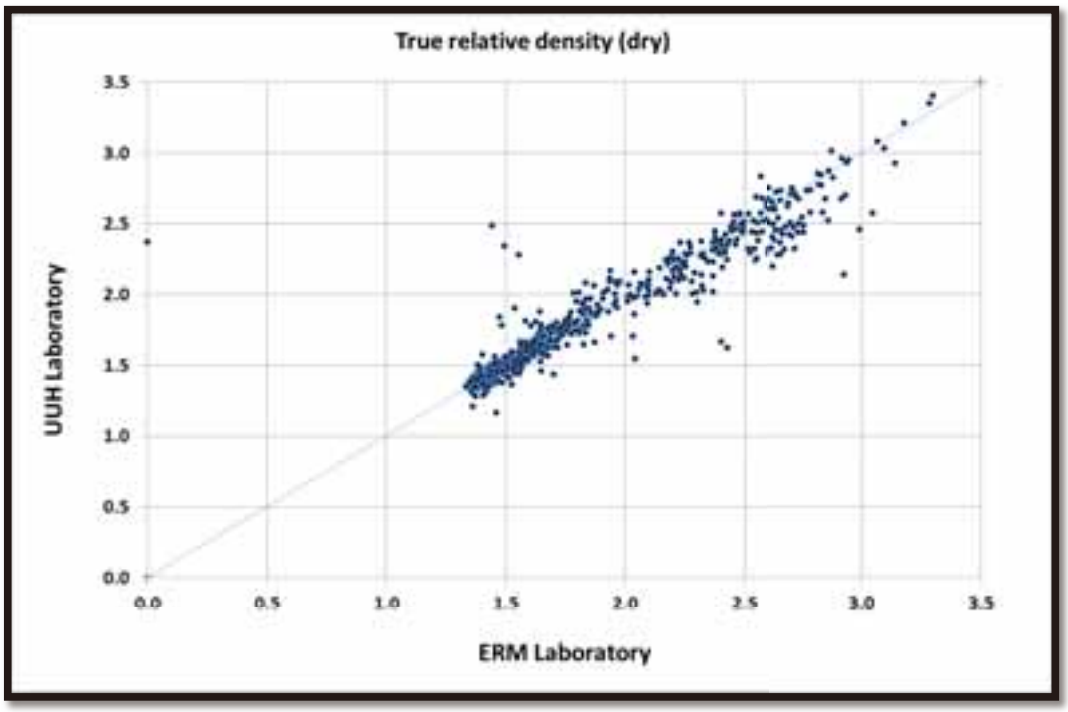
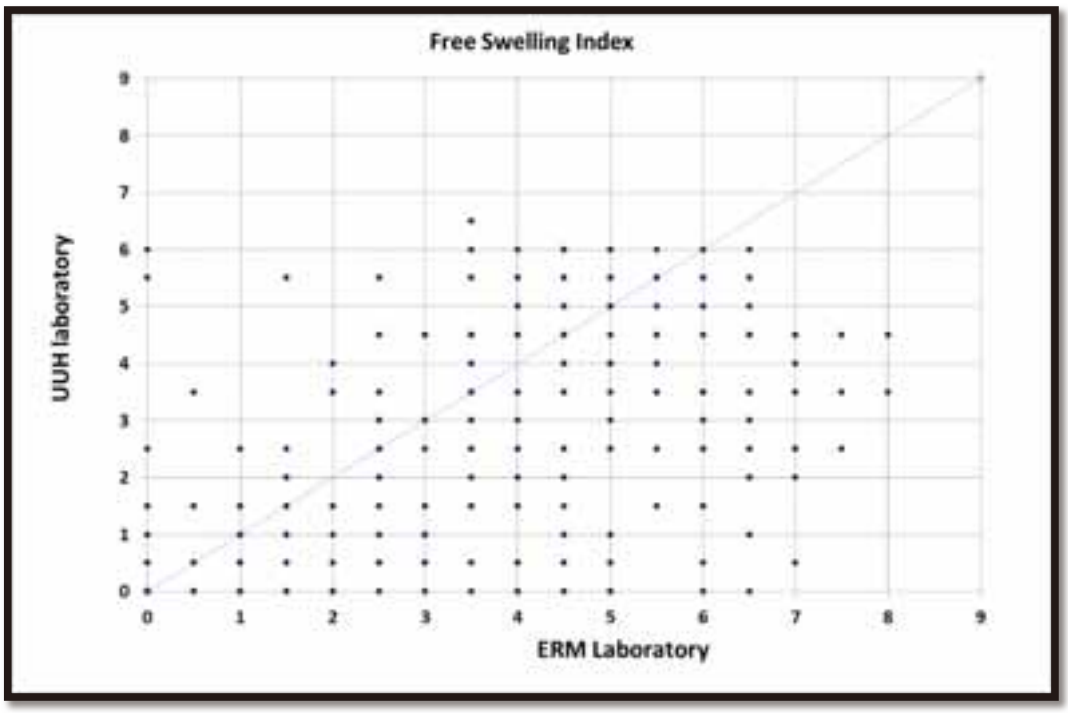


Figure 8-20: Comparison of true relative density values.

(Source: Pretorius)



Note: Free Swelling Index (FSI) = Crucible SwellingNumber (CSN)

Figure 8-21: Comparison of Free Swelling Index determinations.

(Source: Pretorius)

*8.10.4 **Conclusions for reproducibility of analyses between labs***

The ERCCL reported values are considered to be acceptable for the estimation of Coal Resources and Coal Quality.

The ERCCL generally reported the coal quality parameters lower than the SM Laboratory and generally higher than the UUH Laboratory with varying degrees of reproducibility between laboratories. The results are summarised as follows:

Compared with the analytical results from the SM Laboratory, the ERM Laboratory reported on average:

- a higher volatile matter value (0.48 percentage points) with a reasonable reproducibility level at about 80%;
- a lower ash value (0.47 percentage points) with a reasonable reproducibility level at about 80%;
- a lower sulphur value (0.09 percentage points) with a good reproducibility level at about 90%;
- a lower calorific value (140 cal/g) with a poor reproducibility of about 40%;
- a lower true relative density (0.04 units) with a poor reproducibility of about 30%; and
- a lower CSN (1 unit) with a reasonable reproducibility of about 80%.

Compared with the analytical results from the UUH Laboratory, the ERCCL reported on average:

- a lower ash (0.30 percentage points) with a reasonable reproducibility level at about 70%;
- a higher volatile matter value (0.40 percentage points) with a good reproducibility level at about 90%;
- a higher sulphur value (0.31 percentage points) with no reproducibility between the two laboratories;
- a higher calorific value (193 cal/g) with a poor reproducibility of about 20%;
- a higher true relative density (0.02 units) with a poor reproducibility of about 36%; and
- a higher CSN (1 unit) with a reasonable reproducibility of about 70%.

The reported sulphur values from the UUH Laboratory need further investigation to determine the cause of the poor reproducibility.

8.11 Point of Observation definition and calculation

Under the JORC code a POO has a very clear definition to allow it to be used as a valid data point for evaluation and modelling purposes.

A POO for this resource estimate for BN and THG was based on:

1. A complete lithology log for a borehole.
2. Complete LAS data including Caliper, Density, and Gamma as a minimum for a borehole.
3. An ability to correct the lithology log to the LAS data using core photos and other data,
4. Seams/plies to be fully sampled including all stone partings.
5. Complete (and corrected) coal quality data set for seams drilled.
6. Equal to, or greater than 95% core recovery in coal seams deemed moderate to high potential coking coal and equal to, or greater than 90% core recovery in coal seams deemed, low potential coking coal.
7. Adequate easting, northing and relative level data for all borehole collars.
8. Adequate topography data for the project area covered by boreholes.

Normally the JORC code and coal guideline mentions 95% or greater linear core recovery in coal. This mentioned figure is however a guideline, but it has been the CP's experience over many projects, where coking coal is involved, 95% linear core recovery or greater should be mandatory, while for thermal coal a 90% or greater linear core recovery is sufficient. The reasoning for this is; coking coal has very bright and brittle macerals referred to as Vitrinite. It is this Vitrinite that holds the coking potential of the coal and is normally very low in Ash. It is also this Vitrinite that is mostly lost in the coring process, hence lowering the coking potential and also increasing Ash of the overall sample. Thermal coals tend to be duller and stronger coal and hence any minor loss does not affect the overall coal quality.

The CP determined the acceptable linear core recovery for a point of observation based on the potential for coking coal (Figure 5-40) and is shown in Table 5-2 and Table 5-3.

8.12 Use of Conditional Simulation Geostatistics to determine the expected error of estimation as an aid in the understanding of confidence in the classification categories.

Under the newly released 'Australian Guidelines for the Estimation and Classification of Coal Resources' 2014 edition (The Guidelines), which JORC (2012) refers to, it is expected that the Competent Person provides an estimate of confidence in the classification categories used. The Guidelines provide a number of geostatistical methods that can be used to aid the estimation and classification of coal resources.

Once the geological data has been collected, corrected and finally reported in accordance with the JORC Code, an understanding is required on expected error in the estimate so reliable spatial influences for classification categories can be determined. This step estimates the cumulative error of all the processes involved in the JORC Resource estimate. These include geological procedures, geological capability in following those procedures, drilling, sampling, laboratory and modelling/reporting errors.

The result will be an expected error for each parameter used, so it is important that parameters critical to the estimate are selected. Geostatistical techniques can be very computationally intensive and are very dependent on data spacing and the number of data points. The use of variograms in geostatistics is a critical step but, their interpretation can be more art than science. It is important to recognise geostatistical techniques can have limitations but are also, a very good aid in checking category classification limits are realistic and sensible.

The approach undertaken for this report was to take the seam with the greatest number of data points by area that formed a consistent seam (limited splitting/merging), Seam H500. This assumes that all seams were laid down under similar environmental conditions and have had a similar tectonic history so can be expected to have a similar variability to Seam H500. In addition, volume and tonnage are critical values for any in-situ estimate; the parameters focused on were seam thickness (volume), total moisture (tonnage), relative density (tonnage) and ash (tonnage).

Mr Ballantine having experience in this type of evaluation undertook the study with each step supervised by the Competent Person. Mr Brett Larkin (GeoCheck Pty Ltd), who has a Masters in Geostatistics from Stanford University, provided expert guidance and advice, in particular, the variogram interpretation. The technique used was Sequential Gaussian Simulation.

The software used was SGeMS, version 2.5b, which is Stanford geostatistical modelling software.

The method used is described in the following steps:

- Data preparation and import into SGeMS;
- Data analysis and domaining;
- Checking for anisotropy;
- Histogram transformation;
- Grid creation;

- Omnidirectional variogram interpretation on resulting transformation (due to no discernible anisotropy);
- Sequential Gaussian Simulations (500 simulations);
- Checking results of simulations;
- Data masking;
- Calculating e-type average;
- Calculating expected error at 95 percent confidence for drill hole spacing from 50m to 1000m in 50m increments;
- Taking the simulated results for seam thickness (volume) and relative density, and average the results to calculate another simulated result; and
- Calculating 'loss' factor (maximum error) for each category.

The results are illustrated in Figure 8-22. The associated variograms are shown in Appendix 24.

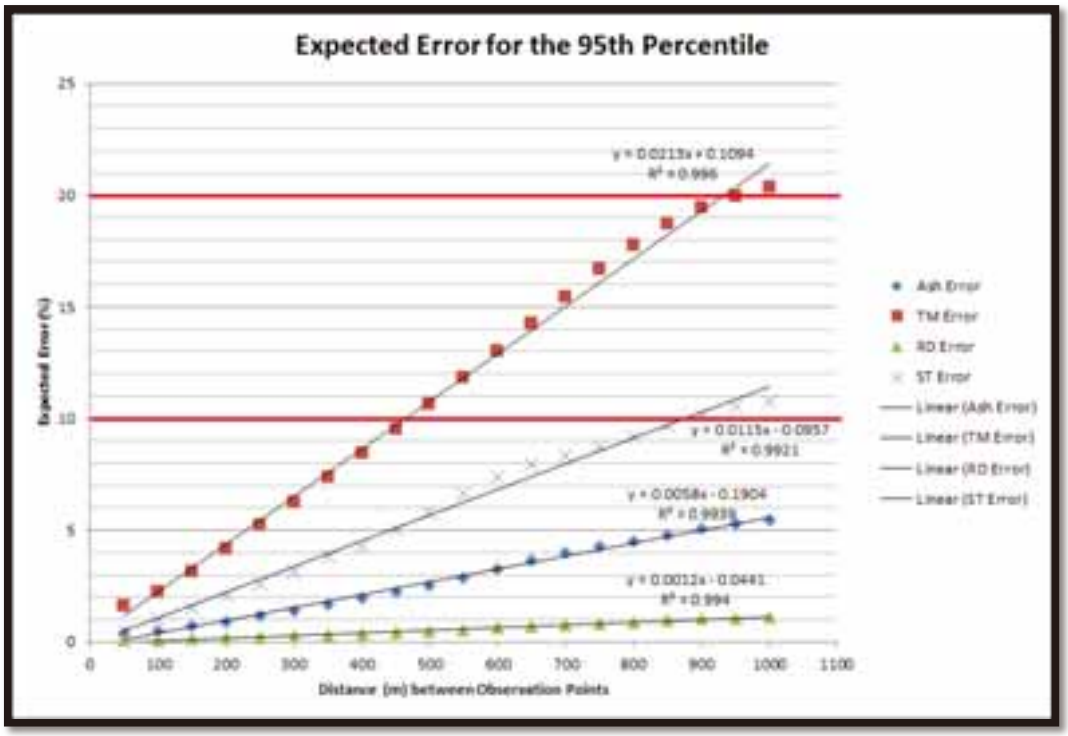


Figure 8-22: Expected error for seam H500 for the 95th Percentile

(Source: Ballantine)

The total moisture proved to have the greatest expected error and relative density the least expected error. This followed logic as free moisture in the field whilst collecting coal samples is an area of high inaccuracy due to numerous outside influences. Relative density is a reasonably reliable and repeatable test so should have less variability. Seam

thickness also gave a good result which makes sense as seam thickness is corrected against downhole geophysics minimising observational and procedural error. Ash has the second highest error and would follow that it has a number of sources of error greater than seam thickness and relative density.

Once the expected error is reasonably known, the issue becomes how to use it. The Guidelines removed the suggested recommended maximum distances as they proved to be confusing due to critical variables differ between deposits and how these variables vary in space will differ between deposits. As stated by the Guidelines *'By removing suggested maximum distances between points of observation for each confidence category in the Coal Guidelines, the responsibility is placed back with the Competent Person to determine the criteria for classification'*. Using expected error as a guide for spatial control for categories and not just arbitrary ('gut feel') measurements, there becomes a more consistent and empirical way of determining spatial control.

Mr Mark Biggs (ROM Resources), a very senior and well respected coal geologist and a member of the committee revising the Australian Coal Guidelines, produced a graph of expect error and resource classification for an early draft of the Guidelines (Biggs 2013). It represents the culmination of results of approximately 50 projects that he had recently worked on, with the resulting expected error and associated resource classification (refer Figure 8-23). This can be used as a guide in justifying expected error results and spatial limits on resource classifications. The focus of this study is on the Measured and Indicated categories only, as these are the categories converted to Reserves requiring the highest confidence. The Inferred category was decided by the Competent Person that not only the expected error was an influence but also the broader geological continuity needed to be taken into consideration.

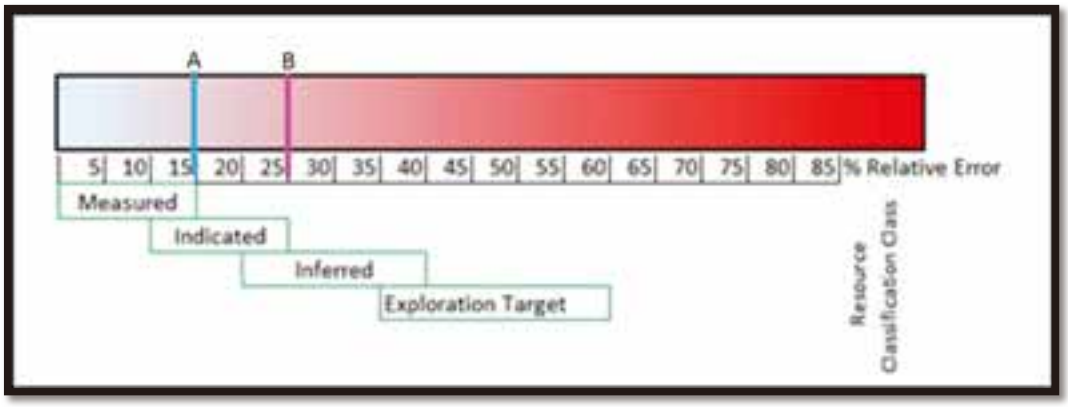


Figure 8-23: Biggs 2013 expected error

(Source: Ballantine)

Referring to Figure 8-23, at point (A), this represents 15 percent error and is the maximum error for the Measured category. The location at point (B) represents 25 percent error and is the maximum error for the Indicated category. The values in Figure 8-23 at points (A) and (B) were used as guides to compare with the category distances being applied to the BN model. The results of expected error at the 95th percentile with the corresponding probabilities at points (A) and (B) from Figure 8-23 is shown in Figure 8-24.

It was observed in Figure 8-24 that the corresponding point (A) matches well with the Measured category distance of 500m, point (C). In the corresponding point (B), the Indicated category distance of 1000m, point (D), meets all variables except total moisture. Since for high rank Coal Measures, moisture is a small component (average 3 percent) of the total material then this distance is acceptable.

The Inferred category was not determined using this method as the narrow dimensions in the west of the deposit may impact the result as a variogram can only be inferred about half the distance of the data points. The Inferred category was reduced to 2,000m data spacing and in most cases is truncated by the deposit boundary well before the limit.

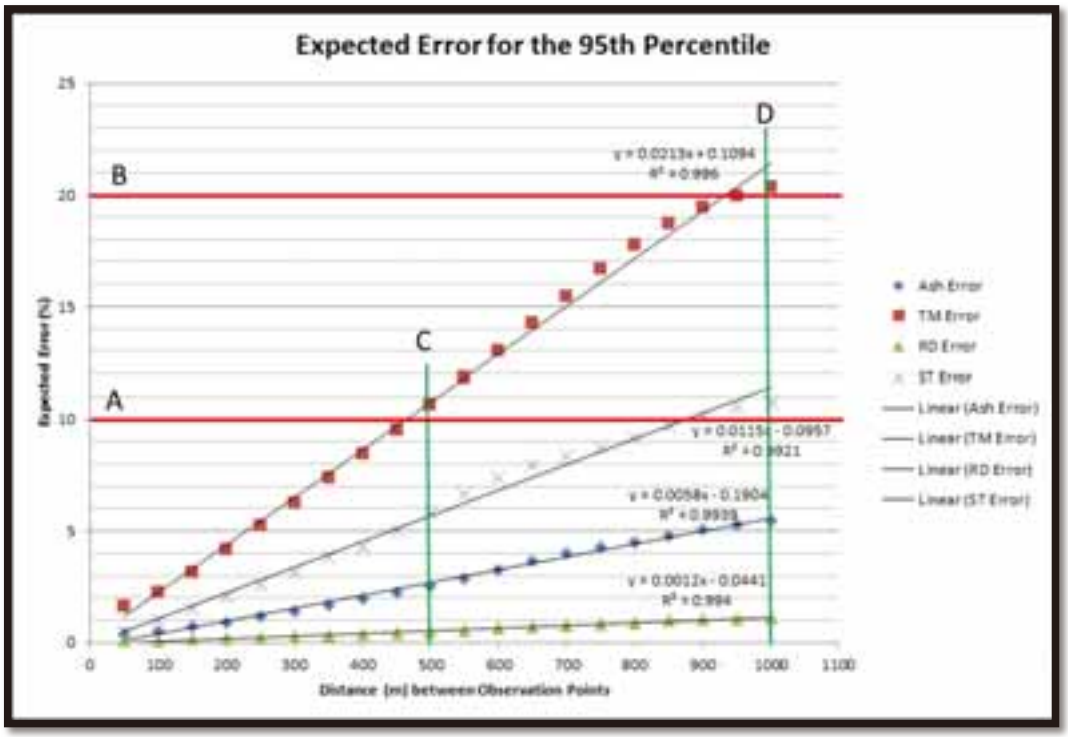


Figure 8-24: resulting category distances from expected error for seam H500

(Source: Ballantine)

It is important to note, total moisture is the absolute maximum for expected error at the 95 percent level of confidence and the other variables are less than the maximum. The 'average' of the errors could be used but, care is required as there is a question of whether averaging the errors makes sense. This comes back to what is referred to as a 'loss' function for each variable. Essentially this is an estimate of how much it will impact the result if a variable is in error, as a function of the error, in that variable.

Investigating the 'loss' function is a way of determining maximum overall error for the category result. Since the result of most interest in a resource statement is the tonnage and tonnage is 'area' multiplied by 'volume' multiplied by 'relative density'. If the 'area' can be assumed to have no error (high quality precision survey) then only the expected error for 'volume' (seam thickness) and 'relative density' needs to be investigated. One approach could be just averaging the resulting expected error curves

in Figure 8-24 however, a better method is to average the simulated realisations for 'volume' (seam thickness) and 'relative density' and calculate a resulting set of realisations. From this a new curve for expected error can be determined. The result of this exercise is found in Figure 8-25.

Figure 8-25: resulting category distances from expected error for seam H500 with 'loss' factor

(Source: Ballantine)

It is noted from Figure 8-25 that the maximum expected error for the Measured category result is 6 percent and for the Indicated category result is 13 percent. For interest, using the regression for 'loss' factor and applying it to the Inferred category distance the maximum expected error is 26 percent. All of the resource category maximum error numbers fit well within the ranges suggested in Figure 8-23.

Using expected error to determine spatial category requirement and then calculating resulting maximum error has been a good exercise in determining confidence. It is recommended that this should now be expanded to the other major seam groups to compare with the assumption made for Seam H500.

9 Resource Estimation Methodology

9.1 Resource Estimation Methodology - BN

The method used for estimating resources at BN involved modelling an elevation grid for the major plies, G405, G505, H507, I505, J505, J604, K504, N504, Q550, R400, T507, U504 and V504, and modelling thickness grids for the other plies and partings. These thickness grids for the plies and partings were then stacked on top or below of the elevation grid to form a 3D block model.

To create an accurate and reliable 3D model of the coal seams a kriging algorithm with semivariogram modelling for the seam elevation was used. Kriging is a geostatistical gridding method for constructing a minimum-error-variance linear estimate at a location where the true value is unknown. This method produces accurate maps from irregularly spaced data, such as coal seam elevation points. Kriging attempts to model trends suggested in the data, so that, for example, low points might be connected along the bottom of the basin rather than isolated by bull's-eye type contours. Kriging is a very flexible gridding method that can be custom-fitted to any data set by specifying the appropriate semivariogram model. Kriging incorporates anisotropy and underlying trends.

9.2 Software Used

The BN resource estimate was carried out using Micromine's Version 18.0.1008 and LogCheck Version 7.277 using the COALLOG geology data format as the database.

9.3 Database Compilation

The POO data were supplied by the Competent Person (Appendix 4a & 4b) in LogCheck format and a summary of the data is shown in Table 9-1. The exploration licence coordinates were supplied by the Competent Person (Appendix 1).

Table 9-1: Summary of Points of Observation File

Data type	Number of Records
Collars	680
Intervals for modeling seam morphology	10302
Intervals for modeling coal quality	3659
Point for modeling base of weahering	446
Points for modeling Quaternary surface	473

(Source: Khangad Exploration LLC)

9.4 Data Validation

The raw data was collected under the full supervision of the Competent Person, following the procedures in Appendix 2.

Following initial modelling, a review of the seam correlation was undertaken. Numerous boreholes and parts of boreholes were found to show anomalous thickness and elevations. This was due to faulting so these plies were removed from the resource estimate. A list of these plies is shown in Appendix 17. The final validated data is shown in Table 9-2.

Table 9-2: Summary of data used for Resource Estimate

Data type	Number of Records
Collars	680
Intervals for modeling seam morphology	10302
Intervals for modeling coal quality	3659
Point for modeling base of weahering	446
Points for modeling Quaternary surface	473

(Source: Khangad Exploration LLC)

9.5 Exploratory Data Analysis

The summary statistics for all of the coal quality values is shown on an as-received and air-dry basis respectively in Table 9-43 and Table 9-34.

Table 9-3: Summary statistics for As-Received Coal Quality

As-Received STATISTCS	RD (g/cc)	TM	Ash	VM	FC	Gross CV	S
		(%)	(%)	(%)	(%)	(Kcal/kg)	(%)
MINIMUM	1.24	0.03	5.39	5.67	1.29	0	0
MAXIMUM	2.75	34.3	92.52	33.09	64.97	8009	10.34
NUMBER OF POINTS	3684	3684	3684	3684	3684	3684	3684
MEAN	1.56	2.29	28.36	23.2	46.12	5618.44	1.11
VARIANCE	0.02	4.59	168	20.96	97.39	1601903	0.48
STD DEVIATION	0.16	2.14	12.97	4.57	9.86	1265.66	0.69

(Source: Khangad Exploration LLC)

Table 9-4: Summary statistics for Air-Dry Coal Quality

Air-Dry STATISTCS	RD (g/cc)	IM	Ash	VM	FC	Gross CV	S
		(%)	(%)	(%)	(%)	(Kcal/kg)	(%)
MINIMUM	1.25	0.1	5.52	5.7	1.3	0	0
MAXIMUM	2.92	14.2	92.9	33.4	65.8	8425	10.73
NUMBER OF POINTS	3684	3684	3684	3684	3684	3684	3684
MEAN	1.57	0.93	28.8	23.23	47.02	5689	0.92
VARIANCE	0.03	0.48	175	21.07	99.47	1640681	0.49
STD DEVIATION	0.17	0.69	13.24	4.59	9.87	1280.89	0.7

(Source: Khangad Exploration LLC)

9.6 Data Processing

To create the block model an elevation grid was created for the major plies G405, G505, H507, I505, J505, J604, K504, N504, Q550, R400, T507, U504, V504 and then the thickness grids for the other plies and partings were stacked above or below this as required. In order to use this method each borehole needed to contain an interval for each ply and parting even if the ply or parting was 'pinched out' and was not intersected by that borehole.

Some plies were not intersected by the boreholes and so 'virtual' plies with a thickness of zero were inserted in order to model the seam morphology. The location of these virtual plies was determined by using the MICROMINE extrapolation tool, which uses Inverse Distance Weighting with a power of three.

This is shown in the example in Figure 9-1 where the temporary grids for all plies under ply H507 have been interpolated for borehole BN06150 as per the seam hierarchy. Where boreholes intercepted plies, but these plies were not present due to deterioration as a result of changing sedimentary environments, these plies were inserted as zero thickness plies at the roof or floor of a logged ply as indicated in borehole BN05118.

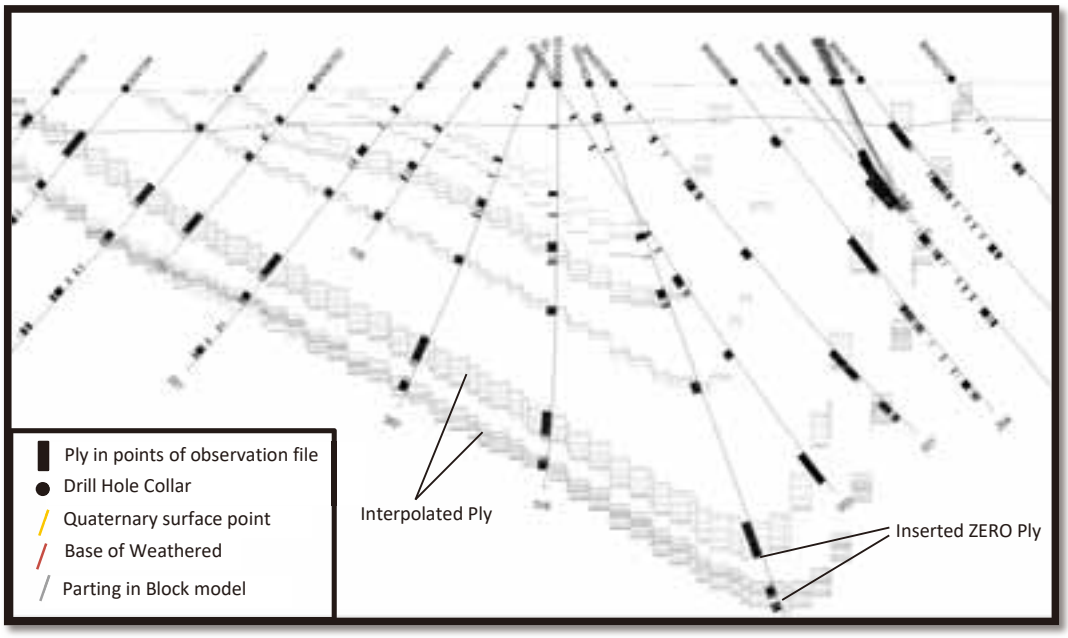


Figure 9-1: Interpolated virtual plies

(Source: Energy Resources LLC)

Virtual plies inserted into the database by temporary grids, or zero thickness plies above and below existing plies, are contained in Appendix 18

Stone parting intervals were logged in the raw database, but where they were missing they were added to all ply groups for each borehole even in cases where the parting thickness was zero.

As a result of this processing, each borehole contained intervals for all plies and all stone partings.

After generating all of the above data, the vertical thickness of each borehole was calculated using Micromine's "Drill hole true thickness" to create a structural model.

9.7 Model Geostatistics

When the kriging algorithm was used, the weights of the values on the distances beyond semivariogram range were minimal if the semivariogram was modelled using spherical, exponential or Gaussian models. Therefore the general linear model was used to model the semivariograms for the seam elevations and thicknesses. Using this method, all of the values within the search ellipse will have some weight and hence used for the block estimation.

9.8 Gridding

In order to create a reliable model of the seam morphology a cell size of 10x10m was selected for gridding. Gridding with exact interpolation using ordinary kriging was used to generate grids for the elevation of the mid-point of the plies and Inverse Distance Weighting with a power of three was used to generate grids for the thicknesses of the plies. Exact interpolation will honour data points exactly only when the data point falls directly in the grid cell being interpolated. With kriging this means that the coincident data point carries a weight of essentially one and all other data points carry a weight of essentially zero. This means that if the intersection of the borehole and the ply falls within the interpolated cell, then this cell is populated with the value of that point.

To allow the grids to cover the necessary areas, a circular search radius of 5,000m with maximum of 20 points was used to create the elevation grids. The elevation grid for the reference ply H507 is shown in Figure 9-2 together with the data points used to make the grid. The thickness grids were created using a circular search radius of 10,000m with maximum of 20 points per sector.

The Extremely weathering grid was produced using IDW with a power of two search radius of 2,000m with maximum of 15 points per sector.

The base of weathering grid was produced using kriging with search radius of 5,000m with maximum of 15 points per sector. The base of weathering grid was used in conjunction with mapped LOX lines as the upper most cut-off for coking coal. Weathered coal can be calculated between the base of weathering and extremely weathering grid. This coal has been successfully mined and used for the onsite PowerStation feed as well as commercial sold as Thermal coal. For the purpose of this resource estimate it has been included in the estimate but should be noted that it is a lower quality material.

The base of Quaternary grid was produced using IDW with a power of two.

A Topography surface grid was produced using IDW with a power of two. This was then converted into a digital terrain (DTM) model.

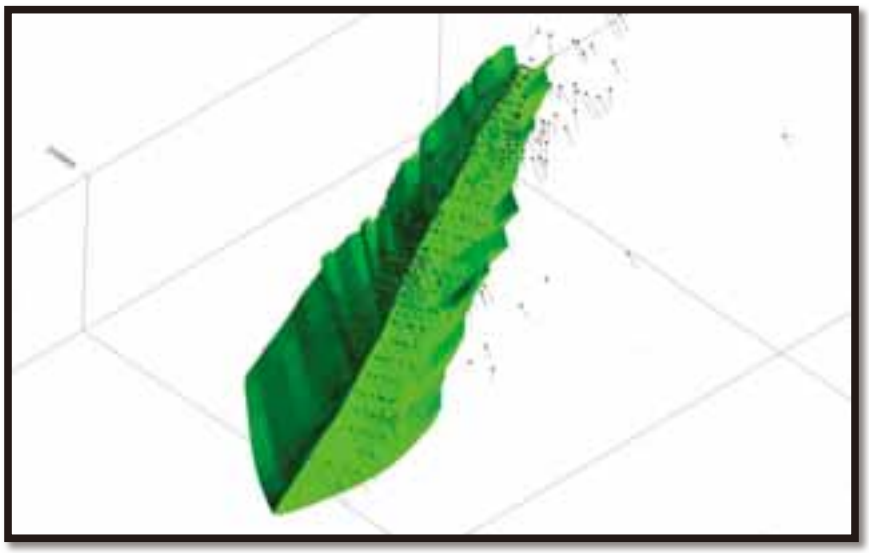


Figure 9-2: Elevation grid for H507 ply (looking southeast) with boreholes

(Source: Energy Resources LLC)

9.9 Block Modelling

The 3D gridded seam block model was generated by stacking thickness grids on top or below of the major plies (G405, G505, H507, I505, J505, J604, K504, N504, Q550, R400, T507, U504, V504) elevation grid. The centroid of the block east and north was the X and Y values from the grid file which was 10x10m (grid cell size), the centroid of the block RL was the Z value from the elevation grid and block size by RL was the Z value from thickness grids.

Once the block model was created any blocks above the modelled base of Extremely weathering surface were removed.

The block model was limited by the base of Extremely weathering where they were determined, the northern and southern fault boundaries, the license boundary and the current mine plan as at 31st December 2021. Figure 9-3 shows the limits of ply H507.

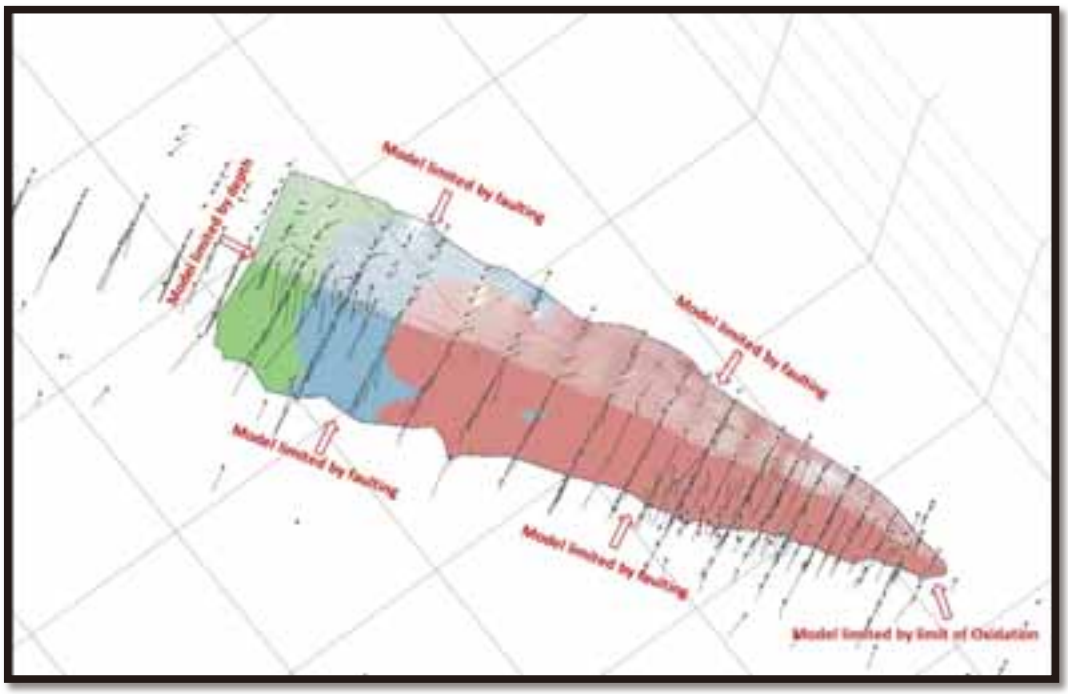


Figure 9-3: Model limits for ply H507 (looking southwest) with Resource categories (red=Measured, blue=Indicated and green=Inferred) and boreholes.

(Source: Energy Resources LLC)

The northern boundary is fault bounded and southern boundary is a sheared faulting zone boundary. QGX in the 2008 resource estimate initially used the geology maps compiled by Dashkhorol et.al, from the 1989 work and simply applied the fault contact with a vertical limit. Khangad Exploration from 2013 to 2014 exploration results was immensely useful in determining a more accurate surface limit and shape.

The final boundary which limited the block model was constructed by borehole information on the contact angle of basement and coal measure to create a wireframe to form a 3D shape. Once the block model was created it was cut by this wireframe to provide the final shape for the block model (Figure 9-4).

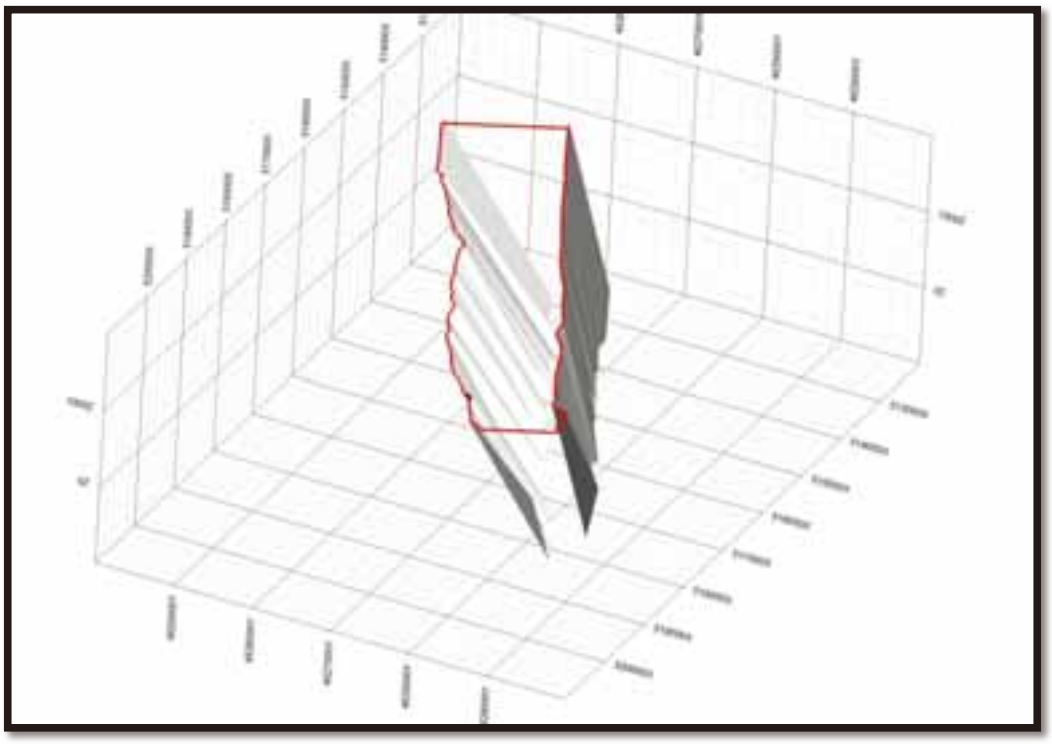


Figure 9-4: Wireframe constructed by borehole information on the contact angle of basement to limit the northern and southern boundary faults.

(Source: Energy Resources LLC)

The resulting block model which was used for the resource classification, seam coding and grade interpolation is shown in Figure 9-5.

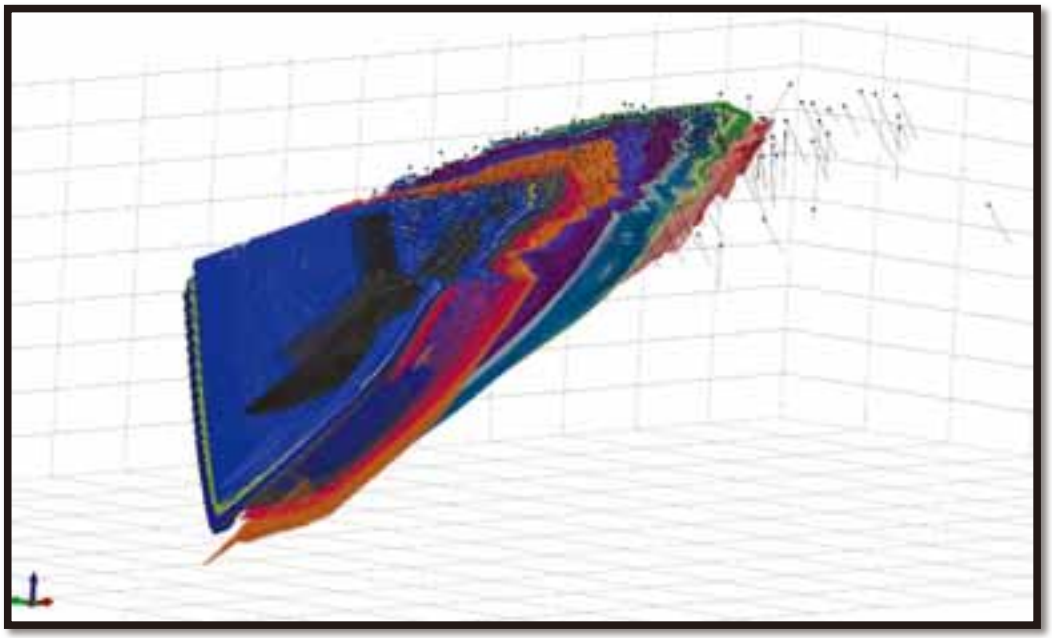


Figure 9-5: Block Model (looking northwest) for each ply with boreholes

(Source: Energy Resources LLC)

9.10 Resource Classification, Seam Coding and Grade Interpolation

The JORC Code and the Guidelines make no recommendations for Resource classifications and place the responsibility with the Competent Person to determine the criteria for classification.

The Competent Person for this estimate used the expected error in the estimate to support distances for Measured and Indicated categories. For Inferred category the narrow dimensions of the deposit may cause a misleading result using the expected error technique so the experience of the Competent Person and detailed knowledge of the deposit were sufficient for determining this category spacing.

In determining extrapolation beyond last data points, half the category distance was applied. Due to the data spacing and deposit dimensions this did not have a major affect.

The shapes for the categories was mostly automated with the Micromine software, however where this case was not true the edge of the data was manually edited by the Competent Person. In addition, due to major structure some areas were hard-wired for specific categories like Inferred and data spacing had no influence. The general approach adopted for the calculation of resources for BN follows:

1. **Measured** resources were estimated with points of observation at 500m and where appropriate were extrapolated half the distance from the last point.
2. **Indicated** resources were estimated with points of observation at 1000m and where appropriate were extrapolated half the distance from the last point.
3. **Inferred** resources were estimated with points of observation at 2000m and where appropriate were extrapolated half the distance from the last point.

The resulting resource category areas are contained in Appendix 19.

Seam coding was applied to composite plies into seams based upon a specified minimum coal thickness and a maximum parting thickness. The seams were also coded on the basis of resource classification so that only plies of the same resource classification were combined together with their partings. The following modifying factors were used for seam coding:

- No maximum seam thickness;
- Minimum seam thickness to be included in the Resource of 0.5m to 400m depth and then 1.5m below 400m;
- Maximum parting thickness to be included in the Resource of 0.5m; and
- Coal Quality limit with Ash content greater than 50 percent (DRY basis) being excluded from the resource estimate.

Following seam coding, coal quality interpolation was carried out. Only intervals that were marked as a POO were used for coal quality interpolation. An IDW algorithm with a power of three was used to interpolate the coal quality into the empty block model.

Coal quality interpolation was conducted for each ply separately. One search run at 10,000m radius was used to interpolate all the blocks in each model. Filters were applied to make sure that only POO for the selected ply were used for the interpolation of the blocks for that ply.

Partings within the model limits but without coal quality were given default coal quality parameters based on rock quality analyses. The default values used on an air-dry and as-received basis are shown in Table 9-5.

Table 9-5: Default coal quality values for partings

Air Dry		As Received	
RD	2.82	RD	2.81
IM	2.15	TM	2.3
ASH	94	ASH	93.86
VM	3.84	VM	3.85
FC	0	FC	0
CV	0	CV	0
S	0.01	S	0.01

(Source: Tsolmon)

9.11 Block Model Validation

The block model was firstly checked to ensure that all blocks were populated and that block values were within the same range as the input values. Following this a visual validation was conducted by loading the block model into the Micromine 3D viewer together with borehole traces, plies from the original POO file, base of Extremely weathering, base of weathering, base of Quaternary and topographic surfaces. Each cross-section was then reviewed to check that the plies from the original POO file agreed with the plies in the block model.

Figure 9-6 shows validation of the block model through a section containing holes BN081022, G00186, BN05033, BN05097, G00185, BN09055 and BN05114. This image shows that the plies from the original POO coincide with the plies in the block model.

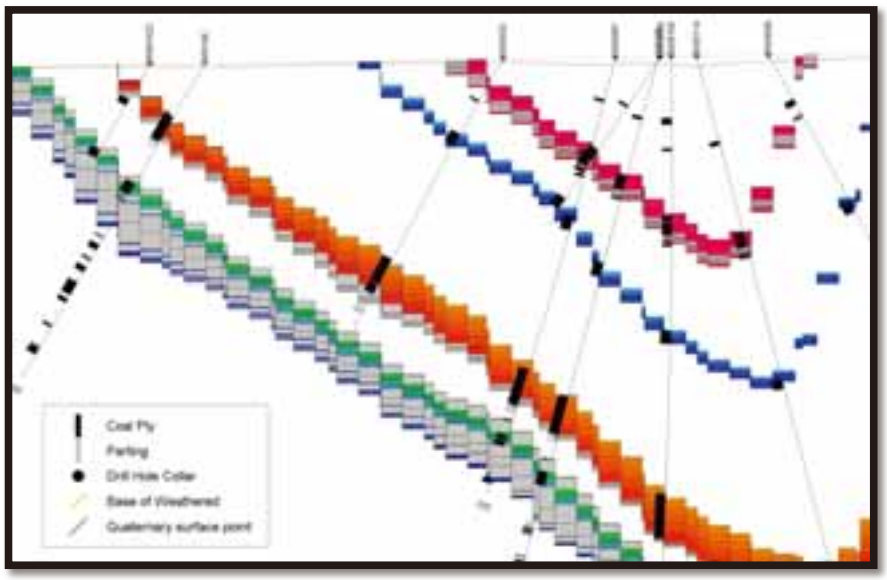


Figure 9-6: Block Model Validation

(Source: Energy Resources LLC)

A further manual check was completed by the Competent Person where an area including boreholes G00185, BN05033, BN05120 and BN05102 for the ply H507 was compared with the block model. The manual result was within 3 percent in tonnage of the block model result. This comparison is within acceptable limits.

9.12 Resource Estimation Methodology - THG

The method used for estimating Resources at THG involved modelling an elevation grid for the major plies, K504, N504, Q550, R400, T507, U504, V504, W506, X502, Y404 and modelling thickness grids for the other plies and partings. These thickness grids for the plies and partings were then stacked on top or below of the elevation grid to form a 3D block model.

To create an accurate and reliable 3D model of the coal seams a kriging algorithm with semivariogram modelling for the seam elevation was used. Kriging is a geostatistical gridding method for constructing a minimum-error-variance linear estimate at a location where the true value is unknown. This method produces accurate maps from irregularly spaced data, such as coal seam elevation points. Kriging attempts to model trends suggested in the data, so that, for example, low points might be connected along the bottom of the basin rather than isolated by bull's-eye type contours. Kriging is a very flexible gridding method that can be custom-fitted to any data set by specifying the appropriate semivariogram model. Kriging incorporates anisotropy and underlying trends.

9.13 Software Used

The UHG Resource estimate was carried out using Micromine's Version 18.0.1008 and LogCheck Version 7.277 using the COALLOG geology data format as the database.

9.14 Database Compilation

The POO data were supplied by the Competent Person (Appendix 4a & 4b) in LogCheck format and a summary of the data is shown in Table 9-16. The exploration licence coordinates were supplied by the Competent Person (Appendix 1).

Table 9-6: Summary of Points of Observation File

Data type	Number of Records
Collars	535
Intervals for modeling seam morphology	9,327
Intervals for modeling coal quality	2,356
Points for modeling base of weathering	470
Points for modeling Quaternary Surface	442

(Source: Khangad Exploration LLC)

9.15 Data Validation

The raw data was collected under the full supervision of the Competent Person, following the procedures in Appendix 2.

Following initial modelling, a review of the seam correlation was undertaken. The final validated data is shown in Table 9-27.

Table 9-7: Summary of data used for Resource Estimate

Data type	Number of Records
Collars	59
Intervals for modeling seam morphology	1,093
Intervals for modeling coal quality	634
Points for modeling base of weathering	53
Points for modeling Quaternary Surface	54

(Source: Khangad Exploration LLC)

9.16 Exploratory Data Analysis

The summary statistics for all of the coal quality values is shown on an as-received and air-dry basis respectively in Table 9-48 and Table 9-39.

Table 9-8: Summary statistics for As-Received Coal Quality

As-Received STATISTCS	RD (g/cc)	TM (%)	Ash (%)	VM (%)	FC (%)	Gross CV (Kcal/kg)	S (%)
MINIMUM	1.35	0.4	12.91	8.36	6.97	0	0.03
MAXIMUM	2.59	10.98	80.65	32.52	55.54	7075	10.01
NUMBER OF POINTS	652	652	652	652	652	652	652
MEAN	1.66	2.92	38.36	22.02	36.7	4534	0.59
VARIANCE	0.03	2.3	135.82	14.57	73.31	1311959	0.36
STD DEVIATION	0.16	1.52	11.65	3.82	8.56	1145	0.6

(Source: Khangad Exploration LLC)

Table 9-9: Summary statistics for Air-Dry Coal Quality

Air-Dry STATISTCS	RD (g/cc)	IM (%)	Ash (%)	VM (%)	FC (%)	Gross CV (Kcal/kg)	S (%)
MINIMUM	1.36	0.08	13.11	8.39	7.11	0	0.03
MAXIMUM	2.6	4.48	82.31	33.57	56.61	7184	10.49
NUMBER OF POINTS	662	662	662	662	662	662	662
MEAN	1.69	0.99	39.05	22.42	37.43	4622	0.6
VARIANCE	0.03	0.26	141.91	15.06	76.03	1358327	0.38
STD DEVIATION	0.17	0.51	11.91	3.88	8.72	1165	0.62

(Source: Khangad Exploration LLC)

9.17 Data Processing

To create the block model an elevation grid was created for the major plies K504, N504, Q550, R400, T507, U504, V504, W506, X502, Y404 and then the thickness grids for the other plies and partings were stacked above or below this as required. In order to use this method each borehole needed to contain an interval for each ply and parting even if the ply or parting was 'pinched out' and was not intersected by that borehole.

Some plies were not intersected by the boreholes and so 'virtual' plies with a thickness of zero were inserted in order to model the seam morphology. The location of these virtual plies was determined by using the MICROMINE extrapolation tool, which uses Inverse Distance Weighting with a power of two.

This is shown in the example in Figure 9-17 where the temporary grids for all plies under ply Q506 have been interpolated for borehole G00091 as per the seam hierarchy. Where boreholes intercepted plies, but these plies were not present due to deterioration as a result of changing sedimentary environments, these plies were inserted as zero thickness plies at the roof or floor of a logged ply as indicated in borehole G00110.

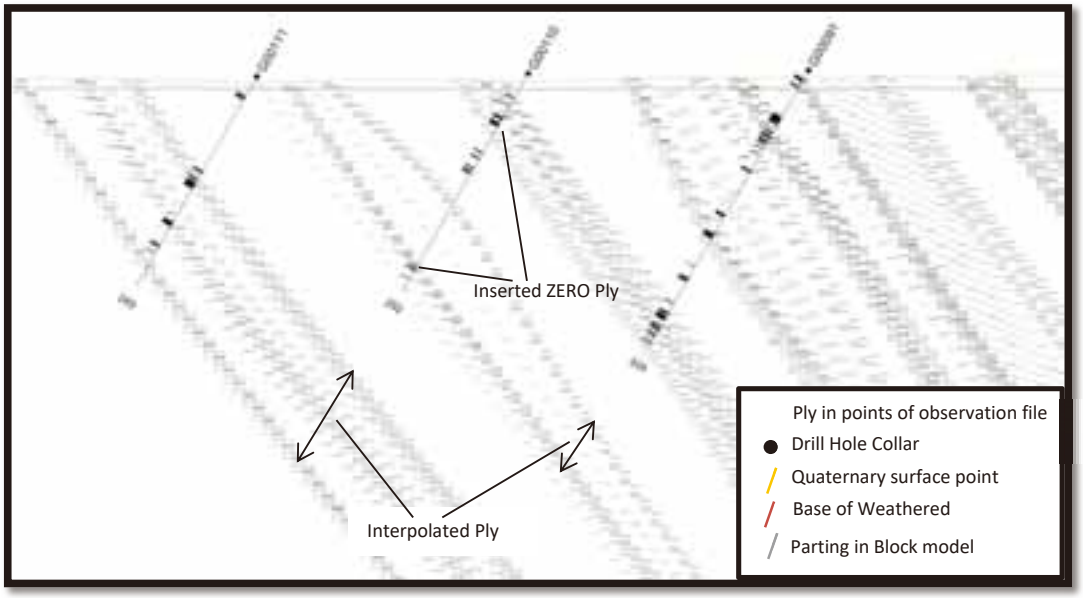


Figure 9-7: Interpolated virtual plies

(Source: Energy Resources LLC)

Virtual plies inserted into the database by temporary grids, or zero thickness plies above and below existing plies, are contained in Appendix 18

Stone parting intervals were logged in the raw database, but where they were missing they were added to all ply groups for each borehole even in cases where the parting thickness was zero.

As a result of this processing, each borehole contained intervals for all plies and all stone partings.

After generating all of the above data, the vertical thickness of each borehole was calculated using Micromine's "Drill hole true thickness" to create a structural model.

9.18 Model Geostatistics

When the kriging algorithm was used, the weights of the values on the distances beyond semivariogram range were minimal if the semivariogram was modelled using spherical, exponential or Gaussian models. Therefore the general linear model was used to model the semivariograms for the seam elevations and thicknesses. Using this method, all of the values within the search ellipse will have some weight and hence used for the block estimation.

9.19 Gridding

In order to create a reliable model of the seam morphology a cell size of 10x10m was selected for gridding. Gridding with exact interpolation using ordinary kriging was used to generate grids for the elevation of the mid-point of the plies and Inverse Distance Weighting with a power of two was used to generate grids for the thicknesses of the plies. Exact interpolation will honour data points exactly only when the data point falls directly in the grid cell being interpolated. With kriging this means that the coincident data point carries a weight of essentially one and all other data points carry a weight of essentially zero. This means that if the intersection of the borehole and the ply falls within the interpolated cell, then this cell is populated with the value of that point.

To allow the grids to cover the necessary areas, a circular search radius of 5,000m with maximum of 20 points was used to create the elevation grids. The elevation grid for the reference ply K504, N504, Q550, R400, T507, U504, V504, W506, X502, Y404 are shown in Figure 9-2 together with the data points used to make the grid. The thickness grids were created using a circular search radius of 5,000m with maximum of 20 points per sector.

The Extremely weathering grid was produced using IDW with a power of two search radius of 2,000m with maximum of 15 points per sector.

The base of weathering grid was produced using kriging with search radius of 5,000m with maximum of 20 points per sector. The base of weathering grid was used in conjunction with mapped LOX lines as the upper most cut-off for coking coal. Weathered coal can be calculated between the base of weathering and extremely weathering grid. This coal has been successfully mined and used for the onsite PowerStation feed as well as commercial sold as Thermal coal. For the purpose of this resource estimate it has been included in the estimate but should be noted that it is a lower quality material.

The base of Quaternary grid was produced using IDW with a power of two.

A Topography surface grid was produced using IDW with a power of two. This was then converted into a digital terrain (DTM) model.

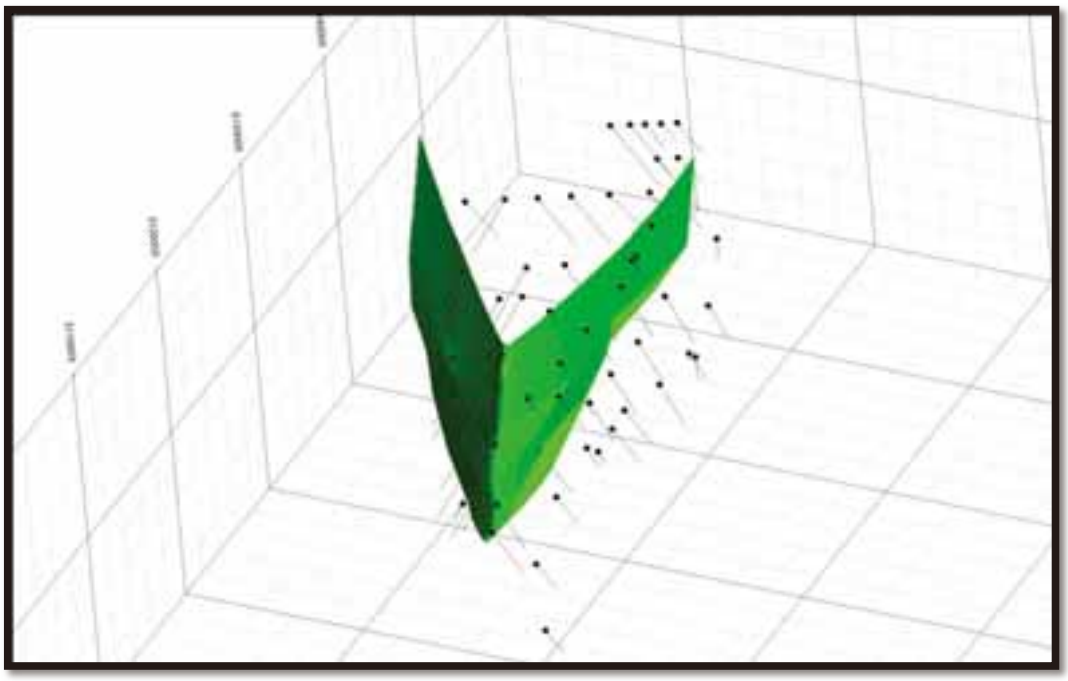


Figure 9-8: Elevation grid for T507 ply (looking east) with boreholes

(Source: Energy Resources LLC)

9.20 Block Modelling

The 3D gridded seam block model was generated by stacking thickness grids on top or below of the major plies (K504, N504, Q550, R400, T507, U504, V504, W506, X502, Y404) elevation grid. The centroid of the block East and North was the X and Y values from the grid file which was 10x10m (grid cell size), the centroid of the block RL was the Z value from the elevation grid and block size by RL was the Z value from thickness grids.

Once the block model was created any blocks above the modelled base of Extremely weathering surface were removed.

The block model was limited by the base of Extremely weathering where they were determined, the northern and southern fault boundaries and the license boundary. Figure 9-39 shows the limits of ply T515.

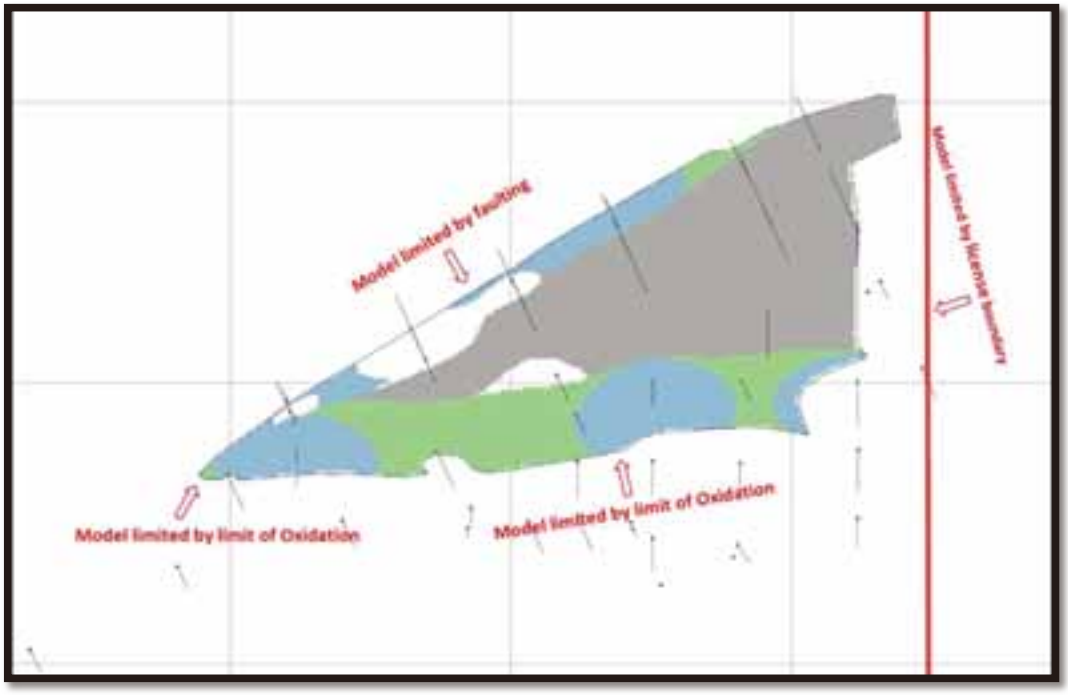


Figure 9-9: Model limits for ply T515 (looking southeast) with Resource category (blue=Indicated and green=Inferred) and boreholes.

(Source: Energy Resources LLC)

The northern boundary is fault boundary and southern boundary is oxidation zone boundary. QGX in the 2008 Resource Estimate initially used the geology maps compiled by Dashkhorol et.al, from the 1989 work and simply applied the fault contact with a vertical limit. Khangad Exploration from 2013 to 2014 exploration results was immensely useful in determining a more accurate surface limit and shape.

The final boundary which limited the block model was constructed by borehole information on the contact angle of basement and coal measure to create a wireframe to form a 3D shape. Once the block model was created it was cut by this wireframe to provide the final shape for the block model (Figure 9-10).

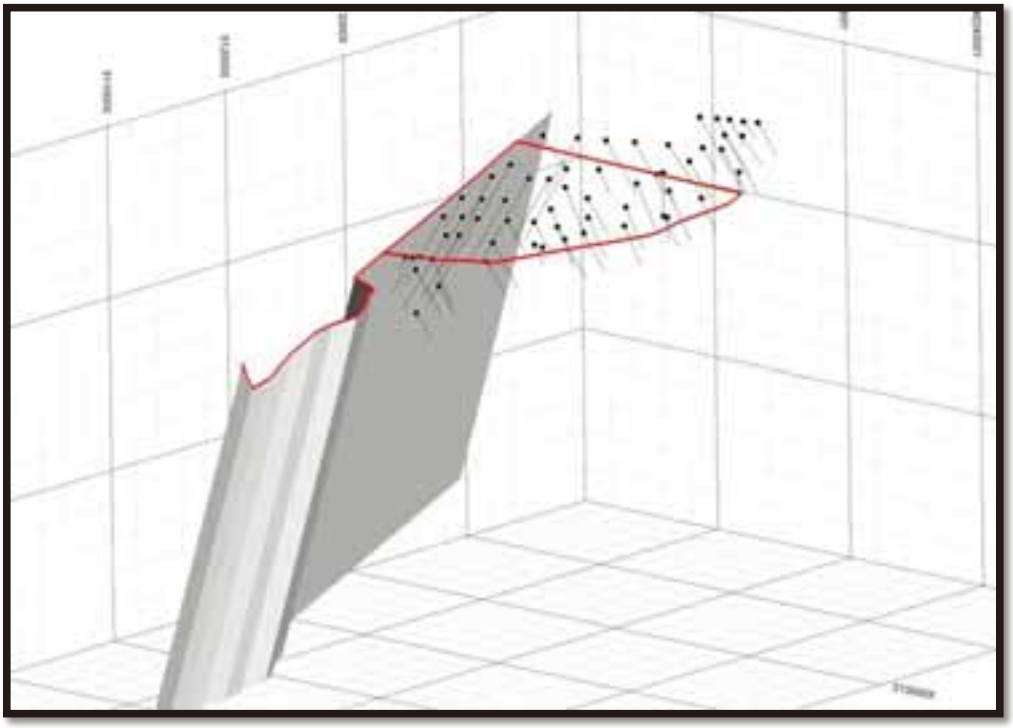


Figure 9-10: Wireframe constructed by borehole information on the contact angle of basement to limit the northern boundary fault.

(Source: Energy Resources LLC)

The resulting block model which was used for the resource classification, seam coding and grade interpolation is shown in Figure 9-5.

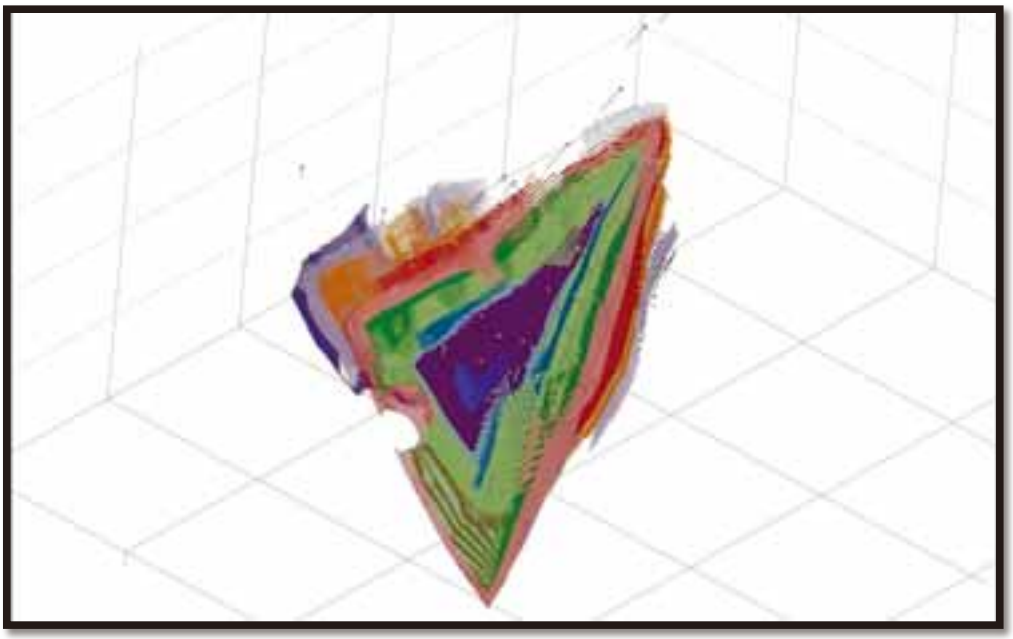


Figure 9-11: Block Model (looking northwest) for each ply with boreholes

(Source: Energy Resources LLC)

9.21 Resource Classification, Seam Coding and Grade Interpolation

The JORC Code and the Guidelines make no recommendations for Resource classifications and place the responsibility with the Competent Person to determine the criteria for classification.

The Competent Person for this estimate used the expected error in the estimate to support distances for Indicated categories. For Inferred category the narrow dimensions of the deposit may cause a misleading result using the expected error technique so the experience of the Competent Person and detailed knowledge of the deposit were sufficient for determining this category spacing.

In determining extrapolation beyond last data points, half the category distance was applied. Due to the data spacing and deposit dimensions this did not have a major affect.

The shapes for the categories was mostly automated with the Micromine software, however where this case was not true the edge of the data was manually edited by the Competent Person. In addition, due to major structure some areas were hard-wired for specific categories like Inferred and data spacing had no influence. The general approach adopted for the calculation of resources for THG follows:

1. **Indicated** resources were estimated with points of observation at 300m and where appropriate were extrapolated half the distance from the last point.
2. **Inferred** resources were estimated with points of observation at 2000m and where appropriate were extrapolated half the distance from the last point.

The resulting resource category areas are contained in Appendix 19.

Seam coding was applied to composite plies into seams based upon a specified minimum coal thickness and a maximum parting thickness. The seams were also coded on the basis of resource classification so that only plies of the same resource classification were combined together with their partings. The following modifying factors were used for seam coding:

- No maximum seam thickness;
- Minimum seam thickness to be included in the Resource of 0.5m to 400m depth and then 1.5m below 400m;
- Maximum parting thickness to be included in the Resource of 0.5m; and
- Coal Quality limit with Ash content greater than 50 percent (DRY basis) being excluded from the resource estimate.

Following seam coding, coal quality interpolation was carried out. Only intervals that were marked as a point of observation were used for coal quality interpolation. An IDW algorithm with a power of two was used to interpolate the coal quality into the empty block model.

Coal quality interpolation was conducted for each ply separately. One search run at 10,000m radius was used to interpolate all the blocks in each model. Filters were applied to make sure that only POO for the selected ply were used for the interpolation of the blocks for that ply.

Partings within the model limits but without coal quality were given default coal quality parameters based on rock quality analyses. The default values used on an air-dry and as-received basis are shown in Table 9-10.

Table 9-10: Default coal quality values for partings

Air Dry		As Received	
RD	2.82	RD	2.81
IM	2.15	TM	2.3
ASH	94	ASH	93.86
VM	3.85	VM	3.84
FC	0	FC	0
CV	0	CV	0
S	0.01	S	0.01

(Source: Adiya)

9.22 Block Model Validation

The block model was firstly checked to ensure that all blocks were populated and that block values were within the same range as the input values. Following this a visual validation was conducted by loading the block model into the Micromine 3D viewer together with borehole traces, plies from the original POO file, base of weathering, base of Quaternary and topographic surfaces. Each cross-section was then reviewed to check that the plies from the original POO file agreed with the plies in the block model.

Figure 9-612 shows validation of the block model through a section containing holes G00114, BN06023, BN06010 and G00121. This image shows that the plies from the original POO coincide with the plies in the block model.

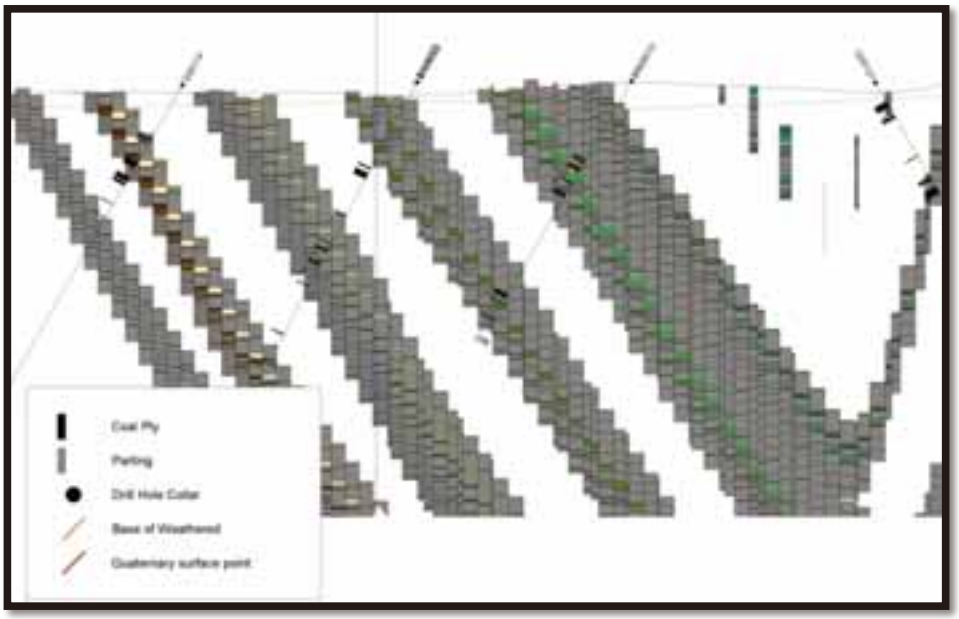


Figure 9-12: Block Model Validation

(Source: Energy Resources LLC)

A further manual check was completed by the Competent Person where an area including boreholes G00123, G00076, BN06012 and G00121 for the ply T507 was compared with the block model. The manual result was within 10.72 percent in tonnage of the block model result. This comparison is within acceptable limits.

10 Resource Statement

10.1 Resource BN

The total resources for the BN license are shown on an as-received basis in Table 10-1 and on an air-dry basis in Table 10-2. It should be noted that these figures have been rounded to reflect the fact that they are estimates and as a result this may cause figures not to sum correctly.

Table 10-1: Total Resources on an As-Received (AR) Basis

Volume (x1,000,000 M^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Total Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA - BHWE									
4.6	7.3	1.6	29.00	2.3	23.9	5515	1.18	44.79	MEASURED
0.8	1.2	1.6	32.01	2.1	23.6	5205	1.06	42.25	INDICATED
0.5	0.7	1.6	31.12	2.5	24.1	5276	1.07	42.32	INFERRED
5.9	**9.2**	**1.6**	**29.55**	**2.3**	**23.9**	**5457**	**1.16**	**44.27**	**SUBTOTAL**
BHWE - 100m									
39.4	61.9	1.57	28.88	2.16	23.90	5543	1.14	45.07	MEASURED
5.7	9.2	1.61	31.33	2.11	23.65	5287	1.04	42.91	INDICATED
3.1	5.0	1.60	30.44	2.36	24.13	5351	1.09	43.06	INFERRED
48.2	**76.1**	**1.58**	**29.28**	**2.17**	**23.88**	**5499**	**1.12**	**44.68**	**SUBTOTAL**
100 - 200m									
55.9	87.8	1.57	28.55	2.02	24.05	5578	1.12	45.37	MEASURED
7.5	12.0	1.61	30.91	2.11	23.69	5330	1.07	43.29	INDICATED
4.8	7.7	1.60	29.92	2.41	24.30	5397	1.07	43.37	INFERRED
68.2	**107.5**	**1.58**	**28.91**	**2.06**	**24.03**	**5537**	**1.11**	**44.99**	**SUBTOTAL**
200 - 300m									
56.4	88.6	1.57	28.60	1.98	24.01	5574	1.10	45.41	MEASURED
8.3	13.3	1.59	29.99	2.06	23.73	5424	1.10	44.21	INDICATED
5.2	8.2	1.59	29.40	2.37	24.32	5457	1.08	43.91	INFERRED
69.9	**110.1**	**1.57**	**28.83**	**2.02**	**24.00**	**5547**	**1.10**	**45.15**	**SUBTOTAL**
300 - 400m									
55.1	86.5	1.57	28.54	1.94	23.96	5583	1.12	45.56	MEASURED
9.8	15.7	1.60	30.49	2.07	23.56	5372	1.10	43.88	INDICATED
5.7	9.0	1.58	28.84	2.32	24.30	5518	1.10	44.54	INFERRED
70.6	**111.2**	**1.58**	**28.84**	**1.99**	**23.93**	**5548**	**1.12**	**45.24**	**SUBTOTAL**
262.8	**414.1**	**1.58**	**28.95**	**2.05**	**23.96**	**5534**	**1.11**	**45.03**	**GRAND TOTAL**
264	**415**	**1.6**	**29**	**2.1**	**24**	**5534**	**1.10**	**45**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

(Source: Energy Resources LLC)

Table 10-2: Total Resources on an Air-Dry (AD) Basis

Volume (x1,000,000 M^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Inherrent Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA - BHWE									
4.6	7.4	1.59	29.5	1.0	24.2	5576	0.98	45.34	MEASURED
0.8	1.2	1.64	32.4	1.0	23.9	5253	0.97	42.66	INDICATED
0.5	0.7	1.63	31.6	1.2	24.4	5337	0.99	42.81	INFERRED
5.9	**9.3**	**1.60**	**30.0**	**1.0**	**24.2**	**5517**	**0.98**	**44.81**	**SUBTOTAL**
BHWE - 100m									
39.4	62.40	1.58	29.28	0.97	24.17	5600	0.99	45.58	MEASURED
5.7	9.30	1.62	31.75	1.03	23.89	5337	0.91	43.33	INDICATED
3.1	5.00	1.62	30.92	1.12	24.42	5411	0.98	43.54	INFERRED
48.2	**76.70**	**1.59**	**29.69**	**0.99**	**24.15**	**5556**	**0.98**	**45.17**	**SUBTOTAL**
100 - 200m									
55.9	88.30	1.58	28.92	0.95	24.30	5631	0.96	45.84	MEASURED
7.5	12.10	1.62	31.34	1.02	23.93	5380	0.91	43.71	INDICATED
4.8	7.80	1.61	30.40	1.15	24.59	5459	0.96	43.86	INFERRED
68.2	**108.20**	**1.59**	**29.30**	**0.97**	**24.28**	**5591**	**0.96**	**45.46**	**SUBTOTAL**
200 - 300m									
56.4	89.20	1.58	28.96	0.94	24.24	5626	0.92	45.85	MEASURED
8.3	13.40	1.61	30.42	0.99	23.97	5474	0.91	44.62	INDICATED
5.2	8.30	1.60	29.85	1.13	24.62	5520	0.95	44.40	INFERRED
69.9	**110.90**	**1.59**	**29.20**	**0.96**	**24.24**	**5600**	**0.92**	**45.59**	**SUBTOTAL**
300 - 400m									
55.1	87.10	1.58	28.89	0.95	24.18	5633	0.91	45.98	MEASURED
9.8	15.90	1.61	30.92	0.99	23.79	5421	0.89	44.29	INDICATED
5.7	9.00	1.59	29.27	1.11	24.58	5581	0.95	45.04	INFERRED
70.6	**112.00**	**1.59**	**29.21**	**0.97**	**24.16**	**5599**	**0.91**	**45.66**	**SUBTOTAL**
262.8	**417.1**	**1.59**	**29.34**	**0.97**	**24.21**	**5587**	**0.94**	**45.48**	**GRAND TOTAL**
264	**415**	**1.6**	**29**	**1.0**	**24**	**5587**	**0.90**	**46**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

(Source: Energy Resources LLC)

The volume of unclassified resources is 332 million m^3.

The resources by seam can be found in Appendix 11a and 11b.

10.2 Resource THG

The total resources for the THG license are shown on an as-received basis in Table 10-13 and on an air-dry basis in Table 10-24. It should be noted that these figures have been rounded to reflect the fact that they are estimates and as a result this may cause figures not to sum correctly.

Table 10-3: Total Resources on an As-Received (AR) Basis

Volume (x1,000,000 M^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Total Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA - BHWE									
0.4	0.7	1.65	38.27	3.82	21.83	4465	0.94	36.08	INDICATED
0.1	0.2	1.63	36.73	2.93	22.26	4707	0.68	38.08	INFERRED
0.5	**0.9**	**1.65**	**37.92**	**3.63**	**21.92**	**4519**	**0.88**	**36.53**	**SUBTOTAL**
BHWE - 100m									
7.8	12.7	1.64	37.12	3.64	22.24	4577	0.94	37.00	INDICATED
2.4	4.0	1.63	36.58	3.13	22.38	4721	0.70	37.92	INFERRED
10.2	**16.7**	**1.64**	**36.99**	**3.52**	**22.27**	**4611**	**0.88**	**37.22**	**SUBTOTAL**
100 - 200m									
10.8	17.8	1.64	37.17	3.33	22.27	4602	0.82	37.24	INDICATED
2.5	4.1	1.63	36.82	3.09	22.37	4692	0.63	37.72	INFERRED
13.3	**21.9**	**1.64**	**37.10**	**3.29**	**22.29**	**4619**	**0.78**	**37.33**	**SUBTOTAL**
200 - 300m									
11.8	19.2	1.63	36.32	3.08	22.66	4702	0.67	37.94	INDICATED
3.2	5.1	1.61	34.94	3.15	23.14	4847	0.59	38.78	INFERRED
15.0	**24.3**	**1.62**	**36.03**	**3.09**	**22.76**	**4732**	**0.65**	**38.11**	**SUBTOTAL**
300 - 400m									
9.9	16.1	1.61	35.43	2.77	23.11	4820	0.61	38.68	INDICATED
5.5	8.9	1.62	35.80	3.23	22.84	4750	0.63	38.13	INFERRED
15.4	**25.0**	**1.62**	**35.56**	**2.93**	**23.02**	**4795**	**0.62**	**38.49**	**SUBTOTAL**
54.4	**88.8**	**1.63**	**36.36**	**3.18**	**22.62**	**4697**	**0.72**	**37.84**	**GRAND TOTAL**
55	**89**	**1.6**	**36**	**3.2**	**23**	**4697**	**0.70**	**38**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

Table 10-4: Total Resources on an Air-Dry (AD) Basis

Volume (x1,000,000 M^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Inherrent Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA - BHWE									
0.4	0.7	1.68	39.3	1.48	22.34	4563	0.98	36.87	INDICATED
0.1	0.2	1.65	37.5	1.13	22.67	4789	0.70	38.74	INFERRED
0.5	**0.9**	**1.68**	**38.9**	**1.40**	**22.41**	**4613**	**0.91**	**37.29**	**SUBTOTAL**
BHWE - 100m									
7.8	12.9	1.67	38.11	1.37	22.75	4674	0.97	37.78	INDICATED
2.4	4.0	1.65	37.38	1.23	22.80	4807	0.72	38.59	INFERRED
10.2	**16.9**	**1.66**	**37.93**	**1.33**	**22.76**	**4705**	**0.91**	**37.97**	**SUBTOTAL**
100 - 200m									
10.8	18.0	1.66	38.06	1.28	22.72	4690	0.85	37.94	INDICATED
2.5	4.2	1.65	37.59	1.22	22.79	4776	0.65	38.39	INFERRED
13.3	**22.2**	**1.66**	**37.97**	**1.27**	**22.74**	**4706**	**0.81**	**38.02**	**SUBTOTAL**
200 - 300m									
11.8	19.4	1.65	37.13	1.19	23.09	4783	0.68	38.59	INDICATED
3.2	5.2	1.62	35.66	1.32	23.56	4931	0.60	39.45	INFERRED
15.0	**24.6**	**1.64**	**36.82**	**1.22**	**23.19**	**4814**	**0.67**	**38.77**	**SUBTOTAL**
300 - 400m									
9.9	16.3	1.63	36.17	1.07	23.49	4893	0.62	39.27	INDICATED
5.5	9.0	1.64	36.58	1.32	23.28	4835	0.65	38.81	INFERRED
15.4	**25.3**	**1.64**	**36.32**	**1.16**	**23.42**	**4872**	**0.63**	**39.11**	**SUBTOTAL**
54.4	**89.9**	**1.65**	**37.19**	**1.24**	**23.05**	**4781**	**0.74**	**38.52**	**GRAND TOTAL**
55	**89**	**1.7**	**37**	**1.2**	**23**	**4781**	**0.70**	**39**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

The volume of unclassified resources is 36 million m^3.

The resources by seam can be found in Appendix 11a and 11b.

10.3 Comparison for BN model between New JORC (2012) - 31 December 2021 and Previous JORC (2012) - 30 June 2015 Resource Estimates to 400m

For the purposes of comparison, the two Resource estimates were un-adjusted for mining so only the models were compared and were not affected by outside influences such as mining dilution etc. This is not to be confused with the final Resource estimate in Table 10-1 and 10-2, which are final JORC (2012) Resource estimates and are adjusted to the mine survey pit shell.

The following table (Table 10-5) shows the Resources quoted on an as-received basis for the previous JORC (2012) – 30 June 2015 and compared with the New Resource from this report. This table is non JORC and should be used for indicative comparative purposes only.

Table 10-5: Comparison of New with Previous JORC Resource estimates – Non JORC

MMC 30th June 2015 - JORC (2012)					
Total Coal Resources	**Resources Category (as-received)**				
Depth Limits	**Measured**	**Indicated**	**Inferred**	**Total (M+I)**	**Total (M+I+I)**
Sub-Total above -300m	184	35	17	219	236
Sub-Total below -300m	70	16	9	86	95
Totals	**254**	**51**	**26**	**305**	**331**
MMC 31st December 2021 - JORC (2012)					
Total Coal Resources	**Resources Category (as received)**				
Depth Limits	**Measured**	**Indicated**	**Inferred**	**Total (M+I)**	**Total (M+I+I)**
Sub-Total above -300m	251	36	22	287	309
Sub-Total below -300m	87	16	9	103	112
Totals	**338**	**52**	**31**	**390**	**421**
Differences:- MMC 30th June 2015 - JORC (2012) vs MMC 31st December 2021 - JORC (2012)					
Total Coal Resources	**Resources Category (as received) Tonnes**				
Depth Limits	**Measured**	**Indicated**	**Inferred**	**Total (M+I)**	**Total (M+I+I)**
Sub-Total above -300m	67	1	5	68	73
Sub-Total below -300m	17	0	0	17	17
Totals	**84**	**1**	**5**	**85**	**90**
Total Coal Resources	**Resources Category (as received) Tonnes**				
Depth Limits	**Measured**	**Indicated**	**Inferred**	**Total (M+I)**	**Total (M+I+I)**
Sub-Total above -300m	36%	3%	29%	31%	31%
Sub-Total below -300m	24%	0%	0%	20%	18%
Totals	**33%**	**2%**	**19%**	**28%**	**27%**

(Source: Energy Resources LLC)

There is moderate agreement with the two estimates with the current estimate having an increase of 27 percent. However, there were a number of materially positive and negative aspects that occurred between the two estimates.

One of the main aspects is the current Resource estimate was completed under the new JORC (2012) Code which refers to the new Coal Guidelines (2014). It should be noted

that the two documents are far more stringent and thorough than previous versions. The following is a list of changes that were applied with apparent affect to the current estimate.

- Updated weathering information from Mine sampling, (coal lost).
- Updated base of weathering and base of Quaternary with new drilling, (coal lost).
- Changed coal seam outcrop limits in east side, (coal gain).
- Changed Resource limit in west side, (coal gain).
- Changed coal thickness estimation of apparent thickness, true thickness and vertical thickness, (coal gain)

10.4 Comparison for THG model between New JORC (2012) - 31 December 2021 and Previous JORC (2012) – 30 June 2015 Resource Estimates to 400m

For the purposes of comparison, the two Resource estimates were un-adjusted for mining so only the models were compared and were not affected by outside influences such as mining dilution etc. This is not to be confused with the final Resource estimate in Table 10-3 and 10-4, which are final JORC (2012) Resource estimates and are adjusted to the mine survey pit shell.

The following table (Table 10-6) shows the Resources quoted on an as-received basis for the previous JORC (2012) – 30 June 2015 and compared with the New Resource from this report. This table is non JORC and should be used for indicative comparative purposes only.

Table 10-6: Comparison of New with Previous JORC Resource estimates – Non JORC

MMC 30th June 2015 - JORC (2012)					
Total Coal Resources	Resources Category (as-received)				
Depth Limits	Measured	Indicated	Inferred	Total (M+I)	Total (M+I+I)
Sub-Total above -300m	0	0	54	0	54
Sub-Total below -300m	0	0	19	0	19
Totals	**0**	**0**	**73**	**0**	**73**
MMC 31st December 2021 - JORC (2012)					
Total Coal Resources	Resources Category (as received)				
Depth Limits	Measured	Indicated	Inferred	Total (M+I)	Total (M+I+I)
Sub-Total above -300m	0	51	13	51	64
Sub-Total below -300m	0	16	9	16	25
Totals	**0**	**67**	**22**	**67**	**89**
Differences:- MMC 30th June 2015 - JORC (2012) vs MMC 31st December 2021 - JORC (2012)					
Total Coal Resources	Resources Category (as received) Tonnes				
Depth Limits	Measured	Indicated	Inferred	Total (M+I)	Total (M+I+I)
Sub-Total above -300m	0	51	-41	51	10
Sub-Total below -300m	0	16	-10	16	6
Totals	**0**	**67**	**-51**	**67**	**16**
Total Coal Resources	Resources Category (as received) percent				
Depth Limits	Measured	Indicated	Inferred	Total (M+I)	Total (M+I+I)
Sub-Total above -300m	0%	100%	-76%	100%	19%
Sub-Total below -300m	0%	100%	-53%	100%	32%
Totals	**0%**	**100%**	**-70%**	**100%**	**22%**

(Source: Energy Resources LLC)

There is moderate agreement with the two estimates with the current estimate having an increase of 22 percent. However, there were a number of materially positive aspects that occurred between the two estimates.

One of the main aspects is the current Resource estimate was completed under the new JORC (2012) Code which refers to the new Coal Guidelines (2014). It should be noted that the two documents are far more stringent and thorough than previous versions. The following is a list of changes that were applied with apparent affect to the current estimate.

- Changed coal seam outcrop limits in west side, (coal gain).
- Changed coal thickness estimation of apparent thickness, true thickness and vertical thickness, (coal gain)

11 Conclusions and Recommendations

The BND is approximately 12.8 km^2 in area and located in south-central Mongolia within the Ulaan Nuur Valley of the Gobi Desert. The coalfield is situated within the Khankhongor soum, Omnogobi Aimag (South Gobi province) about 61km west of Dalanzadgad the provincial capital and around 500km south of Ulaanbaatar, the national capital. The coalfield is 230km from the Gantsu Maudu border of the People's Republic of China to the south.

The Baruun Naran area is characterised by gently rolling desert plains with scattered small hills and ridges. The elevations in the region range from 1500m to 1700m.The higher elevations occur on a number of small hills that surround the area, which is a continuation of the Altai Mountains. The annual average maximum temperatures are 36°C and -38°C respectively.

Baruun Naran coal deposit consists of 2 mining licenses, BN mining license [MV-014493] (4485.65 ha), and THG mining license [MV-017336] (8340.01 ha). Both licenses are valid for 30 years and can be extended twice more for 20 years each.

BND occurs within an Upper Permian clastic sedimentary unit known as the TT formation. The same formation also hosts the large TT coking and thermal coal deposit. An east-northeast trending belt of TT formation crops out in the Baruun Naran valley representing the western continuation of the Ulaan Nuur coal basin. The Ulaan Nuur basin is an asymmetric fault bounded east-northeast trending syncline, with a very steep northern limb (overturned in part) and more gently dipping southern limb. In addition to this folding of the coal bearing strata, seams are truncated by faults in the north, west and south west. Deformation of Permian sediments occurred during early Mesozoic era. Basement rocks are Carboniferous age on the northern margin of the valley and Devonian on the southern limb. The earliest deposited coal seams are less extensive and on-lap onto older basement rocks.

The BND over the licenses of BN and THG have 20 seam groupings which include 'A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'N', 'Q', 'R', 'T', 'U', 'V', 'W', 'X' and 'Y'. Of these, seams 'H' and 'T' are best developed, thickest and most continuous and contain a substantial portion of the coking coal resource within the licenses.

The raw coal quality data used for the Resource estimates was collected from 2 exploration drilling periods. QGX organized drilling from 2005 to 2010 and total 2679 BN, 26 THG samples were sampled. From 2011 until today ER geology team conducted drilling in the area and total 12,502 BN, 3824 THG core coal and rock samples were sampled and tested. These samples were analysed for total moisture, proximate composition, sulphur and calorific value. CSN and G-index were analysed on composite samples, which matched with modelled seams, as CSN and G-index are coking properties and are non-additive so cannot be calculated by weighted averages.

From analysis of the 2 different periods the coal quality data collection there was a clear disparity of the old QGX moisture data compared with the newer ER data with the actual QGX values being clearly out of alignment with the coal rank and with such a large (greater than 50%) dataset of the newer ER data, a decision was made by the CP to transform the QGX moisture data to fit the ER data whereby all the available coal quality data could be used.

In accordance with the ASTM classification of coal by rank, with the wide range in volatile matter, the coal was classified as ranging from high-volatile "A" bituminous coal to low-volatile bituminous coal with most samples in the medium-volatile bituminous group.

Geotechnical data was collected with the current exploration program. AMC consultants have been engaged to provide advice on geotechnical issues at BND. All geotechnical data collected was provided to AMC consultants for their ongoing work.

An initial site visit was completed by Mr Ballantine (Executive General Manager Geology and Exploration) and Mr Andrew Little, Technical Director (at the time) for MMC on 7 April 2011. The purpose of this visit was to form part of the due diligence process for the purchase of BN mine. The visit entailed inspections of the onsite offices, mining equipment, maintenance office and the newly opened 'T' seam pit. Nothing out of the ordinary from the documentation supplied in the data room was determined.

JORC Resource estimates require a level of independence and hence Mr Todd Sercombe, senior consultant for GasCoal Pty Ltd and a coal geologist since 1996, provided an independent peer review of the exploration procedures developed by the ER team.

Internal peer review of exploration work 2018 was conducted by Mr. Lkhagva-Ochir Said, the then Executive General Manager of Mining and Processing. These peer reviews confirmed compliance of the Group's work to update the Coal Resource estimations in compliance with requirements of the JORC Code (2012).

Initial exploration began in 1983 by Mongolian-Russian teams which intercepted a total of 12 coal seams with apparent thickness of 1 to 30 meters of which 4 reported metallurgical quality. Further more concentrated exploration followed by QGX during 2005 – 2009 that focused its efforts on the main BN license. Some regional work was also completed during this time. The current exploration was completed by ER over BN (2011 – 2014, 2018) and TKG (2012). The Resource estimates are based upon the approximate total amount of drilled metres over the BN and THG licenses during all periods is 174,708.4metres of which approximately 141,316.2metres was cored and 33,392.2 metres was openhole. In addition, during 2011, Polaris Seismic International completed for the BN license, 2D high definition seismic program recording 39 lines totalling 73.51km using Roll On and Roll Off methodology and dynamite as the source.

All QAQC methods for drilling, borehole survey, geophysics, logging and sampling were reviewed against current procedures that meet JORC standards. The analytical methods were also investigated. The QGX analyses were completed by SGS Laboratories, Tianjin, China and ACIRL in the USA. The ER program the analyses were completed by the onsite ERCCL. All laboratories were accredited to the standards of the day with the ERCCL laboratory holding a current accreditation to ISO/IEC 17025:2017(MNS ISO/IEC 17025:2018). The ERCCL laboratory underwent 2 audits during the campaign with both delivering favourable responses. In addition, duplicate samples were sent to 2 laboratories, the Ulaanbaatar based ALS and the Mining Institute (UUH) laboratory. The ERCCL laboratory generally reported the coal quality parameters lower than the ALS laboratory and generally higher than the UUH laboratory with varying degrees of reproducibility between laboratories.

The BN and THG Resource estimates were carried out using Micromine' s Version 18.0.1008 and LogCheck Version 7.277 using the COALLOG geology data format as

the database. The resource estimates were carried out using the POO data supplied by the CP.

The method used for estimating Resources for BN and THG was the same. It involved modelling an elevation grid for a major ply and then modelling thickness grids for the other plies and partings. These thickness grids for the plies and partings were then stacked on top or below of the elevation grid to form a 3D block model. Gridding with exact interpolation using ordinary kriging was used to generate grids for the elevation of the mid-point of the plies and inverse distance weighting (IDW) with a power of three was used to generate grids for the thicknesses of the plies and partings. The Base of Extremely weathering surface, the base of weathering surface, the Base of Quaternary and the topographic surface grids were also produced using IDW with a power of two.

The block model used for Resource classification, seam coding and grade interpolation was limited vertically by the Base of weathering grid or LOX lines where they were present. The block model was limited laterally by basement faulting and the subcrop. Each ply was limited to its own Inferred resource boundary or other defined limits.

Measured Resources were limited to circles with a radius of 500m, Indicated Resources by a circle with a radius of 1000m and Inferred Resources by a circle with a radius of 2000m. For seam coding there was no maximum seam thickness, a minimum seam thickness of 0.5m to 400m, a maximum parting thickness of 0.5m, and an ash content cut-off greater than 50% (dry basis). In addition, core recovery was applied where it was greater than or equal to 95% for moderate or high potential coking coal seams and greater than or equal to 90% for low potential or no coking potential coal seams. Coal quality data was interpolated into the block model using IDW with a power of three.

The total resources for the BN deposit are shown on an as-received basis in Table 10-1 and on an air-dry basis in Table 10-2. It should be noted that these figures have been rounded to reflect the fact that they are estimates and as a result this may cause figures not to sum correctly.

Table 11-1: Total Resources on an As-Received (AR) Basis

Volume (x1,000,000 M^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Total Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA - BHWE									
4.6	7.3	1.6	29.00	2.3	23.9	5515	1.18	44.79	MEASURED
0.8	1.2	1.6	32.01	2.1	23.6	5205	1.06	42.25	INDICATED
0.5	0.7	1.6	31.12	2.5	24.1	5276	1.07	42.32	INFERRED
5.9	**9.2**	**1.6**	**29.55**	**2.3**	**23.9**	**5457**	**1.16**	**44.27**	**SUBTOTAL**
BHWE - 100m									
39.4	61.9	1.57	28.88	2.16	23.90	5543	1.14	45.07	MEASURED
5.7	9.2	1.61	31.33	2.11	23.65	5287	1.04	42.91	INDICATED
3.1	5.0	1.60	30.44	2.36	24.13	5351	1.09	43.06	INFERRED
48.2	**76.1**	**1.58**	**29.28**	**2.17**	**23.88**	**5499**	**1.12**	**44.68**	**SUBTOTAL**
100 - 200m									
55.9	87.8	1.57	28.55	2.02	24.05	5578	1.12	45.37	MEASURED
7.5	12.0	1.61	30.91	2.11	23.69	5330	1.07	43.29	INDICATED
4.8	7.7	1.60	29.92	2.41	24.30	5397	1.07	43.37	INFERRED
68.2	**107.5**	**1.58**	**28.91**	**2.06**	**24.03**	**5537**	**1.11**	**44.99**	**SUBTOTAL**
200 - 300m									
56.4	88.6	1.57	28.60	1.98	24.01	5574	1.10	45.41	MEASURED
8.3	13.3	1.59	29.99	2.06	23.73	5424	1.10	44.21	INDICATED
5.2	8.2	1.59	29.40	2.37	24.32	5457	1.08	43.91	INFERRED
69.9	**110.1**	**1.57**	**28.83**	**2.02**	**24.00**	**5547**	**1.10**	**45.15**	**SUBTOTAL**
300 - 400m									
55.1	86.5	1.57	28.54	1.94	23.96	5583	1.12	45.56	MEASURED
9.8	15.7	1.60	30.49	2.07	23.56	5372	1.10	43.88	INDICATED
5.7	9.0	1.58	28.84	2.32	24.30	5518	1.10	44.54	INFERRED
70.6	**111.2**	**1.58**	**28.84**	**1.99**	**23.93**	**5548**	**1.12**	**45.24**	**SUBTOTAL**
262.8	**414.1**	**1.58**	**28.95**	**2.05**	**23.96**	**5534**	**1.11**	**45.03**	**GRAND TOTAL**
264	**415**	**1.6**	**29**	**2.1**	**24**	**5534**	**1.10**	**45**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

(Source: Energy Resources LLC)

Table 11-2: Total Resources on an Air-Dry (AD) Basis

Volume (x1,000,000 M^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Inherrent Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA - BHWE									
4.6	7.4	1.59	29.5	1.0	24.2	5576	0.98	45.34	MEASURED
0.8	1.2	1.64	32.4	1.0	23.9	5253	0.97	42.66	INDICATED
0.5	0.7	1.63	31.6	1.2	24.4	5337	0.99	42.81	INFERRED
5.9	**9.3**	**1.60**	**30.0**	**1.0**	**24.2**	**5517**	**0.98**	**44.81**	**SUBTOTAL**
BHWE - 100m									
39.4	62.40	1.58	29.28	0.97	24.17	5600	0.99	45.58	MEASURED
5.7	9.30	1.62	31.75	1.03	23.89	5337	0.91	43.33	INDICATED
3.1	5.00	1.62	30.92	1.12	24.42	5411	0.98	43.54	INFERRED
48.2	**76.70**	**1.59**	**29.69**	**0.99**	**24.15**	**5556**	**0.98**	**45.17**	**SUBTOTAL**
100 - 200m									
55.9	88.30	1.58	28.92	0.95	24.30	5631	0.96	45.84	MEASURED
7.5	12.10	1.62	31.34	1.02	23.93	5380	0.91	43.71	INDICATED
4.8	7.80	1.61	30.40	1.15	24.59	5459	0.96	43.86	INFERRED
68.2	**108.20**	**1.59**	**29.30**	**0.97**	**24.28**	**5591**	**0.96**	**45.46**	**SUBTOTAL**
200 - 300m									
56.4	89.20	1.58	28.96	0.94	24.24	5626	0.92	45.85	MEASURED
8.3	13.40	1.61	30.42	0.99	23.97	5474	0.91	44.62	INDICATED
5.2	8.30	1.60	29.85	1.13	24.62	5520	0.95	44.40	INFERRED
69.9	**110.90**	**1.59**	**29.20**	**0.96**	**24.24**	**5600**	**0.92**	**45.59**	**SUBTOTAL**
300 - 400m									
55.1	87.10	1.58	28.89	0.95	24.18	5633	0.91	45.98	MEASURED
9.8	15.90	1.61	30.92	0.99	23.79	5421	0.89	44.29	INDICATED
5.7	9.00	1.59	29.27	1.11	24.58	5581	0.95	45.04	INFERRED
70.6	**112.00**	**1.59**	**29.21**	**0.97**	**24.16**	**5599**	**0.91**	**45.66**	**SUBTOTAL**
262.8	**417.1**	**1.59**	**29.34**	**0.97**	**24.21**	**5587**	**0.94**	**45.48**	**GRAND TOTAL**
264	**415**	**1.6**	**29**	**1.0**	**24**	**5587**	**0.90**	**46**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

(Source: Energy Resources LLC)

The total resources for the THG deposit are shown on an as-received basis in Table 10-13 and on an air-dry basis in Table 10-24. It should be noted that these figures have been rounded to reflect the fact that they are estimates and as a result this may cause figures not to sum correctly.

Table 11-3: Total Resources on an As-Received (AR) Basis

Volume (x1,000,000 m^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Total Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA - BHWE									
0.4	0.7	1.65	38.27	3.82	21.83	4465	0.94	36.08	INDICATED
0.1	0.2	1.63	36.73	2.93	22.26	4707	0.68	38.08	INFERRED
0.5	**0.9**	**1.65**	**37.92**	**3.63**	**21.92**	**4519**	**0.88**	**36.53**	**SUBTOTAL**
BHWE - 100m									
7.8	12.7	1.64	37.12	3.64	22.24	4577	0.94	37.00	INDICATED
2.4	4.0	1.63	36.58	3.13	22.38	4721	0.70	37.92	INFERRED
10.2	**16.7**	**1.64**	**36.99**	**3.52**	**22.27**	**4611**	**0.88**	**37.22**	**SUBTOTAL**
100 - 200m									
10.8	17.8	1.64	37.17	3.33	22.27	4602	0.82	37.24	INDICATED
2.5	4.1	1.63	36.82	3.09	22.37	4692	0.63	37.72	INFERRED
13.3	**21.9**	**1.64**	**37.10**	**3.29**	**22.29**	**4619**	**0.78**	**37.33**	**SUBTOTAL**
200 - 300m									
11.8	19.2	1.63	36.32	3.08	22.66	4702	0.67	37.94	INDICATED
3.2	5.1	1.61	34.94	3.15	23.14	4847	0.59	38.78	INFERRED
15.0	**24.3**	**1.62**	**36.03**	**3.09**	**22.76**	**4732**	**0.65**	**38.11**	**SUBTOTAL**
300 - 400m									
9.9	16.1	1.61	35.43	2.77	23.11	4820	0.61	38.68	INDICATED
5.5	8.9	1.62	35.80	3.23	22.84	4750	0.63	38.13	INFERRED
15.4	**25.0**	**1.62**	**35.56**	**2.93**	**23.02**	**4795**	**0.62**	**38.49**	**SUBTOTAL**
54.4	**88.8**	**1.63**	**36.36**	**3.18**	**22.62**	**4697**	**0.72**	**37.84**	**GRAND TOTAL**
55	**89**	**1.6**	**36**	**3.2**	**23**	**4697**	**0.70**	**38**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

(Source: Energy Resources LLC)

Table 11-4: Total Resources on an Air-Dry (AD) Basis

Volume (x1,000,000 m^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Inherrent Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA - BHWE									
0.4	0.7	1.68	39.3	1.48	22.34	4563	0.98	36.87	INDICATED
0.1	0.2	1.65	37.5	1.13	22.67	4789	0.70	38.74	INFERRED
0.5	**0.9**	**1.68**	**38.9**	**1.40**	**22.41**	**4613**	**0.91**	**37.29**	**SUBTOTAL**
BHWE - 100m									
7.8	12.9	1.67	38.11	1.37	22.75	4674	0.97	37.78	INDICATED
2.4	4.0	1.65	37.38	1.23	22.80	4807	0.72	38.59	INFERRED
10.2	**16.9**	**1.66**	**37.93**	**1.33**	**22.76**	**4705**	**0.91**	**37.97**	**SUBTOTAL**
100 - 200m									
10.8	18.0	1.66	38.06	1.28	22.72	4690	0.85	37.94	INDICATED
2.5	4.2	1.65	37.59	1.22	22.79	4776	0.65	38.39	INFERRED
13.3	**22.2**	**1.66**	**37.97**	**1.27**	**22.74**	**4706**	**0.81**	**38.02**	**SUBTOTAL**
200 - 300m									
11.8	19.4	1.65	37.13	1.19	23.09	4783	0.68	38.59	INDICATED
3.2	5.2	1.62	35.66	1.32	23.56	4931	0.60	39.45	INFERRED
15.0	**24.6**	**1.64**	**36.82**	**1.22**	**23.19**	**4814**	**0.67**	**38.77**	**SUBTOTAL**
300 - 400m									
9.9	16.3	1.63	36.17	1.07	23.49	4893	0.62	39.27	INDICATED
5.5	9.0	1.64	36.58	1.32	23.28	4835	0.65	38.81	INFERRED
15.4	**25.3**	**1.64**	**36.32**	**1.16**	**23.42**	**4872**	**0.63**	**39.11**	**SUBTOTAL**
54.4	**89.9**	**1.65**	**37.19**	**1.24**	**23.05**	**4781**	**0.74**	**38.52**	**GRAND TOTAL**
55	**89**	**1.7**	**37**	**1.2**	**23**	**4781**	**0.70**	**39**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

(Source: Energy Resources LLC)

In view that this Resource estimate forms the basis of a Reserves update, the following recommendations for the project area include, but are not limited to:

1. Drill closely spaced boreholes to determine remaining seam LOX lines.
2. Complete a series of Bulk samples for washability tests on all potential coking seams with blending options with UHG seams.
3. Adopt recommendations from the peer review.
4. A better understanding of the spatial distribution of the coking characteristics of the coal and the geological parameters that affect the coking characteristics will be beneficial for mine planning and production scheduling in order to produce a consistent product and maximising the value of the deposit.
5. A review should be completed where there was some variation in the elevations of the topography survey and the collar survey.
6. The Seismic data is high level data that has been important in locating and defining structural style, but it is highly recommended that mine geologists continue to map and monitor faults within the pit.
7. Continue infill drilling program in front of mining.

12 Disclaimer

MMC has compiled this document based on the assumptions therein identified and upon reports, drawings, designs, data and other information provided by others. MMC was unable to check the veracity of the supplied data. MMC has relied upon information that has been prepared by non-qualified persons during the preparation of this report. MMC are not in a position to, and do not, verify the accuracy of, or adopt as their own, the information and data supplied by others. Parts of the document have been prepared by others or extracted from documents prepared by others, as identified in the document; the documents have not been audited by MMC.

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13 Date and Signature

Byambaa Barkhas

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Tsolmon Adya

Manager, Petrographic laboratory (AusIMM #326375)

Energy Resource LLC (HKE 975 Mongolian Mining Corporation LLC)

Bekhbat Purev

Senior Geologist

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14 Statement of qualifications

I, Byambaa Barkhas do hereby certify that:

- I reside at Door 4, Building 9, Tsetsii Khoroolol, Uguumur bag, TsogtTsetsii soum, Umnugobi province, MONGOLIA.
- I graduated in 2008 with a "Bachelor of geology" from the "School of Geology and Petroleum Engineering, Mongolian University of Science and Technology", I am Master student of "School of Geology and Mining, Mongolian University of Science and Technology".
- I have been a Member of the Australasian Institute of Mining and Metallurgy (#318198) since 2014.
- I have practiced my coal geological profession for a total of 12 years.
- I certify by reason of my education, affiliation with a professional association, and past relevant work experience in the type and style of deposit that I fulfil the requirements to be a 'Competent Person' for Coal resources.
- I am a fulltime employee of Mongolian Mining Corporation in the position of Chief Geologist for Geology and Geotechnical.
- I am not aware of any material fact or material change with respect to the subject matter of the technical report that is not reflected in the technical report.

15 Statement of independence

I am a fulltime employee of MMC in the position of Chief Geologist for Geology and Geotechnical.

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17 Glossary of technical terms

3D	Three-dimensional.
%	Percent.
^{o} C	degrees Celsius
Aimag	Provincial centre
Anisotropy	Quality of a variably to having different physical properties when measured in different directions.
Assay	A measured quantity of material within a sample.
ASTM	American Society for Testing and Materials
Azimuth	Azimuth angle on which an exploration hole was drilled (deviation to North).
Coal Seam	Portion of the strata that contains solid fossil fuels
Coal resource	is a concentration or occurrence of material of intrinsic economic interest in or on the earth's crust in such a form and quantity that there are reasonable prospects for eventual economic extraction.
Coefficient of variation	In statistics, a normalised measure of the variation present in a sample population.
Collar	Geographical co-ordinates of a borehole or shaft starting point.
Compositing	In sampling and resource estimation, process designed to carry all samples to certain equal length.
Correlation coefficient	A statistical measure of the degree of similarity between two parameters.
CP	'Competent Person' as defined by JORC
Cumulative frequency graph	Graphical representation of data ranked in ascending or descending order, which are shown in a non-decreasing function between 0% and 100%. The percent frequency and cumulative percent frequency forms are interchangeable, since one can be obtained from the other.
CV	Calorific Value
Dip	Angle which strata makes with horizontal
FC	Fixed Carbon
g/cc	grams per cubic centimetre
Geostatistics	Science studying and describing the spatial continuity of any kind of natural phenomena.
Histogram	A graphical presentation of the distribution of data by frequency of occurrence.
IDW	Inverse Distance Weighting
IM	Inherent Moisture
Indicator	Transformed value.
Inverse Distance Weighting	Geostatistical method to calculate mineral resource. Since this method makes the weight for each sample inversely proportional to its distance from the point being estimated it gives more weight to the closest samples and less to those that are farthest away. Method works very efficiently with regularly gridded data. Extreme versions of inverse distance weighting are the global

	declustering methods like the polygonal method and the local sample mean method.
JORC Code	Australasian Code for Reporting of Mineral Resources and Ore Reserves
Lognormal	Refers to the distribution of a variable where the distribution of the logarithm of that variable is normal.
m	Metre
M	Million or mega (106).
Mean	Average.
Median	Value of the middle sample in a data set arranged in rank order.
Micromine	Mining and exploration software.
Mt	Million tonnes.
Omni	In all directions.
OK	Ordinary Kriging interpolation method.
Percentile	One hundredths of the total data. 50th percentile corresponds to the median.
Ply	A collection of coal lithotypes that make up the basic component of a coal seam. A ply can also be a seam by itself. A collection of plies make up a seam.
Population	In Geostatistics, population encompasses grades which show the same or close geostatistical characteristics. Ideally, one population is characterised by linear distribution
Probability plot	Plot showing cumulative frequencies over different intervals on a log scale probability plot
QAQC	Quality Assurance and Quality Control
Range	Distance at which variogram reaches its plateau.
RD	Relative density (unit grams per cubic centimetre).
Resource	Geological mineral resource (mineable and unmineable).
RL	Reduced level i.e. elevation relative to a local datum
Seam	A collection of plies (see ply).
Sill	Distance at which variogram reaches its sill. Physically, there is no correlation between paired samples at that distance.
Spatial continuity	The description or function how continuous are the data values over a certain distance in three dimensions.
Standard deviation	A statistical measure of the dispersion of sample data around the mean value.
Soum	Small township
S	Sulphur
t	Tonne.
t/m^3	Tonne per cubic metre.
TM	Total Moisture
Variance	In statistics, a measure of dispersion about the mean value of a data set.
VM	Volatile Matter

Appendix 1: Mineral Tenure License

(Please see CD or Hard copies that accompany this report)

Appendix 2: Procedures

(Please see CD or Hard copies that accompany this report)

Appendix 3: Table of Base of Weathering and Quaternary for all boreholes that it was logged.

(Please see CD or Hard copies that accompany this report)

Appendix 4a: Points of Observation – (as-received basis)

(Please see CD or Hard copies that accompany this report)

Appendix 4b: Points of Observation – (air-dry basis)

(Please see CD or Hard copies that accompany this report)

Appendix 5: Laboratory Certificates

(Please see CD or Hard copies that accompany this report)

Appendix 6a: Complete analytical database showing (as-received) coal quality

(Please see CD or Hard copies that accompany this report)

Appendix 6b: Complete analytical database showing (air-dry) coal quality

(Please see CD or Hard copies that accompany this report)

Appendix 7: Graphs on a seam by seam basis and for each coal quality parameter

(Please see CD or Hard copies that accompany this report)

Appendix 8: Borehole profiles with LAS and coal quality

(Please see CD or Hard copies that accompany this report)

Appendix 9: Borehole sections

(Please see CD or Hard copies that accompany this report)

Appendix 10: Seismic sections & map

(Please see CD or Hard copies that accompany this report)

Appendix 11a: Resources by seam (air-dry)

(Please see CD or Hard copies that accompany this report)

Appendix 11b: Resources by seam (as-received)

(Please see CD or Hard copies that accompany this report)

Appendix 12: Laboratory audit reports

(Please see CD or Hard copies that accompany this report)

Appendix 13: Seismic reports

(Please see CD or Hard copies that accompany this report)

Appendix 14: PEER review

(Please see CD or Hard copies that accompany this report)

Appendix 15: Geotechnical report

(Please see CD or Hard copies that accompany this report)

Appendix 16: List of Downhole geophysical equipment

(Please see CD or Hard copies that accompany this report)

Appendix 17: Faulted boreholes and plies

(Please see CD or Hard copies that accompany this report)

Appendix 18: Inserted and extrapolated data points

(Please see CD or Hard copies that accompany this report)

Appendix 19: Resource category areas per ply

(Please see CD or Hard copies that accompany this report)

Appendix 20: Capability Statement

(Please see CD or Hard copies that accompany this report)

Appendix 21: UHG Geochemistry

(Please see CD or Hard copies that accompany this report)

Appendix 22: Reserves

(Please see CD or Hard copies that accompany this report)

Appendix 23: Hydrogeology

(Please see CD or Hard copies that accompany this report)

Appendix 24: Variograms

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Appendix 25: JORC Table 1

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Section 1: Sampling Techniques and Data

Criteria	Commentary
Sampling techniques	***Nature and quality of sampling.***
	• Coal quality samples were collected from HQ3 and some PQ3 sized diamond core. Coal samples once collected were stored in refrigerated containers until required for analysis. • Each coal ply was logged for brightness and sampled separately in intervals of ≤2 metres ("m"). Stone bands ≤2 centimetres ("cm") were sampled with the coal, but stone bands larger than this were sampled separately. Stone bands >50cm were not sampled. • Chip samples from open holes and trench samples were used for continuity purposes and were not used for resource calculations. • Full coal seam samples were taken for the resource calculation and 30cm ply roof or floor samples were taken for inclusion in future work on Reserves, which did not impact the resource calculation methods. • All boreholes were geophysically logged with down-hole wire-line tools with sample spacing's of 1cm, 2cm or 5 cm used. Coal/rock boundaries were well identified from the geophysics. Core boreholes were corrected and checked for core recovery for coal and rock thickness using down-hole geophysics with loss inserted within the lithology record. Open-hole coal ply thickness was corrected to down-hole geophysics.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.
	• For cored boreholes, coal plies were fully cored and sampled. • Two calibration boreholes (G02251 and R00020) were setup at UHG coal mine to regularly test all logging tools as they came onto the site and at regular periods whilst onsite. • A central logging facility was designed at BN coal mine where all borehole cores were stored, logged, photographed and sampled. A standard set of rock types and coal lithotypes were collected and displayed for purposes of calibration in logging. • The logging geologists were supervised and regularly tested on performance for procedural compliance by Mr. Barkhas, Chief Geologist, geology and geotechnical, as internal auditor.
	Aspects of the determination of mineralisation that are Material to the Public Report.

Criteria	Commentary
	• Coal was determined in the core by colour, weight, strength and texture (assisted with using a field knife to scratch the core for streak and hand lens to observe texture). • Once the coal/rock boundary was observed, the coal ply was logged for coal maceral and thickness, for changes in coal brightness (maceral – Vitrinite) using a coal brightness chart: - C1 = >90% bright - C2 = 60-90% bright - C3 = 40-60% bright - C4 = 10-40% bright - C5 = 1-10% bright - C6 = <1% bright). • Based on the brightness of coal macerals, similar brightness sections within a ply were sampled together. • These samples would indicate changes in quality i.e. higher ash/higher density. Rock partings ≤50cm within or between plies were sampled separately. • The core coal interval observations were confirmed with down-hole geophysics.
Drilling techniques	***Drill type and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc.).*** • Diamond core and open-hole drilling was completed. All coring was completed with Boart Longyear triple tube split systems to ensure maximum core recovery. Open-hole drilling was 114-152mm hammer until the water table then water circulated blade drilling. • Core was mostly HQ3 size (hole diameter 96.0mm, core diameter 61.1mm) with some PQ3 size (hole diameter 122.6mm, core diameter 83.0mm). • Core bits were diamond impregnated and surface set to maximise recovery and minimise shattering of core. • Generally boreholes were drilled at an angle to optimally intercept the highly dipping coal seams and all had down-hole verticality Logs run.
Drill sample recovery	***Method of recording and assessing core and chip sample recoveries and results assessed.***

Criteria	Commentary
	• Linear core recovery was calculated initially by the driller's measurement and then confirmed by the rig geologist who calculated the recovered linear length of core for each drill run and expressing it as a percentage of the full core run. • Downhole geophysics was used to further assess the amount and location of linear core loss. • Core photography in boxes also assisted later evaluation of loss. • Linear core loss was recorded in the drill record and inserted into the lithology log at the point of loss. The point of linear loss was determined with photographs and wire-line geophysics by determining the thickness between stone partings within the geophysical log and solid core. • Samples were measured for weight but this mainly served as a cross check with the laboratory. • Linear core loss was mainly attributed to drilling through structural zones. Where poor drilling was deemed as the cause of poor recovery the borehole was redrilled.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.
	• Modern drilling equipment and trained coal drillers was utilised. • High quality drilling pipe, coring and drilling bits used. • Expected high core recovery particularly in coal plies enforced with drilling contractor where ply sections with less than ≥95% were redrilled. • Chip samples collected on a 1m basis and displayed clearly for rig geologist observation.
	Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.
	• High linear core recover was maintained ≥95% therefore, minimising sample bias due to sample mass loss. Core photography and good wire-line geophysics confirmed high linear core recovery and assisted with documentation of actual loss depth recorded within the lithology log.
Logging	***Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.***

Criteria	Commentary
	• All core was logged geologically and geotechnically and recorded in hard copy and electronic format to the Borehole Data Standard for the Australian Coal Industry ("CoalLog") standard.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.
	• Geological and geotechnical logging was qualitative with codes used to describe the different geological and geotechnical aspects of the core as per CoalLog standard. The depths chosen for geological intervals and geotechnical dislocations were quantitative. • Borehole core was photographed in 4-5m boxes (depending PQ3 or HQ3 core size) on a wet and dry basis which included the entire core.
	The total length and percentage of the relevant intersections logged.
	• All coal plies were fully cored and logged to CoalLog standard. All logged coal cores were fully sampled including rock parting ≤ 50cm.
Sub-sampling techniques and sample preparation	***If core, whether cut or sawn and whether quarter, half or all core taken.***
	• The whole core was sampled for coal analysis.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.
	• Not applicable for coal.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.
	• Coal cores at the rig site, were measured in the splits then gently washed to remove drilling grime. The coal was carefully placed into core boxes with no coal remaining in the splits. The boxes were wrapped securely in plastic for transport to the BN central logging facility. The core boxes were delivered (average distance 2km) to the BN central logging facility at the end of each 10 hour shift. The coal core boxes are stored in refrigerated containers until logging. After logging and sampling, the samples were returned to refrigeration until sent to the Energy Resources Central Chemical Laboratory ("ERCCL"). This laboratory is located at the UHG mine site approximately 30km from the BN central logging facility. • At the BN central logging facility core boxes were placed in the dedicated photography area and photos taken. The core was laid out on specifically designed and built logging tables. The atmospheric

Criteria	Commentary
	environment inside the BN central logging facility was kept to a constant temperature. The cores were re-measured and confirmed with field measurements. Geophysical logs were used to correct for seam thickness, loss and expansion were noted. Based on the brightness of coal macerals, similar brightness sections within a ply were sampled together. Rock partings ≥2cm and ≤50cm within or between plies were sampled separately. Roof and floor material of 30cm in thickness was also sampled. Maximum coal sample thickness was 2m. Identified samples were placed in double plastic bags with sample tags placed inside the coal containing sample bag and then in between the sample bags with finally the sample information written on the outside plastic bag. The sample bag was weighed with weight corrected for the sample bag mass. • Geotechnical rock samples were collected on each change of major lithotype. The samples were wrapped in aluminium foil, then plastic and then water proof tape. The sample number and depth was scribe on the sample. The sample number was digitally recorded in the logging software 'LogCheck'.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.
	• All samples were analysed at the ERCCL. With respect to sample preparation, the top size of the sample was reduced and split into two quarters and one half portions. The sample preparation took into account the top size of the sample material required for each of the analytical determinations. One of the quarter portions was used for analysis and the remaining portions were retained. • The ERCCL was accredited to ISO/IEC 17025:2017 (MNS ISO/IEC 17025:2018) standard in November 2020 and expires in July 2023.
	Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.
	• ERCCL prepared and analysed a number of samples and submitted duplicates of these samples for analysis at the ALS (100 samples) and UUH (615 samples) laboratories in Ulaanbaatar. The ERCCL analytical results were compared to the other laboratories by means of cross plots and basic statistical parameters. • The ERCCL generally reported the coal quality parameters lower than the ALS laboratory and generally higher than the UUH laboratory with varying degrees of reproducibility between laboratories.

Criteria	Commentary
	• For work previously completed before 2009, it is unknown if a similar comparison exercise was done.
	Whether sample sizes are appropriate to the grain size of the material being sampled.
	• Grain size is not applicable to coal sampling.
Quality of assay data and laboratory tests	***The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.***
	• Before 2015, Coal samples were analysed for, True Relative Density ("TRD") (GB/T 217:2008), Total Moisture ("TM") (MNS ISO 589:2003), Analytical Moisture ("AM") (MNS ISO 331:2003), Ash (MNS ISO 1171:2009), Volatile Matter ("VM") (MNS ISO 562:2001), Calorific Value ("CV") (MNS ISO 1928:2009), Total Sulphur ("TS") (ASTM D4239:05), Crucible Swelling Number ("CSN") (MNS ISO 501:2003) and Caking Index ("G Index") (MNS ISO 335:2005). • In 2018, Coal samples were analysed for, True relative density (GB/T 217:2015), Total moisture (MNS ISO 589:2003), Analytical moisture (MNS GB/T 212:2015), Ash (MNS GB/T 212:2015), Volatile matter (MNS GB/T 212:2015), Calorific value (MNS ISO 1928:2009), Total sulphur (ASTM D4239:2005), Crucible swelling number (MNS ISO 501:2003) and Caking index (MNS GB/T 547:1997). • The coal analyses are sufficient to determine a Resource. • The laboratory under its certification did regular reproducibility and repeatability samples. Main protocol was that after every 10 samples duplicate tests were done (coal and non-coal samples). For every 30 samples, 1 standard and 1 blank sample was tested for equipment calibration. After each full borehole analyses were completed, regression graphs were constructed for internal checks. When samples deviated from the procedure tolerance the samples were re-analysed from new.
	For geophysical tools, spectrometers, handheld XRF instruments, etc., the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.
	• Two calibration boreholes (G02251 and R00020) were setup at the UHG site to regularly test all downhole wire-line logging tools as they came onto the BN and THG sites and at regular periods whilst onsite. • Gradient-array resistivity survey was undertaken by Geomaster LLC ("Geomaster") in July 2005 with more than 13km^2 along Baruun Naran valley. Monmap LLC ("Monmap"), surveyed grid lines. The program

Criteria	Commentary
	was extended in 2006 to extend the gradient-array survey over shallow Permian subcrop to the west of the Baruun Naran valley. This survey covered another 16km^2. The results were high level and provided some guidance with understanding the deposit.
	Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.
	• The ERCCL was accredited to ISO/IEC 17025:2017 (MNS ISO/IEC 17025:2018) standard in November 2020 and expires in July 2023. Internal testing protocols are mandatory with accreditation with duplicate testing and round robin testing done. • Laboratory certificates were supplied by ERCCL . No certificates were supplied by QGX Coal Ltd ("QGX") for testing completed at the SGS or ACIRL laboratories. • ERCCL prepared and analysed a number of samples from UHG exploration and submitted duplicates of these samples for analysis at the ALS Coal – Mongolia ("ALS") laboratory (100 samples) and the Mining Institute ("UUH") laboratory (615 samples). As the same lab and processes were used for BN and THG as for UHG the following comparison is valid. The ERCCL analytical results were compared to the other laboratories by means of cross plots and basic statistical parameters. The ERCCL generally reported the coal quality parameters lower than the ALS laboratory and generally higher than the UUH laboratory with varying degrees of reproducibility between laboratories.
Verification of sampling and assaying	***The verification of significant intersections by either independent or alternative company personnel.***
	• No verification could be made on the pre-QGX boreholes. However Norwest Corporation ("Norwest") twinned a number of these boreholes with no major variation of information stated. • The QGX boreholes 2005-2009 McElroy Bryan Geological Services ("MBGS") and Norwest consultants were involved in the procedures and collection of this data. There data is verified through quality downhole geophysics, core photographs and paper logs. • The MMC drilled boreholes are verified by highly trained geologists following international standards that are regularly reviewed by internal audit. By high quality downhole geophysics, seismic, core photographs, paper and digital logs.

Criteria	Commentary
	The use of twinned holes.
	• A number of pre QGX boreholes were twinned by the Norwest. • MMC did not twin any QGX boreholes.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.
	• The pre-QGX (pre 2005) primary data (excluding coal quality) was in the form of hardcopy volumes of longhand drafted graphic profiles with all survey, drilling, recovery, geological, downhole geophysics, raw information, interpreted information and final information. These volumes are securely stored in the company's long term storage archives. The volumes were scanned, translated, coded and uploaded in the LogCheck data management software. Coal quality records were provided on hard copy laboratory certificates. These hardcopies are securely stored in the company's long term storage archives. This data was entered into Excel spreadsheet and once validated was loaded into the LogCheck data management software. • The QGX (2005-2009) primary data was in the form of scanned hard copy survey, drilling and geological logs, wireline geophysics as Log ASCII Standard ("LAS") digital files and coal quality as Excel spreadsheets. The hardcopy logs were already in digital form as Excel spreadsheets. These were re-coded as necessary and with LAS files uploaded the LogCheck data management software. The coal quality results were built into MMC's existing Excel spreadsheets for validation and uploaded into the LogCheck data management software. • The primary data for MMC (2011-2015, 2018) was original hard copy records for survey, drilling, geology, wire-line geophysics, geotechnical and coal quality. This data is securely stored in filing cabinets in the central logging facility at the mine site. All data stored is digital and has been entered and validated by the LogCheck data management software. This data is stored on company servers where the company IT department control the security. Furthermore, all data has been uploaded into the company master database stored on the MICROMINE Geobank ("Geobank") system. All data systems are aligned with the CoalLog coding and form system. • All data from all exploration either historical or current has been coded and converted into the CoalLog coding and form system and resides as one database.

Criteria	Commentary
	Discuss any adjustment to assay data. • A number of corrections were made to borehole and sample numbers to the BN coal quality database. No corrections were made to the THG coal quality database. • It was identified that as-received and air-dried moisture from QGX exploration analytical results was significantly higher than MMC's. Expected error was calculated which indicated the QGX data was highly variable and had a distinct population from the MMC data. Using the transformation 'xtran = mnew + sdnew * ((xold – mold) / sdold)', the QGX moisture data was adjusted and remaining QGX coal quality data adjusted to the transformed moisture. This transformation was adjusted for all QGX coal quality data across the BN and THG license areas. • Coal interval thicknesses were matched with wire-line geophysics according to normal industry standards. Expanded coal interval intersections and corresponding sample thickness were reduced in thickness to match the geophysics. Where coal cored interval intersections were less, loss was added in the lithology log at the determined location using comparison thicknesses between observed partings and wire-line rock responses. If the loss occurred within a sample the sample thickness was adjusted to reflect the loss. • All samples once collected at the BN central logging facility were weighed for mass and this mass was matched with laboratory sample mass. • All compositing for the Resource estimate was done mathematically based on sample thickness and TRD. The only composites made by the laboratory were for coke and caking tests. • All sample data and composite data are recorded in the LogCheck data management software and Geobank database.
Location of data points	***Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.*** • The topographic and borehole collar survey was carried out with internal resources using Trimble equipment. • Drill hole collars were surveyed using a Trimble R8 GPS which has a static horizontal and vertical accuracy of ±3mm +0.1ppm RMS, an RTK

Criteria	Commentary
	horizontal measurement of ±3mm +0.1ppm RMS and an RTK vertical measurement ±3.5mm +0.4ppm RMS • Downhole survey was used to control the borehole azimuth and angle. Any variance more than 5 degrees in azimuth and the borehole was redrilled. Downhole surveys, done every 20m or 50m down the drill hole, were also used to locate the boreholes holes with depth.
	Specification of the grid system used. • The grid system coordinates are UTM Zone 48 North. The same system was used for all survey data.
	Quality and adequacy of topographic control. • For the BN and THG licenses the topographic survey was carried out with internal resources using Trimble R8 GPS which has a static horizontal and vertical accuracy of ±3mm +0.1ppm RMS, an RTK horizontal measurement of ±3mm +0.1ppm RMS and a RTK vertical measurement ±3.5mm +0.4ppm RMS. • A difference map comparing the grid based on borehole collars and the grid based on topography was compiled with most differences being less than 1.5m, which is acceptable with a few areas greater than this around the boundaries where there is no borehole control.
Data spacing and distribution	***Data spacing for reporting of Exploration Results.*** • Boreholes within the THG license are roughly spaced on a grid orthogonal to the strike on each limb, with drill lines approximately 500m apart with boreholes 100m to 150m separation. • Boreholes within the northern half of the BN license are roughly spaced on a grid orthogonal to the strike on each limb, with drill lines approximately 150m apart with boreholes 50m to 150m separation. In the southern half of the license, boreholes are roughly spaced on a grid orthogonal to the strike on each limb, with drill lines approximately 300m apart with boreholes 50m to 150m separation.
	Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied. • The data spacing is sufficient to establish a high degree of geological and grade continuity appropriate for the Mineral Resource and classifications applied.

Criteria	Commentary
	• An exercise in geostatistics to calculate estimated error on the estimate was completed which confirms high degree of geological and grade continuity.
	Whether sample compositing has been applied.
	• Samples within plies were composited for points of observation for the Resource estimate by mathematical method, based on sample thickness and TRD. The only analytical composites made by the laboratory were for coke and caking tests.
Orientation of data in relation to geological structure	***Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.***
	• The BN coal deposit is highly folded with variable ranging dips from flat to vertical so every borehole was planned as practical as possible to intercept the coal seams at angles normal to the coal dip. All boreholes were surveyed down the borehole and where deviation (mainly in the older boreholes) was large were not considered as points of observation. The MMC drilling had strict rules about borehole deviation which were implemented where borehole deviation of more than 5 degrees triggered a redrill. • No evidence of bias due to borehole orientation has been observed.
	If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.
	• No evidence of bias due to borehole orientation has been observed.
Sample security	***The measures taken to ensure sample security.***
	• For pre-2005 bore cores for the BN deposit, the following is quoted from (Dashkhorol et.al. 1989): *'All coal seams and rocks of the different lithological contents were subjected to sampling. To select cored, coal samples the following method was used: Core was installed in the drill core box in such sequence, for which it will be derived from core barrel. Washing of core with clean water was used only for whole cylinders or large size fragments by hand, but fine-grained and crushed coals are not recommended for washing in the field conditions to avoid distorting of samples because of loss of any lithotypes. Interval length included in the sample has been estimated depending on thickness of a split or coal seam of any*

Criteria	Commentary
	lithotype. Usually in average it equals to 1.0-1.5 m, but sometimes was more when really homogeneous components were sampled separately. If drill core contains some intersections of original lithological component, they were selected together in one sample. Then these intersections were verified through logging. Sometimes, if separation of rock intersections from coal splits was not possible they were selected together with coal, which were recorded in appropriate documents. For the calculation of medium-weighed quality indicators of coal for seam intersections, the results of analyses made for such samples were related to appropriate complicated structure interval of a seam without any amendment. In such cases, a complicated structure interval as a rule was defined and accepted through logging. Core recovery for coal was determined with utilization of volumetric and linear methods into sample divisions, which were organized by crew. Coal core documents were also examined there and completed preparation of samples, labelling and packing into the synthetic bags was made. Selected samples were sent monthly to laboratory.' • The bore cores for the BN coal deposit during 2005 were collected by Norwest and the coal sampling methods were documented in the Norwest core logging manual titled 'Baruun Naran Core Logging Manual, v.5, dated August 9, 2005' and in the October 2005 CAM Report. Designated rig geologists, trained by external consultants, were responsible for collecting these coal samples. Each core sample was bagged and sealed immediately after the coal had been geologically logged and photographed, to minimize coal moisture loss. The coal sampling approach used sometimes introduced substantial non-coal dilution by assuming that non-coal units <0.25 m thick, or any carbonaceous mudstone, could not be discerned or separated from coal during mining. Individual samples were labelled with the drill-hole number, sample number, and depth interval and were placed into cardboard core boxes. All boxes were labelled according to drill-hole number, box number, total sample interval, and sequence of sample numbers and then stored in a secure sample storage facility until ready for shipment. • From 2006 to 2009 MBGS was commissioned to revise and update the sampling methodology. This sampling methodology is dependent upon (i) the reconciliation of geological core logs to geophysical logs prior to sampling (ensuring better allocation of core losses), and (ii) the

Criteria	Commentary
	identification of plies from the geophysical logs. Once this has been done, all sampling is done conforming to these ply boundaries. Stone partings between plies are sampled separately, down to a thickness of a few centimetres. Decisions as to the compositing of plies and parting are made later once basic quality data are acquired on all samples across the seam with the goal of creating meaningful working-section composites for detailed analysis. • From 2011 until present the MMC's Exploration & Geology team has followed procedures based upon the CoalLog system and the Australian Guidelines for the Estimation and Classification of Coal Resources. More specifically, coal cores at the rig site, were measured in the splits then gently washed to remove drilling grime. The coal was carefully placed into core boxes with no coal remaining. The boxes were wrapped securely in plastic for transport to the central logging facility. The core boxes were delivered (average distance 2km) to BN central logging facility at the end of each 10 hour shift. The BN central logging facility is location within the BN mine site. The mine site has 24 hour high level security. The coal core boxes are stored in secure refrigerated containers attached to the BN central logging facility until logging. After logging and sampling, the samples were returned to refrigeration until sent to the laboratory. The laboratory is located at the UHG mine approximately 30km from the BN central logging facility. The core was laid out on specifically designed and built logging tables. The atmospheric environment inside the BN central logging facility was kept to a constant temperature. The cores were remeasured and confirmed with field measurements. Geophysical logs were used to correct for seam thickness, loss and expansion were noted. The identified samples were placed in double plastic bags with sample tags placed inside the coal containing sample bag and then in between the sample bags with finally the sample information written on the outside plastic bag. The sample bag was weighed with weight corrected for the sample bag mass. A sample dispatch form is completed by the geologist, which contains all information on the sample. The form is sent to the laboratory. The laboratory accesses the secure refrigerated container to retrieve the sample as listed on the dispatch form. Confirmation of the correct sample being analysed is through the triplicate sample tag/bag information and double check with the sample weight. • Analytical data was entered into the Geobank database by the laboratory. The Geobank database was first populated with borehole number and sample number from the logged data in the LogCheck

Criteria	Commentary
	software. This data was seamlessly uploaded into the Geobank database for laboratory access. Once the data was entered by the laboratory and validated it could be passed back to Geology for importing into the master Excel spreadsheets for further processing and validation. Final data was seamlessly passed to the LogCheck software for final validation and repository for points of observation.
Audits or reviews	***The results of any audits or reviews of sampling techniques and data.***
	• Mr. Ballantine (CP), for inclusion of the UHG JORC (2004) Resource report dated June 2012, thought it prudent to have an independent experienced Competent Person qualified geologist provide a site visit and peer review. This was done by Mr. Todd Sercombe, senior consultant for GasCoal Pty Ltd, and a coal geologist with at the time 18 years coal industry experience. Mr. Sercombe's findings from the site visit were: *'The UHG exploration procedures and practices are of extremely high calibre, exceeding both the Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996) and the benchmark coal industry best practices (as observed by Mr. Sercombe in the Bowen Basin, Australia). The accurate and unbiased assignment of coal core loss to coal samples, achieved in the UHG practices, is commendable. The coding, for modelling, of all significant stone band partings in the seams and of inter-burden units between the seams is also praiseworthy. The Exploration and Geology Department are a group of young enthusiastic geologists who have been well trained and led by Gary Ballantine. I would have high confidence in the reportable results obtained from the UHG exploration procedures.'* • The exploration group and procedures that was present for the UHG JORC (2004) Resource report as at June 2012 has changed little so the independent peer review by Mr. Sercombe is still relevant. • In addition, Mr. Ballantine still holds responsibility for budgeting, planning, training and overall oversight of exploration at UHG and Baruun Naran deposit (BN coal deposit). As part of the ongoing evolution of the MMC Exploration & Geology group and knowledge transfer, supervised and structured succession of capable individuals, is planned. Mr. Ballantine understands that complacency can creep into a well establish team. To prevent this he does frequent site visits with Mr. Said (Competent Person) every few months and they review different member's capabilities against the exploration procedures. As part of

Criteria	Commentary
	Mr. Ballantine's role as mentor and internal auditor, all final data, (i.e. seam thickness, seam correlation, sampling intervals, coal quality analysis, collar survey and LAS quality) are reviewed once the team (supervised by the Competent Person) has done the work. With the above process it is Mr. Ballantine's professional opinion that there is a very high compliance with the team's results and JORC standards. • In 2018, Technical information in this BN and THG Coal Resource estimation has been internally peer reviewed by Mr. Lkhagva-Ochir Said Executive General Manager for Mining and Processing, Mongolian Mining Corporation. Mr. Said is a member of the Australasian Institute of Mining and Metallurgy (Member #316005) and has over 14 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012).

Section 2: Reporting Exploration Results

Criteria	Commentary
Mineral tenement and land tenure status	***Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.*** • The BN coal deposit now consists of two mining licenses: - Baruun Naran Mining License MV-014493 covering 4486 hectares ("ha"), converted from an Exploration License on 01 December 2008; and - Tsaikhar Khudag Mining License MV-017336 covering 8340 ha, partially converted from Exploration License 4326X on 24 August 2013. • These licenses were granted under the Law on Minerals (1997), are valid for 30 years and can be extended twice more for 20 years each. ***The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*** • The licenses are 100% secure and owned by Khangad Exploration LLC.

Criteria	Commentary
Exploration done by other parties	***Acknowledgment and appraisal of exploration by other parties.*** • The Tavan Tolgoi coal deposits, of which BN coal deposit is one, were discovered and exploited by the local people since the early 19th century. • During the Mongolian-Russian exploration work at the BN coal deposit in 1983, three shallow vertical boreholes (approximately 70m each) were drilled. Six coal seams with apparent thicknesses of up to 4m were identified in this campaign. The resulting 'prognostic resource' calculations included values of 86 Mt and 10.9 Mt underlying an area of 19.2 km^2 (Khosbayar et al., 1983). • From 1983 to 1993, 21 vertical boreholes (depths range from 33-362m) with total 3,500m depth were drilled across the BN coal deposit. Borehole spacing generally ranged from 250-500m on five north-westerly trending exploration lines spaced approximately 3km. Downhole resistivity, caliper, gamma and density surveys were completed on 19 boreholes. 9 boreholes intersected significant coal thickness. Total 12 coal seams with apparent thickness of 1-30m were identified with 4 of these seams reported metallurgical quality (Gankhuyag, 1990). • From April 2005 to end of 2009 QGX conducted detailed exploration where 524 cored and openhole boreholes were drilled over the BN and THG licenses. A total of 101,916m of HQ3 cored and 23,013m of openhole was completed. • Exploration was sufficient for JORC (2004) Resource and Reserve estimations to be made by MBGS and SRK respectively in 2010.
Geology	***Deposit type, geological setting and style of mineralisation.*** • The late Paleozoic was marked by the continental collision of a number of small micro-continents that came together as convergent margins. As the Siberian Craton and the North China block converged, ancient continental crust was thrust onto the continental margin and small island arcs, subduction wedges, and ophiolitic belts were accreted as pre-existing basement rock was deformed and faulted, and uplift initiated. • Island arc geometry, similar to how the Bowen Basin was formed, coincides with the formation of the late Permian systems that formed the belt of Late Permian coal measures that are found in the south and south-west of Mongolia of which the Tavan Tolgoi deposit forms one of. These types of deposits form large basins that have vast lateral

Criteria	Commentary
	continuity. Unfortunately, due to the collision of India in the Tertiary, these basins in the southern regions of Mongolia have undergone later stage deformation, which appears to be more severe in the west and moderates eastward. This also explains the close proximity of large younger rift type basins that contain thick lignite deposits close to these Permian basins.
Drill hole Information	***A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:*** ○ *easting and northing of the drill hole collar* ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* ○ *dip and azimuth of the hole* ○ *down hole length and interception depth* ○ *hole length.* • No exploration results are reported. • A total of 570 and 50 for BN and THG licenses respectively, valid boreholes are loaded in the LogCheck data management software and Geobank database. Each borehole contains easting, northing, reduced level, dip, azimuth, lithology, coal intersections, sample number, some geotechnical, wire-line geophysics and coal quality. • Points of observation derived from this data are in Appendix 4A and 4B of this report.
	If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case. • No information was excluded from above criteria.
Data aggregation methods	***In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.*** • No exploration results are reported.
	Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail. • No exploration results are reported.

Criteria	Commentary
	The assumptions used for any reporting of metal equivalent values should be clearly stated.
	• No exploration results are reported.
Relationship between mineralisation widths and intercept lengths	***These relationships are particularly important in the reporting of Exploration Results.***
	• No exploration results are reported.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.
	• No exploration results are reported.
	If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').
	• No exploration results are reported.
Diagrams	***Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.***
	• No exploration results are reported.
Balanced reporting	***Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.***
	• No exploration results are reported.
Other substantive exploration data	***Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.***
	• No exploration results are reported. • Gradient-array resistivity survey was undertaken by Geomaster in July 2005 with more than 13km along Baruun Naran valley. Monmap surveyed the grid lines. This program was extended in 2006 ver shallow Permian subcrop to the west of the Baruun Naran valley. This survey covered another 16km2. The results were high level and provided some guidance with understanding the deposit. • Polaris Seismic International Ltd ("Polaris") was awarded the contract to conduct 2D Land High Resolution Seismic Survey at BN in 2011. The 2D BN 2011 Seismic program recorded 39 dynamite lines totalling

Criteria	Commentary
	74km using 'Roll On and Roll Off' methodology and dynamite as the source
Further work	***The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).***
	• No exploration results are reported.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.
	• No exploration results are reported.

Section 3: Estimation and Reporting of Mineral Resources

Criteria	Commentary
Database integrity	***Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.***
	• For programs pre-2010, hard copy and scanned data was part of the data set supplied to MMC. All care has been taken in the translation, recoding and digitising of this data into the CoalLog format. This data has been loaded into the LogCheck data management software and validated for codes, depth errors and consistency. Where photographs exited then these were checked against the coded data. Final checks were made using sections with wire-line geophysics to show seam consistency. • For 2011-present programs the raw data was captured in forms using codes in the CoalLog format in hard copy format. This data was then entered into the LogCheck data management software which has very strict validation rules. These rules assist in data being correctly entered. The logging is done in a controlled environment in a central logging facility located on the mine site. Analytical data was entered into the Geobank database by the laboratory. The Geobank database was first populated with borehole number and sample number from the logged data in the LogCheck software. This data was seamlessly uploaded into the Geobank database for laboratory access. Once the data was entered by the laboratory and validated it could be passed back to Geology for importing into the master Excel spreadsheets for further processing and

Criteria	Commentary
	validation. Final data was seamlessly passed to the LogCheck software for final validation and repository for points of observation. All systems are designed to only enter data once. Once all validation, correlation and points of observation checks are completed, points of observation are produced by the LogCheck data management software by way of Comma Spaced Variable ("CSV") files and these files are uploaded to the MICROMINE modelling software. • Within the modelling software once final validation and correlation checks are completed. Anomalous seam thickness is validated and if due to faulting, is taken out of the database. This data is recorded in Appendix 17 in the report.
	Data validation procedures used. • The CoalLog codes and forms were used for logging which controlled the format and codes to be used. This data was entered once into the LogCheck data management software which has very strict validation rules on entered data. • Once the coded and depth entered data was validated, borehole profiles were produced with wire-line geophysics. Coal intersections were validated with wire-line geophysics coal intersections and core loss or expansion was noted. Where coal loss occurred it was entered into the lithology log as a loss. These final boreholes are recorded in Appendix 8 in the report. Borehole sections in southing and northing directions were produced for seam correction. These records are stored in Appendix 9 of the report. Final validation was completed on the block model through boreholes sections and anomalies investigated. • Data was entered once into the LogCheck data management software for geology/header/drilling/LAS/Geotech data and once into the Geobank database for analytical data. Data transfer for analytical data into LogCheck data management software and LogCheck into the MICROMINE modelling software was done by passing csv files seamlessly.
Site visits	***Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*** • An initial site visit was completed by Mr. Ballantine and Mr. Andrew Little (Executive General Manager of Technical Services) on 07 April 2011 as part of the due diligence process that MMC underwent for the purchase of the BN mine. The newly open T seam pit, offices, workshops, mine equipment and camp were inspected. All areas

Criteria	Commentary
	inspected were in alignment with the due diligence information supplied by QGX at the time. • A technical visit was made by Nigel Godfrey of Roctec Pty Ltd on behalf of AMC Consultants during the period of 28 May 2012 to 10 June 2012. The purpose was to provide geotechnical overview. • Mr. Ballantine, for inclusion in the UHG JORC (2004) Resource report dated June 2012, thought it prudent to have an independent experienced Competent Person qualified geologist provide a site visit and peer review. This was done by Mr. Todd Sercombe, senior consultant for GasCoal Pty Ltd, a coal geologist at the time with 18 years coal experience. Mr. Sercombe's findings from the site visit were: *'The UHG exploration procedures and practices are of extremely high calibre, exceeding both the Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996) and the benchmark coal industry best practices (as observed by Mr. Sercombe in the Bowen Basin, Australia). The accurate and unbiased assignment of coal core loss to coal samples, achieved in the UHG practices, is commendable. The coding, for modelling, of all significant stone band partings in the seams and of inter-burden units between the seams is also praiseworthy. The Exploration and Geology Department are a group of young enthusiastic geologists who have been well trained and led by Gary Ballantine. I would have high confidence in the reportable results obtained from the UHG exploration procedures.'* • The exploration group and procedures that was present for the UHG JORC (2004) Resource report as at June 2012 has changed little so the independent peer review by Mr. Sercombe is still relevant. • In addition, Mr. Ballantine still holds responsibility for budgeting, planning, training and overall oversight of exploration at UHG and BN coal deposits. As part of the ongoing evolution of the MMC Exploration & Geology group and knowledge transfer, supervised and structured succession of capable individuals is planned. Mr. Ballantine understands that complacency can creep into a well establish team. To prevent this he does frequent site visits with Mr. Said (Competent Person) every few months and they review different member's capabilities against the exploration procedures. As part of Mr. Ballantine's role as mentor and internal auditor, all final data, (i.e. seam thickness, seam correlation, sampling intervals, coal quality analysis, collar survey and LAS quality) are reviewed once the team (supervised

Criteria	Commentary
	by the Competent Person) has done the work. With the above process it is Mr. Ballantine's professional opinion that there is a very high compliance with the team's results and JORC standards. • Collar survey is one task that requires a manual audit. Mr. Ballantine on his most recent visit to UHG in mid-November 2014 audited the collar survey for boreholes drilled in the period 2011-2014 with a hand held GPS device. • All GPS coordinates of boreholes and boundary pegs checked were within the tolerance of the GPS device. • In 2018, Technical information in this BN and THG Coal Resource estimation has been internally peer reviewed by Mr. Lkhagva-Ochir Said Executive General Manager for Mining and Processing, Mongolian Mining Corporation. Mr. Said is a member of the Australasian Institute of Mining and Metallurgy (Member #316005) and has over 14 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012).
	If no site visits have been undertaken indicate why this is the case. • Not applicable, see above section.
Geological interpretation	***Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.*** • Detailed mapping from the various campaigns from the 1940's. • Gradient-array resistivity survey was undertaken by Geomaster in July 2005 with more than 13km along Baruun Naran valley. Monmap surveyed the grid lines. This program was extended in 2006 over shallow Permian subcrop to the west of the Baruun Naran valley. This survey covered another 16km2. The results were high level and provided some guidance with understanding the deposit. • The 2D High Resolution Seismic Survey recorded 39 lines totalling 73,510m using 'Roll On and Roll Off' methodology with 240 maximum active channels and using dynamite as the source proved invaluable in locating and understanding fault systems but, just as importantly, showed areas of little to no structure and this is one of the great positives with using Seismic. In addition, the seismic results gave detailed

Criteria	Commentary
	knowledge of the coal basin shallow surface limits, which has now been backed up by drilling. • The Limit of Oxidation ("LOX") was determined by close spaced drilling and confirmed by mapping and sampling from mine geology team. • Seam correlation, continuity and coal quality was confidently predicted by infill drilling of the recent MMC exploration program which confirmed and supported the detailed 2D seismic. The confirmation of the seismic by drilling results gives confidence where drill spacing is less that correlation and continuity in the seismic provides solid evidence that continuity exists. • The continuity of the final computer model provides a high level of confidence. By interrogating the model with all data visible by sections and carefully inspecting allows the Competent Person the confidence to proceed to the final estimate. • As a high level overarching check on the estimate and the confidence of the estimate, expected error on the estimate was used as an aid in understanding the spatial measurements used for the classification categories. As an extension of this the 'loss' function was also estimated determining overall error which, can be used to determine maximum error for Measure and Indicated categories which was 6.5% and 13% respectfully.
	Nature of the data used and of any assumptions made. • The essence of the data used is borehole observations with support from detailed mapping, resistivity and 2D High Resolution Seismic Survey. • No assumption with a material effect to the estimate was made. Notwithstanding, missing or non-analysed coal quality data due to limited sample mass was calculated by regressions and this has been assumed to be adequate for inclusion of the estimate. An exception to this was the moisture results for the QGX drilling data which demonstrated a distinct variance from the expected. Using the transformation 'xtran = mnew + sdnew * ((xold – mold) / sdold)', the QGX moisture data was adjusted and remaining QGX coal quality data adjusted to the transformed moisture.
	The effect, if any, of alternative interpretations on Mineral Resource estimation. • There are no alternative interpretations known to the Competent Person at this time.

Criteria	Commentary
	The use of geology in guiding and controlling Mineral Resource estimation.
	• The geology was used in understanding deposit limits and structure. The geology was also used to determine deposit type.
	The factors affecting continuity both of grade and geology.
	• The BN coal deposit coal measure was limited by surface outcrop of the seams which was the ultimate upper cut-off and limit. • The seams for BN and THG are tightly folded about an asymmetrical syncline where the northern limb is very steep and borehole data indicates it progressively overturns toward the west, before the coal seams are no longer present. The southern limb has a gentler dip of about 40 degrees near the syncline nose (east) but progressively steepens to 75 degrees dip towards the west. The coal sequence is terminated on the north limb by a sharp fault and by a low angle thrust/shearing event on the southern limb.
Dimensions	***The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.***
	• The coal resource area for BN is oriented generally around a synclinal fold plunging to the southwest approximately 15 degrees and is some 7.5km long and 1 km wide. • The coal resource area for THG is oriented generally around a synclinal fold plunging to the northeast approximately 20 degrees and is some 2.5m long and 1 km wide. • BN Mining License (MV-014493) has a total area of 4486 ha. • THG Mining License (MV-017336) has a total area of 8340 ha. • Generally there is an average of 10m of unconsolidated Quaternary sediments overlaying the Permian coal measures. The base of weathering is on average between 15 to 30m. • No Resource has been estimates outside of the Lease boundaries.
Estimation and modelling techniques	***The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.***

Criteria	Commentary
	• The BN and THG Resource estimates were carried out using MICROMINE 18.0.1008 and LogCheck Version 7.277 using the CoalLog geology data format as the database. • The method used for Resource estimation at for BN and THG involved modelling an elevation grid for a commonly distributed ply and modelling thickness grids for the other plies and partings. These thickness grids for the plies and partings were then stacked on top or below of the elevation grid to form a 3D block model. • To create an accurate and reliable 3D model of the coal seams a kriging algorithm with semivariogram modelling for the seam elevation was used. Kriging is a very flexible gridding method that can be custom-fitted to any data set by specifying the appropriate semivariogram model. Kriging incorporates anisotropy and underlying trends. The purpose of geostatistical analysis was to generate a series of semivariograms that could be used as the input weighting mechanism for the Kriging algorithm. To be able to conduct reliable geostatistical analysis there is a requirement to have sufficient number of points. As such a commonly distributed ply was used for geostatistical analysis as it was intersected by the largest number of boreholes and is the most consistent ply across the area. • To create the block model an elevation grid was created for the major lower ply and then the thickness grids for the other plies and partings were stacked above or below this as required. In order to use this method each borehole needed to contain an interval for each ply and parting even if the ply or parting was 'pinched out' and was not intersected by that borehole. Some plies were not intersected by the boreholes and so ‘virtual’ plies with a thickness of zero were inserted in order to model the seam morphology. The location of these virtual plies was determined by using the MICROMINE extrapolation tool, which used Inverse Distance Weighting (“IDW”) with the weighting inversely proportional to the squared distance. Where boreholes intercepted plies, but these plies were not present due to deterioration as a result of changing sedimentary environments then these plies were inserted as zero thickness plies at the roof or floor of a logged ply. Stone parting intervals were logged in the raw database, but where they were missing they were added to all ply groups for each borehole even in cases where the parting thickness was zero. • In order to create a reliable model of the seam morphology a cell size of 10x10m was selected for gridding. Gridding with exact interpolation

Criteria	Commentary
	using ordinary kriging was used to generate grids for the elevation of the mid-point of the plies and IDW with the weighting inversely proportional to the squared distance was used to generate grids for the thicknesses of the plies. To allow the grids to cover the necessary areas, a circular search radius of 10,000m with maximum of 20 points was used to create the elevation grids. The thickness grids were created using a circular search radius of 10,000m with maximum of 20 points per sector. • The base of Quaternary grid was produced using IDW with a power of two search radius of 2000m with maximum of 15 points per sector. The Extremely weathering grid was produced using IDW with a power of two search radius of 2000m with maximum of 15 points per sector. The base of weathering grid was produced using IDW with search radius of 2000m with maximum of 15 points per sector. The base of weathering grid was used in conjunction with mapped LOX lines as the upper most cut-off for coal. Weathered coal can be calculated between the base of weathering and extremely weathering grid. This coal has been successfully mined and has been commercial sold as Thermal coal. For the purpose of this resource estimate it has been included in the estimate. A Topography surface grid was produced using IDW with a power of two. This was then converted into a Digital Terrain Model ("DTM"). • The 3D gridded seam block model was generated by stacking thickness grids on top or below of the major ply elevation grid. The centroid of the block East and North was the X and Y values from the grid file which was 10x10m (grid cell size), the centroid of the block RL was the Z value from the elevation grid and block size by RL was the Z value from thickness grids. • The Competent Person for this estimate used the expected error in the estimate to support distances for Measured and Indicated categories. For Inferred category the narrow dimensions of the deposit may cause a misleading result using the expected error technique so the experience of the Competent Person and detailed knowledge of the deposit were sufficient for determining this category spacing. In determining extrapolation beyond last data points, half the category distance was applied. Due to the data spacing and deposit dimensions this did not have a major affect. The shapes for the categories was mostly automated with the MICROMINE software, however where this case was not true the edge of the data was manually edited by the Competent Person.

Criteria	Commentary
	• Measured resources were estimated with points of observation at 500m, Indicated resources were estimated with points of observation at 1,000m, and Inferred resources were estimated with points of observation at 2,000m. • Seam coding was applied to composite plies into seams based upon a specified minimum coal thickness and a maximum parting thickness. The seams were also coded on the basis of resource classification so that only plies of the same resource classification were combined together with their partings. The following modifying factors were used for seam coding: - No maximum seam thickness. - Minimum seam thickness to be included in the Resource of 0.5m to 400m. - Maximum parting thickness to be included in the Resource of 0.5m. - Coal Quality limit with Ash content greater than 50% (DRY basis) being excluded from the Resource estimate. • Following seam coding, coal quality interpolation was carried out. Only intervals that were marked as a point of observation were used for coal quality interpolation. IDW with the weighting inversely proportional to the squared distance was used to interpolate the coal quality into the empty block model. Coal quality interpolation was conducted for each ply separately. One search run at 10,000m radius was used to interpolate all the blocks in each model. Filters were applied to make sure that only points of observation for the selected ply were used for the interpolation of the blocks for that ply. • Partings within the model limits but without coal quality were given default coal quality parameters based on rock quality analyses.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.
	• MBGS completed a JORC (2004) Coal Resource estimate for BN in June 2012 and THG in May 2013. This updated JORC (2012) Coal Resource estimation indicates a 17% and 31% increase in the total as-received quantities, excluding mine depletion. • MMC completed a JORC (2012) Coal Resource estimate for BN and THG in June 2015. This updated JORC (2012) Coal Resource estimation indicates a 20% and 18% increase in the total as-received quantities, excluding mine depletion.

Criteria	Commentary
	• The BN mine has produced 5 Mt since October 2010 and the mine geology team completes regular (monthly) reconciliation of model/mined ROM tonnage. Where the model has good borehole control the mine recovery is well aligned, however, once borehole control is less there is a notable variance. The drilling campaigns that this estimate is based on plus the review of category limits under JORC (2012) means this notable variance will be minimised and demonstrates the estimate is valid.
	The assumptions made regarding recovery of by-products.
	• Coal mined from the BN deposit is typically used in blend with coal mined from the UHG deposit. Depending on which seam is being washed, and what blends are being scheduled, three main products are produced. A medium volatile hard coking product, a high volatile semi-soft coking product and a high-ash thermal coal (middling) by-product.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).
	• No work to the knowledge of the CP has been completed for BN or THG licenses.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.
	• In order to create a reliable model of the seam morphology a cell size of 10x10m was selected for gridding. Gridding with exact interpolation using ordinary kriging was used to generate grids for the elevation of the mid-point of the plies and IDW with the weighting inversely proportional to the squared distance was used to generate grids for the thicknesses of the plies. To allow the grids to cover the necessary areas, a circular search radius of 10,000m with maximum of 20 points was used to create the elevation grids. The thickness grids were created using a circular search radius of 10,000m with maximum of 20 points per sector. The 3D gridded seam block model was generated by stacking thickness grids on top or below of the major ply elevation grid. The centroid of the block East and North was the X and Y values from the grid file which was 10x10m (grid cell size), the centroid of the block RL was the Z value from the elevation grid and block size by RL was the Z value from thickness grids.
	Any assumptions behind modelling of selective mining units.

Criteria	Commentary
	• All seams were modelled, therefore there were no 'specific' horizons that were separately modelled.
	Any assumptions about correlation between variables.
	• Missing or non-analysed coal quality data due to limited sample mass was calculated by regressions of determined coal quality data on a seam group basis and this has been assumed to be adequate for inclusion of the estimate.
	Description of how the geological interpretation was used to control the resource estimates.
	• Geological interpretation using the seismic results was critical in identifying major structure and confirming seam correlation and continuity. • Gradient-array resistivity survey was undertaken by Geomaster in July 2005 with more than 13km along Baruun Naran valley. Monmap surveyed the grid lines. This program was extended in 2006 over shallow Permian subcrop to the west of the Baruun Naran valley. This survey covered another 16km2. The results were high level and provided some guidance with understanding the deposit. • The 'limit of oxidation' was determined by close spaced drilling and confirmed by mapping and sampling from mine geology team.
	Discussion of basis for using or not using grade cutting or capping.
	• A greater than 50% ash (DRY basis) cut-off was used to determine what coal was and what rock was.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.
	• The block model was firstly checked to ensure that all blocks were populated and that block values were within the same range as the input values. Following this a visual validation was conducted by loading the block model into the MICROMINE 3D viewer together with borehole traces, plies from the original points of observation file, base of weathering, base of Quaternary and topographic surfaces. Each cross-section was then reviewed to check that the plies from the original points of observation file agreed with the plies in the block model. • The model was reconciled against the mined area and is closely aligned.

Criteria	Commentary
Moisture	***Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*** • Moisture was analysed as TM (MNS ISO 589:2003) and Analytical moisture (MNS GB/T 212:2015). TM was assumed to equal in-situ moisture and the Preston Sanders formula was used to convert air-dry TRD to as-received (in-situ) TRD. • The estimated Resource is reported on 'as received' basis and 'air dried' basis
Cut-off parameters	***The basis of the adopted cut-off grade(s) or quality parameters applied.*** • No maximum seam thickness. • Minimum seam thickness to be included in the Resource of 0.5m to 400m depth. No resources were estimated below 400m as this is considered to be underground and at this stage due to the complexity of the deposit no underground resources are being considered. • Maximum parting thickness to be included in the Resource of 0.5m. • Coal Quality limit with Ash content greater than 50% (DRY basis) being excluded from the Resource estimate.
Mining factors or assumptions	***Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.*** • The BN mine has produced 5 Mt since October 2010 through 'truck and excavator' style mining operation. No mining assumptions have been applied to the Resource estimate other than minimum coal thickness and maximum in-seam parting thickness which has been taken from engineering operational advice. In the exploration process sufficient roof and floor sampling and analysis has been completed for Reserve estimates of dilution.
Metallurgical factors or assumptions	***The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this***

Criteria	Commentary
	should be reported with an explanation of the basis of the metallurgical assumptions made. • The coal mined from the BN deposit typically is used for blending with coal mined from the UHG deposit. Depending on which seam is being washed, and what blends are being scheduled, three main products are produced. A medium volatile hard coking product, high volatile semi-soft coking product and high ash thermal coal (middling) by-product. • The Resource estimate for this report has had no assumptions made on the estimate for beneficiation.
Environmental factors or assumptions	***Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*** • All environmental issues are managed by the Company's environmental department which has operated since the start of mining. • In addition, under the BN and THG mining licences and THG exploration license, there are strict environmental conditions. While these were not reviewed in detail they are relevant to the operation to ensure that waste material is well managed and that what soil profiles are available in the area are used for the rehabilitation process. • During all site visits there have been no obvious environmental issues of leachates emanating from spoil piles or from coal stockpiles.
Bulk density	***Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.*** • TRD was analysed for 13,776 samples, or 90.7% of all samples (GB/T 217:2015). The missing TRD data was calculated using the regression on a seam group basis of TRD v Ash for air dried and as-received samples. • An industry standard method for estimating in situ TRD was applied using the Preston Sanders formula was used to convert air-dry TRD to as-received (in-situ) TRD.

Criteria	Commentary
	The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.
	• An industry standard method for estimating in situ TRD was applied using the Preston Sanders formula was used to convert air-dry TRD to as-received (in-situ) TRD.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.
	• Partings within the model limits but without coal quality were given default coal quality parameters based on rock quality analyses.
Classification	***The basis for the classification of the Mineral Resources into varying confidence categories.***
	• The basis for the classification for the Resource estimate is taken from guidance from the Australian Guidelines for the Estimation and Classification of Coal Resources (2014). • The basis of the classification confidence categories is from the results of an investigation of expected error for the 95th percentile through the use of Conditional Simulation Geostatistics.
	Whether appropriate account has been taken of all relevant factors (i.e. relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).
	• Exploration prior to 2005 had been done to good geological standards however, not always to JORC standards. The geological teams of this era were well trained in the collection of geological information and this information has been used affectively for the current Resource estimates and have assisted greatly in the preliminary understands of seam correlation, continuity, coal quality and boundary limits. • The QGX era 2005-2009 was completed by Norwest and MBGS. • Since 2011, the MMC Exploration & Geology team, highly trained to international and Australian standards, has controlled all ongoing exploration. This with the addition of modern drilling methods and equipment, good downhole geophysics, high quality 2D seismic, good survey control for borehole locations and topography, a modern onsite accredited coal laboratory and having an active modern mine, there is great confidence that the resulting Resource estimate for this report is highly reliable.

Criteria	Commentary
	• As a further measure to understand the confidence in the estimate the high level overarching check on the estimate, expected error on the estimate, was used as an aid in understanding the spatial measurements used for the classification categories. As an extension of this the 'loss' function was also estimated determining overall error which, can be used to determine a range that the estimate applies too.
	Whether the result appropriately reflects the Competent Person's view of the deposit.
	• The Competent Person has confidence in the Resource figures reflecting well the contained coal resource.
Audits or reviews	***The results of any audits or reviews of Mineral Resource estimates.***
	• Mr. Ballantine, for inclusion in the UHG JORC (2004) Resource report dated June 2012, thought it prudent to have an independent experienced Competent Person qualified geologist provide a site visit and peer review. This was done by Mr. Todd Sercombe, senior consultant for GasCoal Pty Ltd, a coal geologist at the time with 18 years coal experience. Mr. Sercombe's findings from the site visit were: *'The UHG exploration procedures and practices are of extremely high calibre, exceeding both the Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996) and the benchmark coal industry best practices (as observed by Mr. Sercombe in the Bowen Basin, Australia). The accurate and unbiased assignment of coal core loss to coal samples, achieved in the UHG practices, is commendable. The coding, for modelling, of all significant stone band partings in the seams and of inter-burden units between the seams is also praiseworthy. The Exploration and Geology Department are a group of young enthusiastic geologists who have been well trained and led by Gary Ballantine. I would have high confidence in the reportable results obtained from the UHG exploration procedures.'* • The exploration group and procedures that was present for the UHG JORC (2004) Resource report as at June 2012 has changed little so the independent peer review by Mr. Sercombe is still relevant. • In addition, Mr. Ballantine still holds the position of Executive General Manager, Exploration and Geology and has responsibility for budgeting, planning, training and overall oversight of exploration at UHG and BN coal deposit. As part of the ongoing evolution of the MMC Exploration & Geology group and knowledge transfer, supervised and structured succession of capable individuals, is planned.

Criteria	Commentary
	Mr. Ballantine understands that complacency can creep into a well establish team. To prevent this he does frequent site visits with Mr. Said (Competent Person) every few months and they review different member's capabilities against the exploration procedures. As part of Mr. Ballantine's role as mentor and internal auditor, all final data, (i.e. seam thickness, seam correlation, sampling intervals, coal quality analysis, collar survey and LAS quality) are reviewed once the team (supervised by the Competent Person) has done the work. With the above process it is Mr. Ballantine's professional opinion that there is a very high compliance with the team's results and JORC standards. In addition, Mr. Ballantine has completed an oral review and internal audit with the Competent Person for every step of the data preparation of the points of observation and the modelling stages to the final estimate. • In 2021, Technical information in this BN and THG Coal Resource estimation has been internally peer reviewed by Mr. Lkhagva-Ochir Said Executive General Manager for Mining and Processing, Mongolian Mining Corporation. Mr. Said is a member of the Australasian Institute of Mining and Metallurgy (Member #316005) and has over 14 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012).
Discussion of relative accuracy/ confidence	***Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.*** • As a measure of relative accuracy and to understand the confidence in the estimate the high level overarching check on the estimate, expected error on the estimate, was used as an aid in understanding the spatial measurements used for the classification categories. As an extension of this the 'loss' function was also estimated determining overall error which, can be used to determine a range that the estimate applies too. • In addition, the 3D model for the estimate was accurate and reliable due to a kriging algorithm with semivariogram modelling for the seam elevation was used. Kriging is a very flexible gridding method that can be custom-fitted to any data set by specifying the appropriate

Criteria	Commentary
	semivariogram model. Kriging incorporates anisotropy and underlying trends. The purpose of geostatistical analysis was to generate a series of semivariograms that could be used as the input weighting mechanism for the Kriging algorithm. To be able to conduct reliable geostatistical analysis there is a requirement to have sufficient number of points. • The use of high level 2D seismic, downhole geophysical data, modern drilling with high core recovery, a modern onsite accredited coal laboratory and highly trained geologists gives high confidence and confirms the existence of location of the coal seams in 3D space. A detailed understanding of the coal seam geometry from trenches and existing operating mine pits, also gives a high level of confidence in the estimate.
	The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.
	• The Resource estimates for this report is a global estimate to international standards and meets all JORC (2012) requirements. • All assumptions and procedures for the Resource estimate are documented within the report sections or as Appendices.
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.
	• The BN mine has produced 5 Mt since October 2010, and the mine geology team completes regular (monthly) reconciliation of modelled versus mined ROM tonnage. Where the model has good borehole control the mine recovery is well aligned, however, once borehole control is less than ideal there is a notable variance. The drilling campaigns that this estimate is based on plus the review of category limits under JORC (2012) means this notable variance will be minimised and demonstrates the estimate is valid.

Reference No. GC-23/10
06th February 2023

Dr. Battsengel Gotov
Executive Director and Chief Executive Officer
Mongolian Mining Corporation
16th Floor, Central Tower,
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Dear Sir

SUBJECT: Ukhaa Khudag Coal Mine (UHG) – Statement of Open Cut Coal Reserves as at 1st January 2023

Glogex Consulting LLC ("**Glogex**") has been commissioned by MMC to complete an independent estimate, hereafter referred to as (the "Statement"), of the Open Cut Coal Reserves for the UHG coal deposit. The Statement reports the Coal Reserves as at 01 January 2023 and has been undertaken in compliance with the requirements of the reporting guidelines of the 2012 Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australasian Institute of Geoscientists and Minerals Council of Australia ("**JORC Code**"). Detailed data, model, and results in the Glogex report *"Statement of open pit coal reserves as at 01 January 2022, Ukhaa Khudag Coal Mine" dated 25 February 2022.*

GLOGEX has adopted the following terms for the reporting of Coal Reserves:

- ***Coal Resources*** as used in this report are the same as "Mineral Resources" in The JORC Code and "Geological Resources", a common term used in the industry. Coal Resources refers to coal in such form, quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, geological characteristics and continuity are known, estimated or interpreted from specific geological evidence or knowledge, including sampling.

- The ***Coal Resources*** are sub-divided, in order of increasing geological confidence, into ***Inferred***, ***Indicated*** and ***Measured Resources*** to reflect the confidence in the underlying resource data.

- ***Coal Reserves*** as used in this report are the same as "Ore Reserves" in The JORC Code and "recoverable" coal which are terms in common use in the coal industry. Coal Reserves are the

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economically mineable part of a Measured and/or Indicated Mineral Resources. The Coal Reserves include diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include the application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.

- ***Coal Reserves*** have been subdivided in order of increasing confidence into ***Probable Coal Reserves and Proved Coal Reserves*** to reflect the confidence in the underlying resource data and mine planning detail. A Proved Coal Reserve can only be based on a Measured Coal Resource. Probable Reserves can be based on Measured and/or Indicated Resources. Inferred Coal Resources cannot be included as a Coal Reserve.

- ***Marketable Coal Reserves*** allow for practical yields in a coal processing plant, which is commonly known in the industry as "product coal"

Geological exploration at UHG has estimated a total Coal Resource of **567 Mt** (as received moisture basis) of which **469 Mt** is classified as Measured, **30 Mt** as Indicated and **68 Mt** as Inferred, to a depth of 800 m as specified under the Australasian Code for Reporting of Mineral Resources and Ore Reserves 2012 Edition ("The JORC Code 2012") (Mr Byambaa Barkhas, MMC, 31st December, 2022). Coal quality studies have identified the potential to produce both hard and semi-soft coking coal and thermal coal products.

UHG deposit is a moderate to steeply dipping, high quality coal deposit, consisting predominantly of hard coking coal. Production commenced in April 2009, utilizing conventional terrace mining techniques with hydraulic excavators and trucks to exploit the moderately complex coal deposit. Run-of-Mine ("ROM") coal production **of 84.4 Mt** was reported by mine survey measurement until end of 2022.

The process associated with estimating Coal Reserves includes defining viable pit limits and applying various modifying factors including mining recovery, metallurgical, cost, revenue to the Coal Resources.

UHG is a complex and highly faulted coal deposit, with moderate to steeply dipping seams of predominantly hard coking coals.

As at 01 January 2023, the UHG total Open Cut Coal ROM reserves **of 365 Mt** are shown in Table-1 and the total Marketable reserve of **225 Mt** are shown in Table -2. In this study topographic survey information was only updated to account for depletion as result of 31 December, 2022 and no other changes has been done from previous reserves report.

The previous Coal Reserves Statement for UHG was prepared as at 25 February 2022 by Glogex Consulting LLC ("Glogex"). The comparison between two statements is outlined in Table-3.

Table-1. Total coal reserve as at 01 January 2023 (ROM)

Coal type	Reserve category (Mt)		
	Proved	Probable	Total (Proven + Probable)
Coking Coal	336	10	346
Thermal Coal	19	0	19
Total	**355**	**10**	**365**

Notes:

- *Estimate has been rounded to reflect accuracy*
- *Coking coal in-situ total moisture is 3.64%*
- *Thermal coal in-situ total moisture is 2.68%*
- *Coal Reserve above 450m depth limit below topographical surface as at 1st Jan, 2023*

Table-2. Total Marketable reserve as at 01 January 2023

Coal type	Reserve category (Mt)		
	Proved	Probable	Total (Proven + Probable)
Coking Coal	155	4	159
Middlings	46	1	47
Thermal Coal	19	0	19
Total	**220**	**5**	**225**

Notes:

- *Estimate has been rounded to reflect accuracy*
- *Product Coking coal total moisture is 8%, Ash – 11% (dry)*
- *Product Middlings total moisture is 9%, Ash ~21% (dry)*
- *Product Thermal coal total moisture is in-situ 2.68%, Caloric value – 4,953 kcal/kg (ar)*
- *Coal Reserve above 450m depth limit below topographical surface as at 1st Jan, 2023*

Table-3: Comparison of Coal Reserves to Previous Coal Reserves Statement (Mt)

Coal Reserves as at 01 January 2022 (ROM)	**371**
Coal Mined and depleted 01 January 2022 to 31 December 2022	(5)
Increase in Coal Reserves identified in the 2022 Reserves estimate that are economically viable for mining at 01 January 2023	-
Coal Reserves as of 01 January 2023 (ROM)	**365**

Notes:

- *Estimate has been rounded to reflect accuracy*
- *Coal Reserve is above 450m depth limit below topographical surface*
- *The estimate of Coal Reserve presented in Table-1, Table-2 and Table-3 has been carried out in accordance with the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012). Technical information in the UHG Coal Reserve estimation report has been compiled by Mr. Naranbaatar Lundeg, who is a Member of the Australasian Institute of Mining and Metallurgy (MAusIMM No.326646).*
  He is a principal shareholder of Glogex Consulting LLC and also serves as General Director and Executive Consultant of the company. He is bachelor of mining industrial management and master of business administration in field of financial management. He has extensive experience in the mining industry, working for over 22 years with major mining companies and mining consultants. During this time, he has either managed or contributed significantly to numerous mining studies related to the estimation, pit optimization, mine planning, assessment, evaluation and economic extraction of coal in Mongolia. He has sufficient experience which is relevant to the style of mineralization and type of deposit under consideration and to the activity he is undertaking to qualify him as a Competent Person as defined under the JORC Code (2012). Mr. Lundeg consents to the inclusion in the release of the matters based on this information in the form and context in which it appears.

Best Regards

Naranbaatar Lundeg
General Director and Executive Consultant
Competent Person (member of AusIMM #326646)

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STATEMENT OF OPEN CUT COAL RESERVES

AS AT 1ST JANUARY 2022

UKHAA KHUDAG COAL MINE

Prepared for

MONGOLIAN MINING CORPORATION

Report No: GC-01-22

Date: 25 February 2022

Prepared by

GLOGEX CONSULTING LLC ("GLOGEX")

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Geology & Mining Consulting Services

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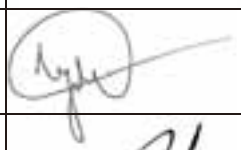
Prepared by	Buyan-Ulzii Narankhuu	Associate consultant, Senior mineral processing engineer, AusIMM member#327826		25th February, 2022
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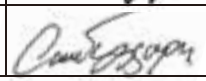
Prepared by	Sambuudorj Erdenebat	Senior mineral economist.		25th February, 2022

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Executive Summary

Mongolian Mining Corporation ("MMC") is a Hong Kong Stock Exchange listed mining company with high- quality coal assets in Mongolia, where it is a coal producer and exporter. It owns and operates Ukhaa Khudag ("UHG") and Baruun Naran ("BN"), open cut coking coal mines that are located within the Tavan Tolgoi coal formation in the South Gobi desert of Mongolia. UHG is located in the aimag (province) of Umnogovi approximately 560 km south of Ulaanbaatar.

Glogex Consulting LLC ("GLOGEX") was commissioned by MMC to complete an independent estimate, hereafter referred to as (the "Statement") of the Open Cut Coal Reserves of UHG coal deposit. The Statement reports the Coal Reserves as at 1st January 2022 and has been undertaken in compliance with the requirements of the reporting guidelines of the 2012 Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australasian Institute of Geoscientists and Minerals Council of Australia ("JORC Code").

Geological exploration at UHG has estimated a total Coal Resource of **572 Mt** (as received moisture basis) of which **474 Mt** is classified as Measured, **30 Mt** as Indicated and **68 Mt** as Inferred, to a depth of 800 m as specified under the Australasian Code for Reporting of Mineral Resources and Ore Reserves 2012 Edition ("The JORC Code 2012") (Mr Byambaa Barkhas, MMC, 31st December, 2021). Coal quality studies have identified the potential to produce both hard and semi-soft coking coal and thermal coal products.

UHG deposit is a moderate to steeply dipping, high quality coal deposit, consisting predominantly of hard coking coal. Production commenced in April 2009, utilizing conventional terrace mining techniques with hydraulic excavators and trucks to exploit the moderately complex coal deposit. Run-of-Mine ("ROM") coal production **of 79.2 Mt** was reported by mine survey measurement until end 2021.

The process associated with estimating Coal Reserves includes defining viable pit limits and applying various modifying factors including mining recovery, metallurgical, cost, revenue to the Coal Resources. UHG is a complex and highly faulted coal deposit, with moderate to steeply dipping seams of predominantly hard coking coals.

As at 01 January 2022, the UHG total Open Cut Coal ROM reserve is **371 Mt** and the total Marketable reserve is **230 Mt**.

Geotechnical pit stability slope parameters for UHG were defined during the preparation of the updated LOM Plan scenario, on a recommendation provided by Australian Mining Consultants ("AMC"), geotechnical consultant of the UHG project with overall pit wall slopes of between 21° and 33°.

In the UHG LOM Study completed by RPM in 2013, MMC provided Runge with a series of polygons for each major seam group which defined zones within the deposit that have been more significantly affected by faulting and other geological processes. Based upon actual coal recovery reconciliation results undertaken and provided by MMC and in addition to MMC having already downgraded Resources to Indicated of Inferred categorization in those areas, GLOGEX accepted the discontinuation of fault affected zones for this study.

The mining factors adopted in converting the UHG Resource model to a ROM model have been summarized in the table below.

Summary of UHG Mining Modifying Factors

Modifying factors	Unit	Value
Roof loss	mm	100
Roof dilution	mm	100
Floor loss	mm	100
Floor dilution	mm	100
Minimum seam thickness	m	0.5
Maximum included ply thickness	m	0.5
Global loss	%	1.0

Initial wash plant yield data for a range of cut-point densities were provided by Norwest Corporation ("Norwest") for each majority of the coal seams of the deposit. More recently, MMC engineers have updated the plant yield data of coal seams that are exposed in the mine based on bench bulk samples. GLOGEX used yield data from both studies to factor the product yield.

A number of iterations were completed in the Datamine Studio NVPS Pit Optimizer to determine the most suitable coking "ROM Ash – Yield" cut-point density curves to use, based upon achieving a hard coking product ash of 11.0% (dry) and semi-soft coking product ash of 9.5% (dry) across all periods.

The MMC "ROM Ash – Yield" curves found to achieve these coking product specifications as a weight average over the entire deposit was at a cut-point density of 1.425 for hard coking coal and 1.4 for semi- soft coking coal. The thermal coal is not planned to be washed and thermal product ash is variable and determined by ROM coal quality.

The mining, hauling, processing, handling, administration, transportation, air pollution, logistic and import duty charges costs were adjusted from actual costs incurred at UHG provided by MMC year to date 1st January 2022 based on 2850 MNT/USD exchange rate. GLOGEX reviewed key cost inputs and concluded these were reasonable to be used for pit optimization.

The coal selling prices for Hard Coking Coal were estimated based on an average of 2020-2021 price record and price forecast for 2022-2025 as provided to MMC by Shanxi Fenwei Energy Consulting Co. Ltd ("Shanxi Fenwei") product value at the DAP Ganqimaodou port of China.

The coal selling prices for Semi-soft coking coal, Middlings coal and Thermal coal were estimated based on an average of 2020-2021 price record and price forecast 2022-2025, as provided to MMC by Shanxi Fenwei Energy Consulting Co. Ltd ("Shanxi Fenwei") product value at the DAP Ganqimaodou port of China.

The coal selling prices assigned to each product, were:

- Hard coking coal < 11.0% ash (dry): US$134.7/t product (ar),
- Semi-soft coking coal < 9.5% ash (dry): US$95.9/t product (ar),
- Middlings coal ~ benchmark CV 6,000 kcal/kg (gar): US$48.8/t product (ar),
- Thermal coal ~ benchmark CV 5,000 kcal/kg (gar): US$30.7/t product (ar).

Datamine Studio NVPS software was used to generate a series of incremental pit shells based on a range of coal selling prices. This is a three-dimensional approach which provides a series of pit shells where each increment

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reflects different economic scenarios such as changes to depth, mining cost, or coal price. Through the application of mining and metallurgical factors described above, the mineable in situ coal within the pit shell was converted to ROM coal quantities and product coal quantities.

The pit optimization results were examined and the optimal pit shell that is determined by the results corresponding to the pit shell with an incremental cash margin of 0 (the difference between incremental revenue and incremental cash cost) was selected as the Optimized Pit Shell. The optimization was not limited to a vertical depth.

The selected pit shell (Optimized Pit Shell) was modified slightly to form a practical shape for mining (Mineable Pit Shell). Measured and Indicated Coal Resources within the optimized Mineable Pit Shell were classified as Coal Reserves. Measured Coal Resources were classified as Proved Coal Reserves and Indicated Coal Resources were classified as Probable Coal Reserves. While Inferred Resource was assigned revenue in the UHG LOM Study pit optimizer to define the Mineable Pit Shells, no Inferred Resources have been reported as Reserves in this statement.

The Coal Reserves by major seam group for Open Cut Coal Reserves, Marketable Coking Coal Reserves, Marketable Thermal Coal Reserves and Marketable Middlings Coal Reserves are outlined in the tables below.

Total coal reserve as at 01 January 2022 (ROM)

	Reserve category (Mt)		
Coal type	**Proved**	**Probable**	**Total (Proved + Probable)**
Coking Coal	341	10	351
Thermal Coal	20	0	20
Total	**361**	**10**	**371**

Notes:

- *Estimate has been rounded to reflect accuracy*
- *Coking coal in-situ total moisture is 3.64%*
- *Thermal coal in-situ total moisture is 2.68%*
- *Coal Reserve above 450m depth limit below topographical surface as at 1st Jan, 2022*

Total Marketable reserve as at 01 January 2022

	Reserve category (Mt)		
Coal type	**Proved**	**Probable**	**Total (Proved + Probable)**
Coking Coal	158	4	162
Middlings	47	1	48
Thermal Coal	20	0	20
Total	**225**	**5**	**230**

Notes:

- *Estimate has been rounded to reflect accuracy*
- *Product Coking coal total moisture is 8%, Ash – 11% (dry)*
- *Product Middlings total moisture is 9%, Ash ~21% (dry)*
- *Product Thermal coal total moisture is in-situ 2.68%, Caloric value – 4,953 kcal/kg (ar)*
- *Coal Reserve above 450m depth limit below topographical surface as at 1st Jan, 2022*

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Comparison of Coal Reserves to Previous Coal Reserves Statement (Mt)

Coal Reserves as at 1st January 2021 (ROM)	**305**
Coal Mined and depleted 01st January 2021 to 01st January 2022	(4)
Increase in Coal Reserves identified in the 2021 Reserves estimate that are economically viable for mining as at 01 January 2022	70
Coal Reserves as at 01st January 2022 (ROM)	**371**

Notes:

- *Estimate has been rounded to reflect accuracy*
- *Coal Reserve is above 450m depth limit below topographical surface*
- *The estimate of Coal Reserve presented in Tables has been carried out in accordance with the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012). Technical information in the UHG Coal Reserve estimation report has been compiled by Mr. Naranbaatar Lundeg, who is a Member of the Australasian Institute of Mining and Metallurgy (MAusIMM No.326646).*
  He is a principal shareholder of Glogex Consulting LLC and also serves as General Director and Executive Consultant of the company. He has Bachelor of Mining Industrial Management and Master of Business Administration in field of financial management. He has extensive experience in the mining industry, working for over 20 years with major mining companies and mining consultants. During this time, he has either managed or contributed significantly to numerous mining studies related to the estimation, pit optimization, mine planning, assessment, evaluation, and economic extraction of coal in Mongolia. He has sufficient experience which is relevant to the style of mineralization and type of deposit under consideration and to the activity he is undertaking to qualify him as a Competent Person as defined under the JORC Code (2012). Mr. Lundeg consents to the inclusion in the release of the matters based on this information in the form and context in which it appears.
- *Technical information in this UHG Coal Reserve estimation has been peer reviewed by the Independent consultant Mr. Gary Ballantine. Mr. Ballantine is a member of the Australasian Institute of Mining and Metallurgy (Member #109105) and has over 32 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012).*

Total Open Cut Coal Reserves by Seam

Proved+Probable reserves				
Seam	**ROM Coal (Mt)**	**Total Moisture, %**	**Ash (%)**	**Calorific Value (kcal/kg)**
12	0.53	5.99	36.85	4,585
11	2.90	8.16	35.81	4,437
10	4.12	4.42	36.91	4,513
9	27.13	5.09	24.86	5,810
8	3.18	3.94	41.06	4,381
7	17.39	4.04	25.59	5,817
6	33.92	4.91	26.99	5,763
5A	4.29	2.91	41.64	4,434
4C	31.82	3.39	20.60	6,365
4B	26.85	4.93	28.22	5,668
4A	24.58	3.86	34.03	5,157
3A	32.97	3.10	34.68	5,120
25/2/1	2.37	2.63	51.63	3,574
0CU	55.23	2.96	28.91	5,630
0CL	14.13	2.62	38.70	4,755
0B	37.76	3.17	32.18	5,345
0A	51.61	2.33	37.56	4,804
Total Coal (Mt)	**370.77**	**3.58**	**30.83**	**5,415**
Total Coking (Mt)	**350.37**	**3.64**	**30.53**	**5,442**
Total Thermal (Mt)	**20.40**	**2.68**	**36.13**	**4,953**

(Note: Estimate has been rounded to reflect accuracy)

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Marketable Coking Coal Reserves by Seam

Coking	Proved		Probable		Total	
Seam	Mt (ar)	Ash (% ad)	Mt (ar)	Ash (% ad)	Mt (ar)	Ash (% ad)
12	0.15	7.10	0.05	7.10	0.20	7.10
11	1.06	7.10	0.06	7.10	1.12	7.10
10	1.49	8.88	0.02	9.88	1.51	8.89
9	12.39	9.83	0.11	9.87	12.49	9.83
8	0.87	8.20	0.01	8.20	0.88	8.20
7	9.74	10.62	0.06	10.74	9.80	10.62
6	18.86	10.24	0.43	9.55	19.29	10.22
5A	1.67	8.94	0.01	8.00	1.68	8.93
4C	21.75	8.64	0.72	8.64	22.47	8.64
4B	13.68	8.10	0.38	8.10	14.06	8.10
4A	14.84	10.02	0.21	10.02	15.05	10.02
3A	15.36	12.11	0.13	11.29	15.48	12.10
25/2/1	0.32	12.48	0.00	12.48	0.32	12.48
0CU	22.08	13.49	1.27	13.03	23.35	13.47
0CL	2.94	14.42	0.04	13.73	2.98	14.41
0B	13.27	10.98	0.86	10.11	14.14	10.93
0A	7.10	20.63	0.02	20.63	7.12	20.63
Total	**157.58**	**10.99**	**4.37**	**10.51**	**161.95**	**10.98**

(Note: Estimate has been rounded to reflect accuracy, Product coking coal total moisture is 8%)

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Marketable Middlings Coal Reserves by Seam

Coking	Proved		Probable		Total	
Seam	Mt (ar)	Ash (% ad)	Mt (ar)	Ash (% ad)	Mt (ar)	Ash (% ad)
12	0.02	18.00	0.01	18.00	0.03	18.00
11	0.17	18.00	0.01	18.00	0.18	18.00
10	0.39	18.00	0.01	18.00	0.40	18.00
9	4.02	18.00	0.03	18.00	4.06	18.00
8	0.15	16.00	0.00	16.00	0.15	16.00
7	1.34	22.21	0.01	22.38	1.35	22.21
6	3.56	20.78	0.08	19.57	3.63	20.75
5A	0.35	21.81	0.00	19.43	0.35	21.79
4C	2.46	17.06	0.08	17.06	2.54	17.06
4B	2.59	18.00	0.07	18.00	2.67	18.00
4A	1.31	18.12	0.02	18.14	1.34	18.12
3A	4.60	20.50	0.04	19.65	4.64	20.49
25/2/1	0.13	31.74	0.00	31.74	0.13	31.74
0CU	12.50	22.07	0.60	22.37	13.10	22.08
0CL	4.14	24.59	0.05	24.16	4.19	24.59
0B	4.51	19.09	0.18	15.69	4.68	18.96
0A	4.79	27.10	0.01	27.10	4.80	27.10
Total	**47.04**	**21.28**	**1.20**	**20.31**	**48.24**	**21.26**

(Note: Estimate has been rounded to reflect accuracy, Product Middlings coal total moisture is 9%)

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Marketable Thermal Coal Reserves by Seam

Thermal	Proved		Probable		Total	
Seam	Mt (ar)	Calorific Value (kcal/kg)	Mt (ar)	Calorific Value (kcal/kg)	Mt (ar)	Calorific Value (kcal/kg)
11	0.03	5,744			0.03	5,744
10	0.01	5,348			0.01	5,348
9	0.59	6,231	0.04	6,601	0.62	6,635
8	0.02	5,099			0.02	5,099
7	0.21	5,911	0.01	5,549	0.22	6,096
6	0.50	6,321			0.50	6,321
4C	0.05	5,531	0.08	6,195	0.13	14,657
4B	0.07	5,825	0.06	5,344	0.13	10,202
4A	0.01	5,638	0.00	5,523	0.01	8,025
3A	0.04	5,965	0.01	5,525	0.04	7,014
0CU	0.56	5,958	0.10	6,344	0.66	7,107
0CL	0.13	5,815	0.00	5,527	0.14	5,969
0B	0.10	5,812			0.10	5,812
0A	17.70	4,796	0.08	3,200	17.78	4,811
Total	**20.02**	**4,943**	**0.38**	**5,461**	**20.40**	**4,953**

(Note: Estimate has been rounded to reflect accuracy, Thermal coal total moisture is 2.68%)

The Coal Reserves estimates in the report were estimated by Naranbaatar Lundeg, BE (mining management) and MS (business administration), Buyan-Ulzii Narankhuu MS (mineral processing) whose are the Members of the Australasian Institute of Mining and Metallurgy.

The estimate is compiled and reviewed by Naranbaatar Lundeg. He is a general director of Glogex Consulting LLC and has sufficient experience relevant to the style and type of deposit under consideration and to the activity undertaken to qualify him as a Competent Person as defined in the 2012 Edition of the JORC Code.

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Table of Contents

Executive Summary **5**

1. Introduction **16**

1.1. Overview 16

1.2. Approach 17

1.3. Relevant Report and Studies 19

1.4. Previous Coal Reserve Statements 20

2. Competent Persons Statement **20**

3. Project Description **21**

3.1. General Background 21

3.2. Location and Titles 22

4. Geology, Coal quality and Coal Resource Estimate **23**

4.1. Introduction 23

4.2. Geology Overview 23

4.3. Geological Model 25

4.4. Coal Resources 25

5. Coal Reserves Estimate **28**

5.1. Coal Resources Estimate 28

5.2. Study Status 28

5.3. Geotechnical Criteria 28

5.4. Mining Factors 29

5.5. Metallurgical Factors and Product Specification 31

5.6. Cost Parameters 35

5.7. Marketing and Revenue Parameters 38

5.8. Pit Optimisation Results 40

5.9. Classification 44

5.10. Audits and Reviews 44

5.11. Results 45

5.12. Coal Reserves Reconciliation with Coal Resources 50

5.13. Coal Reserves Comparison to Previous Coal Reserves Statement 51

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List of Table

Table 4-1. Coal Resource by Depth (ar) 26
Table 5-1. Pit Optimiser Geotechnical Parameters 29
Table 5-2. Summary of UHG Mining Modifying Factors 30
Table 5-3. UHG Default Dilutant Qualities 31
Table 5-4. Hard Coking Coal "ROM Ash – Yield" Curve (Wash Plant - 1.425 Cut-Point Density) 32
Table 5-5. Semi-Soft Coking Coal "ROM Ash – Yield" Curve (Wash Plant - 1.4 Cut-Point Density) 33
Table 5-6. Middlings Coal "ROM Ash – Yield" Wash Plant Curves 34
Table 5-7. Pit Optimization Input Costs 35
Table 5-8. Historical mining cost per ROM ton of coal, 2018-2021H1 36
Table 5-9. Historical mining cost per BCM, 2018-2021H1 36
Table 5-10. Unit mining cost calculation, per BCM 36
Table 5-11. Historical site admin cost per BCM 37
Table 5-12. Historical handling cost per ROM ton of coal 37
Table 5-13. Historical coal processing cost per ROM ton of coal 37
Table 5-14. Historical Transportation and logistics cost per ton product 38
Table 5-15. Coal historical price and benchmark price forecast exclusive VAT (DAP Ganqimaudu port, China) 38
Table 5-16. Royalty 40
Table 5-17. Pit Optimization Results – Coal Price Sensitivity 41
Table 5-18. Proved Open Cut Coal Reserves by Seam 45
Table 5-19. Probable Open Cut Coal Reserves by Seam 46
Table 5-20. Total Open Cut Coal Reserves by Seam 47
Table 5-21. Marketable Coking Coal Reserves by Seam 48
Table 5-22. Marketable Middlings Coal Reserves by Seam 49
Table 5-23. Marketable Thermal Coal Reserves by Seam 50
Table 5-24. Reconciliation of Coal Resources and Coal Reserves (Mt) 50
Table 5-25. Comparison of Coal Reserves to Previous Coal Reserves Statement (Mt) 51

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List of Figure

Figure 3-1. Regional Location of Ukhaa Khudag deposit....22
Figure 4-1. Regional map of the Tavan Tolgoi coal basin....24
Figure 5-1. Final Pit optimization pit shell Design....28
Figure 5-2. Pit Optimization shell....42
Figure 5-3. Cross sections....43

List of Graph

Graph 5-1. Pit Optimization - Coal Price Sensitivity....42

List of Appendices

Appendix A - Sampling Techniques and Data
Appendix B - Reporting Exploration Results
Appendix C - Estimation and Reporting of Mineral Resources
Appendix D - Estimation and Reporting of Ore Reserves

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1. Introduction

1.1. Overview

Mongolian Mining Corporation ("MMC") is a Hong Kong Stock Exchange listed mining company with high- quality coal assets in Mongolia, where it is a coking coal and thermal coal producer and exporter. It owns and operates the Ukhaa Khudag ("UHG") and Baruun Naran ("BN") open cut coking coal mines located within the Tavan Tolgoi coal formation in South Gobi desert of Mongolia.

MMC's wholly-owned subsidiary Energy Resources LLC ("ER") holds the mining license MV-11952A covering 2,960 hectares across the UHG deposit, effective for 30 years from 29 August 2006, extendable twice by 20 year periods. UHG is located in southern Mongolia, in the Umnugovi aimag (province), approximately 560 km south of Ulaanbaatar, the capital of Mongolia.

Glogex Consulting LLC has been commissioned by MMC to complete an independent estimate, hereafter referred to as (the "Statement"), of the Open Cut Coal Reserves for the UHG coal deposit. The Statement reports the Coal Reserves as at 1st January 2022 and has been undertaken in compliance with the requirements of the reporting guidelines of the The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (2012) version ("JORC Code").

GLOGEX has adopted the following terms for the reporting of Coal Reserves:

- ***Coal Resources*** as used in this report are the same as "Mineral Resources" in The JORC Code and "Geological Resources", a common term used in the industry. Coal Resources refers to coal in such form, quality, and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, geological characteristics, and continuity are known, estimated, or interpreted from specific geological evidence or knowledge, including sampling.

- The ***Coal Resources*** are sub-divided, in order of increasing geological confidence, into ***Inferred***, ***Indicated*** and ***Measured Resources*** to reflect the confidence in the underlying resource data.

- ***Coal Reserves*** as used in this report are the same as "Ore Reserves" in The JORC Code and "recoverable" coal which are terms in common use in the coal industry. Coal Reserves are the economically mineable part of a Measured and/or Indicated Mineral Resources. The Coal Reserves include diluting materials and allowances for losses, which may occur while material is being mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include the application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.

- ***Coal Reserves*** have been subdivided in order of increasing confidence into ***Probable Coal Reserves*** *and* ***Proved Coal Reserves*** to reflect the confidence in the underlying resource data and mine planning detail. A Proved Coal Reserve can only be based on a Measured Coal Resource. Probable Reserves can be based on Measured and/or Indicated Resources. Inferred Coal Resources cannot be included as a Coal Reserve.
- ***Marketable Coal Reserves*** allow for practical yields in a beneficiation plant, which is commonly known in the industry as "product coal".

- ***Coal Resources*** are reported inclusive of Coal Reserves, (that is, Coal Reserves are not additional to Coal Resources).

Additional terminology applied within this report includes the following:

- ***Geological Model*** (or "In Situ" Model) is the computerized, three-dimensional representation of the coal deposit based on topographic survey data, coal seam data derived from outcrop, drill hole or other data points, including coal thickness and quality;

- ***Optimizer*** is the use of Datamine Studio NPV Scheduler software applied to the geological model to determine the economic pit limits by the application of modifying factors such as practical minimum mining thicknesses, geological, mining dilution and loss, geotechnical slope design and cost/revenue inputs;

- ***Optimized Pit Shell*** is a three-dimensional, economic pit limit determined by using the Datamine Studio NPV Scheduler software;

- ***Mineable Pit Shell*** is based on an optimized pit shell with modifications to conform to a practical pit design;

- ***Mineable In Situ Coal*** (non-JORC terminology) as used in this report is in situ coal within a mineable pit shell;

- ***Run of Mine ("ROM") Coal*** (non-JORC terminology) as used in this report is the coal within a mineable pit shell after application of geological and mining losses, roof as well as floor loss and dilution. ROM coal may include some Inferred Coal Resources or unclassified coal, i.e., coal not yet assigned to any of the Resource classification.

1.2. Approach

The process adopted for completing the Statement is described below.

1. A Resource block model of the UHG deposit was created by MMC by using the Micromine software. This model was based upon an "in situ" geological block model. GLOGEX applied mining parameters, including minimum seam thickness, maximum rock parting thickness, and mining loss and dilution to convert the in situ ply model to the Resource ROM model. MMC provided the original in situ geological ply model in .csv format to GLOGEX for conversion.

2. Cross sections, plans, and deposit characteristics such as structure and seam thicknesses were examined in conjunction with the proposed equipment and mining method to decide minimum mining seam thickness, coal loss and dilution factors. These factors were used to convert the Resource block model to a Resource ROM model by using the Micromine software. The Micromine ROM model was validated for pit optimization and subsequent mine planning by the Datamine Studio NPVS software. No model conversion is required as NPVS software uses Micromine models.

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3. The mining, hauling, processing, handling, administration, transportation, air pollution, logistic, and import duty charges costs were adjusted from an actual cost incurred at UHG provided by MMC year to date 1st January 2022 based on 2850 MNT/USD exchange rate. GLOGEX reviewed key cost inputs and concluded these were reasonable to be used for pit optimization. These were then converted to unit rates suitable for use by the Datamine Studio NPVS software along with other criterion such as geotechnical factors and minimum coal seam mining thickness. A series of pit shells were derived from the software for varying revenue inputs.

4. A pit shell ("Optimized Pit Shell") was selected, and minor adjustments were made (as necessary) to accommodate practical pit designs ("Mineable Pit Shell"). This pit shell formed the basis of the subsequent reserve estimate.

5. The Mineable Pit Shell delineated into a series of strips, blocks, and benches to form a block reserve database with quantities and qualities. The reserving of these blocks was undertaken in Datamine Studio NVPS software.

6. The Coal Resource categories (Measured, Indicated, and Inferred) were supplied as a field in the original in situ Micromine block model provided by MMC and were incorporated into the Micromine ROM model during the Resource to ROM model conversion. The Micromine Resource ROM model is not required to be converted for Datamine Studio NPV Scheduler as the software can perform using Micromine block models. The Resource categories limits were used to report Resource tonnes by classification within the Mineable Pit Shell. While Inferred Resources were assigned revenue in the UHG LOM Study pit optimizer, no Inferred Resource, or unclassified tons have been reported as Reserves in this statement.

7. The Coal Reserve was then categorized as Proved or Probable based on the Coal Resource categories and the level of detail in the mine planning.

8. The report was reviewed and results and supporting information are included in this report.

1.3. Relevant Report and Studies

The following reports, documents and studies were used as reference material for the Statement.

1. Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, (The JORC Code), 2012.

2. "Integrated UHG and BN LOM Study" prepared by Runge Pincock Minarco (May 2013).

3. "Statement of Open Cut Coal Reserves as at 1st January 2013, Ukhaa Khudag Coal Mine" prepared by Runge Pincock Minarco (June 2013).

4. "JORC (2012) Standard Resource Estimation, Ukhaa Khudag Coal Mine (License 11952A)" prepared by Mongolian Mining Corporation (November 2015)

5. "UHG Slope Design Guidelines Table", AMC Consultants Pty Ltd (September 2015)

6. "Statement of Open Cut Coal Reserves as at 30th November 2015", Runge Pincock Minarco (March 2016).

7. "Price Forecast for MMC (Shanxi Fenwei)" prepared by Shanxi Fenwei (April 2021)

9. "Asset Table UHG Fleet at 1 Jan 2018" prepared by Mongolian Mining Corporation (January 2018)

10. . "JORC (2012) Standard Reserve Estimation "Statement of Open Cut Coal Reserves as at 1st January 2018", Glogex Consulting LLC (Feb, 2021).

11. "JORC (2012) Standard Resource Estimation, Ukhaa Khudag Coal Mine (License 11952A)" prepared by Mongolian Mining Corporation (January 2022).10. "Statement of Open Cut Coal Reserves as at 1st January 2021", Glogex Consulting LLC (Feb, 2021).

11. "JORC (2012) Standard Resource Estimation, Ukhaa Khudag Coal Mine (License 11952A)" prepared by Mongolian Mining Corporation (January 2022).

12. UHG mine washability evaluation report, 2021

1.4. Previous Coal Reserve Statements

The previous Coal Reserve Statement was the Statement of Open Cut Coal Reserves as at 1st January 2021 for UHG, prepared by Glogex Consulting LLC (as referenced above).

2. Competent Persons Statement

The information in the report, to which this statement is attached, that relates to the Coal Reserves of Mongolian Mining Corporation – UKHAA KHUDAG Coal Deposit, is based on information compiled and reviewed by Mr. Naranbaatar Lundeg, who is a Member of the Australasian Institute of Mining and Metallurgy and is owner and General director of Glogex Consulting LLC.

Naranbaatar Lundeg, signing on behalf of Glogex Consulting LLC, is a bachelor's in mining management and master's in business administration. He has extensive experience in the mining industry, working for over 20 years with major mining companies, mining contractors and consultants. During this time, he managed and contributed significantly to numerous mining studies related to the estimation, assessment, evaluation, and economic extraction of coal in Mongolia. He has sufficient experience relevant to the style of mineralization and type of deposit under consideration and to the activity he is undertaking, to qualify him as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves.

Naranbaatar Lundeg

General Director and Executive Consultant

Competent Person (MAusIMM #326646)

The estimate of Coal Reserves presented in this Statement has been carried out in accordance with the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves" (December, 2012).

The above-mentioned person has no interest whatsoever in the mining assets reviewed and will gain no reward for the provision of this Coal Reserve Statement. Glogex Consulting LLC will receive a professional fee for the preparation of this statement.

3. Project Description

3.1. General Background

Mongolian Mining Corporation ("MMC") is a Hong Kong Stock Exchange listed mining company with high- quality coal assets in Mongolia. It owns and operates the Ukhaa Khudag ("UHG") and Baruun Naran ("BN") open cut coking coal mines located within the Tavan Tolgoi coal formation in the South Gobi desert of Mongolia.

MMC's wholly-owned subsidiary Energy Resources LLC ("ER") holds the mining license MV-11952A for UHG, covering 2,960 hectares across the UHG deposit, effective for 30 years from 29 August 2006, extendable twice by 20 year periods.

Glogex Consulting LLC has been commissioned by MMC to complete an independent estimate, hereafter, referred to as the "Statement" of the Open Cut Coal Reserves for the UHG coal deposit.

Geological exploration at UHG has estimated a total Coal Resource of **572 Mt** (as received moisture basis) of which **474 Mt** is classified as Measured, **30 Mt** as Indicated and **68 Mt** as Inferred, to a depth of 800 m as specified under the Australasian Code for Reporting of Mineral Resources and Ore Reserves 2012 Edition ("The JORC Code 2012") (Mr Byambaa Barkhas, MMC, 31st December, 2021). Coal quality studies have identified the potential to produce both hard and semi-soft coking coal and thermal coal products.

UHG deposit is a moderate to steeply dipping, high quality coal deposit, consisting predominantly of hard coking coal. Production commenced in April 2009, utilizing conventional terrace mining techniques with hydraulic excavators and trucks to exploit the moderately complex coal deposit. Run-of-Mine ("ROM") coal production **of 79.2 Mt** was reported by mine survey measurement until end 2021.

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3.2. Location and Titles

The UHG deposit located in the Umnogovi aimag (province), approximately 560 km south of Ulaanbaatar, the capital of Mongolia as shown in Figure 3.1.

Figure 3-1. Regional Location of Ukhaa Khudag deposit

The town of Dalanzadgad (population of 28,059), the provincial capital of Umnogovi aimag is located 90 km to the east of the property, and the Oyu Tolgoi copper / gold mine is located 190 km to the southeast.

The nearest Mongolia-Chinese border, Gashuun Sukhait - Ganquimaodou is located approximately 240 km to the south. The port of Gashuun Sukhait is the Mongolian side of the border, and Ganquimaodou is the Chinese side of the border named after the town of Ganquimaodou.

The site is located east of Baruun Naran ("BN"), approximately 32 km by paved road. Baruun Naran is an existing open pit coal mine also owned and operated by MMC and is adjacent to Erdenes Tavantolgoi LLC's East Tsankhi coal mining.

MMC's wholly-owned subsidiary ER holds the mining license MV-11952A for UHG, covering 2,960 hectares across the UHG deposit, effective for 30 years from 29 August 2006, extendable twice by 20 year periods. ER is responsible for operation of the UHG site, with assistance under an alliance style contract for mining services with mining contractor Thiess Mongolia LLC ("Thiess").

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4. Geology, Coal quality and Coal Resource Estimate

4.1. Introduction

The UHG coalfield is a subfield located in the north-eastern extension of the greater Tavan Tolgoi coalfield, which is in south-central Mongolia, within the Ulaannuur Valley of the Gobi Desert. The deposit contains both coking and thermal grade coal.

Coal quality analysis has been conducted for UHG to estimate density, moisture (air dried and total), raw ash, volatile matter, calorific value, sulphur, as well as CSN and G index that are analyzed on composite samples. MMC provided the UHG Micromine seam block model with coal quality parameters including total moisture, air dried moisture, in situ density (g/cc), raw ash (%), fixed carbon (%), calorific value (kcal/kg), and sulphur (%) on an as received basis. A weighted average total moisture of UHG Micromine block model was 3.73%. When the model was converted to a Micromine ROM model, weighted average total moisture was changed to 3.79%.

The most variable coal quality parameter of the deposit is ash, ranges between 8.10% to 92.03% in the Micromine ROM model with a weighted average ROM ash of 30.89%. Ash content is higher in the original in situ model, however, MMC incorporated a maximum ash cut-off of 50% (dry base) when generating the UHG Resource model. The ROM model weighted average ash content is higher than the Resource model due to the application of seam aggregation as well as losses and dilution, which adjusts the model to include stone partings and dilution with default ROM ash content of 92.03% (ar) (refer to Table 5.3).

Geological exploration at UHG has estimated a total Coal Resource of **572 Mt** (as received moisture basis) of which **474 Mt** is classified as Measured, **30 Mt** as Indicated and **68 Mt** as Inferred, to a depth of 800 m as specified under the Australasian Code for Reporting of Mineral Resources and Ore Reserves 2012 Edition ("The JORC Code 2012") (Mr Byambaa Barkhas, MMC, 31st December, 2021). Coal quality studies have identified the potential to produce both hard and semi-soft coking coal and thermal coal products.

UHG deposit is a moderate to steeply dipping, high quality coal deposit, consisting predominantly of hard coking coal. Production commenced in April 2009, utilizing conventional terrace mining techniques with hydraulic excavators and trucks to exploit the moderately complex coal deposit. Run-of-Mine ("ROM") coal production **of 79.2 Mt** was reported by mine survey measurement until end 2021.

4.2. Geology Overview

"JORC Standard Resource Estimation Report for the Ukhaa Khudag Coal Mine" (MMC, December 2014) provides a comprehensive summary of the regional and local geological setting of UHG deposit. A following summary is based on outputs from this report:

The UHG deposit forms part of the Ulaannuur coal bearing depression in the South Gobi coal bearing basin also known as the Tavan Tolgoi Formation as shown in Figure 4.1. UHG is approximately 29.6 km2 in area and represents about 13% of Tavan Tolgoi which covers an area of approximately 220 km2. The Tavan Tolgoi coalfield is separated into seven separate subfields; namely Tsankhi, Southwest, Borteeg, Ukhaa Khudag, Eastern, Bortolgoi, and Baruun Naran.

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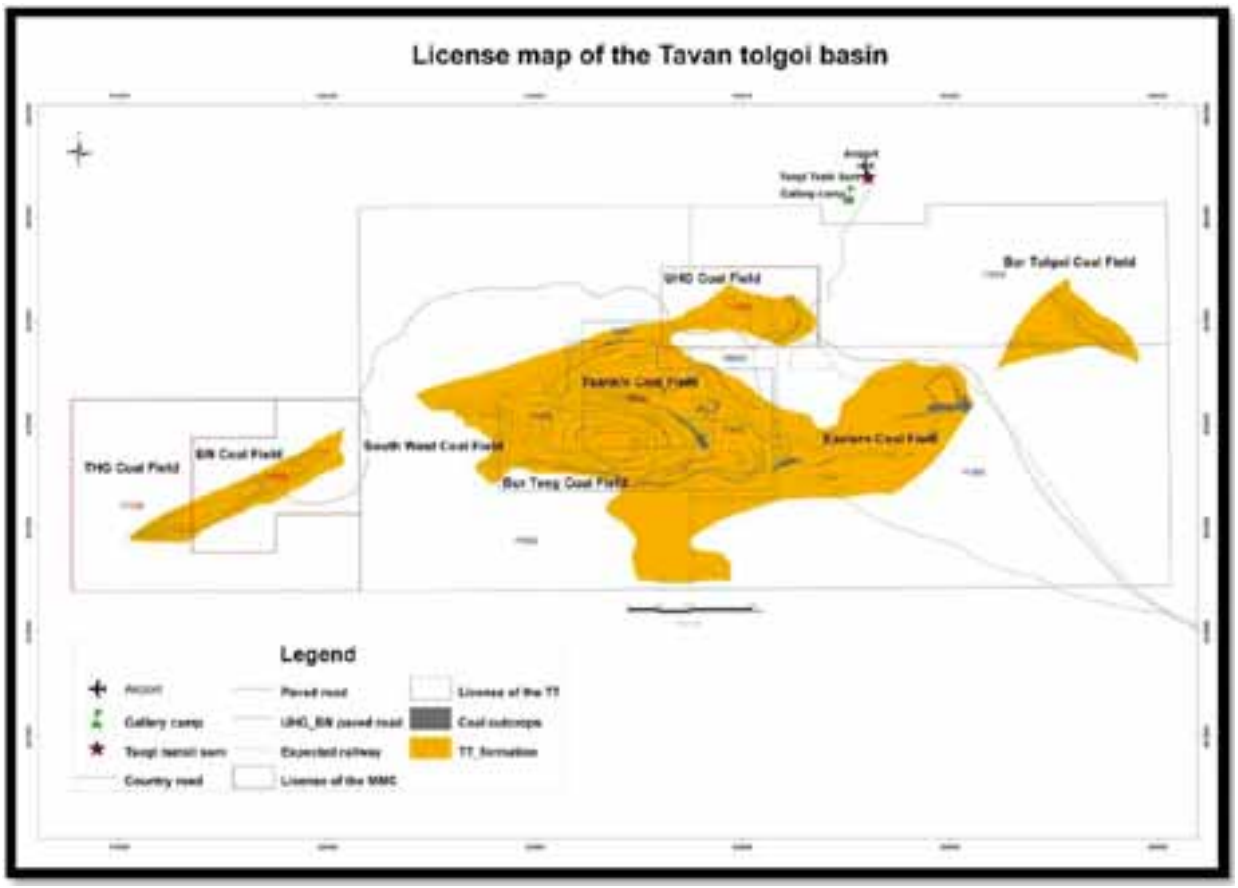

Figure 4-1. Regional map of the Tavan Tolgoi coal basin

The coal-bearing formation at UHG is of upper Permian age and has been intercepted by drill holes to a depth of 700 m, however, based upon surrounding drilling data it is expected that the UHG deposit extends much deeper than this. The UHG Resource model generated by MMC consists of 18 major seam groups, which outcrop in the east and south of the area dipping west and north-west. Seams split and merge throughout the deposit with 49 discrete plies being identified that form 133 seams or working sections.

The UHG deposit is a fault-bounded synclinal coal basin that plunges towards the west, resulting in coal seams dipping predominantly to the west and sub-cropping along the eastern margins or southern margin of their occurrence. The coal seams in the basin have been faulted and folded forming a multi-seam, highly complex environment. Refer to Figure 5.2 which illustrates geological cross sections through the Mineable Pit Shell.

Based upon coal quality data, the seams defined as having the highest coking potential are 12, 11, 10, 9, 8, 7, 6, 5, 4, 3A, and 0C, with the primary coking coal seams considered for mining at UHG being seams 9, 8, 4C, 4B, 4A, 3A, and 0C. Of these, seams 4C, 4A, 3A, and 0C are the best developed, thickest, and most continuous and contain a substantial portion of the coking coal resource within the license. The lowest seams in the deposit, 0B and 0A were classified as thermal coal due to lacking raw coking coal properties. However, based on the actual wash plant-based performance data, both 0B and 0AU have been reclassified as hard coking coal. Seam 0B reclassification is based on results, wash plant based performance data, as well as product quality reconciliation

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data from 2018 to Dec 2021 provided by MMC. Seam 0AU reclassification is based on a full-scale production washing trial undertaken in 2017 by MMC with a knowledge of seam 0AU exhibiting some coking properties. Approximately 47kt of seam 0AU was mined and washed in varying ROM feed blends with hard coking coal seams. It was found that hard coking coal product that meets customer specifications could be produced without significant difficultly and that both seams 0B and 0AU performed adequately as a substitute in ROM feed blend replacing seam 0C. Only seam 0AL and oxidized parts of the hard coking coal seams are classified as thermal coal.

Additionally, hard coking potential of seam 7 was observed when the seam was extracted in the mine. Coal quality parameters, particularly volatile matter results from boreholes suggested a coal rank variation within the seam. To interpret this variation, pit wall ply samples as well as blast hole chip samples were collected from the mine for detailed petrographic analysis by MMC. The results revealed seam 7 with an average of 1.12 mean random vitrinite reflectance. Therefore, arguably MMC reclassified seam 7 as hard coking coal owing to its closely associated ranks with other hard coking coal seams.

4.3. Geological Model

The UHG geological Resource model was prepared by MMC using the Micromine software and was provided to GLOGEX. Then, the geological Resource model was converted to UHG Resource ROM model by using Micromine software by GLOGEX, incorporating same modifying factors that MMC had applied to the in situ model when generating the Resource model. To allow the coal loss and dilution results from mining processes, GLOGEX applied additional modifying factors to the Resource model. The UHG ROM Micromine model was generated, validated for subsequent mine planning and used for this Reserves estimate.

4.4. Coal Resources

The UHG Resource model provided to GLOGEX contained 13 main seams that further split into 88 plies. The model was provided on an as received basis with a weighted average total moisture of 3.74%. It included full coal quality parameters including in situ density (g/cc), raw ash (%), total moisture (%), fixed carbon (%), calorific value (kcal/kg), and sulphur (%). Coal Resources were estimated by MMC in January 2022 from their geological model based on the following constraints:

- Measured Resources were limited to circles with radius of 350 m, Indicated Resources by a circle with a radius of 700 m and Inferred Resources by a circle with a radius of 1,500 m;
- Areas shown from the 2D seismic data to have no continuity but to have coal from borehole intercepts were classified as Inferred Resources;
- No maximum seam thickness;
- A minimum seam thickness of 0.5 m to 400 m depth and 1.5 m for Resources below 400 m depth;
- Maximum parting thickness to be included in the Resources of 0.5 m; and
- Working sections with ash content greater than 50% (db) were excluded from the Resources.

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Table 4-1 summarizes the Coal Resources in terms of resource category and depth and has been reported by the major seam group. The total Measured and Indicated Coal Resources were estimated at 572 Mt, comprising 474 Mt of Measured Resources and 30 Mt of Indicated Resources. There is 68 Mt of Inferred Resources. Total Resources are estimated as 572 Mt (as received basis).

Table 4-1. Coal Resource by Depth (ar)

Volume (x1,000,000 м^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Total Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA-BHWE									
4.7	7.2	1.53	28.44	6.66	21.01	5,518	0.96	46.82	MEASURED
0.4	0.7	1.50	26.54	4.87	22.68	5,747	0.93	47.73	INDICATED
1.9	2.9	1.52	27.55	7.26	22.83	5,381	0.85	45.44	INFERRED
7.0	**10.8**	**1.52**	**28.08**	**6.70**	**21.61**	**5,496**	**0.93**	**46.51**	**SUBTOTAL**
BHWE - 100m									
41.6	63.9	1.54	28.53	4.18	20.79	5,659	1.05	47.62	MEASURED
2.8	4.2	1.51	27.25	5.00	21.48	5,742	0.92	48.29	INDICATED
8.8	13.4	1.52	28.50	5.22	21.57	5,499	0.94	46.55	INFERRED
53.2	**81.5**	**1.53**	**28.46**	**4.39**	**20.95**	**5,637**	**1.03**	**47.48**	**SUBTOTAL**
100 - 200m									
63.7	96.3	1.51	26.67	3.63	21.39	5,854	1.02	48.96	MEASURED
5.9	9.0	1.53	28.04	4.61	20.43	5,713	0.86	48.65	INDICATED
13.0	20.0	1.54	28.42	3.92	19.77	5,664	0.92	48.82	INFERRED
82.6	**125.3**	**1.52**	**27.05**	**3.74**	**21.07**	**5,814**	**0.99**	**48.92**	**SUBTOTAL**
200 - 300m									
88.6	133.7	1.51	26.17	3.38	20.28	5,939	0.89	50.66	MEASURED
3.9	6.0	1.53	27.33	3.94	20.65	5,754	0.71	49.11	INDICATED
8.9	13.6	1.53	28.24	3.61	21.43	5,697	0.99	47.29	INFERRED
101.4	**153.3**	**1.51**	**26.40**	**3.42**	**20.40**	**5,910**	**0.89**	**50.30**	**SUBTOTAL**
300 - 400m									
57.6	88.1	1.53	27.58	3.19	19.39	5,795	0.70	50.16	MEASURED
1.6	2.5	1.55	26.64	3.63	19.29	5,776	0.74	51.03	INDICATED
2.7	4.0	1.52	27.26	3.57	21.93	5,797	0.73	47.76	INFERRED
61.9	**94.6**	**1.53**	**27.54**	**3.22**	**19.49**	**5,795**	**0.70**	**50.08**	**SUBTOTAL**
Below 400m									
56.7	85.2	1.50	25.80	3.82	20.45	5,942	0.51	50.78	MEASURED
4.4	6.9	1.55	27.59	3.48	18.24	5,729	0.38	51.21	INDICATED
9.2	13.7	1.49	24.20	4.29	20.88	6,069	0.52	51.93	INFERRED
70.3	**105.8**	**1.50**	**25.71**	**3.86**	**20.36**	**5,945**	**0.51**	**50.95**	**SUBTOTAL**
376.4	**571.3**	**1.52**	**26.93**	**3.74**	**20.49**	**5,829**	**0.83**	**49.61**	**GRAND TOTAL**
379	**572**	**1.5**	**27**	**3.7**	**20**	**5829**	**0.83**	**50**	***Total (Rounded)**

(Source: JORC (2012) Standard Resource Estimation Ukhaa Khudag JORC Statement as at 1st January 2022)

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Note:

(i) *Technical information in this UHG Coal Resource estimation has been compiled by Mr. Byambaa Barkhas, Chief Geologist, Mongolian Mining Corporation. Mr. Barkhas is a member of the Australasian Institute of Mining and Metallurgy (Member #318198) and has over 10 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Minerals Resources and Ore Reserves, The JORC Code (2012). Mr. Barkhas consents to the inclusion in the release of the matters based on this information in the form and context in which it appears. The estimate of the Coal Resource set out in Table 1 presented in this report are considered to be a true reflection of the UHG Coal Resource as at 1st January 2022, and have been carried out in accordance with the principles and guidelines of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. The JORC Code (2012).*

(ii) *Technical information in this UHG Coal Resource estimation has been internally peer reviewed by Mr. Lkhagva-Ochir Said, Executive General Manager for Mining and Production, Mongolian Mining Corporation. Mr.Said is a member of the Australasian Institute of Mining and Metallurgy (Member #316005) and has over 15 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012).*

(iii) *Due to rounding, discrepancy may exist between sub-totals and totals.*

5. Coal Reserves Estimate

The following sections describe the processes used to convert the Coal Resources into the Coal Reserves. The order generally follows "Table 1 – Section 4 Check List of Assessment and Reporting Criteria" in the JORC Code 2012 Edition. This process includes defining viable pit limits, applying various modifying factors including mining recovery, metallurgical, cost, revenue to the Coal Resources to estimate Coal Reserves.

5.1. Coal Resources Estimate

The Coal Resource estimate which is the basis for the Coal Reserves estimate is summarized in Section 4.4 of this report. The Competent person who prepared the Coal Resources estimate is Mr Byambaa Barkhas. Mr Byambaa Barkhas is a full-time employee of MMC and is a member of the Australasian Institute of Mining and Metallurgy. The Coal Resources are reported inclusive of those Coal Resources modified to produce the Coal Reserves.

5.2. Study Status

GLOGEX completed the Reserve Statement of the UHG deposit as of 1st of January 2022 based on the UHG Coal Resource Estimation as of January 2022.

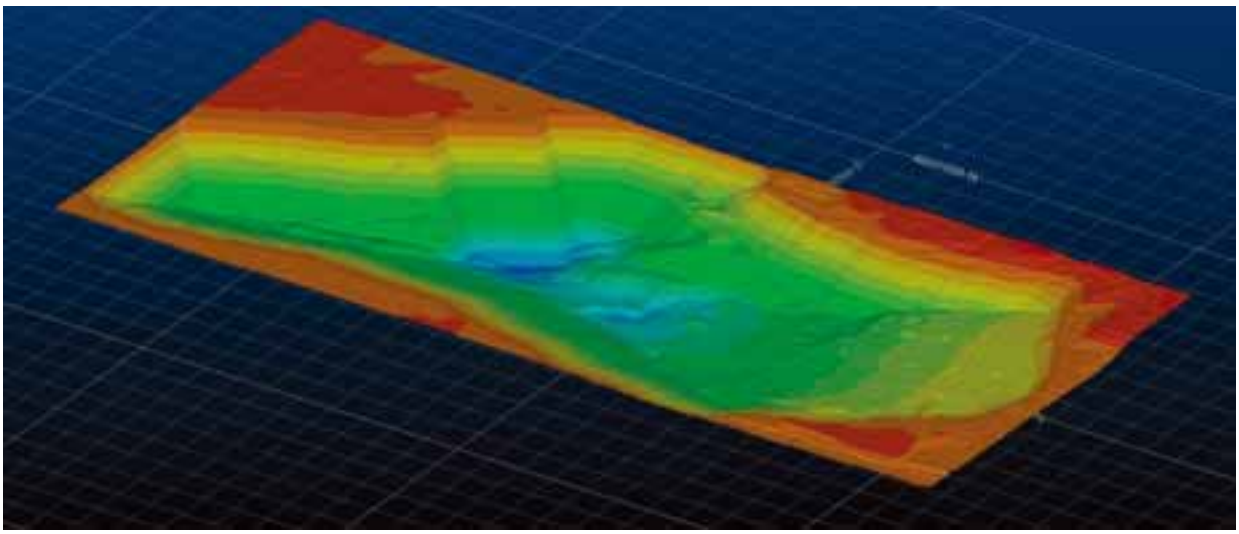

Figure 5-1. Final Pit optimization pit shell Design

The Competent Person for the Coal Reserves Statement made consecutive site visits since 2017. His last visit was in November 2021. The competent person believes that further site visit will be in 2022 to review changes in the mining progress as well as mining conditions.

5.3. Geotechnical Criteria

Geotechnical stable slope parameters for UHG were defined during the LOM Plan and its update in 2015, on the advice provided by Australian Mining Consultants ("AMC"), the UHG project geotechnical consultant as per table 5.1.

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Table 5-1. Pit Optimiser Geotechnical Parameters

Pit Highwall	*Corresponding Ground Control District*	*Maximum Overall Slope Angle (°)*
Weathered	WOB	27.0
North Pit Highwall Angle	NEW4	22.0
North East Pit Highwall Angle	NEW2	30.0
East Pit Highwall Angle	ELW	33.0
South East Pit Highwall Angle	SEW1	25.0
South Pit Highwall Angle	SEW2	21.0
South West Pit Highwall Angle	SEW3	22.0
West Pit Highwall Angle	NEW5	28.0
North West Pit Highwall Angle	NEW4	22.0

(Source: Australian Mining Consultants ("AMC"))

5.4. Mining Factors

The selected mining method is an "open cut, multi seam, truck, and hydraulic excavator mining method" with both ex pit and in pit waste dumping. Mining factors applied to the Coal Resource model, which is a ply model, for deriving ROM Coal quantities were selected based on a excavators and trucks combination. The assumption is that clean, accurate mining practices will be adopted.

In the previous UHG LOM Study completed by RungePincockMinarco in November 2013, MMC provided RungePincockMinarco with a series of polygons for each major seam group which defined zones within the deposit that have been more significantly affected by faulting and other geological processes. These areas were referred to as "Affected Zones", as mining of the coal was anticipated to be more difficult in these zones. Although, actual mining coal recovery reconciliation results supplied by MMC for 18 months period from January 2014 to June 2015, RungePincockMinarco accepted the discontinuation of the use of fault affected zones for 2015 LOM study. Glogex agreed the discontinuation of fault affected zones for this study.

The key findings identified by MMC from the coal recovery reconciliation analysis were:

- Within the ' Affected Zones', the total coal recovery amounted to 94.4% of that modelled;
- Outside of the ' Affected Zones', the total coal recovery improved to 98.4% of that modelled;
- If Seams 5A, 6A and 7A were excluded from the evaluation, considering (i) the limited actual mined tonnage, and (ii) impacts on seams recovery due to disrupted sub crop setting (to be considered as part of the global per cent loss on basis of 'Mining and Geological' losses), the total coal recovery improves to 100.2%;
- After integrating 1% global loss, further application of coal losses inside or outside of 'Affected Zones' is considered not necessary.

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The mining factors adopted to convert the UHG Resource model to the ROM model are as follows (refer to summary in Table 5.2):

- **Minimum Mining Thickness:** Coal working sections with total thickness of less than 0.5 m were excluded as mineable coal;

- **Minimum Parting Thickness:** Partings with thickness less than 0.5 m were aggregated with adjacent coal working sections and included in the ROM coal calculations;

- **Roof and Floor Loss:** It was assumed that approximately 100 mm of loss occur with all coal seams both from roofs and floors.

- **Roof and Floor Dilution:** It was assumed that approximately 100 mm of waste material will be mined with all coal seams both from roofs and floors, thus, diluting the coal working section quality. Average dilution percentages of each seam was calculated by assaying the number of potential working sections on a block by block basis. Dilution is applied to the model as a percentage to each working section. Refer to Table 5.3 for the default dilutant qualities;

- **Global Loss:** 1% of all mineable coal has been deducted from the estimate of ROM coal. This global allowance covers both geological and mining losses, including losses which will occur along edges, such as subcrops, faults, wedges, and ramps;

- **Moisture:** The in situ relative density data in the original Micromine resource block model provided by MMC was based on weighted average in situ moisture of 3.72% and weighted average air dried moisture of 0.78%. Same principle applies to remaining coal quality parameters. The Preston Sanders formula of in situ density was used to convert relative density to in situ relative density. MMC advised that coking product moisture will be 8%, middlings product moisture will be 9%, and thermal product moisture will be 2.68%.

Table 5-2. Summary of UHG Mining Modifying Factors

Modifying Factor / Unit	unit	Value
Roof loss	mm	100
Roof dilution	mm	100
Floor loss	mm	100
Floor dilution	mm	100
Minimum seam thickness	m	0.5
Maximum included ply thickness	m	0.5
Global loss	%	1.0

Table 5-3. UHG Default Dilutant Qualities

Default Quality / Unit	*As Received Value*
Relative Density / g/cc	2.46
Total Moisture / %	2.46
Ash / %	92.03
Volatile Matter / %	5.51
Fixed Carbon / %	0.00
Calorific Value / kCal/kg	0.00
Sulphur / %	2.41

(Source: JORC (2012) Standard Resource Estimation Ukhaa Khudag Coal Mine (License 11952A), MMC, January 2022)

5.5. Metallurgical Factors and Product Specification

The classification of seams by coking or thermal coal product was provided by Mr John Trygstad of Norwest as part of the "Integrated UHG and BN LOM Study" completed by RungePincockMinarco in May 2013. Modifications were made to this classification on the "Statement of Open Pit Coal Reserves as at 30th November 2015 study" by RungePincockMinarco where seam 0B was reclassified as hard coking coal based on the actual wash plant based performance data provided by MMC. Additionally, the 0AU seam throughout the deposit was reclassified as a hard coking coal on the "Statement of Open Pit Coal Reserves as of 1st January 2018 study" by GLOGEX based on the similar wash plant based seam 0A performance data from 2017 provided by MMC. Only the seam 0AL was classified as thermal coal. GLOGEX accepted these reclassifications.

Moreover, seam 7 exhibited a degree of hard coking potential in the mine. Coal quality parameters, particularly volatile matter results from pit and borehole samples suggested a coal rank variation within the seam. To interpret this variation, 10 pit wall ply samples, blast hole chip samples were collected from the mine for detailed petrographic analysis by MMC. The results revealed seam 7 with an average of 1.12 mean random vitrinite reflectance. Therefore, arguably MMC reclassified seam 7 as hard coking coal due to its closely associated rank with other hard coking coal seams. To test this reclassification, a full-scale production washing trial was undertaken in 2019 by MMC. Approximately 8000 tons of seam 7 was mined and washed at 40% ROM feed blends with hard coking seams 4A, 4C, 0CUU, and 0B and produced a hard coking coal product with an average of 1.04 mean random vitrinite reflectance. Combination of these results assured the seam 7 reclassification thus, MMC concluded that seam 7 can be blended with hard coking coal seams of the UHG with caution, advisably at less than 40% ROM feed blend. GLOGEX further accepted seam 7 reclassification in this study.

The selected coal preparation process for coking coal seams is a high cut, low cut dense media process with the low cut density set to produce a coking coal product with a target ash. Similarly, the high cut density set dense media process is selected to produce a middling's product with a target ash. Coal Processing Plant ("CPP") yield data for a range of cut-point densities was provided by Norwest for each major coking seam group. Adjustments were made to extracted coal seams' yield data and cut-point densities based on the pit wall bulk sample washability analyses results provided by MMC. Seams 0A, 0B, 0C, 1, 2, 3A, 4A, 4B, 4C, 5A, 6, and 7A were thoroughly sampled on a ply basis in the mine and analyzed by MMC following Norwest equivalent standards. These adjustments were necessary as the raw coal quality and washability characteristic change as the mine

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progresses to the west. The Norwest yield and cut-point density data for the seams 7B, 8, 9, 10, 11, 12 remained unadjusted as they are yet to be extracted.

A number of iterations were completed in the Datamine Studio NPVS software to determine the most suitable coking "ROM Ash – Yield" cut-point density curve to use, on the bases of achieving a hard coking product ash of with 11.0% (dry) and semi-soft coking product ash with 9.5% (dry) on weighted average across the life of the mine.

The MMC and Norwest "ROM Ash – Yield" curves found to achieve the hard coking and semi-soft coking product specifications were at a cut-point density of 1.425 and 1.4 respectively. Table 5.4 and Table 5.5 shows the details of the "ROM Ash – Yield" curves at wash plant cut-point densities of 1.425 for the hard coking and 1.4 semi-soft coking coal seams in this study.

Table 5-4. Hard Coking Coal "ROM Ash – Yield" Curve (Wash Plant - 1.425 Cut-Point Density)

Seam	Ply	*Hard Coking Product*	
		ROM Ash - Yield Curve (% ad)	*Product Ash (% ad)*
7	7B	-0.0127 x ROM Ash% + 0.9271	8.4
	7A	-0.0139 x ROM Ash% + 0.9054	10.7
6	6C	-0.0145 x ROM Ash% + 0.9039	12.3
	6B	-0.0127 x ROM Ash% + 0.979	9.3
	6A	-0.0168 x ROM Ash% + 1.0211	9.1
5	5AU	-0.0123 x ROM Ash% + 0.9349	7.8
	5AL	-0.0105 x ROM Ash% + 0.7934	9.9
	5ALL	-0.0123 x ROM Ash% + 0.9163	9.8
4	4CR	-0.0119 x ROM Ash% + 0.8844	8.1
	4C	-0.0138 x ROM Ash% + 0.9674	8.6
	4B	-0.0119 x ROM Ash% + 0.8541	8.1
	4A20	-0.0119 x ROM Ash% + 0.8723	9.3
	4A10	-0.0119 x ROM Ash% + 0.8723	9.3
	4AR	-0.0119 x ROM Ash% + 0.8723	9.3
	4AU	-0.0144 x ROM Ash% + 1.0778	10.2
	4AL	-0.0144 x ROM Ash% + 1.0778	10.2
3	3AU	-0.0149 x ROM Ash% + 0.9775	11.3
	3AM	-0.0118 x ROM Ash% + 0.8562	10.8
	3AL	-0.0136 x ROM Ash% + 0.9304	13.2
2	25	-0.0049 x ROM Ash% + 0.3916	12.5
	2	-0.0049 x ROM Ash% + 0.3916	12.5
1	1	-0.0049 x ROM Ash% + 0.3916	12.5
0	0D	-0.0094 x ROM Ash% + 0.6882	15.4
	0CR	-0.0094 x ROM Ash% + 0.6882	15.4
	0CUU	-0.0102 x ROM Ash% + 0.7162	14.7
	0CUM	-0.0082 x ROM Ash% + 0.6613	13.7

	0CUL	-0.0107 x ROM Ash% + 0.7172	12.9
	0CL4	-0.0113 x ROM Ash% + 0.8198	12.3
	0CL3	-0.0102 x ROM Ash% + 0.6327	14.4
	0CL2	-0.0099 x ROM Ash% + 0.7199	12.8
	0CL1	-0.0071 x ROM Ash% + 0.4326	15.6
	0BR	-0.0059 x ROM Ash% + 0.3907	17.6
	0BU	-0.0148 x ROM Ash% + 0.817	11.1
	0BL	-0.0134 x ROM Ash% + 0.8548	10.1
	0AR	-0.0041 x ROM Ash% + 0.3604	20.6
	0AU	-0.0041 x ROM Ash% + 0.3604	20.6

(Source: Norwest and MMC)

Table 5-5. Semi-Soft Coking Coal "ROM Ash – Yield" Curve (Wash Plant - 1.4 Cut-Point Density)

Seam	Ply	*Semi-Soft Coking Product*	
		ROM Ash - Yield Curve (% ad)	*Product Ash (% ad)*
12	12C	-0.0115 x ROM Ash% + 0.8126	7.1
	12B	-0.0115 x ROM Ash% + 0.8126	7.1
	12A	-0.0115 x ROM Ash% + 0.8126	7.1
11	11C	-0.0115 x ROM Ash% + 0.8126	7.1
	11B	-0.0115 x ROM Ash% + 0.8126	7.1
	11A	-0.0115 x ROM Ash% + 0.8126	7.1
10	10B	-0.0103 x ROM Ash% + 0.7297	9.9
	10A	-0.0117 x ROM Ash% + 0.7921	8.7
9	9B	-0.01 x ROM Ash% + 0.7297	9.2
	9A	-0.0098 x ROM Ash% + 0.6626	12.2
8	8B	-0.0112 x ROM Ash% + 0.7377	8.2

(Source: Norwest)

Table 5.6 shows the details of the "ROM Ash – Yield" curves targeting a middlings or secondary product with varied ash were incorporated into this study.

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Table 5-6. Middlings Coal "ROM Ash – Yield" Wash Plant Curves

Seam	Ply	*Middling Product*			
		Primery Product	Primery Cut-Point Density	*ROM Ash - Yield Curve (% ad)*	*Product Ash (% ad)*
12	12C	SSCC	1.40	-0.002 x ROM Ash% + 0.1304	18.0
	12B	SSCC	1.40	-0.002 x ROM Ash% + 0.1304	18.0
	12A	SSCC	1.40	-0.002 x ROM Ash% + 0.1304	18.0
11	11C	SSCC	1.40	-0.002 x ROM Ash% + 0.1304	18.0
	11B	SSCC	1.40	-0.002 x ROM Ash% + 0.1304	18.0
	11A	SSCC	1.40	-0.002 x ROM Ash% + 0.1304	18.0
10	10B	SSCC	1.40	-0.003 x ROM Ash% + 0.239	18.0
	10A	SSCC	1.40	-0.0024 x ROM Ash% + 0.1661	18.0
9	9B	SSCC	1.40	-0.0024 x ROM Ash% + 0.2137	18.0
	9A	SSCC	1.40	-0.0018 x ROM Ash% + 0.1323	18.0
8	8B	SSCC	1.40	-0.0015 x ROM Ash% + 0.1048	16.0
7	7B	HCC	1.425	-0.0018 x ROM Ash% + 0.1165	18.0
	7A	HCC	1.425	-0.0008 x ROM Ash% + 0.0919	23.2
6	6C	HCC	1.425	-0.0015 x ROM Ash% + 0.1831	23.1
	6B	HCC	1.425	-0.0016 x ROM Ash% + 0.1163	21.2
	6A	HCC	1.425	-0.0004 x ROM Ash% + 0.082	18.9
5	5AU	HCC	1.425	-0.0011 x ROM Ash% + 0.1021	19.9
	5AL	HCC	1.425	-0.0034 x ROM Ash% + 0.2309	24.0
	5ALL	HCC	1.425	-0.0018 x ROM Ash% + 0.1427	24.1
4	4CR	HCC	1.425	-0.0017 x ROM Ash% + 0.137	18.0
	4C	HCC	1.425	-0.0009 x ROM Ash% + 0.0888	17.7
	4B	HCC	1.425	-0.0017 x ROM Ash% + 0.137	20.7
	4A20	HCC	1.425	-0.0023 x ROM Ash% + 0.1754	18.0
	4A10	HCC	1.425	-0.0023 x ROM Ash% + 0.1754	18.0
	4AR	HCC	1.425	-0.0023 x ROM Ash% + 0.1754	18.0
	4AU	HCC	1.425	-0.0003 x ROM Ash% + 0.0382	17.6
	4AL	HCC	1.425	-0.0003 x ROM Ash% + 0.0382	17.6
3	3AU	HCC	1.425	-0.002 x ROM Ash% + 0.1411	20.5
	3AM	HCC	1.425	-0.0021 x ROM Ash% + 0.18	19.7
	3AL	HCC	1.425	-0.0013 x ROM Ash% + 0.2179	22.0
2	25	HCC	1.425	-0.0028 x ROM Ash% + 0.1948	33.0
	2	HCC	1.425	-0.0028 x ROM Ash% + 0.1948	33.0
1	1	HCC	1.425	-0.0028 x ROM Ash% + 0.1948	33.0
0	0D	HCC	1.425	-0.0016 x ROM Ash% + 0.1298	18.0
	0CR	HCC	1.425	-0.0016 x ROM Ash% + 0.1298	18.0
	0CUU	HCC	1.425	-0.0036 x ROM Ash% + 0.3315	23.2
	0CUM	HCC	1.425	-0.005 x ROM Ash% + 0.4236	22.3
	0CUL	HCC	1.425	-0.0047 x ROM Ash% + 0.3012	23.8

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	0CL4	HCC	1.425	-0.004 x ROM Ash% + 0.302	22.1
	0CL3	HCC	1.425	-0.0033 x ROM Ash% + 0.3542	24.3
	0CL2	HCC	1.425	-0.005 x ROM Ash% + 0.3608	23.2
	0CL1	HCC	1.425	-0.0053 x ROM Ash% + 0.5195	25.6
	0BR	HCC	1.425	-0.0053 x ROM Ash% + 0.3735	26.9
	0BU	HCC	1.425	-0.0049 x ROM Ash% + 0.2726	19.3
	0BL	HCC	1.425	-0.0031 x ROM Ash% + 0.1787	16.5
	0AR	HCC	1.425	-0.0028 x ROM Ash% + 0.2315	27.9
	0AU	HCC	1.425	-0.0028 x ROM Ash% + 0.2315	27.9

(Source: Norwest & MMC)

5.6. Cost Parameters

The mining, hauling, processing, handling, administration, transportation, air pollution, logistic, and import duty charges costs were adjusted from an actual cost incurred at UHG provided by MMC year to date 1st January 2022 based on 2850 MNT/USD exchange rate. GLOGEX reviewed key cost inputs and adjusted actual costs to reflect the key factors of the project to increase the accuracy of pit optimization results. The input costs are summarized in Table 5.7.

Table 5-7. Pit Optimization Input Costs

No	Item	Unit	Rate
1	Mining cost per BCM	USD/BCM	1.81
2	Site admin cost per BCM	USD/BCM	0.40
3	Waste mining cost-vertical	USD/m.BCM	0.00780
4	Air pollution fee	USD/t.ROM	0.351
5	Handling cost	USD/t.ROM	1.34
6	Processing cost	USD/t.ROM	4.60
7	General Administration cost	USD/t.ROM	1.19
8	Transportation and logistics cost UHG-GM	USD/t.product	9.25
9	Custom duty (at GM port)	USD/t.product	0.53

5.6.1. Mining cost basis

The historical actual mining costs occurred in the UHG mine is summarized in Table 5.8 and Table 5.9 as provided by MMC. Based on this summarization, the actual mining costs per BCM have been reducing since 2018. GLOGEX used cost inputs of the 2020 for pit optimization. The primary factor of mining cost reduction is the fact that the contract between MMC and Thiess Mongolia, the main operational contractor of MMC is ending in 2023 by fully transferring mining equipment to the MMC.

Additionally, the Labor Law of Mongolia regulated the mine employees' roster to be 14/14, thus, GLOGEX increased the MMC salary fund by 20% to reflect the law. Based on the adjustments above, GLOGEX estimated mining cost per BCM as 1.81 USD/BCM. The cost estimation is summarized on Table 5.10.

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Table 5-8. Historical mining cost per ROM ton of coal, 2018-2021H1

Item	2018	2019	2020	2021H1
Blasting	0.9	1.0	0.8	0.9
Plant cost	3.5	4.5	4.6	5.1
Fuel	2.4	2.6	2.1	2.1
National staff cost	0.7	0.9	1.0	1.0
Expatriate staff cost	0.2	0.2	0.2	0.2
Contractor fee	3.7	3.1	3.2	3.3
Ancillary and support cost	0.1	0.0	0.0	0.2
Depreciation and amortization	2.2	2.4	2.7	3.6
Total	**13.7**	**14.7**	**14.6**	**16.4**

Source: MMC annual report 2018-2020, MMC interim report 2021

Table 5-9. Historical mining cost per BCM, 2018-2021H1

Item	2018	2019	2020	2021H1
Total coal sales, 1000 ROM ton	9,228	9,241	7,410	1,379
Waste, 1000 BCM (per coal sales)	45,715	53,084	42,507	9,327
Total coal sales, 1000 BCM	6,364	6,373	5,110	951
Total movement, 1000 BCM (per coal sales)	52,079	59,457	47,617	10,278
Total mining cost, 1000 USD	126,420	136,026	108,333	22,610
Mining cost, USD/BCM	**2.43**	**2.29**	**2.28**	**2.20**

Source: MMC annual report 2018-2020, MMC interim report 2021

Table 5-10. Unit mining cost calculation, per BCM

Item	Unit mining cost, USD/ROM ton (2020 actual)	Coal sales, million ROM ton (2020 actual)	Mining cost, thousand USD (2020 actual)	Mining cost, USD/BCM (2020 actual)	Factor	Mining cost, USD/BCM (forecast)
Blasting	0.80	7.4	5,928	0.12	1.00	0.12
Plant cost	4.60	7.4	34,086	0.72	1.00	0.72
Fuel	2.10	7.4	15,561	0.33	1.00	0.33
National staff cost	1.00	7.4	7,410	0.16	1.20	0.19
Expatriate staff cost	0.20	7.4	1,482	0.03	1.00	0.03
Contractor fee	3.20	7.4	23,712	0.50	-	-
Ancillary and support cost	0.02	7.4	148	0.00	1.00	0.00
Depreciation and amortization	2.70	7.4	20,007	0.42	1.00	0.42
Total	**14.62**		**108,333**	**2.28**		**1.81**

Source: MMC annual report 2018-2020, MMC interim report 2021

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5.6.2. Site admin cost

The historical site admin cost per ROM ton of coal range between 1.75-1.81 USD, per BCM range between 0.31-0.51 USD as provided by MMC. GLOGEX estimated the site admin cost based on average actual cost of 2018-2021H1 to be **0.4 USD/BCM**.

Table 5-11. Historical site admin cost per BCM

Item	2018	2019	2020	2021H1
Total site admin cost, million USD	16.1	21.3	19.5	5.3
Site admin cost, USD/ROM ton	1.75	2.31	2.63	3.81
Site admin cost, USD/BCM	**0.31**	**0.36**	**0.41**	**0.51**

Source: MMC annual report 2018-2020, MMC interim report 2021

5.6.3. Air pollution fee

1,000 tugriks per ROM ton of coal rate is applied per Mongolian Law on Air: Section 7.1. GLOGEX estimated air pollution fee as 0.35 USD/t.ROM after currency exchange.

5.6.4. Handling cost

The key factor of the handling cost includes costs associated with the CHPP in feed coal handling and primary product, middling, and reject handling. The historical handling costs range between 1.24-1.71 USD/ROM from 2018 to 2021H1 as provided by MMC. GLOGEX estimated handling cost based on the average actual cost of 2018-2020 **as 1.34 USD/ROM.**

Table 5-12. Historical handling cost per ROM ton of coal

Item	2018	2019	2020	2021H1
Total handling cost, Million USD	11.4	13.5	9.9	2.4
Handling cost, USD/ROM ton	**1.24**	**1.46**	**1.33**	**1.71**

Source: MMC annual report 2018-2020, MMC interim report 2021

5.6.5. Processing cost

The historical processing cost range between 4.2-4.8 USD/ROM from 2018 to 2021H1 as provided by MMC. GLOGEX estimated processing cost based on the average actual cost of 2018-2021H1 as **4.6 USD/t.ROM.**

Table 5-13. Historical coal processing cost per ROM ton of coal

Item	2018	2019	2020	2021H1
Processing cost, USD/ROM ton feed	4.6	4.8	4.8	4.2

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Source: MMC annual report 2018-2020, MMC interim report 2021

5.6.6. General administration cost

The general administration cost of the UHG is 17.8 million USD, 1.19 USD/BCM in last 4 years average. GLOGEX accepted this cost and used it for pit optimization (*Source: Actual costs incurred at UHG provided by MMC)*

5.6.7. Transportation and logistics cost UHG-GM

The UHG-GM railroad is being constructed by The Tavantolgoi Railroad LLC. GLOGEX estimated railroad transportation cost as 8 USD/t.ROM as provided in the Tavantolgoi Railroad website. GLOGEX estimated logistics cost based on the average actual cost of 2018-2020 and calculated combined transportation and logistics cost as 9.25 USD/product.

Table 5-14. Historical Transportation and logistics cost per ton product

Item	2018	2019	2020	2021H1
Total logistic cost, Millon USD	5.4	6.4	5.6	1.5
Logistic cost, USD/ton product	**1.15**	**1.26**	**1.33**	**1.90**

Source: *MMC annual report 2018-2020, MMC interim report 2021*

5.6.8. Custom duty

1,500 tugriks per PRODUCT ton of coal rate is applied for customs duty per Government of Mongolia regulations. GLOGEX estimated customs duty as **0.53 USD/t.PRODUCT** after currency exchange.

5.7. Marketing and Revenue Parameters

MMC is the closest coking coal producer to the Baotou in Inner Mongolia, which is the closest railway transportation hub providing access from Mongolia to the largest steel producing provinces in China. In April 2021 Shanxi Fenwei completed an independent market study for UHG and identified principal coking and thermal coal markets for 2018-2025 in Mongolia and China.

Table 5-15. Coal historical price and benchmark price forecast exclusive VAT (DAP Ganqimaudu port, China)

USD/t	2020*	2021*	2022**	2023**	2024**	2025**	Average	Royalty rate	Royalty exclusive	Note
UHG-JM (HCC)	100.6	119.6	159.5	150.1	141.9	136.2	134.7	6.5%	125.9	average of 2020-2025
BN-1/3JM (G75)/SSCC	67.4	81.7	109.4	107.3	105.3	104.4	95.9	5.0%	91.1	average of 2020-2025
MMC-6000Kcal/kg	-	-	51.3	48.6	48	47.3	48.8	5.0%	46.3	average of 2022-2025
MMC-5000Kcal/kg	14	-	37	34.6	34.2	33.7	30.7	6.0%	28.8	average of 2020-2025

*Note: *MMC actual price, provided by MMC, ** Price forecast by Fenwei Energy*

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DAP price coal quality of MMC coals at Ganqimaodu (excl. customs duty, VAT and prices prior to inspection)

		CV	A	M	V	S	G	CSR	MF (lga)
MMC products	MMC-JM		11.0	9	26	0.7	83		
	MMC-1/3JM		9.5	10	35	0.7	75		
	MMC-6000 Kcal/kg	6000							
	MMC-5000 Kcal/kg	5000							

Source: Fenwei Energy

The coal selling prices for Hard Coking Coal were estimated based on 6-year average of 2020-2021 historical prices and price forecast 2022-2025, as provided by MMC actual coal selling price as well as price forecast of Shanxi Fenwei Energy Consulting Co. Ltd ("Shanxi Fenwei") product value at the DAP Ganqimaodou port of China.

The coal selling prices for Semi-soft coking coal, Middlings coal and Thermal coal were estimated based on 6 year average of 2020-2021 historical prices and price forecast 2022-2025, as provided by MMC actual coal selling price as well as price forecast of Shanxi Fenwei Energy Consulting Co. Ltd ("Shanxi Fenwei") product value at the DAP Ganqimaodou port of China.

The coal selling prices assigned to each product, were:

- Hard coking coal < 11.0% ash (dry): US$134.7/t product (ar),
- Semi-soft coking coal < 9.5% ash (dry): US$95.9/t product (ar),
- Middlings coal ~ benchmark CV 6,000 kcal/kg (gar): US$48.8/t product (ar),
- Thermal coal ~ benchmark CV 5,000 kcal/kg (gar): US$30.7/t product (ar).

The royalty provided by MMC was assigned as a percentage of revenue generated by the product coal as summarized in Table 5-16.

Table 5-16. Royalty

Royalty		
Washed coal		
Base royalty	% of DAP price	5.0
Additional royalty		
If DAP GM price 0<100, royalty added by	% of DAP price	-
If DAP price 100=<130, royalty added by	% of DAP price	1.0
If DAP price 130=<160, royalty added by	% of DAP price	1.5
If DAP price 160=<190, royalty added by	% of DAP price	2.0
If DAP price 190=<210, royalty added by	% of DAP price	2.5
If DAP price 210=< , royalty added by	% of DAP price	3.0
Unwashed (raw) coal		
Base royalty	% of DAP price	5.0
Additional royalty		
If DAP price 0<25, royalty added by	% of DAP price	-
If DAP price 25=<50, royalty added by	% of DAP price	1.0
If DAP price 50=<75, royalty added by	% of DAP price	2.0
If DAP price 75=<100, royalty added by	% of DAP price	3.0
If DAP price 100=<125, royalty added by	% of DAP price	4.0
If DAP price 125=< , royalty added by	% of DAP price	5.0

5.8. Pit Optimization Results

Datamine Studio NPVS software was used to generate a series of incremental pit shells based on a range of coal selling prices. This is a three-dimensional approach which provides a series of pit shells where each increment reflects different economic scenarios such as changes to depth, mining cost, or coal price. Through the application of mining factors (Section 5.4), and metallurgical factors (Section 5.5) the mineable in situ coal within the pit shell was converted to ROM coal quantities and product coal quantities.

The pit optimization results were examined and the optimal pit shell that is determined by the results corresponding to the pit shell with an incremental cash margin of $0 (the difference between incremental revenue and incremental cash cost) was selected as the Optimized Pit Shell. The optimization was not limited to a vertical depth.

The selected pit shell (Optimized Pit Shell) was modified slightly to form a practical pit for mining (Mineable Pit Shell) as shown in Figure 5. The Mineable Pit Shell contains a waste volume of 2,529.2 Mbcm, ROM coal of 406.2 Mt at a Strip Ratio of 6.23:1 (bcm/t ROM). The mineable ROM coal quantity includes Measured, Indicated, and Inferred coal resources, as well as unclassified coal within the pit shell.

The pit optimization price sensitivity results are summarized in Table 5.17, which outlines the waste and coal quantities in the optimal pit shell for a range of coal selling prices (labelled as a percentage of the base price, with 100% being equal to the base coal selling prices outlined in Section 5.7).

Table 5-17. Pit Optimization Results – Coal Price Sensitivity

Coal Price as % of Base Price	Waste Mbcm	Coal Mt ROM	Strip Ratio m3/tn
50%	402.4	105.77	3.80
55%	565.2	138.21	4.09
60%	1093.5	209.16	5.23
65%	1356.8	250.99	5.41
70%	1878.5	323.13	5.81
75%	2008.9	342.71	5.86
80%	2091.4	354.96	5.89
85%	2162.3	364.68	5.93
90%	2239.1	373.60	5.99
95%	2485.3	400.92	6.20
100%	**2529.2**	**406.21**	**6.23**
105%	2583.8	411.63	6.28
110%	2626.0	416.70	6.30
115%	2676.6	421.28	6.35
120%	2747.0	426.47	6.44
125%	2787.4	430.42	6.48
130%	2806.5	431.86	6.50
135%	2828.1	433.34	6.53
140%	2882.7	436.58	6.60
145%	2991.9	442.19	6.77
150%	3009.1	443.49	6.79

Graph 5.1 Illustrates that the UHG deposit, while not overly sensitive to an increase in coal sales price, is more sensitive to a drop in coal sales price below the base price. This is evident by the more rapid rate of decrease in ROM coal quantities at coal prices below 100% of the base price, as opposed to the rate of increase in ROM coal quantities at coal prices above 100% of the base price.

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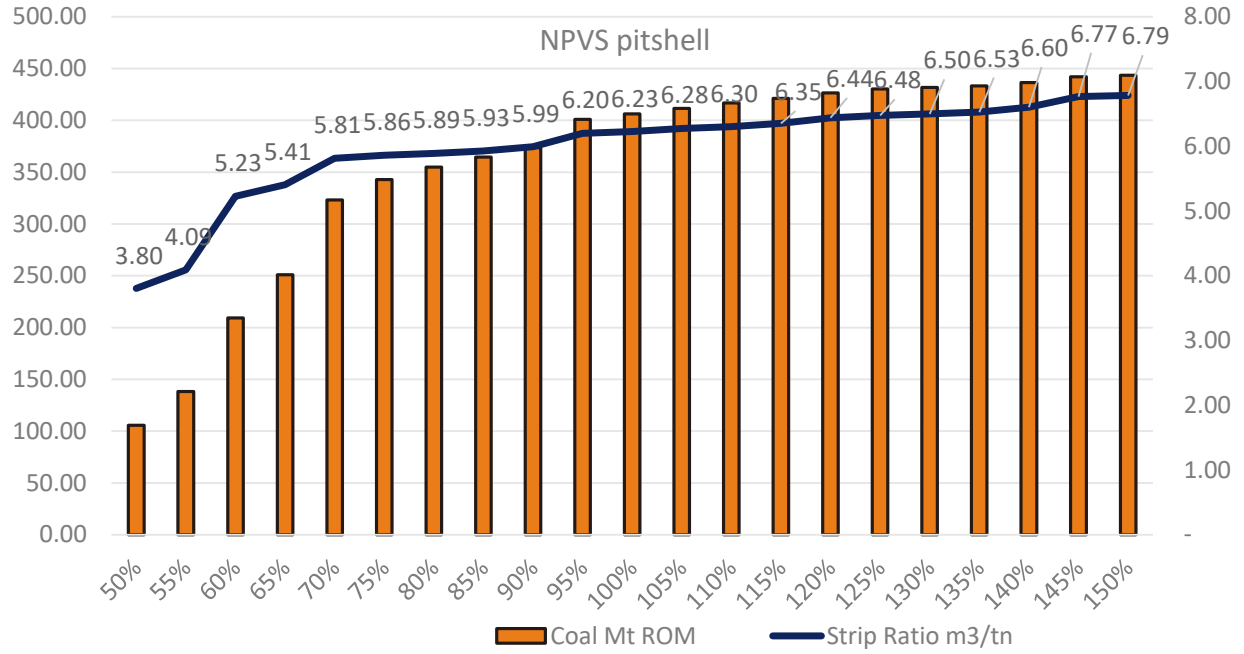
Graph 5-1. Pit Optimization - Coal Price Sensitivity



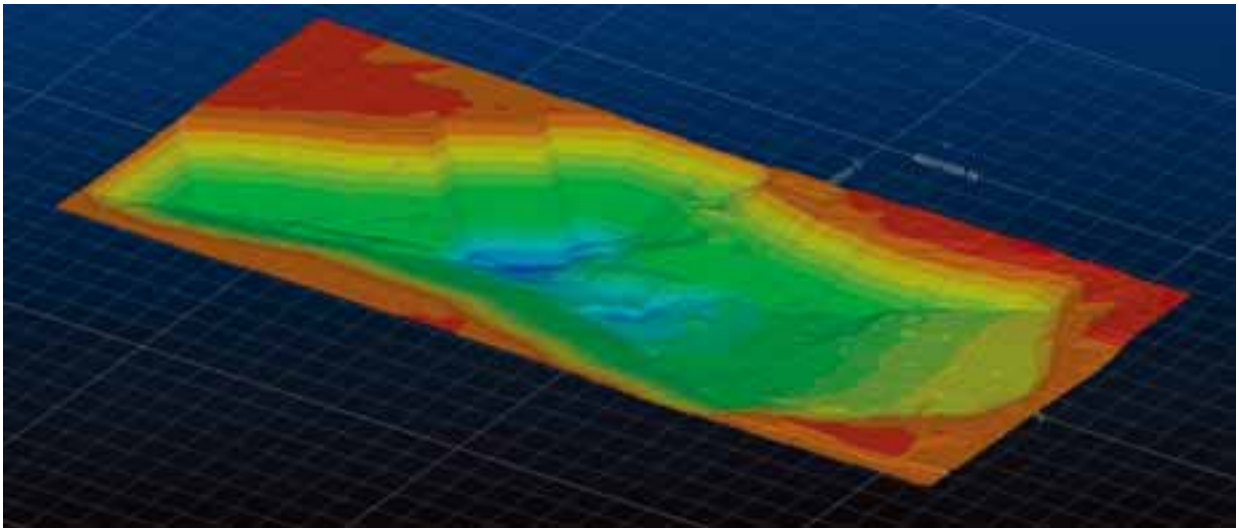


Figure 5-2. Pit Optimization shell

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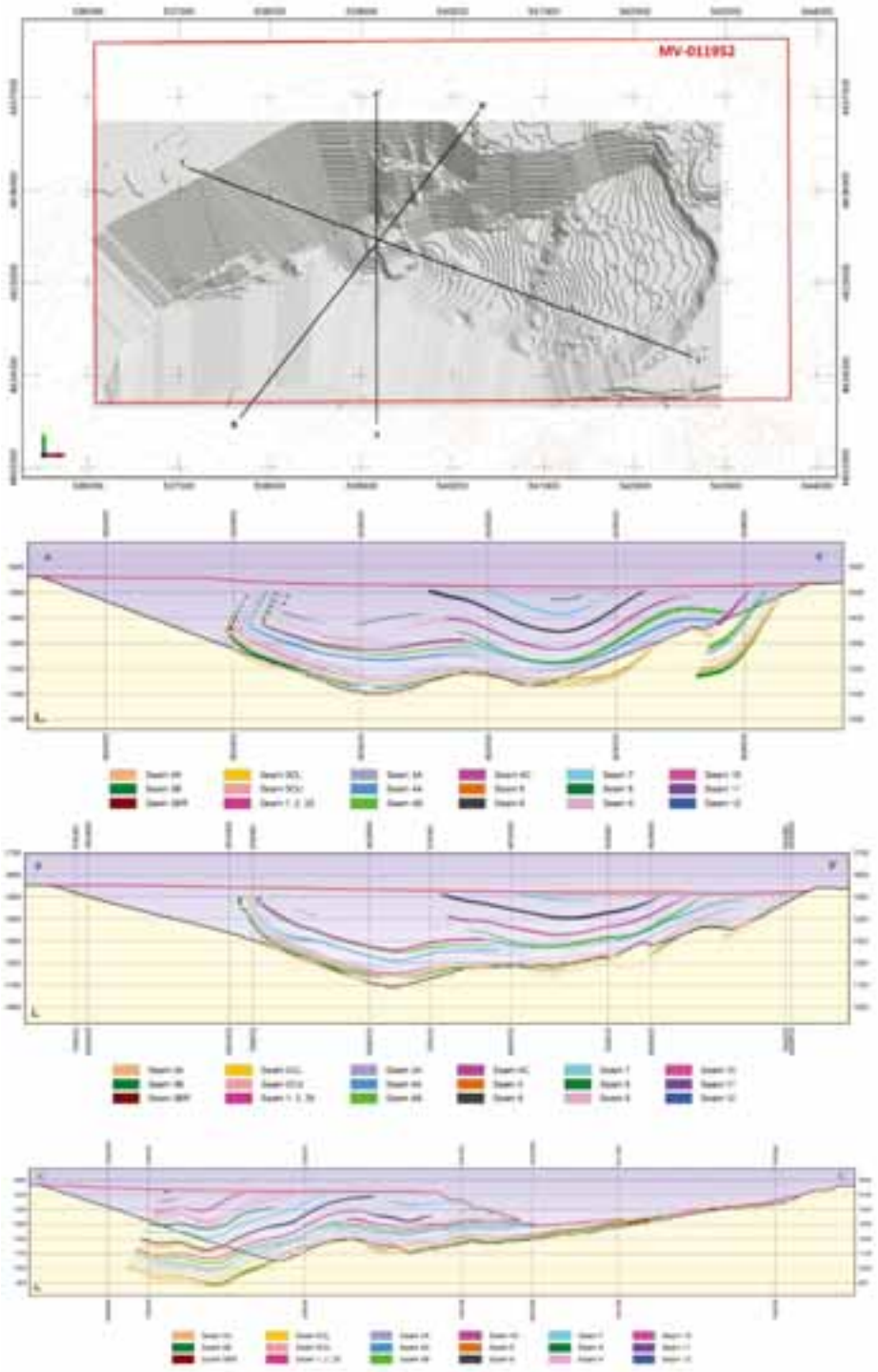
Figure 5-3. Cross sections



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5.9. Categorization

Measured and Indicated Coal Resources within the Mineable Pit Shells were categorized as Coal Reserves. Coal Reserves have been categorized based on the confidence level of the Coal Resources and the level of detail in the mine planning. Measured Resources within the pit shells have been categorized as Proved Reserves. All Indicated Resources have been categorized as Probable Reserves. While Inferred Resources were assigned revenue in the UHG LOM Study pit optimizer to generate and define the Mineable Pit Shells, no Inferred Resources have been reported as Reserves in this statement.

5.10. Audits and Reviews

The JORC Code (2012) provides guidelines which set out minimum standards, recommendations, and guidelines for the Public Reporting of exploration results, Mineral Resources and Ore Reserves. Within the code is a "Checklist of Assessment and Reporting Criteria" (Table 1 – JORC Code), encompassing Section 1- Sampling Techniques and Data, Section 2 – Reporting Exploration Results, Section 3 – Estimation and Reporting of Mineral Resources, and Section 4 – Estimation and Reporting of Ore Reserves.

Sections 1, 2, and 3 of Table 1 have been extracted from the Coal Resource report (JORC (2012) Standard Resource Estimation Ukhaa Khudag Coal Mine (License 11952A), MMC, January 2022) which describes the Resource estimate used for this Reserve estimate in full detail.

The CP (Reserves) has previously discussed the Resource estimate with the CP (Resources) and is satisfied that Sections 1, 2, and 3 have been appropriately considered in the Resource estimate. These sections are attached to this Reserves Statement as Appendix A, B, and C respectively. Section 4 of Table 1, completed by the CP (Reserves), is attached in Appendix D.

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5.11. Results

The Proved Open Cut Coal Reserve of UHG of 360.5 Mt is shown in Table 5.18, the Probable Open Cut Coal Reserve of 10.3 Mt is shown in Table 5.19. Total Open Cut Coal reserve of 370.8 Mt is shown in Table 5.20. The Proved and Probable Total Coal Reserves are also shown by major seam groups in the tables.

Table 5-18. Proved Open Cut Coal Reserves by Seam

Proved reserves				
Seam	**ROM Coal (Mt)**	**Total Moisture, %**	**Ash (%)**	**Calorific Value (kcal/kg)**
12	0.39	6.45	36.33	4,619
11	2.77	8.17	35.92	4,430
10	4.06	4.41	36.86	4,520
9	26.87	5.05	24.87	5,807
8	3.14	3.93	41.03	4,384
7	17.25	4.03	25.53	5,822
6	33.06	4.95	26.87	5,774
5A	4.24	2.89	41.55	4,442
4C	30.70	3.38	20.57	6,372
4B	26.03	4.91	28.17	5,676
4A	24.25	3.86	33.95	5,164
3A	32.58	3.10	34.57	5,131
25/2/1	2.33	2.63	51.51	3,586
0CU	52.00	2.87	28.84	5,636
0CL	13.91	2.62	38.61	4,768
0B	35.50	2.93	32.02	5,362
0A	51.43	2.33	37.53	4,806
Total Coal (Mt)	**360.50**	**3.55**	**30.80**	**5,418**
Total Coking (Mt)	**340.48**	**3.60**	**30.48**	**5,446**
Total Thermal (Mt)	**20.02**	**2.65**	**36.26**	**4,943**

(Note: Estimate has been rounded to reflect accuracy)

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Table 5-19. Probable Open Cut Coal Reserves by Seam

Probable reserves				
Seam	**ROM Coal (Mt)**	**Total Moisture, %**	**Ash (%)**	**Calorific Value (kcal/kg)**
12	0.14	4.72	38.27	4,491
11	0.13	8.07	33.47	4,576
10	0.06	5.11	40.39	4,024
9	0.26	9.70	23.83	6,073
8	0.03	4.78	44.07	4,091
7	0.14	5.33	33.80	5,205
6	0.86	3.56	31.67	5,339
5A	0.05	4.55	49.63	3,708
4C	1.12	3.49	21.56	6,197
4B	0.82	5.45	29.88	5,405
4A	0.34	3.61	39.78	4,660
3A	0.39	3.38	44.34	4,210
25/2/1	0.04	2.66	58.53	2,855
0CU	3.24	4.50	30.00	5,537
0CL	0.21	2.81	44.63	3,967
0B	2.26	7.00	34.67	5,078
0A	0.17	3.14	44.62	4,022
Total Coal (Mt)	**10.27**	**5.00**	**32.01**	**5,294**
Total Coking (Mt)	**9.89**	**5.02**	**32.11**	**5,288**
Total Thermal (Mt)	**0.38**	**4.51**	**29.53**	**5,461**

(Note: Estimate has been rounded to reflect accuracy)

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Table 5-20. Total Open Cut Coal Reserves by Seam

Proved+Probable reserves				
Seam	**ROM Coal (Mt)**	**Total Moisture, %**	**Ash (%)**	**Calorific Value (kcal/kg)**
12	0.53	5.99	36.85	4,585
11	2.90	8.16	35.81	4,437
10	4.12	4.42	36.91	4,513
9	27.13	5.09	24.86	5,810
8	3.18	3.94	41.06	4,381
7	17.39	4.04	25.59	5,817
6	33.92	4.91	26.99	5,763
5A	4.29	2.91	41.64	4,434
4C	31.82	3.39	20.60	6,365
4B	26.85	4.93	28.22	5,668
4A	24.58	3.86	34.03	5,157
3A	32.97	3.10	34.68	5,120
25/2/1	2.37	2.63	51.63	3,574
0CU	55.23	2.96	28.91	5,630
0CL	14.13	2.62	38.70	4,755
0B	37.76	3.17	32.18	5,345
0A	51.61	2.33	37.56	4,804
Total Coal (Mt)	**370.77**	**3.58**	**30.83**	**5,415**
Total Coking (Mt)	**350.37**	**3.64**	**30.53**	**5,442**
Total Thermal (Mt)	**20.40**	**2.68**	**36.13**	**4,953**

(Note: Estimate has been rounded to reflect accuracy)

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The Proved and Probable Total Marketable Coking Coal Reserves are shown in Table 5.21 by major seam group. Total Marketable Coking Coal Reserve is **162 Mt.**

Table 5-21. Marketable Coking Coal Reserves by Seam

Coking	Proved		Probable		Total	
Seam	Mt (ar)	Ash (% ad)	Mt (ar)	Ash (% ad)	Mt (ar)	Ash (% ad)
12	0.15	7.10	0.05	7.10	0.20	7.10
11	1.06	7.10	0.06	7.10	1.12	7.10
10	1.49	8.88	0.02	9.88	1.51	8.89
9	12.39	9.83	0.11	9.87	12.49	9.83
8	0.87	8.20	0.01	8.20	0.88	8.20
7	9.74	10.62	0.06	10.74	9.80	10.62
6	18.86	10.24	0.43	9.55	19.29	10.22
5A	1.67	8.94	0.01	8.00	1.68	8.93
4C	21.75	8.64	0.72	8.64	22.47	8.64
4B	13.68	8.10	0.38	8.10	14.06	8.10
4A	14.84	10.02	0.21	10.02	15.05	10.02
3A	15.36	12.11	0.13	11.29	15.48	12.10
25/2/1	0.32	12.48	0.00	12.48	0.32	12.48
0CU	22.08	13.49	1.27	13.03	23.35	13.47
0CL	2.94	14.42	0.04	13.73	2.98	14.41
0B	13.27	10.98	0.86	10.11	14.14	10.93
0A	7.10	20.63	0.02	20.63	7.12	20.63
Total	**157.58**	**10.99**	**4.37**	**10.51**	**161.95**	**10.98**

(Note: Estimate has been rounded to reflect accuracy, Product Coking coal total moisture is 8%)

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The Proved and Probable Total Marketable Middlings Coal Reserves are shown in Table 5.22 by major seam group. Total Marketable Middlings Coal Reserve is **48 Mt.**

Table 5-22. Marketable Middlings Coal Reserves by Seam

Coking	Proved		Probable		Total	
Seam	Mt (ar)	Ash (% ad)	Mt (ar)	Ash (% ad)	Mt (ar)	Ash (% ad)
12	0.02	18.00	0.01	18.00	0.03	18.00
11	0.17	18.00	0.01	18.00	0.18	18.00
10	0.39	18.00	0.01	18.00	0.40	18.00
9	4.02	18.00	0.03	18.00	4.06	18.00
8	0.15	16.00	0.00	16.00	0.15	16.00
7	1.34	22.21	0.01	22.38	1.35	22.21
6	3.56	20.78	0.08	19.57	3.63	20.75
5A	0.35	21.81	0.00	19.43	0.35	21.79
4C	2.46	17.06	0.08	17.06	2.54	17.06
4B	2.59	18.00	0.07	18.00	2.67	18.00
4A	1.31	18.12	0.02	18.14	1.34	18.12
3A	4.60	20.50	0.04	19.65	4.64	20.49
25/2/1	0.13	31.74	0.00	31.74	0.13	31.74
0CU	12.50	22.07	0.60	22.37	13.10	22.08
0CL	4.14	24.59	0.05	24.16	4.19	24.59
0B	4.51	19.09	0.18	15.69	4.68	18.96
0A	4.79	27.10	0.01	27.10	4.80	27.10
Total	**47.04**	**21.28**	**1.20**	**20.31**	**48.24**	**21.26**

(Note: Estimate has been rounded to reflect accuracy, Product Middlings total moisture is 9%)

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The Proved and Probable Total Marketable Thermal Coal Reserves are shown in Table 5.23 by major seam group. Total Marketable Thermal Coal Reserve is 20.4 Mt.

Table 5-23. Marketable Thermal Coal Reserves by Seam

Thermal	Proved		Probable		Total	
Seam	Mt (ar)	Calorific Value (kcal/kg)	Mt (ar)	Calorific Value (kcal/kg)	Mt (ar)	Calorific Value (kcal/kg)
11	0.03	5,744			0.03	5,744
10	0.01	5,348			0.01	5,348
9	0.59	6,231	0.04	6,601	0.62	6,635
8	0.02	5,099			0.02	5,099
7	0.21	5,911	0.01	5,549	0.22	6,096
6	0.50	6,321			0.50	6,321
4C	0.05	5,531	0.08	6,195	0.13	14,657
4B	0.07	5,825	0.06	5,344	0.13	10,202
4A	0.01	5,638	0.00	5,523	0.01	8,025
3A	0.04	5,965	0.01	5,525	0.04	7,014
0CU	0.56	5,958	0.10	6,344	0.66	7,107
0CL	0.13	5,815	0.00	5,527	0.14	5,969
0B	0.10	5,812			0.10	5,812
0A	17.70	4,796	0.08	3,200	17.78	4,811
Total	**20.02**	**4,943**	**0.38**	**5,461**	**20.40**	**4,953**

(Note: Estimate has been rounded to reflect accuracy)

5.12. Coal Reserves Reconciliation with Coal Resources

The Total UHG Coal Reserves to 450 m depth at 01 January 2022 are estimated at 370.7 Mt out of Total Coal Resources to 800 m depth of 572 Mt as at 1st January 2022. The reconciliation between reported Total Coal Resources estimated at 1st January 2022 and Total Coal Reserves estimated at 1st January 2022 is outlined below in Table 5.24.

Table 5-24. Reconciliation of Coal Resources and Coal Reserves (Mt)

Total Coal Resources, 1st January 2022	*572*
Total Coal Resources less than 800m and greater than 400 m	*106*
Total Coal Resources less than 400m	*466*
Measured and Indicated Coal Resources less than 450 m	*412*
Mining losses and Coal Resources not converting to Coal Reserves	*41*
Coal Reserve 01 January 2022	*371*

(Note: Estimate has been rounded to reflect accuracy)

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5.13. Coal Reserves Comparison to Previous Coal Reserves Statement

The previous Coal Reserves Statement for UHG was published at 1st January 2021 by GLOGEX. The Coal Reserves estimated in that Statement were 305 Mt. The comparison with the Coal Reserves presented in the 1st January 2021 and 01 January 2022 by GLOGEX statements are outlined below in Table 5.25

GLOGEX reserve estimation 2022 is increased by 70 million tins compare to the 2018 reserve estimation. Main reasons of this increase include increased geological resource based on 2020 exploration program, coal price forecast, and changes in the mine cost.

Table 5-25. Comparison of Coal Reserves to Previous Coal Reserves Statement (Mt)

Coal Reserves as at 1st January 2022 (ROM)	**305**
Coal Mined and depleted 01st January 2018 to 01st January 2022	(4)
Increase in Coal Reserves identified in the 2021 Reserves estimate that are economically viable for mining at 01 January 2022	70
Coal Reserves as at 01st January 2022 (ROM)	**371**

(Note: Estimate has been rounded to reflect accuracy)

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Appendix A: Sampling Techniques and Data

Section 1: Sampling Techniques and Data *(Source: JORC (2012) Standard Resource Estimation Ukhaa Khudag Coal Mine (License 11952A), MMC, 1st January 2022)*

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling*	• Coal quality samples were collected from HQ and some PQ sized diamond core. Coal samples once collected were stored in refrigerated containers until required for analysis. • Each coal ply was brightness logged and sampled separately in intervals no greater than 2.0m. Stone bands up to 2cm were sampled with the coal but stone bands larger than this were sampled separately. Stone bands larger than 50cm were not sampled. • Chip samples from open holes and trench samples were used for continuity purposes and were not used for resource calculations. • Full coal seam samples were taken for the resource calculation and 30cm ply roof or floor samples were taken for inclusion in future work on Reserves, which did not impact the resource calculation methods. • All boreholes were geophysically logged with down-hole wire-line tools with sample spacing's of 1, 2 or 5 centimetres used. Coal/rock boundaries were well identified from the geophysics. Core boreholes were corrected and checked for core recovery for coal and rock thickness using down-hole geophysics with loss inserted within the lithology record. Open-hole coal ply thickness was corrected to down-hole geophysics.
	• *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used*	• For cored boreholes, coal plies were fully cored and sampled. • In 2011-2014, Two calibration boreholes (G02251 and R00020) were setup to regularly test all logging tools as they came onto the site and at regular periods whilst onsite. • In 2020, One calibration borehole (G02637) were setup to regularly test all logging tools as they came onto the site and at regular periods whilst onsite. • A central logging facility was designed where all borehole cores were stored, logged photographed and sampled. A standard set of rock types and coal lithotypes were collected and displayed for purposes of calibration in logging. The logging geologists were supervised

Criteria	JORC Code explanation	Commentary
	• *Aspects of the determination of mineralisation that are Material to the Public Report*	• Coal was determined in the core by colour, weight, strength, and texture (assisted with using a field knife to scratch the core and hand lens to observe texture). Once the coal/rock boundary was observed, the coal ply was logged for coal maceral and thickness, for changes in coal brightness (maceral – Vitrinite) using a coal brightness chart (C1 = >90% bright, C2= 60-90% bright, C3=40-60% bright, C4=10-40% bright, C5=1-10% bright and C6=<1% bright). Based on the brightness of coal macerals, similar brightness sections within a ply were sampled together. These samples would indicate changes in quality i.e. higher ash/higher density. Rock partings ≤50cm within or between plies were sampled separately. • The core coal interval observations were confirmed with down-hole geophysics.
Drilling techniques	• *Drill type and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc.).*	• Diamond core and open-hole drilling was completed. All coring was completed with Boart Longyear triple tube split systems to ensure maximum core recovery. Open-hole drilling was 4.5-6' hammer until the water table then water circulated blade drilling. • Core was mostly HQ3 size with some PQ3 size. • Core bits were diamond impregnated and surface set to maximise recovery and minimise shattering of core. • Generally, boreholes were drilled vertically with most having a down-hole verticality Log run. • A small number of angle boreholes were drilled in the fault zone to determine the structure
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.*	• Linear core recovery was calculated initially by the driller's measurement and then confirmed by the rig geologist who calculated the recovered linear length of core for each drill run and expressing it as a percentage of the full core run. • Downhole geophysics was used to further assess the amount and location of linear core loss. • Core photography in boxes also assisted later evaluation of loss. • Linear core loss was recorded in the drill record and inserted into the lithology log at the point of loss. The point of linear loss was determined with photographs and wire-line geophysics by determining the thickness between stone partings within the geophysical log and solid core. • Samples were measured for weight but this mainly served as a cross check with the laboratory. • Linear core loss was mainly attributed to drilling through structural zones. Where poor drilling was deemed as the cause of poor recovery the borehole was redrilled.

Criteria	JORC Code explanation	Commentary
	• *Measures taken to maximise sample recovery and ensure representative nature of the samples.*	• Modern drilling equipment and trained coal drillers was utilized. • High quality drilling pipe, coring and drilling bits used. • Expected high core recovery particularly in coal plies enforced with drilling contractor where ply sections with less than ≥95% were redrilled. • Chip samples collected on a 1m basis and displayed clearly for rig geologist observation.
	• *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• High linear core recover was maintained ≥95% therefore, minimising sample bias due to sample mass loss. Core photography and good wire-line geophysics confirmed high linear core recovery and assisted with documentation of actual loss depth recorded within the lithology log.
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• All core was logged geologically and geotechnically and recorded in hard copy and electronic format to COALLOG standard. • Geological and geotechnical logging was qualitative with codes used to describe the different geological and geotechnical aspects of the core as per COALLOG standard. • Borehole core was photographed in 4 or 5 metre boxes (depending PQ or HQ) on a wet and dry basis which included the entire core. • All coal plies were fully cored and logged to COALLOG standard. All logged coal cores were fully sampled including rock parting 50 cm or less.

Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.*	• The whole core was sampled for coal analysis. • Not applicable for coal. • Coal cores at the rig site, were measured in the splits then gently washed to remove drilling grime. The coal was carefully placed into core boxes with no coal remaining. • The boxes were wrapped securely in plastic for transport to the central logging facility. The core boxes were delivered (average distance 5km) to central logging facility at the end of each 10hr shift. The coal core boxes are stored in refrigerated containers until logging. After logging and sampling, the samples were returned to refrigeration until sent to the Energy Resources Central Chemical Laboratory ("ERCCL"). This laboratory is less than 500m from the central logging facility. • At the central logging facility core boxes were placed in the dedicated photography area and photos taken. The core was laid out on specifically designed and built logging tables. The atmospheric environment inside the central logging facility was kept to a constant temperature. The cores were re- measured and confirmed with field measurements. Geophysical logs were used to correct for seam thickness, loss and expansion were noted. Based on the brightness of coal macerals, similar brightness sections within a ply were sampled together. Rock partings ≥0.02cm and ≤50cm within or between plies were sampled separately. Roof and floor material of 30cm in thickness was also sampled. Maximum coal sample thickness was 2m. Identified samples were placed in double plastic bags with sample tags placed inside the coal containing sample bag and then in between the sample bags with finally the sample information written on the outside plastic bag. The sample bag was weighed with weight corrected for the sample bag mass. • Geotechnical rock samples were collected on each change of major lithotype. The samples were wrapped in aluminium foil, then plastic and then water proof tape. The sample number and depth was scribe on the sample. The sample number was digitally recorded in the logging software 'LogCheck'.
	• *Quality control procedures adopted for all sub- sampling stages to maximise representivity of samples.*	• All samples were analyzed at the ERCCL, which is located onsite. With respect to sample preparation, the top size of the sample was reduced and split into two quarters and one half portions. The sample preparation took into account the top size of the sample material required for each of the analytical determinations. One of the quarter portions was used for analysis and the remaining portions were retained. • The ERCCL was accredited to I ISO/IEC 17025:2017(MNS ISO/IEC 17025:2018) standard in November 2020 and expires in July 2023.

	• *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.*	• In 2011-2014, ERML prepared and analysed a number of samples, and submitted duplicates of these samples for analysis at the ALS (100 samples) and UUH and the UUH (615 samples) laboratories in Ulaanbaatar. The ERML analytical results were compared to the other laboratories by means of cross plots and basic statistical parameters. • The ERML generally reported the coal quality parameters lower than the SM Laboratory and generally higher than the UUH Laboratory with varying degrees of reproducibility between laboratories. • For work previously completed before 2009, it is unknown if a similar comparison exercise was done. • In 2020, ER Central Chemical Laboratory prepared and analysed a number of samples and submitted duplicates of these samples for analysis at the SGS Laboratory (712 samples) Mongolia branch in Ulaanbaatar. The ER Central Chemical Laboratory analytical results were compared to the SGS Laboratory by means of cross plots and basic statistical parameters. • The ER Central Chemical Laboratory generally reported the coal quality parameters higher than the SGS Laboratory with varying degrees of reproducibility between laboratories.
	• *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• Bulk samples were taken for dry and wet tumbler sizing analysis in 2008 and 2012. • The 2008 work was completed for seams (0C, 3A, 4A, 4C, 8 and 9) and the work was analysed at the SGS – Tianjin, China laboratory. • The 2012 work was completed for seams (0C, 3A, 4A and 4C) and the work was analysed at the ALS – Ulaanbaatar, Mongolia laboratory. • The same procedure was applied to both programs. The average seam sample weight was 800kg. Dropshatter, sample dropped five times from height of 2m, three times. The sizes weighed 2, 6, 8, 11.2 and 16mm. Wet Tumble with steel cubes for five minutes (18 cubes/50kg/150l pro-rata). Wet size at 16, 11.2, 8, 4, 2, 1, 0.5, 0.25, 0.125. The top size for this work was 19mm. • The results of this work were for the design of the CHPP and Reserves. It did not have an impact on the Resource estimate. • For work previously completed before 2008, it is unknown if a similar exercise was done.

Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.*	• In 2011-2014, Coal samples were analysed for, True relative density (GB/T 217:2008), Total moisture (MNS ISO 589:2003), Analytical moisture (MNS ISO 331:2003), Ash (MNS SO 1171:2009), Volatile matter (MNS ISO 562:2001), Calorific value (MNS ISO 1928:2009), Total sulphur (ASTM D4239:05), Crucible swelling number (MNS ISO 501:2003) and Caking index (MNS ISO 335:2005). • In addition, bulk samples were taken in 2008 and 2012 for coke testing. • In 2020, Coal samples were analysed for, True relative density (GB/T 217:2015), Total moisture (MNS ISO 589:2008), Analytical moisture (MNS GB/T 212:2015), Ash (MNS GB/T 212:2015), Volatile matter (MNS GB/T 212:2015), Calorific value (MNS ISO 1928:2009), Total sulphur (ASTM D4239:2005), Crucible swelling number (MNS ISO 501:2003) and Caking index (MNS ISO 15585:2014). • The coal analyses are sufficient to determine a Resource estimate and determine the potential coal products and support the marketability of the coal products. • The laboratory under its certification did regular reproducibility and repeatability samples. Main protocol was every 10 sample duplicate tests were done (coal and non-coal samples). For every 30 sample, 1 standard and 1 blank sample was tested for equipment calibration. After each full borehole analyses were completed, regression graphs were constructed for internal checks. When samples deviated from the procedure tolerance the samples were re-analysed from new.
Criteria	**JORC Code explanation**	**Commentary**
	• *For geophysical tools, spectrometers, handheld XRF instruments, etc., the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.*	• In 2011-2014, Two calibration boreholes (G02251 and R00020) were setup to regularly test all logging tools as they came onto the site and at regular periods whilst onsite. • In 2020, One calibration borehole (G02637) were setup to regularly test all wire-line logging tools as they came onto the site and at regular periods whilst onsite.
	• *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.*	• The ERCCL was accredited to I ISO/IEC 17025:2017(MNS ISO/IEC 17025:2018) standard in November 2020 and expires in July 2023. Internal testing protocols are mandatory with accreditation with duplicate testing and round robin testing done. • Laboratory certificates were supplied by ERCCL, ALS the Russian lab and SGS lab. • In 2011-2014, ERML prepared and analysed a number of samples and submitted duplicates of these samples for analysis at the SM Laboratory (ALS) (100 samples) and the UUH (Mining Institute) Laboratory (615 samples). The ERML analytical results were compared to the other laboratories by means of cross plots and basic statistical parameters. The ERML generally reported the coal quality parameters lower than the SM Laboratory and generally higher than the UUH Laboratory with varying degrees of reproducibility between laboratories.

	•	• In 2020, ER Central Chemical Laboratory prepared and analysed a number of samples and submitted duplicates of these samples for analysis at the SGS Laboratory (712 samples) Mongolia branch in Ulaanbaatar. The ER Central Chemical Laboratory analytical results were compared to the SGS Laboratory by means of cross plots and basic statistical parameters. • The ER Central Chemical Laboratory generally reported the coal quality parameters higher than the SGS Laboratory with varying degrees of reproducibility between laboratories.
Verification of Sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.*	• A number of pre-2008 boreholes were twinned by the Norwest and Energy Resources ("ER") drilling programs. • Coal thickness intervals were check with a high level of agreement. • Due to poor core recovery many of the pre-2008 boreholes were not accepted for points of observation but due to the good agreement of coal interval thickness the boreholes were generally used for seam correlation and continuity. Most of the pre-2008 boreholes were redrilled with only a few boreholes, which were accepted for points of observation used in Inferred areas. In these boreholes where coal quality comparisons were possible, there was up to a 20% error upside on relative density and ash. No adjustments were made to the coal quality data. • A few numbers of boreholes from the 2008 program were twinned. In these cases the coal thickness intervals and coal quality had good agreement. All boreholes in this program where they meet point of observation guidelines were used for the Resource estimate.

Criteria	JORC Code explanation	Commentary
		• Hard copy data from the pre-2008 programs were translated and coded and uploaded into the LogCheck data management software. The hard copy geophysical logs were scanned and then digitised and LAS files created and uploaded into the LogCheck data management software. All hard copy coal quality results were entered into Excel spreadsheet and once validated was loaded into the LogCheck data management software. Unless for obvious typographical errors no adjustments were made to the coal quality data. • The 2008 program coded digital data was translated and re-coded and uploaded into the LogCheck data management software. The LAS geophysical logs were validated and uploaded into the LogCheck data management software. The coal quality results were received as Excel spreadsheets and were built into the existing ER Excel spreadsheets for validation and uploaded into the LogCheck data management software. Unless for obvious typographical errors no adjustments were made to the coal quality data.
	• *The use of twinned holes.*	• A number of pre 2008 boreholes were twinned by the Norwest and ER drilling programs. • Coal thickness intervals were check with a high level of agreement. • Due to poor core recovery many of the pre 2008 boreholes were not accepted for points of observation but due to the good agreement of coal interval thickness the boreholes were generally used for seam correlation and continuity. • Most of the pre 2008 boreholes were redrilled with only a few boreholes, which were accepted for points of observation used in Inferred areas. In these boreholes where coal quality comparisons were possible, there was up to a 20% error upside on relative density and ash. • A few numbers of boreholes from the 2008 program were twinned. In these cases the coal thickness intervals and coal quality had good agreement. All boreholes in this program where they meet point of observation guidelines were used for the Resource estimate. • A few numbers of boreholes from the 2008 program were twinned. In these cases the coal thickness intervals and coal quality had good agreement. All boreholes in this program where they meet point of observation guidelines were used for the Resource estimate.

Criteria	JORC Code explanation	Commentary
	• *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.*	• The pre-2008 primary data (excluding coal quality) was in the form of hardcopy volumes of longhand drafted graphic profiles with all survey, drilling, recovery, geological, downhole geophysics, raw information, interpreted information and final information. These volumes are securely stored in the company's long term storage archives. The volumes were scanned, translated, coded and uploaded in the LogCheck data management software. Coal quality records were provided on hard copy laboratory certificates. These hardcopies are securely stored in the company's long term storage archives. This data was entered into Excel spreadsheet and once validated was loaded into the LogCheck data management software. • The 2008 primary data was in the form of scanned hard copy survey, drilling and geological logs, wire-line geophysics as LAS digital files and coal quality as Excel spreadsheets. The hardcopy logs were already in digital form as Excel spreadsheets. These were re-coded as necessary and with LAS files uploaded the LogCheck data management software. The coal quality results were built into the existing ER Excel spreadsheets for validation and uploaded into the LogCheck data management software. • The primary data for 2009 – 2014 and 2018-2020 was original hard copy records for survey, drilling, geology, wire-line geophysics, geotechnical and coal quality. This data is securely stored in filing cabinets in the central logging facility at the mine site. All data stored is digital and has been entered and validated by the LogCheck data management software. This data is stored on company servers where the company IT department control the security. Furthermore, all data has been uploaded into the company master database stored on the Micromine GeoBANK system. All data systems are aligned with the COALLOG coding and form system. • All data from all exploration either historical or current has been coded and converted into the COALLOG coding and form system and resides as one database.

Criteria	JORC Code explanation	Commentary
	• *Discuss any adjustment to assay data.*	• No adjustments have been made to any coal quality data unless for obvious typographical errors. Regressions using all determined coal quality data on a seam group basis were constructed and missing data calculated and added to the digital database. • Coal interval thicknesses were matched with wire-line geophysics according to normal industry standards. Expanded coal interval intersections and corresponding sample thickness were reduced in thickness to match the geophysics. Where coal interval intersections were less, loss was added in the lithology log at the determined location using comparison thicknesses between observed partings and wire-line rock responses. If the loss occurred within a sample the sample thickness was adjusted to reflect the loss. • All samples once collected at the central logging facility were weighed for mass and this mass was matched with laboratory sample mass. • All compositing for the Resource estimate was done mathematically based on sample thickness and relative density. The only composites made by the laboratory were for coke and caking tests. • All sample data and composite data are recorded in the LogCheck data management software and GeoBANK database.

Criteria	JORC Code explanation	Commentary
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.*	• The topographic and borehole collar survey was carried out by ER's own survey team using Trimble equipment. • Drill hole collars were surveyed using a Trimble R8 GPS which has a static horizontal and vertical accuracy of ±3mm +0.1ppm RMS, an RTK horizontal measurement of ±3mm +0.1ppm RMS and an RTK vertical measurement ±3.5mm +0.4ppm RMS • Following a review of the LAS variance for the deviation data, the Competent Person decided to assume that boreholes were vertical for modelling purposes. This was due to the low variance of deviation of the boreholes from the vertical plane.
	• *Specification of the grid system used.*	• The grid system coordinates are UTM Zone 48 North. The same system was used for all survey data.
	• *Quality and adequacy of topographic control.*	• The topographic survey was carried out by ER's own survey team using Trimble R8 GPS which has a static horizontal and vertical accuracy of ±3mm +0.1ppm RMS, an RTK horizontal measurement of ±3mm +0.1ppm RMS and a RTK vertical measurement ±3.5mm +0.4ppm RMS in 2008. • A difference map comparing the grid based on borehole collars and the grid based on topography was compiled with most differences being less than 1.5m, which is acceptable with a few areas greater than this around the boundaries where there is no borehole control.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.*	• Pre-2008, distance between explorations lines on the east limb was 125-500 m, while it increases up to 625-750 m for other areas of the deposit. Distance between boreholes on the exploration lines is 250-300m. Exploration depth was to 300-320 m from the surface. • The 2008 program was an infill drilling program that appeared to have an irregular design and spacing. • The drilling program that covered 2009–2011 was a 50x50m square grid on

Criteria	JORC Code explanation	Commentary
		the eastern deposit area covering the mining areas first ten years. This 50x50 grid consisted of 100x100 core boreholes and 100x100 openholes for the first 400m down dip of each seam. The western area was a 120x120 triangular grid of all core boreholes. • The drilling program that covered the period 2012-2014 was an extension of the eastern deposit area in front of the mining face. This program was aligned to the western grid and was drilled on a 120x120 triangular grid of all core boreholes. • The drilling program that covered the period 2018, 2020 was an extension of the central deposit area in front of the mining face. This program was aligned to the central grid and was drilled on a 300x300 grid of all core boreholes. • The openhole boreholes were mainly for structure and LOX work so only intercepted the first two seams in any location. The average depth was 150m. • The cored boreholes were where possible to intercept all seams. A limit of approximately 700m was placed on the boreholes in the western area. All other areas the coal measures were fully penetrated.
	• *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.*	• The data spacing is sufficient to establish a high degree of geological and grade continuity appropriate for the Mineral Resource and classifications applied. • An exercise in geostatistics to calculate estimated error on the estimate was completed which confirms high degree of geological and grade continuity.
	• *Whether sample compositing has been applied.*	• Samples within plies were composited for points of observation for the Resource estimate by mathematical method, based on sample thickness and relative density. The only analytical composites made by the laboratory were for coke and caking tests.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.*	• Pre 2008 and 2009-2014 boreholes included in the Resource estimate were drilled with a vertical orientation. Most boreholes after 2009 had verticality deviation LAS data completed. • The Competent Person decided to assume that boreholes were vertical and angle for modelling purposes. This was due to the low variance of deviation of the boreholes from the planned direction.

Criteria	JORC Code explanation	Commentary
		• No evidence of bias due to borehole orientation has been observed.
	• *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• No evidence of bias due to borehole orientation has been observed. • As part of the geostatistical review on estimated error a check for anisotropy was made with no evidence that there was one.
Sample security	• *The measures taken to ensure sample security.*	• For pre-2008 bore cores the following is quoted from (Dashkhorol et.al. 1989): *All coal seams and rocks of the different lithological contents were subjected to sampling. To select cored, coal samples the following method was used: Core was installed in the drill core box in such sequence, for which it will be derived from core barrel. Washing of core with clean water was used only for whole cylinders or large size fragments by hand, but fine-grained and crushed coals are not recommended for washing in the field conditions to avoid distorting of samples because of loss of any lithotypes. Interval length included in the sample has been estimated depending on thickness of a split or coal seam of any lithotype. Usually in average it equals to 1.0-1.5 m, but sometimes was more when really homogeneous components were sampled separately. If drill core contains some intersections of original lithological component, they were selected together in one sample. Then these intersections were verified through logging. Sometimes, if separation of rock intersections from coal splits was not possible they were selected together with coal, which were recorded in appropriate documents. For the calculation of medium-weighed quality indicators of coal for seam intersections, the results of analyses made for such samples were related to appropriate complicated structure interval of a seam without any amendment. In such cases, a complicated structure interval as a rule was defined and accepted through logging. Core recovery for coal was determined with utilization of volumetric and linear methods into sample divisions, which were organized by crew. Coal core documents were also examined there and completed*

Criteria	JORC Code explanation	Commentary
preparation of samples, labelling and packing into the synthetic bags was made. Selected samples were sent monthly to laboratory.		• The 2008 bore cores, little was mentioned in the Norwest report on sample security. The following is summarised (Norwest 2008): *only borehole core samples were assayed. Field samples, usually no more than 0.5m of core length. Incremental samples consisting of combined groups of field samples based on consistent lithological units interpreted from core and geophysical logs. Physical composite samples, consisting of combined incremental sample intervals representing logical mining or integral coal seam units. Large diameter (150mm) core samples of key seams for washability analyses, processing plant simulation and metallurgical characterization. Geotechnical rock strength samples taken of waste (non-coal) and coal core.* • Coal cores at the rig site, were measured in the splits then gently washed to remove drilling grime. The coal was carefully placed into core boxes with no coal remaining. The boxes were wrapped securely in plastic for transport to the central logging facility. The core boxes were delivered (average distance 5 km) to central logging facility at the end of each 10 hour shift. The central logging facility is location within the mine site. The mine site has 24 hour high level security. The coal core boxes are stored in secure refrigerated containers attached to the central logging facility until logging. After logging and sampling, the samples were returned to refrigeration until sent to the laboratory. The laboratory is less than 500m from the central logging facility. The core was laid out on specifically designed and built logging tables. The atmospheric environment inside the central logging facility was kept to a constant temperature. The cores were re-measured and confirmed with field measurements. Geophysical logs were used to correct for seam thickness, loss and expansion were noted. The identified samples were placed in double plastic bags with sample tags placed inside the coal containing sample bag and then in between the sample bags with finally the sample information written on the outside plastic bag. The sample bag was weighed with weight corrected for the sample bag mass. A sample dispatch form is completed by

Criteria	JORC Code explanation	Commentary
		the geologist, which contains all information on the sample. The form is sent to the laboratory. The laboratory accesses the secure refrigerated container to retrieve the sample as listed on the dispatch form. Confirmation of the correct sample being analysed is through the triplicate sample tag/bag information and double check with the sample weight. • Analytical data was entered into the GeoBANK database by the laboratory. The GeoBANK database was first populated with borehole number and sample number from the logged data in the LogCheck software. This data was seamlessly uploaded into the GeoBANK database for laboratory access. Once the data was entered by the laboratory and validated it could be passed back to Geology for importing into the master Excel spreadsheets for further processing and validation. Final data was seamlessly passed to the LogCheck software for final validation and repository for points of observation.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• An initial site visit was completed by Mr Ballantine as a consultant for Micromine Pty Ltd in late January 2009. The visit was commissioned by Mr Andrew Little, Technical Director (at the time) for ER. The purpose of this visit was to audit the topographical and geological data and to assess the quality of the information recorded into the digital geological database and to comment on the implications that this would have on the confidence in the geological model of the UHG coal deposit. The audit used the reference 'Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996)' to compare with the data collected and is referred to as the standard. Numerous issues were identified and Mr Ballantine was asked provided a full time service whereby providing budgeting, planning, procedures and training for required ongoing exploration following the initial visit (January 2009) recommendations overall oversight of exploration at UHG. • Mr Ballantine (Competent Person, Resource estimate- June 2012), thought it prudent to have an independent experienced Competent Person qualified geologist provide a site visit and peer review. This was done by Mr Todd

Criteria	JORC Code explanation	Commentary
		• Sercombe, senior consultant for GasCoal Pty Ltd, a coal geologist with 18 years coal experience. Mr Sercombe's findings from the site visit were; *The UHG exploration procedures and practices are of extremely high calibre, exceeding both the Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996) and the benchmark coal industry best practices (as observed by Mr Sercombe in the Bowen Basin, Australia). The accurate and unbiased assignment of coal core loss to coal samples, achieved in the UHG practices, is commendable. The coding, for modelling, of all significant stone band partings in the seams and of inter-burden units between the seams is also praiseworthy. The Exploration and Geology Department are a group of young enthusiastic geologists who have been well trained and led by Gary Ballantine. I would have high confidence in the reportable results obtained from the UHG exploration procedures.* • The exploration group has changed little from the previous JORC (2004) Resources report- June 2012 so the independent peer review by Mr Sercombe is still relevant. • Mr Ballantine was Executive General Manager, Exploration and Geology and has responsibility for budgeting, planning, training and overall oversight of exploration at UHG. As part of the ongoing evolution of the ER geology group and knowledge transfer, supervised and structured succession of capable individuals, is planned. Mr Ballantine understands that complacency can creep into a well establish team. To prevent this he does frequent site visits with Mr Said (Competent Person) every few months and they review different member's capabilities against the exploration procedures. As part of Mr Ballantine's role as mentor and internal auditor, all final data, (i.e. seam thickness, seam correlation, sampling intervals, coal quality analysis, collar survey and LAS quality) are reviewed once the team (supervised by the Competent Person) has done the work. With the above process it is Mr Ballantine's professional opinion that there is a very high compliance with the teams results and JORC standards.

Appendix B: Reporting Exploration Results

Section 2: Reporting Exploration Results (Source: *JORC (2012) Standard Resource Estimation Ukhaa Khudag Coal Mine (License 11952A), MMC, January 2022*)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.*	• The license is wholly owned by ER and was granted by the Mineral Resources and Oil Authority on 23rd January 2007 for a period of 30 years. In accordance with this consensus the License Transfer Agreement was signed on 21st March 2008 and the coordinates of license [No.11952A] was increased from 1011 hectares up to 2962 Ha. On the 1st April 2010, a further minor change to the license was made, which reduced the area to its now present 2960 Ha.
	• *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• The license is 100% secure and owned by ER.

Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• The TT deposits of fossilized coal was discovered and exploited by the local people since early 19th century. • The first official information on the deposit appears in reports by geologist K.D.Pomazkov, who studied the coal in a small open-cut pit in 1940. The coal of the deposit was surveyed and tested by the geologist N.A.Marinov in 1943-1953. • In 1975, from shafts sunk in the deposit, five semi-industrial (pilot-plant rank) samples were taken from seams 4A, 4B, 8A, 8B, 8C, 9A, 9B, 9C by Bulgarian geologists. • In 1977 at the request of the Government, MPR (Mongolian People's Republic), 'LENGIPROSHAHT' conducted technical and economic assessment for detailed exploration, upon the condition that the coal of all seams is coking, relying on the results of incomplete exploration works. • In 1985-1987 exploration and evaluation works were conducted in areas directly connected to the Eastern, Bor Tolgoi and Ukhaa Khudag. More perspective and potential among these was the area of UHG, which

Criteria	JORC Code explanation	Commentary
		underwent a preliminary survey in 1987. As results of exploration-evaluation work it was established that the most valuable coal seams by quality and thickness are located within the UHG deposit. • In 1984-1989 continual testing of coal by the USSR's VUHIN Institute of Minchermet; the Institute completed studies of the chemical characteristics of the coking coal for Tsankhi & preliminary reports of the coal from Ukhaa Khudag and Tavan Tolgoi South. • ER conducted an infill drilling and bulk sampling program at UHG in 2008, which was planned and managed by Norwest. The purpose of this program was to address the issues identified above and bring the bulk of the UHG resource to a level of geologic assurance sufficient for mine planning and feasibility level study. • A total of 111 Russian drilled holes were used in the Norwest model, the majority being cored holes. The Norwest program included a total of 121 holes, comprised of 17 slim gauge core holes (PQ/HQ), 99 slim rotary holes (± 100mm) and 5 large diameter core/bulk sample locations. A grand total of 232 holes were used in the creation of the current (2008) geologic model with an average drilled depth of approximately 200m. • The 2008 program sufficiently increased the prior borehole density and validated the historic Russian data to an extent sufficient for categorizing the UHG mine area as a measured plus indicated resource according to the JORC Code and thereby permitting advanced mine planning and economic evaluations to be conducted at current international standards. The drilling plan will also penetrate to a depth of 600m, thus bringing potentially underground mineable resources into a higher level of confidence.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• The late Paleozoic was marked by the continental collision of a number of small micro-continents that came together as convergent margins. As the Siberian Craton and the North China block converged, ancient continental crust was thrust onto the continental margin and small island arcs, subduction wedges, and ophiolitic belts were accreted as pre-existing

Criteria	JORC Code explanation	Commentary
		basement rock was deformed and faulted, and uplift initiated. • Island arc geometry, similar to how the Bowen Basin was formed, coincides with the formation of the late Permian systems that formed the belt of Late Permian coal measures that are found in the south and south-west of Mongolia of which the Tavan Tolgoi deposit forms one of. These types of deposits form large basins that have vast lateral continuity. Unfortunately, due to the collision of India in the Tertiary, these basins in the southern regions of Mongolia have undergone later stage deformation, which appears to be more severe in the west and moderates eastward. This also explains the close proximity of large younger rift type basins that contain thick lignite deposits close to these Permian basins.
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* o *easting and northing of the drill hole collar* o *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* o *dip and azimuth of the hole* o *down hole length and interception depth* o *hole length.*	• No exploration results are reported. • A total of 1,792 valid boreholes are loaded in the LogCheck data management software and GeoBANK database. Each borehole contains easting, northing, reduced level, dip, azimuth, lithology, coal intersections, sample number, geotechnical, wire-line geophysics and coal quality. • Points of observation derived from this data are in Appendix 4A and 4B of this report.
	• *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	• No information was excluded from above criteria.
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.*	• No exploration results are reported.

Criteria	JORC Code explanation	Commentary
	• Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.	
	• The assumptions used for any reporting of metal equivalent values should be clearly stated.	• No exploration results are reported.
Relationship between mineralization widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.*	• No exploration results are reported.
	• *If the geometry of the mineralization with respect to the drill hole angle is known, its nature should be reported.*	• No exploration results are reported.
	• If it is not known and only the down hole lengths are reported there should be a clear statement to this effect (e.g. 'down hole length, true width not known').	• No exploration results are reported.
Diagrams	• Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	• No exploration results are reported.
Balanced reporting	• Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.	• No exploration results are reported.
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• No exploration results are reported. • A ground Magnetic and Gravity program was undertaken by Monkarotaj LLC in November 2010. The results were high level and provided some guidance with understanding the magnetic hydrothermal fluids and broad coal basin limits. • Polaris Seismic International was awarded the contract to conduct 2D Land High Resolution Seismic Survey at UHG in 2010 and 2011. The 2D UHG 2010 Seismic program recorded 22 lines totalling 46,000m and the 2011

Criteria	JORC Code explanation	Commentary
		Seismic program recorded 15 lines totalling 25,270m using Roll On and Roll Off methodology with 240 maximum active channels and using dynamite as the source
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).*	• No exploration results are reported.
	• *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• No exploration results are reported.

Appendix C Estimation and Reporting of Mineral Resources

Section 3: Estimation and Reporting of Mineral Resources (Source: *JORC (2012) Standard Resource Estimation Ukhaa Khudag Coal Mine (License 11952A), MMC, December 2014*)

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.*	• For programs pre-2009, hard copy and scanned data was part of the data set supplied to ER. All care has been taken in the translation, recoding and digitizing of this data into the COALLOG format. This data has been loaded into the LogCheck data management software and validated for codes, depth errors and consistency. Where photographs exited then these were checked against the coded data. Final checks were data making with wire-line geophysics and through sections with neighbouring boreholes for consistency. • For 2009-2014 programs the raw data was captured in forms using codes in the COALLOG format in hard copy format. This data was then entered into the LogCheck data management software which has very strict validation rules. These rules assist in data being correctly entered. The logging is done in a controlled environment in a central logging facility located on the mine site. Analytical data was entered into the GeoBANK database by the laboratory. The GeoBANK database was first populated with borehole number and sample number from the logged data in the LogCheck software. This data was seamlessly uploaded into the GeoBANK database for laboratory access. Once the data was entered by the laboratory and validated it could be passed back to Geology for importing into the master Excel spreadsheets for further processing and validation. Final data was seamlessly passed to the LogCheck software for final validation and repository for points of observation. All systems are designed to only enter data once. Once all validation, correlation and points of observation checks are completed, points of observation are produced by the LogCheck data management software by way of csv files and these files are uploaded to the Micromine modelling software. • Within the modelling software once final validation and correlation checks are completed. Anomalous seam thickness is validated and if due to faulting is taken out of the database.

Criteria	JORC Code explanation	Commentary
	• *Data validation procedures used.*	• The COALLOG codes and forms were used for logging which controlled the format and codes to be used. This data was entered once into the LogCheck data management software which has very strict validation rules on entered data. • Once the coded and depth entered data was validated, borehole profiles were produced with wire-line geophysics. Coal intersections were validated with wire-line geophysics coal intersections and core loss or expansion was noted. Where coal loss occurred it was entered into the lithology log as a loss. These final boreholes are recorded in Appendix 8 in the report. Borehole sections in southing and northing directions were produced for seam correction. These records are stored in Appendix 9 of the report. Final validation was completed on the block model through boreholes sections and anomalies investigated. • Data was entered once into the LogCheck data management software for geology/header/drilling/LAS/Geotech data and once into the GeoBANK database for analytical data. Data transfer for analytical data into LogCheck data management software and LogCheck into the Micromine modelling software was done by passing csv files seamlessly.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	• An initial site visit was completed by Mr Ballantine as a consultant for Micromine Pty Ltd in late January 2009. The visit was commissioned by Mr Andrew Little, Technical Director (at the time) for ER. The purpose of this visit was to audit the topographical and geological data and to assess the quality of the information recorded into the digital geological database and to comment on the implications that this would have on the confidence in the geological model of the UHG coal deposit. The audit used the reference 'Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996)' to compare with the data collected and is referred to as the standard. Numerous issues were identified and Mr Ballantine was asked provided a full time service whereby providing budgeting, planning, procedures and training for required ongoing exploration following the initial visit (January 2009) recommendations overall oversight of exploration at UHG.

Criteria	JORC Code explanation	Commentary
		• Mr Ballantine (Competent Person, Resource estimate- June 2012), thought it prudent to have an independent experienced Competent Person qualified geologist provide a site visit and peer review. This was done by Mr Todd Sercombe, senior consultant for GasCoal Pty Ltd, a coal geologist with 18 years coal experience. Mr Sercombe's findings from the site visit were; *The UHG exploration procedures and practices are of extremely high calibre, exceeding both the Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996) and the benchmark coal industry best practices (as observed by Mr Sercombe in the Bowen Basin, Australia). The accurate and unbiased assignment of coal core loss to coal samples, achieved in the UHG practices, is commendable. The coding, for modelling, of all significant stone band partings in the seams and of inter-burden units between the seams is also praiseworthy. The Exploration and Geology Department are a group of young enthusiastic geologists who have been well trained and led by Gary Ballantine. I would have high confidence in the reportable results obtained from the UHG exploration procedures.* • The exploration group has changed little from the previous JORC (2004) Resources report- June 2012 so the independent peer review by Mr Sercombe is still relevant. • Mr Ballantine currently holds the position of Executive General Manager, Exploration and Geology and has responsibility for budgeting, planning, training and overall oversight of exploration at UHG. As part of the ongoing evolution of the ER geology group and knowledge transfer, supervised and structured succession of capable individuals, is planned. Mr Ballantine understands that complacency can creep into a well establish team. To prevent this he does frequent site visits with Mr Said (Competent Person) every few months and they review different member's capabilities against the exploration procedures. As part of Mr Ballantine's role as mentor and internal auditor, all final data, (i.e. seam thickness, seam correlation, sampling intervals, coal quality analysis, collar survey and LAS quality) are reviewed once the team (supervised by the Competent Person) has done the work. With the above process it is Mr Ballantine's professional opinion that there is a very high compliance with the team's results and JORC standards. Collar survey is one task that requires a manual audit. Mr Ballantine on his most recent visit to UHG in mid-November 2014 audited the collar survey for boreholes drilled in the period 2012-2014 with a hand held GPS device.

Criteria	JORC Code explanation	Commentary
	• *If no site visits have been undertaken indicate why this is the case.*	• All GPS coordinates of boreholes and boundary pegs checked were within the tolerance of the GPS device. • Not applicable, see above section.
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.*	• Detailed mapping from the various campaigns from the 1940's. • A ground Magnetic and Gravity program was undertaken by Monkarotaj LLC in November 2010. The results were high level and provided guidance with understanding the magnetic anomaly and confirmation of broad coal basin limits. • The 2D High Resolution Seismic Survey recorded 37 lines totalling 71,270m using Roll On and Roll Off methodology with 240 maximum active channels and using dynamite as the source proved invaluable in locating and understanding fault systems but, just as importantly, showed areas of little to no structure and this is one of the great positives with using Seismic. In addition, the seismic results gave detailed knowledge of the coal basin shallow surface limits. • Seismic results on structure have been confirmed and updated by mine geology team detailed in-pit and face-wall mapping.

Criteria	JORC Code explanation	Commentary
		• The northern and southern fault boundaries coal/basement contact has been confirmed by face-wall mapping by the geology mine team and angled geotechnical drilling along strike to confirm continuity. • The 'limit of oxidation' was determined by close spaced drilling and confirmed by mapping and sampling from mine geology team. • Seam correlation, continuity and coal quality was confidently predicted by use of close spaced drilling in the eastern and western areas and these results confirmed and supported by detailed 2D seismic. The confirmation of the seismic by drilling results gives confidence where drill spacing is less that correlation and continuity in the seismic provides solid evidence that continuity exists. • Where seismic displayed major structural zones and within these zones boreholes intercepting coal had low confidence of continuity, the seismic was used to map polygons about these areas and deem them as Inferred which was not dependent on points of observation distance. • The continuity of the final computer model provides a high level of confidence. By interrogating the model with all data visible by sections and carefully inspecting allows the Competent Person the confidence to procedure to the final estimate. • As a high level overarching check on the estimate and the confidence of the estimate, expected error on the estimate was used as an aid in understanding the spatial measurements used for the classification categories. As an extension of this the 'loss' function was also estimated determining overall error which, can be used to determine maximum error for Measure and Indicated categories which was 6% and 12% respectfully.
	• *Nature of the data used and of any assumptions made.*	• The essence of the data used is borehole observations with support from detailed mapping and 2D High Resolution Seismic Survey. • No assumption with a material effect to the estimate was made. Notwithstanding, missing or non-analysed coal quality data due to limited sample mass was calculated by regressions and this has been assumed to be adequate for inclusion of the estimate.

Criteria	JORC Code explanation	Commentary
	• *The use of geology in guiding and controlling Mineral Resource estimation.*	• The geology was used in understanding deposit limits and structure. The geology was also used to determine deposit type.
	• *The factors affecting continuity both of grade and geology.*	• The coal measure was limited by surface outcrop of the seams in the eastern boundary. • The northern and southern limits were fault bounded with generally a steep sharp overthrusting contact. Coal seams close to this contact were highly deformed and coal quality was highly variable. • The western boundary was limited by the license boundary but the seams are continuous beyond this point. • Within the deposit, major structural zones effected coal seam continuity and coal quality. Rank increases due to the major structures effected coal quality.
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	• The coal resource area is oriented generally in an east-west direction and is some 7.5km long and 3 km wide. • The area of the license is 2960.23 hectare • The seams mostly outcrop in the eastern area of the deposit with an average of 10m of unconsolidated Quaternary sediments overlaying the Permian coal measures. The base of weathering is on average between 15 to 25m. • Drilling in the western area went to 700m depth and it is estimated the coal measures still extend another 300m past the drilling. • The model extension is less than 100m deeper than the deepest borehole. Categories were extended half the distance past the last borehole but this had little effect on the estimate due to the dimensions of the deposit. • No resource has been estimates outside of the Lease boundaries.

Criteria	JORC Code explanation	Commentary
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.*	• The UHG resource estimate was carried out using Micromine's 18.0 and LogCheck Version 7.277 using the COALLOG geology data format as the database. • The method used for estimating Resources at UHG involved modelling an elevation grid for the major ply, 0AL, and modelling thickness grids for the other plies and partings. These thickness grids for the plies and partings were then stacked on top or below of the elevation grid to form a 3D block model. • To create an accurate and reliable 3D model of the coal seams a kriging algorithm with semivariogram modelling for the seam elevation was used. Kriging is a very flexible gridding method that can be custom-fitted to any data set by specifying the appropriate semivariogram model. Kriging incorporates anisotropy and underlying trends. The purpose of geostatistical analysis was to generate a series of semivariograms that could be used as the input weighting mechanism for the Kriging algorithm. To be able to conduct reliable geostatistical analysis there is a requirement to have sufficient number of points. As such, ply 0AL was used for geostatistical analysis as it was intersected by the largest number of boreholes and is the most consistent ply across the area. • To create the block model an elevation grid was created for the major lower ply 0AL and then the thickness grids for the other plies and partings were stacked above or below this as required. In order to use this method each borehole needed to contain an interval for each ply and parting even if the ply or parting was 'pinched out' and was not intersected by that borehole. Some plies were not intersected by the boreholes and so 'virtual' plies with a thickness of zero were inserted in order to model the seam morphology. The location of these virtual plies was determined by using the MICROMINE extrapolation tool, which uses Inverse Distance Weighting with a power of 2. Where boreholes intercepted plies, but these

Criteria	JORC Code explanation	Commentary
		plies were not present due to deterioration as a result of changing sedimentary environments then these plies were inserted as zero thickness plies at the roof or floor of a logged ply. Stone parting intervals were logged in the raw database, but where they were missing they were added to all ply groups for each borehole even in cases where the parting thickness was zero. • In order to create a reliable model of the seam morphology a cell size of 10m by 10m was selected for gridding. Gridding with exact interpolation using ordinary kriging was used to generate grids for the elevation of the mid-point of the plies and Kriging with a omnidirectional semivarigram was used to generate grids for the thicknesses of the plies. To allow the grids to cover the necessary areas, a circular search radius of 10,000m with maximum of 12 points was used to create the elevation grids. The thickness grids were created using a circular search radius of 10,000m with maximum of 12 points per sector. • The base of Quaternary grid was produced using IDW with a power of two search radius of 500m with maximum of 4 points per sector. The Extremely weathering grid was produced using IDW with a power of two search radius of 500m with maximum of 4 points per sector. The base of weathering grid was produced using IDW with search radius of 500m with maximum of 4 points per sector. The base of weathering grid was used in conjunction with mapped LOX lines as the upper most cut-off for coal. Weathered coal can be calculated between the base of weathering and Extremely weathering grid. This coal has been successfully mined and has been commercial sold as Thermal coal. For the purpose of this resource estimate it has been included in the estimate. A Topography surface grid was produced using Implicit model. This was then created into a DTM. • The 3D gridded seam block model was generated by stacking thickness grids on top or below of the major ply (0AL) elevation grid. The centroid of the block East and North was the X and Y values from the grid file which was 10x10m (grid cell size), the centroid of the block RL was the Z value from the elevation grid and block size by RL was the Z value from thickness grids.

Criteria	JORC Code explanation	Commentary
		estimate to support distances for Measured and Indicated categories. For Inferred category the narrow dimensions of the deposit may cause a misleading result using the expected error technique so the experience of the Competent Person and detailed knowledge of the deposit were sufficient for determining this category spacing. In determining extrapolation beyond last data points, half the category distance was applied. Due to the data spacing and deposit dimensions this did not have a major affect. The shapes for the categories was mostly automated with the Micromine software, however where this case was not true the edge of the data was manually edited by the Competent Person. In addition, due to major structure some areas were hard-wired for specific categories like Inferred and data spacing had no influence. • Measured resources were estimated with points of observation at 350m, Indicated resources were estimated with points of observation at 700m, and Inferred resources were estimated with points of observation at 1500m. • Seam coding was applied to composite plies into seams based upon a specified minimum coal thickness and a maximum parting thickness. The seams were also coded on the basis of resource classification so that only plies of the same resource classification were combined together with their partings. The following modifying factors were used for seam coding; No maximum seam thickness. Minimum seam thickness to be included in the Resource of 0.5m to 400m depth and then 1.5m below 400m. Maximum parting thickness to be included in the Resource of 0.5m. Coal Quality limit with Ash content greater than 50% (DRY basis) being excluded from the Resource Estimate. • Following seam coding, coal quality interpolation was carried out. Only intervals that were marked as a point of observation were used for coal quality interpolation. IDW algorithm with a power of three was used to interpolate the coal quality into the empty block model. Coal quality interpolation was conducted for each ply separately. One search run at 7,000m radius was used to interpolate all the blocks in each model. Filters

Criteria	JORC Code explanation	Commentary
		were applied to make sure that only points of observation for the selected ply were used for the interpolation of the blocks for that ply. • Partings within the model limits but without coal quality were given default coal quality parameters based on rock quality analyses.
	• *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.*	• Norwest completed a JORC (2004) estimate in 2010. There was a 23 per cent increase in total air-dried Resource with the JORC (2004) estimate completed by ER in 2012 (excluding mine depletion). The JORC (2012) estimate (excluding mine depletion) based on this report compares well with an increase in 3 per cent in total as-received Resource. • ER completed a JORC (2012) estimate (excluding mine depletion) estimate in 2014. There was a -17 per cent decrease in total as-received Resource with the JORC (2012) estimate completed by ER in 2020 (excluding mine depletion). • The mine has produced 75.0 Mt since April 2009 and the mine geology team completes regular (monthly) reconciliation of model/mined ROM tonnage. Where the model has good borehole control the mine recovery is well aligned, however, once borehole control is less there is a notable variance. The drilling campaigns that this estimate is based on plus the review of category limits under JORC (2012) means this notable variance will be minimised and demonstrates the estimate is valid.
	• *The assumptions made regarding recovery of by- products.*	• The report in section 4.7.2.6 shows typical production figures from the CHPP. Depending on which seam is being washed and what blends are being appointed three main products are produced. A mid-vol hard coking product, high-vol semi soft coking product and high-ash middling by- product for the thermal coal market.
	• *Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).*	• Norwest in their JORC (2004) estimate in 2010 mentions that samples were collected for Acid Generating Potential in 2008. • Further rock and in seam parting samples were collected by the ER geology team for further work by EGI on Acid Generating Potential. • A total of 631 samples were tested from these holes, including coal and parting samples. All holes were sampled continuously except where there were missing intervals. Sample intervals were selected by site geologists

Criteria	JORC Code explanation	Commentary
		in conjunction with EGI to match geological boundaries, with intervals ranging from less than 0.5m to over 5m. Standard ARD testing was carried out on these samples by the Stewart Mongolia LLC Ulaanbaatar laboratory, with EGI providing advice on testing methods and carrying out quality control and specialised testing on a sub set of 42 samples. • Results indicate that the vast majority of overburden/interburden and pit floor materials represented by the samples tested are unlikely to be acid producing or release significant salinity. The NAF overburden and interburden has excess ANC, providing a high factor of safety and offering a potential source of materials to mitigate ARD from PAF washery waste materials. PAF-LC samples made up only 2 per cent of samples tested, and PAF samples accounted for 0.3 per cent. PAF/PAF-LC materials occur in the immediate 0.5m of a number of coal seams, and could potentially produce localised ARD if not mixed effectively with the NAF overburden and interburden. Near surface (within 5 to 10m of surface) materials have higher salinity due to salt accumulation. • This work lead to the design and disposal of high sulphur reject material from the CHPP in the waste dumps.
	• *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.*	• In order to create a reliable model of the seam morphology a cell size of 10x10m was selected for gridding. Gridding with exact interpolation using ordinary kriging was used to generate grids for the elevation of the mid- point of the plies and Kriging with a omnidirectional semivarigram was used to generate grids for the thicknesses of the plies. To allow the grids to cover the necessary areas, a circular search radius of 10,000m with maximum of 12 points was used to create the elevation grids. The thickness grids were created using a circular search radius of 10,000m with maximum of 12 points per sector. The 3D gridded seam block model was generated by stacking thickness grids on top or below of the major ply (0AL) elevation grid. The centroid of the block East and North was the X and Y values from the grid file which was 10x10m (grid cell size), the centroid of the block RL was the Z value from the elevation grid and block size by RL was the Z value from thickness grids.

Criteria	JORC Code explanation	Commentary
	• *Any assumptions behind modelling of selective mining units.*	• All seams were modelled, therefore there were no 'specific' horizons that were separately modelled. However, there is a change in minimum seam thickness for below 400m Resources from 0.5m to 1.5m to reflect the possibility of only underground Resources past this depth.
	• *Any assumptions about correlation between variables.*	• Missing or non-analysed coal quality data due to limited sample mass was calculated by regressions of determined coal quality data on a seam group basis and this has been assumed to be adequate for inclusion of the estimate.
	• *Description of the geological interpretation which was used to control the resource estimates.*	• Geological interpretation using the seismic results was critical in identifying major structure and confirming seam correlation and continuity. Much of these results have been confirmed and updated by mine geology team detailed in-pit and face-wall mapping. • The northern and southern fault boundaries coal/basement contact has been confirmed by face-wall mapping by the geology mine team and angled geotechnical drilling along strike to confirm continuity. • The 'limit of oxidation' was determined by close spaced drilling and confirmed by mapping and sampling from mine geology team. • Where seismic displayed major structural zones and within these zones boreholes intercepting coal had low confidence of continuity, the seismic was used to map polygons about these areas and deem them as Inferred which was not dependent on points of observation distance.
	• *Discussion of basis for using or not using grade cutting or capping.*	• A greater than 50% ash (DRY basis) cut-off was used to determine what coal was and what rock was.
	• *The process of validation, the checking process used, the comparison of model data to drill hole data, and use*	• The block model was firstly checked to ensure that all blocks were populated and that block values were within the same range as the input

Criteria	JORC Code explanation	Commentary
	of reconciliation data if available.	values. Following this a visual validation was conducted by loading the block model into the Micromine 3D viewer together with borehole traces, plies from the original points of observation file, base of weathering, base of Quaternary and topographic surfaces. Each cross-section was then reviewed to check that the plies from the original points of observation file agreed with the plies in the block model. • The further manual check will be completed by the Competent Person where an area including boreholes G02057, G02193, G02212 and G02056 for the ply 3AU which was compared with the block model. The manual result was within 3 per cent in tonnage of the block model result. This comparison is within acceptable limits.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• Moisture was analysed as TM (MNS ISO 589:2008) and Analytical moisture (MNS GB/T 212:2015). TM was assumed to equal in-situ moisture and the Preston Sanders formula was used to convert air-dry relative density to as-received (in-situ) relative density. • The estimated Resource is reported on 'as received' basis and 'air dried' basis
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• No maximum seam thickness. • Minimum seam thickness to be included in the Resource of 0.5m to 400m depth and then 1.5m below 400m. • Maximum parting thickness to be included in the Resource of 0.5m. • Coal Quality limit with Ash content greater than 50% (DRY basis) being excluded from the Resource Estimate.
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the*	• The UHG mine has produced 79.2 Mt since April 2009 as a large-scale 'truck and shovel' operation and has an 15Mt/year capacity CHPP. No mining assumptions have been applied to the Resource estimate other than minimum coal thickness and maximum in-seam parting thickness which has been taken from engineering operational advice. In the

Criteria	JORC Code explanation	Commentary
	assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	exploration process sufficient roof and floor sampling and analysis has been completed for Reserve estimates of dilution.
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	• *The report in section 4.7.2.6 shows typical production figures from the CHPP. Depending on which seam is being washed and what blends are being appointed three main products are produced. A mid-vol hard, low ash, coking product, high-vol, low ash, semi soft coking product and high- ash middling by-product for the thermal coal market.* • *The Resource estimate for this report has had no assumptions made on the estimate for beneficiation.*
Environmental factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a green fields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	• *All environmental issues are managed by the company's environmental department which has operated since the start of mining.* • *In addition, under the Mining License there are strict environmental conditions. While these were not reviewed in detail they are relevant to the operation to ensure that waste material is well managed and that what soil profiles are available in the area are used for the rehabilitation process.* • *During all site visits there have been no obvious environmental issues of leachates emanating from spoil piles or from coal stockpiles.*
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.*	• *True Relative Density was analyzed for 40,126 samples, or 91.8 per cent of all samples (MNS GB/T 217:2015). The missing Relative density data was calculated using the regression on a seam group basis of RD v ASH for air dried and as-received samples.* • *An industry standard method for estimating in situ RD was applied using the Preston Sanders formula was used to convert air-dry relative density to* as-received (in-situ) relative density.

Criteria	JORC Code explanation	Commentary
	• *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.*	• *An industry standard method for estimating in situ RD was applied using the Preston Sanders formula was used to convert air-dry relative density to as-received (in-situ) relative density.*
	• *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	• *Partings within the model limits but without coal quality were given default coal quality parameters based on rock quality analyses. These are defined in the report in Table 9-5.*
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.*	• *The basis for the classification for the Resource estimate is taken from guidance from the Australian Coal Guidelines (2014).* • *The basis of the classification confidence categories is from the results of an investigation of expected error for the 95th percentile through the use of Conditional Simulation Geostatistics.*
	• *Whether appropriate account has been taken of all relevant factors (i.e. relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).*	• *Exploration prior to 2009 had been done to good geological standards however, not always to JORC standards. The geological teams of this era were well trained in the collection of geological information and this information has been used affectively for the current Resource estimates and have assisted greatly in the preliminary understands of seam correlation, continuity, coal quality and boundary limits.* • *Since 2009 having a highly trained team to international and Australian standards, modern drilling methods and equipment, good downhole geophysics, high quality 2D seismic, good survey control for borehole locations and topography, a modern onsite accredited coal laboratory and having an active modern mine, there is great confidence that the resulting Resource estimate for this report is highly reliable.* • *As a further measure to understand the confidence in the estimate the high level overarching check on the estimate, expected error on the estimate was used as an aid in understanding the spatial measurements used for*

Criteria	JORC Code explanation	Commentary
		the classification categories. As an extension of this the 'loss' function was also estimated determining overall error which, can be used to determine a range that the estimate applies too.
	• *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• *The Competent Person has confidence in the resource figures reflecting well the contained coal resource.*
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• *Mr Ballantine (Competent Person, Resource estimate- June 2012), thought it prudent to have an independent experienced Competent Person qualified geologist provide a site visit and peer review. This was done by Mr Todd Sercombe, senior consultant for GasCoal Pty Ltd, a coal geologist with 18 years coal experience. Mr Sercombe's findings from the site visit were; The UHG exploration procedures and practices are of extremely high calibre, exceeding both the Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996) and the benchmark coal industry best practices (as observed by Mr Sercombe in the Bowen Basin, Australia). The accurate and unbiased assignment of coal core loss to coal samples, achieved in the UHG practices, is commendable. The coding, for modelling, of all significant stone band partings in the seams and of inter-burden units between the seams is also praiseworthy. The Exploration and Geology Department are a group of young enthusiastic geologists who have been well trained and led by Gary Ballantine. I would have high confidence in the reportable results obtained from the UHG exploration procedures.* • *The exploration group has changed little from the previous JORC (2004) Resources report- June 2012 so the independent peer review by Mr Sercombe is still relevant.* • *Mr Ballantine currently holds the position of Executive General Manager, Exploration and Geology and has responsibility for budgeting, planning, training and overall oversight of exploration at UHG. As part of the ongoing evolution of the ER geology group and knowledge transfer, supervised and*

Criteria	JORC Code explanation	Commentary
		structured succession of capable individuals, is planned. Mr Ballantine understands that complacency can creep into a well establish team. To prevent this he does frequent site visits with Mr Said (Competent Person) every few months and they review different member's capabilities against the exploration procedures. As part of Mr Ballantine's role as mentor and internal auditor, all final data, (i.e. seam thickness, seam correlation, sampling intervals, coal quality analysis, collar survey and LAS quality) are reviewed once the team (supervised by the Competent Person) has done the work. With the above process it is Mr Ballantine's professional opinion that there is a very high compliance with the team's results and JORC standards. In addition, Mr Ballantine has completed an oral review and internal audit with the Competent Person for every step of the data preparation of the points of observation and the modelling stages to the final estimate.
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.*	• *As a measure relative accuracy and to understand the confidence in the estimate the high level overarching check on the estimate, expected error on the estimate was used as an aid in understanding the spatial measurements used for the classification categories. As an extension of this the 'loss' function was also estimated determining overall error which, can be used to determine a range that the estimate applies too.* • *In addition, the 3D model for the estimate was accurate and reliable due to a kriging algorithm with semivariogram modelling for the seam elevation and thickness was used. Kriging is a very flexible gridding method that can be custom- fitted to any data set by specifying the appropriate semivariogram model. Kriging incorporates anisotropy and underlying trends. The purpose of geostatistical analysis was to generate a series of semivariograms that could be used as the input weighting mechanism for the Kriging algorithm. To be able to conduct reliable geostatistical analysis there is a requirement to have sufficient number of points.* • *The use of high level 2D seismic, downhole geophysical data, modern drilling with high core recovery, a modern onsite accredited coal laboratory and highly trained geologists gives high confidence and confirms the existence of location of the coal seams in 3D space. A detailed understanding of the coal seam geometry from trenches and existing operating mine pits, also gives a high level of confidence in the estimate.*

Criteria	JORC Code explanation	Commentary
	• *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.*	• *The Resource estimate for this report is a global estimate to international standards and meets all JORC 2012 requirements.* • *All assumptions and procedures for the Resource estimate are documented within the report sections or as Appendices.*
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	*Run-of-Mine ("ROM") coal production of 79.2 Mt was reported by mine survey measurement from 2009 until end of 2021. Where the model has good borehole control the mine recovery is well aligned, however, once borehole control is less there is a notable variance. The drilling campaigns that this estimate is based on plus the review of category limits under JORC (2012) means this notable variance will be minimised and demonstrates the estimate is valid.*

Appendix D: Estimation and Reporting of Ore Reserves

Section 4: Estimation and Reporting of Ore Reserves

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	• *Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.* • *Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.*	• The Mineral Resource estimate used as the basis of this Coal Reserves Statement is "JORC (2012) Standard Resource Estimation Ukhaa Khudag Coal Mine (Licence 11952A)", prepared by Mongolian Mining Corporation, Energy Resources LLC, Geology Department, January 2022. • The Competent Person for the Mineral Resource estimate was Mr. Byambaa Barkhas, a full time employee of Mongolian Mining Corporation in the position of General Manager of Technical Services. Mr. Barkhas graduated in 2008 with a "Bachelor of Geology" from the "School of Geology and Petroleum Engineering, Mongolian University of Science and Technology", and is a Member of the Australian Institute of Mining and Metallurgy (#318198). • The Coal Resources are reported inclusive of those Coal Resources modified to produce the Coal Reserves.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• The Competent Person for the Coal Reserves Statement made consecutive site visits since 2017. His last visit was in November 2021. The outcome of these site visits was observation of site and mining conditions and discussion with site operating personnel that contributed to the determination of project parameters used in the UHG Life of Mine (LOM) plan update study April 2022. • The competent person believes a further site visit was warranted in 2022 to review changes in the mining progress as well as mining conditions.
Study status	• *The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.* • *The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.*	• A LOM study update, equivalent to a Feasibility Study update was completed in January 2018 by GLOGEX. • GLOGEX is completing preparation of an updated scenario of the Life of Mine ("LOM") Study for the UHG deposit. UHG design, mine planning has been completed and economic analysis will be completed in April 2022.

Criteria	JORC Code explanation	Commentary
Cut-off parameters	• *The basis of the cut-off grade(s) or quality parameters applied.*	• There are no coal quality cut-off parameters used to eliminate the conversion of Coal Resources to Coal Reserves. Coal Resources have already been determined with an ash cut off of 50% (DRY basis). Pit Optimization and LOM planning has been used to determine whether Coal Resources will convert to Coal Reserves
Mining factors or assumptions	• *The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design).* • *The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.* • *The assumptions made regarding geotechnical parameters (eg pit slopes, stope sizes, etc), grade control and pre-production drilling.* • *The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).* • *The mining dilution factors used.* • *The mining recovery factors used.* • *Any minimum mining widths used.* • *The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.* • *The infrastructure requirements of the selected mining methods.*	• Pit Optimization and LOM planning has been used as the basis of converting Coal Resources to Coal Reserves. • The selected mining method is that in use in the operating mine, i.e. open cut truck and hydraulic excavator mining for both waste mining and coal mining, with out of pit and in pit dumping of waste. • Geotechnical parameters for the design of stable slopes have been provided by Australian Mining Consultants ("AMC"). • The mining factors used were: o Minimum coal mining thickness of 0.5 m. o Minimum parting mining thickness of 0.5 m. o Mineable coal section roof loss of 100 mm. o Mineable coal section floor loss of 100 mm. o Mineable coal section roof dilution of 100 mm. o Mineable coal section floor dilution of 100 mm o Global mining and geological loss 1%. o The quality of diluting material is relative density of 2.46 t/m3, and ash of 92%. o Relative density data in the geological model is based on an average in-situ moisture of 3.58% (ar). ROM moisture is assumed to be 3.64% (ar), coking coal product moisture 8% (ar), middlings product moisture 9% (ar), and thermal product coal moisture 2.68% (ar). • The application off "Affected Zones" with higher global losses, as per the 2013 LOM Study, were discontinued on the basis of actual mining coal recovery reconciliation results supplied by MMC for an 18 month period of sampling undertaken by MMC from January 2014 to June 2015. • Inferred Coal Resources are assigned revenue in the LOM study pit optimizer and included in the LOM production schedule as mineable coal, but are not converted to Coal Reserves. • The infrastructure requirements are in place at the operating mine comprising offices, workshops, service station and shared CHPP facilities with the BN mine. The infrastructure will be expanded as UHG production expands.

Criteria	JORC Code explanation	Commentary
Metallurgical factors or assumptions	• *The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.* • *Whether the metallurgical process is well-tested technology or novel in nature.* • *The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.* • *Any assumptions or allowances made for deleterious elements.* • *The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.* • *For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?*	• The metallurgical process for washing the coking coal seams is already in place and being used. It is a low cut high cut dense media processing plant at the UHG mine site. The process is well tested and robust. Coking coal seams 0C, 3A, and 4 have been mined and processed through this plant and the ash-yield curves for these seams have been reconciled and adjusted with the laboratory generated curves from the back analysis of results when these seams were washed. • The process generates primary coking coal product from a low cut point that will produce a 11.0% (dry) ash HCC and 9.5% (dry) ash SSCC product, and a secondary middlings product of varied ash per customer request is produced from a variable high cut. • International coal processing consultant Norwest Corporation has generated ash-yield curves for major coking coal seams. MMC recently modified ash yield curves of extracted coal seams in the mine based on in pit bulk sampling. • Thermal coal seams to produce a relatively high ash low energy thermal coal product suitable for export or domestic use.
Environmental	• *The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.*	• An Environmental Impact Statement has been prepared and all environmental approvals obtained. • Waste rock characterization results do not require special placement requirements or procedures in the dumps. • Coal processing plant reject is stored appropriately in the waste dumps or storage cells in accordance with the environmental approvals.
Infrastructure	• *The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.*	• All necessary infrastructure to support the UHG mine is in place at either the mine site or at the UHG mine industrial area. Power is supplied from an onsite coal fired power station with the transmission line connected to the Mongolian power grid. Water is supplied from a nearby bore field. The workforce is accommodated in a purpose built camp or in housing provided in the nearby communities.
Costs	• *The derivation of, or assumptions made, regarding projected capital costs in the study.* • *The methodology used to estimate operating costs.* • *Allowances made for the content of deleterious elements.* • *The derivation of assumptions made of metal or*	• Project capital cost estimates for mining plant and equipment have been provided by MMC. • The mining, hauling, processing, handling, administration, transportation, air pollution, logistic and import duty charges costs were adjusted from an actual costs incurred at UHG provided by MMC year to date 1st January 2022 based on 2850 MNT/USD exchange rate. GLOGEX reviewed key cost inputs and adjusted actual costs to reflect the key factors of the project to increase the accuracy of pit optimization results.

Criteria	JORC Code explanation	Commentary
	commodity price(s), for the principal minerals and co- products. • *The source of exchange rates used in the study.* • *Derivation of transportation charges.* • *The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.* • *The allowances made for royalties payable, both Government and private.*	• Operating cost estimates have been provided from MMC's assessment of existing operating costs incurred in the operation and as provided by MMC's mining contractor. • Actual mining contractor coal mining costs were provided and applied in the study in $/bcm; however, for presentation in Table 5.7 GLOGEX CONSULTING LLC converted to $/t ROM using the weight average relative density of coal in the pit shells) • Coal processing costs are based on actual costs of existing CHPP operation. • Government royalty costs are based on currently legislated rates applicable to the forecast sales prices of UHG product coal. There are no private royalties payable.
Revenue factors	• *The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.* • *The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.*	• Shanxi Fenwei Energy Consulting Co Ltd ("Shanxi Fenwei") completed an independent market study for UHG products and identified principal coking and thermal coal markets in Mongolia and China. • The coal selling prices for Hard Coking Coal were estimated based on on 6 years average of 2020-2021 historical prices and price forecast 2022-2025, as provided by MMC's actual coal selling prices as well as price forecast of Shanxi Fenwei Energy Consulting Co. Ltd ("Shanxi Fenwei") product value at the DAP Ganqimaodou port of China. The coal selling prices for Semi-soft coking coal, Middlings coal and Thermal coal were estimated based on 6 year average of price forecast 2020-2025, as provided by MMC's actual coal selling prices as well as price forecast of Shanxi Fenwei Energy Consulting Co. Ltd ("Shanxi Fenwei") product value at the DAP Ganqimaodou port of China. • The coal selling prices assigned to each product, were: • Hard coking coal < 11.0% ash (dry): US$134.7/t product (ar), • Semi-soft coking coal < 9.5% ash (dry) US$95.9/t product (ar), • Middlings coal ~ benchmark CV 6,000 kcal/kg (gar): US$48.8/t product (ar), • Thermal coal ~ benchmark CV 5,000 kcal/kg (gar): US$30.7/t product (ar).

Market assessment	• *The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.* • *A customer and competitor analysis along with the identification of likely market windows for the product.* • *Price and volume forecasts and the basis for these forecasts.* • *For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.*	• Shanxi Fenwei completed an independent market study for UHG and identified principal coking and thermal coal markets in Mongolia and China in April 2021.
Economic	• *The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.* • *NPV ranges and sensitivity to variations in the significant assumptions and inputs.*	• No economic analysis
Social	• *The status of agreements with key stakeholders and matters leading to social license to operate.*	• *All key stakeholder agreements are in place providing a social license to operate.*
Other	• *To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:* • *Any identified material naturally occurring risks.* • *The status of material legal agreements and marketing arrangements.* • *The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre- Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.*	• All material legal agreements, marketing agreements and government agreements are in place to allow the UHG mine to successfully operate. As expansion proceeds it is reasonably expected any modifications to existing agreements or additional agreements that may be required can be obtained in a timely manner.

Criteria	JORC Code explanation	Commentary
Classification	• *The basis for the classification of the Ore Reserves into varying confidence categories.* • *Whether the result appropriately reflects the Competent Person's view of the deposit.* • *The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).*	• Measured Resources have been classified a Proved Reserves, Indicated Resources have been classified as Probable Reserves. No Probable Reserves have been derived from Measured Resources. • No Inferred Resources have been converted to Reserves (although Inferred Resource was assigned revenue in the pit optimiser and reported as mineable ROM coal in the LOM schedule). • The result reflects the Competent Persons view of the deposit.
Audits or reviews	• *The results of any audits or reviews of Ore Reserve estimates.*	• Internal peer review by GLOGEX CONSULTING LLC of the Reserves estimate has been completed. • Technical information in this UHG Coal Reserve estimation has been peer reviewed by Independent consultant Mr. Gary Ballantine. Mr. Ballantine is a member of the Australasian Institute of Mining and Metallurgy (Member #109105) and has over 29 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012).

Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.* • *It is recognized that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• Coal production at UHG commenced in April 2009. Run-of-Mine ("ROM") coal production of 79.2 Mt was reported by mine survey measurement from April 2009 until end of 2021. • Since the preparation of Reserves estimate effective as of 1st January 2022 the UHG mine has completed reconciliations of actual coal mined against the geological model for the period January 2021 to January 2022. Last Coal Reserves Statement for UHG was prepared as at 1st January 2022 by GLOGEX and reported as 371Mt (ROM) and the total Marketable reserve is 230 Mt. • As a result of the coal recovery reconciliations that have been undertaken by MMC and the observations made associated with the mining activities over this period of time, the mining modifying factors in this Reserves estimate have been adjusted to be less conservative particularly with respect to assumed losses incurred in the “affected zones”, and in the assumed reassignment of thermal to coking coal and semisoft coal to hard coking coal.

MONGOLIAN MINING CORPORATION

Our ref: Ulaanbaatar

Memo To: **MMC Executive Committee**
From: Mr. Byambaa Barkhas (Competent Person)
Date: 17th January 2023
Subject: Ukhaa Khudag JORC Statement 31 December 2022

Estimate of the JORC (2012) compliant Coal Resource within the Ukhaa Khudag ("UHG") deposit has been updated as of 31 December, 2022. Total estimate is now 567 Mt, comprising 469 Mt Measured, 30 Mt Indicated and 68 Mt Inferred component quantities.

This memo provides summary information regarding this update, and should be considered in conjunction with detail included in the "JORC Standard Resource Estimation Ukhaa Khudag Coal Mine (License 11952A)" report, released documenting the previous Coal Resource estimate, stated as of 31 December, 2021.

Since completion of the previous Coal Resource estimate, no further exploration data has been incorporated into structural or coal quality geological models. To produce the updated Coal Resource estimate, topographic survey information was updated to account for depletion as result of mining between 1 January, 2022, and 31 December, 2022.

The new Coal Resource statement is included in Appendix 1, summarised in 100m depth cut-off intervals, with Coal Resources tonnages reported based upon in situ density on an as received moisture basis.

Regards,

Byambaa Barkhas
Senior Chief Geologist (Geology and geotechnical)

Appendix 1

UHG mining license Coal Resource, by depth and category, as at 31 December, 2022:

Volume (x1,000,000 m^3)	Tonnes (x1,000,000)	RD (g/cc)	ASH (%)	TM (%)	VM (%)	CV (kcal/kg)	TS (%)	FC (%)	Classification
BUQA - BHWE									
4.5	6.9	1.53	28.58	6.79	21.14	5418	0.96	46.54	MEASURED
0.4	0.7	1.50	26.55	4.88	22.69	5687	0.93	47.72	INDICATED
1.9	2.9	1.52	27.56	7.26	22.84	5325	0.85	45.44	INFERRED
6.8	**10.5**	**1.52**	**28.16**	**6.79**	**21.71**	**5410**	**0.93**	**46.31**	**SUBTOTAL**
BHWE - 100m									
40.7	62.4	1.54	28.68	4.21	20.86	5552	1.06	47.39	MEASURED
2.7	4.1	1.51	27.34	5.04	21.59	5663	0.92	48.08	INDICATED
8.5	12.9	1.53	28.69	5.26	21.62	5421	0.93	46.28	INFERRED
51.9	**79.4**	**1.53**	**28.62**	**4.42**	**21.02**	**5536**	**1.03**	**47.25**	**SUBTOTAL**
100 - 200m									
61.9	93.6	1.51	26.73	3.64	21.48	5761	1.02	48.82	MEASURED
5.9	9.0	1.53	28.04	4.61	20.43	5647	0.86	48.65	INDICATED
12.7	19.6	1.54	28.50	3.93	19.75	5593	0.91	48.75	INFERRED
80.5	**122.2**	**1.52**	**27.11**	**3.76**	**21.12**	**5726**	**0.99**	**48.79**	**SUBTOTAL**
200 - 300m									
88.1	132.9	1.51	26.18	3.38	20.30	5859	0.89	50.63	MEASURED
3.9	6.0	1.53	27.33	3.94	20.65	5687	0.71	49.11	INDICATED
8.9	13.6	1.53	28.24	3.61	21.43	5600	0.99	47.29	INFERRED
100.9	**152.5**	**1.51**	**26.41**	**3.43**	**20.41**	**5829**	**0.89**	**50.27**	**SUBTOTAL**
300 - 400m									
57.6	88.1	1.53	27.58	3.19	19.39	5712	0.70	50.16	MEASURED
1.6	2.5	1.55	26.64	3.63	19.29	5681	0.74	51.03	INDICATED
2.7	4.0	1.52	27.26	3.57	21.93	5726	0.73	47.76	INFERRED
61.9	**94.6**	**1.53**	**27.54**	**3.22**	**19.49**	**5712**	**0.70**	**50.08**	**SUBTOTAL**
Below 400m									
56.7	85.2	1.50	25.80	3.82	20.45	5869	0.51	50.78	MEASURED
4.4	6.9	1.55	27.59	3.48	18.24	5671	0.38	51.21	INDICATED
9.2	13.7	1.49	24.20	4.29	20.88	6006	0.52	51.93	INFERRED
70.3	**105.8**	**1.50**	**25.71**	**3.86**	**20.36**	**5873**	**0.51**	**50.95**	**SUBTOTAL**
372.3	**565.0**	**1.52**	**26.96**	**3.75**	**20.51**	**5746**	**0.83**	**49.55**	**GRAND TOTAL**
375	**567**	**1.5**	**27**	**3.7**	**21**	**5746**	**0.83**	**50**	***Total (Rounded)**

Note:

(i) Technical information in this UHG Coal Resource estimation has been compiled by Mr. Byambaa Barkhas, Senior Chief Geologist of Geology and Geotechnical, Mongolian Mining Corporation. Mr. Barkhas is a member of the Australasian Institute of Mining and Metallurgy (Member #318198) and has over 12 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Minerals Resources and Ore Reserves, The JORC Code (2012). Mr. Barkhas consents to the inclusion in the release of the matters based on this information in the form and context in which it appears. The estimate of the Coal Resource set out in Table 1 presented in this report are considered to be a true reflection of the UHG Coal Resource as at 31 December 2022, and have been carried out in accordance with the principles and guidelines of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. The JORC Code (2012).

(ii) Technical information in this UHG Coal Resource estimation has been internally peer reviewed by Mr. Lkhagva-Ochir Said Executive General Manager for Mining and Processing, Mongolian Mining Corporation. Mr. Said is a member of the Australasian Institute of Mining and Metallurgy (Member #316005) and has over 14 years of experience relevant to the style and type of coal deposit under consideration and to the activity which is being undertaken to qualify as a Competent Person as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The JORC Code (2012).

(iii) Due to rounding, discrepancy may exist between sub-totals and totals.

JORC (2012) Standard Resource Estimation

Ukhaa Khudag Coal Mine (Licence MV-011952)

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Prepared by
MONGOLIAN MINING CORPORATION
ENERGY RESOURCES LLC
DECEMBER 2021

TABLE OF CONTENTS

1 EXECUTIVE SUMMARY 8

2 INTRODUCTION 15

2.1 SCOPE OF WORK 15
2.2 RELIANCE ON OTHER EXPERTS 16

3 LOCATION, ACCESS AND LICENCE INFORMATION 17

3.1 PROJECT LOCATION 17
3.2 PROJECT ACCESS AND INFRASTRUCTURE 17
3.3 PHYSIOGRAPHY AND CLIMATE 22
3.4 OWNERSHIP AND MINERAL TENURE 24

4 EXPLORATION HISTORY 27

4.1 PREVIOUS EXPLORATION 27
4.2 PREVIOUS RESOURCE AND RESERVE ESTIMATES 31
4.3 MINING HISTORY 33

5 GEOLOGY 34

5.1 REGIONAL GEOLOGY 34
5.2 REGIONAL STRATIGRAPHY 35
5.3 LOCAL STRATIGRAPHY 40
5.4 DEPOSIT TYPE 44
5.5 STRUCTURE 45
5.6 INTRUSIVES 56
5.7 COAL SEAMS 59
5.8 OUTCROP, SUB-CROP AND OXIDATION 89
5.9 GEOCHEMISTRY 92
5.10 GEOTECHNICAL ISSUES 92
5.11 HYDROGEOLOGY 116
5.12 GAS 116
5.13 MINING POTENTIAL 116
5.14 COAL ECONOMICS 117

6 PEER REVIEW AND SITE VISITS 119

6.1 INITIAL SITE VISIT AND ONGOING COMPETENT PERSON VISITS FOR JORC (2004) RESOURCE ESTIMATE – JUNE 2012 119
6.2 SUMMARY OF ONGOING SITE VISITS, COMMENTS AND INTERNAL AUDITS FOR JORC (2012) RESOURCE ESTIMATE - DECEMBER 2014 121
6.3 INTERNAL PEER REVIEW – 2021 122

7 EXPLORATION 123

7.1 DRILLING 123
7.2 GEOPHYSICS 131

8 QUALITY ASSURANCE AND QUALITY CONTROL 133

8.1 DRILLING METHOD 133
8.2 BOREHOLE SURVEY 134
8.3 GEOPHYSICS 135

8.4 Geological Logging and Sampling 137
8.5 Analytical Method 141
8.6 Laboratory Inspection 143
8.7 Reproducibility of Analyses between Laboratories 145
8.8 Point of Observation definition and calculation 152
8.9 Use of Conditional Simulation Geostatistics to determine the expected error of estimation as an aid in the understanding of confidence in the classification categories. 153

9 RESOURCE ESTIMATION METHODOLOGY 159

9.1 Software Used 159
9.2 Database Compilation 159
9.3 Data Validation 159
9.4 Exploratory Data Analysis 160
9.5 Data Processing 160
9.6 Model Geostatistics 161
9.7 Gridding 163
9.8 Block Modelling 164
9.9 Resource Classification, Seam Coding and Grade Interpolation 168
9.10 Block Model Validation 169

10 RESOURCE STATEMENT 171

10.1 Comparison between New JORC (2012) - 31 December 2021 and Previous JORC (2004) – 31 December 2014 Resource Estimates to 400m 173

11 CONCLUSIONS AND RECOMMENDATIONS 175

12 DISCLAIMER 180

13 DATE AND SIGNATURE 181

14 STATEMENT OF QUALIFICATIONS 182

15 STATEMENT OF INDEPENDENCE 183

16 REFERENCES 184

17 GLOSSARY OF TECHNICAL TERMS 185

APPENDIX 1: MINERAL TENURE LICENSE 187

APPENDIX 2: PROCEDURES 188

APPENDIX 3: TABLE OF BASE OF WEATHERING AND QUATERNARY FOR ALL BOREHOLES THAT IT WAS LOGGED. 189

APPENDIX 4A: POINTS OF OBSERVATION – (AS-RECEIVED BASIS) 190

APPENDIX 4B: POINTS OF OBSERVATION – (AIR-DRY BASIS) 191

APPENDIX 5: LABORATORY CERTIFICATES 192

APPENDIX 6A: COMPLETE ANALYTICAL DATABASE SHOWING (AS-RECEIVED) COAL QUALITY 193

APPENDIX 6B: COMPLETE ANALYTICAL DATABASE SHOWING (AIR-DRY) COAL QUALITY 194

APPENDIX 7: GRAPHS ON A SEAM BY SEAM BASIS AND FOR EACH COAL QUALITY PARAMETER 195
APPENDIX 8: BOREHOLE PROFILES WITH LAS AND COAL QUALITY 196
APPENDIX 9: EAST-WEST & NORTH-SOUTH BOREHOLE SECTIONS 197
APPENDIX 10: SEISMIC SECTIONS & MAP 198
APPENDIX 11A: RESOURCES BY SEAM (AIR-DRY) 199
APPENDIX 11B: RESOURCES BY SEAM (AS-RECEIVED) 200
APPENDIX 12: LABORATORY AUDIT REPORTS 201
APPENDIX 13: SEISMIC REPORTS 202
APPENDIX 14: PEER REVIEW 203
APPENDIX 15: GEOTECHNICAL REPORT 204
APPENDIX 16: LIST OF DOWNHOLE GEOPHYSICAL EQUIPMENT 205
APPENDIX 17: FAULTED BOREHOLES AND PLIES 206
APPENDIX 18: INSERTED AND EXTRAPOLATED DATA POINTS 207
APPENDIX 19: RESOURCE CATEGORY AREAS PER PLY 208
APPENDIX 20: CAPABILITY STATEMENT 209
APPENDIX 21: UHG GEOCHEMISTRY 210
APPENDIX 22: RESERVES - RPM 211
APPENDIX 23: HYDROGEOLOGY 212
APPENDIX 24: VARIOGRAMS 213
APPENDIX 25: JORC (2012) TABLE 1 214

LIST OF FIGURES

FIGURE 3-1: LOCATION OF UKHAA KHUDAG DEPOSIT 17
FIGURE 3-2: TAVAN TOLGOI AIRPORT 18
FIGURE 3-3: UHG INFRASTRUCTURE 19
FIGURE 3-4: UHG CAMPS AND TOWN 20
FIGURE 3-5: 'DREAM' EDUCATION COMPLEX 21
FIGURE 3-6: 'TSETSII' APARTMENT COMPLEX 22
FIGURE 3-7: GOBI DESERT LANDSCAPE 23
FIGURE 3-8: GOBI DESERT FAUNA AND FLORA 24
FIGURE 3-9: MMC OWNERSHIP 25
FIGURE 3-10: UKHAA KHUDAG MINERAL TENURE 26
FIGURE 5-1: REGIONAL MAP OF THE TAVAN TOLGOI COAL BASIN 34
FIGURE 5-2: REGIONAL MAP OF THE TAVAN TOLGOI BASIN STRUCTURAL FEATURES 35
FIGURE 5-3: REGIONAL GEOLOGICAL MAP OF TAVAN TOLGOI COALFIELD 39
FIGURE 5-4: GEOLOGICAL MAP OF UKHAA KHUDAG DEPOSIT 41
FIGURE 5-5: GENERAL GEOLOGY UHG FROM WEST TO EAST 43
FIGURE 5-6: 1989 GEOLOGICAL MAP OF THE UHG DEPOSIT 46
FIGURE 5-7: COMPARISON OF SEISMIC AND BOREHOLE INTERPRETATION OF 'REVERSE FAULT A' 48
FIGURE 5-8: FAULT 'REVERSE FAULT A' RECENTLY UNCOVERED AT UHG 49
FIGURE 5-9: SEISMIC SECTION SHOWING SEAM CONTINUITY AND COMPLEX FAULT SYSTEM 49
FIGURE 5-10: STRUCTURE COMPARISON FROM 1989/NW WITH 2012 PROGRAM 51
FIGURE 5-11: SEISMIC LINE 10-14 SHOWING OVERTHRUST ZONE OF 'REVERSE FAULT B'. 52
FIGURE 5-12: IMBRICATE STRUCTURE 53
FIGURE 5-13: FAULT AREA PLAN/ SEISMIC INTERPRETATION ON THE FAULT. 54
FIGURE 5-14: MANDATORY AREAS FOR INDICATED AND INFERRED BASED ON STRUCTURE. 54
FIGURE 5-15: UHG MINE FAULT MAP 55
FIGURE 5-16: MAGNETIC ANOMALY MAP 56
FIGURE 5-17: HYDROTHERMAL LEACHING - FIRECLAY 57
FIGURE 5-18: RELATIONSHIP BETWEEN TOTAL MOISTURE AND AIR-DRY MOISTURE. 66
FIGURE 5-19: RELATIONSHIP BETWEEN ASH AND TRUE RELATIVE DENSITY. 66
FIGURE 5-20: RELATIONSHIP BETWEEN ASH AND VOLATILE MATTER. 67
FIGURE 5-21: RELATIONSHIP BETWEEN ASH AND CALORIFIC VALUE. 67
FIGURE 5-22: RELATIONSHIP BETWEEN ASH AND TOTAL SULPHUR. 68
FIGURE 5-23: RELATIONSHIP BETWEEN ASH AND VOLATILE MATTER ON A SEAM BASIS 69
FIGURE 5-24: AREAS OF UN-AFFECTED COAL AND DEVOLATILISED COAL. 71
FIGURE 5-25: VITRINITE MEAN MAXIMUM REFLECTANCE MAP OF MAJOR GROUP SEAMS. 73
FIGURE 5-26: STRUCTURE AND AREAS OF DEVOLATILISATION. ALL COAL SEAMS IN THE UPPER MAP AND SEAM 4C IN THE LOWER MAP. 74
FIGURE 5-27: PRODUCT DEFINITION FOR SEAM 4C FROM DETAILED IN-PIT SAMPLING 75
FIGURE 5-28: THE ASTM CLASSIFICATION OF THE COAL BASED ON RANK. 76
FIGURE 5-29: COMPARISON OF THE ASH AND CALORIFIC VALUE. ORANGE DOTS SHOW PRE 2020 DRILLING PROGRAM RESULTS (FROM JORC (2012) RESOURCE REPORT), BLUE DOTS SHOW 020 DRILLING PROGRAM RESULTS. 77
FIGURE 5-30: RELATIONSHIP BETWEEN AIR-DRY MOISTURE AND TOTAL MOISTURE FOR SEAM 0CU. 78
FIGURE 5-31: RELATIONSHIP BETWEEN ASH AND TRUE RELATIVE DENSITY FOR SEAM 0CU 78
FIGURE 5-32: RELATIONSHIP BETWEEN ASH AND VOLATILE MATTER FOR SEAM 0CU. 79

FIGURE 5-33: RELATIONSHIP BETWEEN ASH AND CALORIFIC VALUE FOR SEAM 0CU. 79
FIGURE 5-34: RELATIONSHIP BETWEEN ASH AND SULPHUR FOR SEAM 0CU. 80
FIGURE 5-35: CUMULATIVE PERCENTAGE DISTRIBUTION OF CSN VALUES. 85
FIGURE 5-36: THREE GROUPS OF SEAMS ACCORDING TO CSN DISTRIBUTIONS. 86
FIGURE 5-37: RANKING OF THE COAL SEAMS ACCORDING TO COKING COAL POTENTIAL 87
FIGURE 5-38: DETERMINING LIMITS OF WEATHERING 90
FIGURE 5-39: CURRENT LIMITS OF WEATHERING 91
FIGURE 5-40: REVISED GEOTECHNICAL PIT SECTORS (MARCH 2021) 93
FIGURE 5-41: PLAN VIEW (ABOVE) AND CROSS-SECTION (BELOW) SHOWING THE PROPOSED MINING SEQUENCE FOR SOUTHERN FAILED ZONE RE-MINING 96
FIGURE 5-42: SW CORNER - OBLIQUE VIEW 98
FIGURE 5-43: 3 X 20M HIGH BATTERS - 1.5M SAFETY BUND 100
FIGURE 5-44: ISOMETRIC VIEWS SHOWING A 80 M HIGH, 35° FACE ANGLE AND INDICATIVE ROCKFALL TRAJECTORIES FOR: 0.1 TONNE ROCKS (TOP) AND BOTH 0.1 AND 1 TONNE ROCKS (BOTTOM 3 X 20M HIGH BATTERS - 1.5M SAFETY BUND 101
FIGURE 5-45: FOS VS. OSA FOR NON-CIRCULAR FAILURE 102
FIGURE 5-46: WASTE DUMP CONSTRUCTION SEQUENCE 104
FIGURE 5-47: CROSS-SECTION LOOKING NORTH SHOWING STAGED IN-PIT DUMP CONSTRUCTION SEQUENCE 105
FIGURE 7-1: RUSSIAN BOREHOLES 123
FIGURE 7-2: NORWEST BOREHOLES 125
FIGURE 7-3: MMC GEOLOGY DEPARTMENT ROLE STRUCTURE 126
FIGURE 7-4: 2009-2011 BOREHOLES 127
FIGURE 7-5: SEISMIC PROGRAM FOR 2010 AND 2011 128
FIGURE 7-6: EMAIL FROM DR GRAEME HANCOCK - ANGLOAMERICAN 129
FIGURE 7-7: 2012-2014 BOREHOLES 129
FIGURE 7-8: 2018, 2020 BOREHOLES 130
FIGURE 7-9: ALL BOREHOLES END OF 2020 131
FIGURE 8-1: DIFFERENCE MAP OF COLLAR SURVEY AND TOPOGRAPHY SURVEY GEOPHYSICS 135
FIGURE 8-2: EXAMPLE OF A COMPARISON OF SCAN DATA AND LOGCHECK OUTPUT 138
FIGURE 8-3: EXAMPLE OF CORE PHOTOGRAPHS 140
FIGURE 8-4: PHOTOGRAPH OF FREEZER WHERE COAL SAMPLES WERE STORED WHILE WAITING FOR ANALYSIS 141
FIGURE 8-5: LABORATORY ACCREDITATION CERTIFICATE 143
FIGURE 8-6: COMPARISON OF ANALYSIS MOISTURE DETERMINATIONS. 148
FIGURE 8-7: COMPARISON OF ASH DETERMINATIONS 149
FIGURE 8-8: COMPARISON OF VOLATILE MATTER DETERMINATIONS. 149
FIGURE 8-9: COMPARISON OF TOTAL SULPHUR DETERMINATIONS. 150
FIGURE 8-10: COMPARISON OF CALORIFIC VALUE DETERMINATIONS 150
FIGURE 8-11: COMPARISON OF TRUE RELATIVE DENSITY VALUES. 151
FIGURE 8-12: COMPARISON OF FREE SWELLING INDEX DETERMINATIONS. 151
FIGURE 8-13: EXPECTED ERROR FOR SEAM 4C FOR THE 95TH PERCENTILE 155
FIGURE 8-14: BIGGS 2013 EXPECTED ERROR 156
FIGURE 8-15: RESULTING CATEGORY DISTANCES FROM EXPECTED ERROR FOR SEAM 4C 157
FIGURE 8-16: RESULTING CATEGORY DISTANCES FROM EXPECTED ERROR FOR SEAM 4C WITH 'LOSS' FACTOR 158
FIGURE 9-1: INTERPOLATED VIRTUAL PLIES 161
FIGURE 9-2: OMNIDIRECTIONAL SEMIVARIOGRAM FOR ELEVATION OF PLY 0AL 162
FIGURE 9-3: OMNIDIRECTIONAL SEMIVARIOGRAM FOR THICKNESS OF PLY 0AL 162
FIGURE 9-4: FIVE EXAMPLE OF ALL SURFACE GRIDS (SECTION) WITH BOREHOLES 163

FIGURE 9-5: FIVE STRUCTURE ZONE ELEVATION GRID FOR 0AL PLY (LOOKING NORTHWEST) WITH BOREHOLES 164
FIGURE 9-6: MODEL LIMITS FOR ALL SEAM 165
FIGURE 9-7: BASEMENT CONTACT WITH COAL MEASURE 166
FIGURE 9-8: WIREFRAME CONSTRUCTED FROM 2D SEISMIC PROFILES, FACE-WALL MAPPING AND BOREHOLES TO LIMIT THE NORTHERN AND SOUTHERN BOUNDARY FAULTS. 167
FIGURE 9-9: BLOCK MODEL (LOOKING NORTHWEST) FOR EACH STRUCTURE ZONES 167
FIGURE 9-10: FINAL BLOCK MODEL (LOOKING NORTHWEST) FOR EACH PLY 168
FIGURE 9-11: BLOCK MODEL VALIDATION 170

LIST OF TABLES

TABLE 1-1: TOTAL RESOURCE ON AN AS-RECEIVED (AR) BASIS 12
TABLE 1-2: TOTAL RESOURCE ON AN AIR-DRY (AD) BASIS 13
TABLE 3-1: GEOGRAPHICAL COORDINATES OF LICENCE MV-011952 25
TABLE 4-1: TOTAL AIR DRIED RESOURCES – 300M DEPTH LIMIT, MINIMUM APPARENT SEAM THICKNESS OF 0.6M 31
TABLE 4-2: TOTAL AIR DRIED RESOURCES – 300M DEPTH LIMIT, MINIMUM APPARENT SEAM THICKNESS OF 0.5M AND MAXIMUM ASH CUT-OFF OF 50% 31
TABLE 4-3: TOTAL AIR-DRIED RESOURCES – 400M DEPTH LIMIT, MINIMUM APPARENT SEAM THICKNESS OF 0.5M AND MAXIMUM ASH (DRY BASE) CUT-OFF OF 50% 32
TABLE 4-4: TOTAL COAL RESERVE 33
TABLE 5-1: GENERALIZED STRATIGRAPHIC COLUMN, TAVAN TOLGOI 38
TABLE 5-2: CHARACTERISTICS OF THE DISJUNCTIVE DISLOCATIONS AT THE UHG DEPOSIT 45
TABLE 5-3: LIST OF BOREHOLES WHICH HAVE INTERSECTED THE MAGNETIC ANOMALY 58
TABLE 5-4: SEAM HIERARCHY FOR UKHAA KHUDAG 63
TABLE 5-5: SUMMARY OF THE ANALYTICAL DATABASE. 64
TABLE 5-6: REGRESSION FORMULAE FOR COAL QUALITY PARAMETERS ON A SEAM BASIS. 81
TABLE 5-7: DISTRIBUTION OF CSN VALUES BY COAL SEAM. 84
TABLE 5-8: CUMULATIVE PERCENTAGE DISTRIBUTION OF CSN VALUES. 85
TABLE 5-9: COMPARISON OF BULK SAMPLE COKE TESTS 88
TABLE 5-10: TYPICAL AVERAGE CHPP WASHED COAL PRODUCT RESULTS 88
TABLE 5-11: TYPICAL PRODUCT TESTING PRIOR TO ACCEPTANCE 89
TABLE 5-12: PRELIMINARY SHEAR STRENGTH PROPERTIES – SOUTH WALL RE-MINING ANALYSES 96
TABLE 5-13: ESTIMATED SLOPE HEIGHTS AND ANGLES FOR SLOPES A, B AND C 99
TABLE 5-14: UHG MINE SLOPE DESIGN TABLE UPDATED SEP 2015 108
TABLE 5-15: REVISED ROCK STRENGTH VALUES FOR GALENA MODELLING (DECEMBER 2013) 113
TABLE 6-1- SURVEY AUDIT ON COLLAR SURVEYS 122
TABLE 7-1: VOLUME OF THE BASIC CATEGORIES OF GEOLOGY-EXPLORATION WORK AT THE UHG DEPOSIT IN 1985-1987 123
TABLE 7-2: NORWEST BOREHOLE DATA SUMMARY 124
TABLE 7-3: BOREHOLE DATA SUMMARY FOR 2009-2011 127
TABLE 7-4: BOREHOLE DATA SUMMARY FOR 2012-2014 130
TABLE 7-5: BOREHOLE DATA SUMMARY FOR 2018, 2020 131
TABLE 8-1: ERCCL LABORATORY AND SGS LABORATORY COMPARED. 145
TABLE 8-2: AVERAGE ER CENTRAL CHEMICAL LABORATORY VALUES AND DIFFERENCES COMPARED. 146
TABLE 8-3: REPRODUCIBILITY LIMITS BETWEEN LABORATORIES. 146

TABLE 8-4: REPRODUCIBILITY OF RESULTS BETWEEN ER CENTRAL CHEMICAL LABORATORY AND SGS LABORATORY 147
TABLE 8-5: CORE RECOVERY LIMIT PER SEAM 153
TABLE 9-1: SUMMARY OF POINTS OF OBSERVATION FILE 159
TABLE 9-2: SUMMARY OF DATA USED FOR RESOURCE ESTIMATE 160
TABLE 9-3: SUMMARY STATISTICS FOR AS-RECEIVED COAL QUALITY 160
TABLE 9-4: SUMMARY STATISTICS FOR AIR-DRY COAL QUALITY 160
TABLE 9-5: DEFAULT COAL QUALITY VALUES FOR PARTINGS 169
TABLE 10-1: TOTAL RESOURCES ON AN AS-RECEIVED (AR) BASIS 171
TABLE 10-2: TOTAL RESOURCES ON AN AIR-DRY (AD) BASIS 172
TABLE 10-3: COMPARISON OF UNADJUSTED NEW WITH PREVIOUS JORC RESOURCE ESTIMATES – NON JORC 173
TABLE 11-1: TOTAL RESOURCES ON AN AS RECEIVED (AR) BASIS 177
TABLE 11-2: TOTAL RESOURCES ON AN AIR DRY (AD) BASIS 178

1 Executive Summary

This report contains the results of the JORC (2012) Resource Estimation as at 31st December 2021, of the Ukhaa Khudag (UHG) deposit contained within Mining Licence [MV-011952] owned by Energy Resources LLC (ER), a wholly owned subsidiary of Mongolian Mining Corporation (MMC).

Mr Byambaa Barkhas is the Competent Person for this report and meets all requirements under the JORC Code (2012). Mr Barkhas, an employee of ER since March 2010. Mr Ballantine designed the previous exploration programs conducted from 2009-2014, and originally wrote the exploration procedures (Appendix 2), trained and developed the ER geology team and assisted with the setup of the onsite laboratory. Mr Barkhas and Mr Lkhagva-Ochir have designed the exploration programs of 2018 and 2020.

Mr Byambaa Barkhas was responsible for the revised seam correlation and structural interpretation, current Resource review, approving borehole data for JORC compliance resource estimation.

Mrs Tsolmon Adiya an ER employee was responsible for the coal quality section of the report.

Mr Uranbayar Chuluunbaatar an ER employee was responsible for block modelling and Resource estimation.

Internal peer review was conducted by Mr. Lkhagva-Ochir Said, the then Executive General Manager of Mining and Processing. These peer reviews confirmed compliance of the Group's work to update the Coal Resource estimations in compliance with requirements of the JORC Code (2012).

The UHG deposit forms part of the northern extension of the greater Tavan Tolgoi (TT) coalfield. The UHG license is approximately 30 km^2 in area and covers approximately 13 percent of the TT deposit of approximately 220 km^2. The coalfield is located in south-central Mongolia within the Ulaan Nuur Valley of the Gobi Desert. TT is separated into seven separate subfields, namely Tsankhi, Southwest, Borteeg, Ukhaa Khudag, Eastern, Bortolgoi and Baruun Naran.

The coalfield is situated within the Omnogobi Aimag (South Gobi province) about 90 km east of Dalanzadgad, the provincial capital, and some 550 km south of Ulaanbaatar, the national capital. The coalfield is 240 km from the border of the People's Republic of China to the south.

UHG is well serviced by the local soum (town), Tsogttsetsii, which is located approximately 7 km from the mine. ER has invested in the soums infrastructure to accommodate the operational staff, their families and supporting businesses. The soum has water and power, communications and high-speed internet.

The Mining License [MV-011952] is held by ER, the Mongolian operating company and wholly owned subsidiary of MMC. The license was dated 23rd January 2007 and is for a period of 30 years and covers an area 2960 Ha.

UHG is located within the TT synform, which is also a part of the South Gobi coal bearing basin. The deposit is composed of the Tsankhi and TT formations of upper Permian age. Underlying these formations are the volcanic and tuff-sediments of the Dushiin ovoo and Tsogttsetsii formations of upper Carboniferous-lower Permian age. Rocks of the latter two formations outcrop in the south-west and north-east parts of the

deposit, forming mountain uplifts surrounding the core of the syncline. These formations are exposed in a number of boreholes within the syncline. The north-west border of the deposit runs along the large Tsankhi thrust-fault.

The TT formation at UHG demonstrates 18 seam groups. The seam groups consist of 0A, 0B, 0CL, 0CU, 25-0D, 3A, 4A, 4A10-20, 4B, 4C, 5 and 6, which outcrop in the east and south of the area dipping west and north-west. In addition, seam groups 7, 8, 9, 10, 11 and 12, outcrop in the central-west of the deposit and dip north-north-west.

The seams have been intercepted by drilling to depths of 700m. The overall thickness of this formation was limited by the borehole depth but is much greater than 700m. In the Tsankhi deposit this formation's thickness is recorded at 965m. This formation in the Ukhaa Khudag deposit is likely to be of similar thickness. Seams split and merge throughout the deposit with 49 discrete plies being identified with 48 partings that form 97 seams. In accordance with the ASTM classification of coal by rank, with the wide range in volatile matter, the coal was classified as ranging from high-volatile 'A' bituminous coal to low-volatile bituminous coal with most samples in the medium-volatile bituminous group.

From the drilling programs conducted during 2009-2020, it was observed that boreholes alone were insufficient information to determine seam continuity and structure so a 2D high resolution seismic program was completed. The results showed the deposit to be highly faulted with complex low angle structures where previous work only indicated simple single faults. The seismic program proved invaluable in locating and understanding these fault systems but, just as importantly, showed areas of little to no structure and this is one of the great positives with using seismic. This work has continued to be a valuable guide with the 2012-2020 drilling campaign, and continues to provide additional confidence in the final resource model for mine planning and scheduling.

It was found in the 2009-2020 campaign that coal in the eastern part of the deposit was devolatilised more than the western part of the deposit. The cause of this was due to a major thrust structure, which can be traced with the seismic sections from the south-western to the north-eastern extent of the coal deposit. The effective result is coal being upgraded from a high-volatile (daf) coal to a mid-volatile (daf) coal and hence is the reason why these coal seams are potentially hard coking and not of a lower coking quality. The results of the 2018, 2020 campaign continue to support this finding and this volatile (daf) relationship has been a guiding tool in the mining process to select blocks based on coal rank for product selection.

A review from the RAW coal analyses on the seam group coking potential was completed. Three groups of seams were defined based upon low, medium and high potential for coking coal. Seams including 0A, 0B and 0BR were defined as having low to no coking potential, seams 0CU, 0CL, 25-0D, 4A10-20, 5, 8, 10, 11 and 12 were defined as having medium coking potential and seams 3A, 4A, 4B, 4C, 6, 7 and 9 were defined as having high coking potential.

Limit of Oxidation (LOX) work was completed for the immediate mining area for seam groups 0A and 0B. This work is ongoing as mining and exploration progresses.

Geotechnical data was collected with the previous and current exploration programs. AMC Consultants Pty Ltd (AMC) has been engaged to provide advice on geotechnical issues at UHG. All geotechnical data collected was provided to AMC for their on-going work.

UHG is now a world class mining operation utilising conventional truck and excavator mining methods. The mining operation is managed jointly under an alliance style contract with international mining contractor Thiess and other contractors. Under the contract, Thies provides all mining equipment. The site-based mining related workforce is comprised mostly of ER employees, and a small number of Thiess employees who are assigned to control equipment. All equipment operators and maintenance tradespeople are employees of ER.

Previous JORC (2004) Resources report, Mr Ballantine undertakes frequent site visits with Mr Said (Competent Person) and they reviewed different member's capabilities against the exploration procedures. Mr Ballantine's role was mentor and internal auditor, all final data, (i.e. seam thickness, seam correlation, sampling intervals, coal quality analysis, collar survey and LAS quality) are reviewed once the team (supervised by the Competent Person) completes the work. It was Mr Ballantine's professional opinion that within the ER geology team's works that there is a very high compliance with the team's results and JORC (2012) standards. Mr Ballantine has completed oral reviews and internal audits with the Competent Person at every step of the data preparation of the points of observation and the modelling stages to the final estimate. The ER geology and exploration team has changed little from that involved with preparing the previous JORC (2004) Resources report, issued in June 2012. Subsequently, the independent peer review by Mr Sercombe, senior consultant for GasCoal Pty Ltd and a coal geologist since 1996 is still relevant.

The ER geology and geotechnical team responsible for drilling program of 2018 and 2020, which forms the basis of this new Resource estimate update December 2021.

Internal peer review was conducted by Mr. Lkhagva-Ochir Said, the then Executive General Manager of Mining and Processing. These peer reviews confirmed compliance of the Group's work to update the Coal Resource estimations in compliance with requirements of the JORC Code (2012).

This Resource estimate is based on five separate campaigns of exploration:

- 1985-1987, where 111 cored boreholes were drilled by a joint Mongolian-Russian team;
- 2008, where Norwest drilled 116 cored and openhole boreholes and five large diameter bulk sample sites;
- 2009-2011, where ER drilled 1,435 cored and openhole boreholes; and
- 2012-2014, where ER drilled, 84 cored and 37 openhole boreholes; and
- 2018, 2020, the current program, where 51 cored and 76 openhole boreholes were completed.

Over the five campaigns a total of 249,802 metres was drilled, of which approximately 148,608 metres was cored and 101,183 metres was openhole. The drill spacing for the points of observation in the east and the west is less than 200 metres, with the central area greater than this.

All Quality Assurance and Quality Control (QAQC) methods for drilling, borehole survey, geophysics, logging and sampling were reviewed against current procedures that meet JORC (2012) standards. The analytical methods were also investigated. Mongolian-Russian analyses were completed by the Central Geological Laboratory in Ulaanbaatar, the Norwest analyses were completed by SGS Laboratories, Tianjin,

China, and for the 2009–2014 and the current program the analyses were completed by the onsite Energy Resources Central Chemical Laboratory (ERCCL).

All laboratories were accredited to the standards of the day with the ERCCL holding a current accreditation to ISO/IEC 17025:2017(MNS ISO/IEC 17025:2018). The ERCCL underwent two audits during the previous campaign with both delivering favourable responses. In addition, duplicate samples were sent to the Ulaanbaatar based SGS laboratory. The ERCCL generally reported the coal quality parameters generally higher than the SGS laboratory with varying degrees of reproducibility between laboratories.

The UHG resource estimate was carried out using Micromine Version 2021.5 and LogCheck Version 7.277 using the COALLOG geology data format as the database.

The method used for estimating resources at UHG involved modelling an elevation grid for the major ply 0AL and modelling thickness grids for the other plies and partings. These thickness grids for the plies and partings were then stacked on top or below of the elevation grid to form a 3D block model. Gridding with exact interpolation using ordinary kriging was used to generate grids for the elevation of the mid-point of the plies and Kriging with a omnidirectional semivarigram used to generate grids for the thicknesses of the plies and partings. The base of Quaternary surface, the extremely weathering surface, base of weathering surface and the topographic surface grids were also produced using IDW with a power of two.

The block model used for resource classification, seam coding and grade interpolation was limited vertically by the extremely weathering grid. The block model was limited laterally in the east by the subcrop. In the north and south, the model was limited by boundary faults and in the west by the license boundary. Each ply was limited to its own Inferred resource boundary or other defined limits. Coal mined between the base of weathering and extremely weathering surface has been economically used for the onsite PowerStation feed and a thermal coal product. It is now considered part of the resources but should be noted that it is a lower quality material.

Measured Resources were limited to points of observation at 350m, Indicated Resources by points of observation at 700m and Inferred Resources by points of observation at 1500m. Areas shown from the seismic to have low confidence in continuity, but still had coal from borehole intercepts were classified as Inferred Resources.

For seam coding there was no maximum seam thickness, a minimum seam thickness of 0.5m to 400m and 1.5m for Resources below 400m depth, a maximum parting thickness of 0.5m, and an ash content cut-off greater than 50% (DRY basis). In addition, core recovery was applied where it was greater than or equal to 95 percent for moderate or high potential coking coal seams and greater than or equal to 90 percent for low potential or no coking potential coal seams. Coal quality data was interpolated into the block model using IDW with a power of three.

Under the newly released ‘Australian Guidelines for the Estimation and Classification of Coal Resources’ 2014 edition (The Guidelines), which JORC (2012) refers to, the Competent Person is expected to provide an estimate of confidence in the classification categories used. This was done using conditional simulation geostatistics to aid in checking the category classification limits were sensible and determine the maximum expected error for each category. The maximum expected error for the

Measured category result is 6 percent, for the Indicated category result 12 percent and the Inferred category result 30 percent.

The total Resource estimate for UHG is shown on an as-received basis in Table 1-1 and on an air-dry basis in Table 1-2. It should be noted that these figures have been rounded to reflect that they are estimates and as a result this may cause figures not to sum correctly.

Table 1-1: Total Resource on an As-Received (AR) Basis

Volume (x1,000,000 m^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Total Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA-BHWE									
4.7	7.2	1.53	28.44	6.66	21.01	5518	0.96	46.82	MEASURED
0.4	0.7	1.50	26.54	4.87	22.68	5747	0.93	47.73	INDICATED
1.9	2.9	1.52	27.55	7.26	22.83	5381	0.85	45.44	INFERRED
7.0	**10.8**	**1.52**	**28.08**	**6.70**	**21.61**	**5496**	**0.93**	**46.51**	**SUBTOTAL**
BHWE - 100m									
41.6	63.9	1.54	28.53	4.18	20.79	5659	1.05	47.62	MEASURED
2.8	4.2	1.51	27.25	5.00	21.48	5742	0.92	48.29	INDICATED
8.8	13.4	1.52	28.50	5.22	21.57	5499	0.94	46.55	INFERRED
53.2	**81.5**	**1.53**	**28.46**	**4.39**	**20.95**	**5637**	**1.03**	**47.48**	**SUBTOTAL**
100 - 200m									
63.7	96.3	1.51	26.67	3.63	21.39	5854	1.02	48.96	MEASURED
5.9	9.0	1.53	28.04	4.61	20.43	5713	0.86	48.65	INDICATED
13.0	20.0	1.54	28.42	3.92	19.77	5664	0.92	48.82	INFERRED
82.6	**125.3**	**1.52**	**27.05**	**3.74**	**21.07**	**5814**	**0.99**	**48.92**	**SUBTOTAL**
200 - 300m									
88.6	133.7	1.51	26.17	3.38	20.28	5939	0.89	50.66	MEASURED
3.9	6.0	1.53	27.33	3.94	20.65	5754	0.71	49.11	INDICATED
8.9	13.6	1.53	28.24	3.61	21.43	5697	0.99	47.29	INFERRED
101.4	**153.3**	**1.51**	**26.40**	**3.42**	**20.40**	**5910**	**0.89**	**50.30**	**SUBTOTAL**
300 - 400m									
57.6	88.1	1.53	27.58	3.19	19.39	5795	0.70	50.16	MEASURED
1.6	2.5	1.55	26.64	3.63	19.29	5776	0.74	51.03	INDICATED
2.7	4.0	1.52	27.26	3.57	21.93	5797	0.73	47.76	INFERRED
61.9	**94.6**	**1.53**	**27.54**	**3.22**	**19.49**	**5795**	**0.70**	**50.08**	**SUBTOTAL**
Below 400m									
56.7	85.2	1.50	25.80	3.82	20.45	5942	0.51	50.78	MEASURED
4.4	6.9	1.55	27.59	3.48	18.24	5729	0.38	51.21	INDICATED
9.2	13.7	1.49	24.20	4.29	20.88	6069	0.52	51.93	INFERRED
70.3	**105.8**	**1.50**	**25.71**	**3.86**	**20.36**	**5945**	**0.51**	**50.95**	**SUBTOTAL**
376.4	**571.3**	**1.52**	**26.93**	**3.74**	**20.49**	**5829**	**0.83**	**49.61**	**GRAND TOTAL**
379	**572**	**1.5**	**27**	**3.7**	**20**	**5829**	**0.83**	**50**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

(Source: Energy Resources LLC)

Table 1-2: Total Resource on an Air-Dry (AD) Basis

Volume (x1,000,000 m^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Inherrent Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA-BHWE									
4.7	7.4	1.57	29.16	1.56	21.49	5643	1.00	47.77	MEASURED
0.4	0.7	1.54	27.16	0.87	23.18	5876	0.98	48.79	INDICATED
1.9	3.0	1.57	28.18	2.05	23.38	5502	0.89	46.39	INFERRED
7.0	**11.1**	**1.57**	**28.77**	**1.65**	**22.11**	**5619**	**0.97**	**47.46**	**SUBTOTAL**
BHWE - 100m									
41.6	65.1	1.56	29.19	0.88	21.28	5787	1.09	48.65	MEASURED
2.8	4.3	1.55	27.93	0.80	21.93	5871	0.97	49.34	INDICATED
8.8	13.8	1.56	29.19	1.22	22.05	5623	0.98	47.54	INFERRED
53.2	**83.2**	**1.56**	**29.13**	**0.93**	**21.44**	**5764**	**1.07**	**48.50**	**SUBTOTAL**
100 - 200m									
63.7	97.7	1.54	27.29	0.79	21.88	5986	1.05	50.04	MEASURED
5.9	9.2	1.56	28.71	0.69	20.87	5841	0.90	49.73	INDICATED
13.0	20.4	1.56	29.10	0.80	20.20	5792	0.95	49.89	INFERRED
82.6	**127.3**	**1.54**	**27.68**	**0.78**	**21.54**	**5945**	**1.02**	**50.00**	**SUBTOTAL**
200 - 300m									
88.6	135.7	1.53	26.79	0.70	20.74	6073	0.92	51.77	MEASURED
3.9	6.1	1.56	27.97	0.73	21.11	5883	0.74	50.19	INDICATED
8.9	13.9	1.56	28.89	0.86	21.92	5825	1.02	48.33	INFERRED
101.4	**155.7**	**1.53**	**27.02**	**0.71**	**20.86**	**6043**	**0.92**	**51.40**	**SUBTOTAL**
300 - 400m									
57.6	89.3	1.55	28.24	0.68	19.83	5926	0.72	51.25	MEASURED
1.6	2.6	1.57	27.29	0.87	19.72	5906	0.75	52.14	INDICATED
2.7	4.1	1.54	27.88	0.86	22.43	5928	0.74	48.83	INFERRED
61.9	**96.0**	**1.55**	**28.20**	**0.70**	**19.93**	**5926**	**0.72**	**51.17**	**SUBTOTAL**
Below 400m									
56.7	86.6	1.53	26.42	0.77	20.91	6076	0.53	51.89	MEASURED
4.4	7.0	1.58	28.26	0.75	18.66	5858	0.39	52.32	INDICATED
9.2	14.0	1.51	24.79	0.78	21.36	6206	0.54	53.06	INFERRED
70.3	**107.6**	**1.53**	**26.33**	**0.77**	**20.83**	**6079**	**0.53**	**52.07**	**SUBTOTAL**
376.4	**580.9**	**1.54**	**27.57**	**0.78**	**20.96**	**5961**	**0.86**	**50.69**	**GRAND TOTAL**
379	**581**	**1.5**	**28**	**0.8**	**21**	**5961**	**0.86**	**51**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

(Source: Energy Resources LLC)

In comparing the previous Resource estimate and the current Resource estimate, un-adjusted for mining so only the models were compared and were not affected by outside influences such as mining dilution, there is good agreement with the two estimates with the current estimate having an decrease of 8 percent in tonnes.

There were a number of materially positive and negative aspects that occurred between the previous (December 2014) and current (December 2021) Resource estimates. One of the main aspects is that the current Resource estimate was completed under the new JORC Code (2012) which references the new Coal Guidelines (2014). It should be noted that the two documents are far more stringent and thorough than previous versions. The following is a list of changes that were applied with apparent affect to the current estimate.

- Updated base of weathering and base of Quaternary with new drilling, (coal lost).
- Basement rocks found in boreholes G02603, G02611, G02638 and G02619 and the Ukhaakhudag fault boundary have shrunk inside the deposit. The thickness of the coal seams in the Ukhaakhudag fault zone has also decreased, (coal lost)
- Seam correlation changed (boreholes G01882, U72R, G02601, G02649) around reverse fault A and B (coal lost)

- Decreased coal thickness near (boreholes G02601, G02649, G02611) reverse faults B and C (coal lost)
- Decreased coal thickness (borehole G02635) in the west and south-west area of the deposit (coal lost)
- The boundaries of the deposit have been extended to the north, (coal gained).

In view that this Resource estimate forms the basis for a Reserve update, the following recommendations for the project area include, but are not limited to:

1. Continue to map LOX lines within the mine area and also drill closely spaced boreholes to determine remaining seam LOX lines in the west of the deposit.
2. Plan and execute drilling 120x120 metre borehole spacing triangular grid in the middle area in front of mining for better seam delineation and coal quality to keep the mining pit advancing on reliable information.
3. Further bulk sample work for the western area for washability and coke testing so a full understanding of how these seams behave so the current CHPP performance can be ascertained and viable saleable products can be determined and scheduled for the mining operation.
4. Expand the calculation for expected error to all the other major seam groups.
5. Continue the understanding of the spatial distribution of the coking characteristics of the coal, and the geological parameters that affect the coking characteristics, as these are beneficial for mine planning and production scheduling in order to produce a consistent product and maximising the value of the deposit.
6. A review should be completed where there was some variation in the elevations of the topography survey and the collar survey.
7. The seismic data is high level data that has been important in locating and defining structural style, but it is highly recommended that mine geologists continue to map and monitor faults within the pit.
8. It is recommended that for future programs that some gas testing is completed on deeper boreholes to develop an understanding of the potential for coal bed methane at UHG.

The JORC (2012) Table 1 for this report can be viewed in Appendix 25.

2 Introduction

This report contains the results of the JORC (2012) Resource Estimation as at 31st December 2021, of the UHG deposit contained within licence [MV-011952] owned by ER, a wholly owned subsidiary of MMC.

Mr Byambaa Barkhas is the Competent Person for this report and meets all requirements under the JORC Code (2012). Mr Barkhas, an employee of ER since March 2010. Mr Ballantine designed the previous exploration programs conducted from 2009-2014, and originally wrote the exploration procedures (Appendix 2), trained and developed the ER geology team and assisted with the setup of the onsite laboratory. Mr Barkhas and Mr Lkhagva-Ochir have designed the exploration programs of 2018 and 2020.

Mr Byambaa Barkhas was responsible for the revised seam correlation and structural interpretation, current Resource review, approving borehole data for JORC compliance resource estimation.

Mrs Tsolmon Adiya an ER employee was responsible for the coal quality section of the report.

Mr Uranbayar Chuluunbaatar an ER employee was responsible for block modelling and Resource estimation.

Mr Ballantine worked as an independent consultant employed by GeoCheck Pty Ltd working on Mongolian projects as a coal expert from January 2008 to June 2010. From July 2010, he joined the ER management team as a full time employee in the position, Executive General Manager for Exploration and Geology. Mr. Ballantine was responsible for training, development, and consulting for the geology team. In addition, he provides assisted and peer review for the CP for 2015 resource estimate, approved borehole data for reported in accordance with the JORC Code (2012), designed, budgeted and supervised the exploration programs and results.

Internal peer review of exploration work 2018 was conducted by Mr. Lkhagva-Ochir Said, the then Executive General Manager of Mining and Processing. These peer reviews confirmed compliance of the Group's work to update the Coal Resource estimations in compliance with requirements of the JORC Code (2012).

As stated by the JORC (2012) Code: *The Code requires in Clauses 19, 27 and 35 that reporting of first time or materially changed Exploration Results, Mineral Resources or Ore Reserves estimates be accompanied by a technical summary of all relevant sections of Table 1 on an 'if not, why not' basis as an appendix to the Public Report.* The JORC Table 1 can be viewed for this report in Appendix 25.

2.1 Scope of Work

The following items make up the scope of work for the UHG deposit:

- Continue to develop an internal geological team for ER and review procedures, training and mentoring for reporting in accordance with the JORC Code (2012).
- Design and budget an exploration program that would provide geological information on infill drilling for coal quality, seam continuity, structure and an update of Resources.

- Review, based on new data and actual mining geology data, the high resolution 2D seismic data for structure and seam continuity.
- Review the onsite coal laboratory.
- Perform QAQC analysis, document the laboratory process and determine densities to be used in Resource estimation.
- Complete depth adjustment and seam correlation.
- Establish points of observation.
- Estimate expected error as support to Measured and Indicated classification category limits.
- Complete resource estimation.
- Write the JORC (2012) standard report including JORC Table 1.

Other study sections such as legal standing, environmental, processing, mine planning and safety are outside of this scope of work.

2.2 Reliance on Other Experts

Mr Barkhas has relied upon information that has been prepared by non-qualified persons during the preparation of this report. Mr Barkhas is not in a position to, and does not, verify the accuracy of, or adopt as his own, the information and data supplied by others. All information provided in this report with the exception of observations and interpretations made on the basis of the Competent Person, rely on such data as provided by non-qualified persons.

3 Location, Access and Licence Information

3.1 Project Location

The UHG deposit forms part of the northern extension of the greater TT coalfield. UHG is approximately 30 km^2 in area and represents about 13 percent of the TT coalfield, which covers an area approximately 220 km^2. The coalfield is located in south-central Mongolia within the Ulaan Nuur Valley of the Gobi Desert. The coalfield is situated within the Omnogobi Aimag (South Gobi province) about 90 km east of Dalanzadgad the provincial capital and around 550 km south of Ulaanbaatar, the national capital (Figure 3-1). The coalfield is 240 km from the border between Mongolia and the People's Republic of China (PRC) to the south.

Figure 3-1: Location of Ukhaa Khudag deposit

(Source: Energy Resources LLC)

3.2 Project Access and Infrastructure

UHG is located approximately 550 km south of the Mongolian capital city Ulaanbaatar and approximately 95 km east of the Omnogobi Aimag centre Dalanzadgad.

Regular direct commercial flights (duration approximately 1hr) from Ulaanbaatar are available to the Tavan Tolgoi airport (Figure 3-2), located approximately 16 km from the UHG mine site. Other regular commercial flights are available to Dalanzadgad

(duration also approximately 1hr), from where access to the UHG site is possible via approximately 1 hour drive over mostly sealed roads.

Figure 3-2: Tavan Tolgoi airport

(Source: Energy Resources LLC)

Dalanzadgad is the administrative centre of the Omnogobi aimag, and as such contains the region's major government agencies, transport links, services and industries. The town has a power station, food and produce market as well as smaller businesses such as supermarkets, hotels and restaurants.

Electricity is mainly supplied to Dalanzadgad by the town's thermal coal fired power station. This power station is supplied by coal from the small Tavan Tolgoi mine which is not owned by ER and is on a separate mining licence to the west of the ER tenure, UHG.

Overburden removal commenced in October 2008 at UHG, with coal extraction commencing in April 2009. Workshop, office and accommodation facilities, offices, 18 MW Power Station and 15 Mtpa Coal Handling and Preparation Plant (CHPP) are the main infrastructures now located at UHG (Refer Figure 3-3). The UHG operation has excellent communications infrastructure, with full coverage for mobile phone services and high speed internet throughout the operation.

Figure 3-3: UHG Infrastructure

(Source: Energy Resources LLC)

A fully sealed 240km two lane highway was construction to take coal from UHG to Gashuun Sukhait, the Mongolian coal port 30km from the Chinese border. Currently a 240 km railway line is under construction.

Tsogttsetsii is a small soum that is located 7 km from the mine. The soum had basic facilities but is growing very quickly. ER has invested in the soums infrastructure to accommodate the majority of staff, their families and supporting businesses. The soum has water and power, communications and high-speed internet. The worker's camp constructed early in the development of UHG remains in operation, providing full-service accommodation to the remaining portion of bus-in bus-out employees (Refer Figure 3-4).

Figure 3-4: UHG Camps and Town

(Source: Energy Resources LLC)

A new school, kindergarten and dormitory complex was constructed and put into operation as part of the company's corporate social responsibility commitment. Jointly financed by ER and the local government, the new school and kindergarten complex is a modern facility, comprising a secondary school for 640 children, a kindergarten for 144 children and a dormitory for about 100 children (Figure 3-5). In addition to providing direct educational access to the company employees, the new complex is expected to make significant contribution in raising the quality of education in the region in which it operates.

Figure 3-5: 'Dream' education complex

(Source: Energy Resources)

To facilitate the relocation of employees from Ulaanbaatar to Tsogttsetsii, ER has also built an apartment complex named 'Tsetsii'. To date, more than 500 families have moved into fully-furnished apartments (Figure 3-6). Given the expanding presence in Tsogttsetsii soum of Omnogobi aimag, ER sees the new facilities as part of its growing commitment to make substantial contribution to the social and educational well-being of the local communities. While encouraging the company employees to move and settle in South Gobi by providing them with complete and comfortable living conditions, the investment is expected to bring lasting value in the host communities where existing social infrastructure is very limited.

Figure 3-6: 'Tsetsii' apartment complex

(Source: Energy Resources)

3.3 Physiography and climate

The Tavan Tolgoi area is characterised by gently rolling desert plains with minor topographic relief. The elevations in the region range from 1490m to 1590m. The higher elevations occur on a number of small hills that surround the area, which is a continuation of the Altai mountain range that contains mountains with elevation around 3000m such as Gobi Gurvan saikhan, Sevrei, Noyon bogd, Nomgon, Tost, Nemegt and Altan Uul Gilbent. Also, in this area is the 800m high and 150km long Khongor sand dune (Figure 3-7).

The following information was taken from the report 'Detailed Exploration Results and Resource Estimation of Ukhaa Khudag Coking Coal deposit'.

'Even though Omnogobi aimag doesn't have any big lakes and rivers, it has beautiful oases and small lakes and ponds. The area has many springs such as Khadat, Zuulun, Nemegt, Zuulun, Enger Buleen and Talkhit cold springs, Elgen and Salkhit hot springs. By 2007, the national water department had registered, 3 rivers, 2 lakes, 581 springs, and 1 medical spring. From regional hydrology investigations it had been estimated that underground water reserves are of the order of 260.5 million cubic meters'.

Figure 3-7: Gobi desert landscape

(Source: Energy Resources LLC)

The annual average maximum temperature is around 20.2°C to 24°C during July and minimum temperature is around -11.5°C to -6.8°C during January. Average annual temperatures can fluctuate every year.

The maximum temperature can reach from 32.6°C to 39.9°C in the rest of aimag. The whole area of the aimag is located in a dry climatic region, and average humidity is around 29% to 50% during the warm season and 50% to 73% during the cold seasons.

Average precipitation received in Dalanzadgad, Noyon, Gurvantes, Khankhongor, Bulgan and Manlai soums is around 102.1 to 132.9mm, in Bayan-Ovoo and Nomgon soums is around 63.2 to 70.9mm and in the rest of the soums is around 80 to 100mm. Monthly average wind speed is the highest in spring and lowest in winter and summer seasons. Average wind speed is 7.5 m/sec and maximum speed is 50.0 m/sec.

Medicinal herbs are found in the area and total about 250 species of small leafed, nutritious, short plants and vegetation's that are resistant to hot and dry weather of the desert. Desert and desert steppe plants like stipa, straw, cleistogenes, psammochloa, aphedra, xanthoxylon, anabasis, ceratoides, salsola etc. are found in the area. Plants and vegetation that local people use in their lives are cynomorium; nitraria and a Mongolian onion (refer Figure 3-8).

World and nationwide endangered species like Argali the wild sheep, ibex, leopard, black tailed antelope, mazaalai the Gobi bear, marbled polecat, wildcat, lynx, rock marten, gopher, antelope etc. inhabit the area (refer Figure 3-8).

Figure 3-8: Gobi desert fauna and flora

(Source: Energy Resources LLC)

Sparse, small semi desert shrubs and grasses are typical of the vegetation throughout the region and the soil profile in this area is poorly developed. The thickness of soil cover or other surficial deposits at Tavan Tolgoi typically is only about 4cm to 6cm thick.

3.4 Ownership and Mineral Tenure

Initially, on 2nd May 2005, the following six exploration licenses in the area of the TT coalfield were transferred to ER based upon a merger of two license holding companies: Energy Resources LLC and Darkhankhaan-Uul LLC.

1. 1900X – (Tavan Tolgoi-1) from Energy Resources LLC;
2. 1901KH – (Tavan Tolgoi) from Energy Resources LLC;
3. 1901KH-1 – (Ukhaa Khudag) from Energy Resources LLC;
4. 5188KH – (Bor Tolgoi) from Darkhankhaan-Uul LLC;
5. 5189KH – (Shar Teeg) from Darkhankhaan-Uul LLC;
6. 5190KH – (Bor Teeg-1) from Darkhankhaan-Uul LLC.

On 8th May 2006, based upon its six exploration licenses, ER applied to the Mineral Resources and Oil Authority for granting mining licenses, and six mining licenses (11943A, 11952A, 11953A, 11954A, 11955A, 11956A) were granted by the decisions No.789 and 805 of the Head for Geology, Mining Cadastre Unit of the Mineral Resources and Oil Authority on 10th August 2006 and 17th August 2006 respectively. These licenses were granted based upon the 1997 Mineral Law.

With effectiveness of the newly approved 2006 Mineral law from 26th August 2006, ER negotiated with the Government of Mongolia reaching agreement to transfer five of its mining licenses to the State, and hold the remaining mining license over the UHG deposit, [MV-011952], with minor coordinate changes. The license was dated 23rd January 2007 and is for a period of 30 years.

In accordance with this consensus the License Transfer Agreement was signed on 21st March 2008 and the coordinates of license [MV-011952] was increased from 1011 Ha up to 2962 Ha. On the 1st April 2010, a further minor change to the license was made, which reduced the area to its now present 2960 Ha.

The license is held by ER, the Mongolian operating company of MMC, a BVI incorporated company, listed on the HK Stock Exchange (refer Figure 3-9). The UHG license is currently owned by ER (refer Appendix 1 Mineral Tenure Certificates).

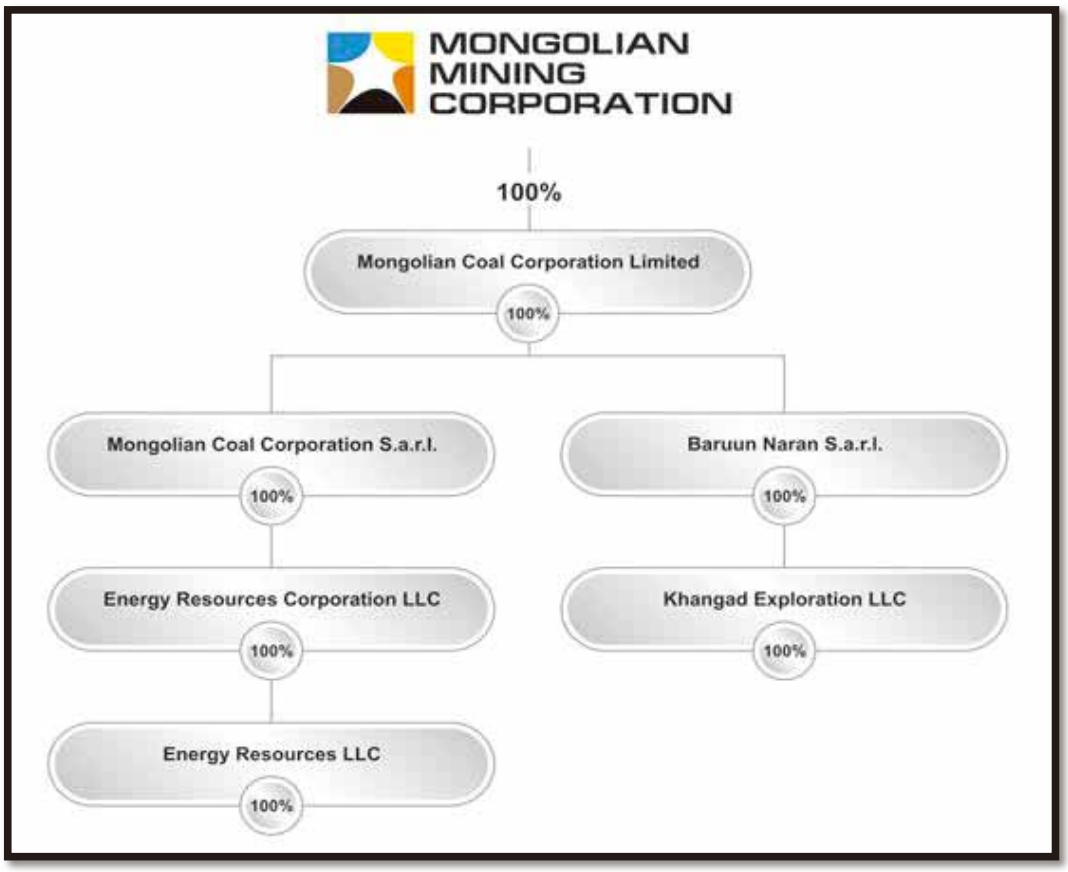


Figure 3-9: MMC Ownership

(Source: Energy Resources LLC)

The geographical coordinates for this license are shown in Table 3-1 and Figure 3-10.

Table 3-1: Geographical Coordinates of licence MV-011952

Point Number	Longitude			Latitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
1	105°	32’	31.32”	43°	39’	19.4”
2	105°	26’	51.25”	43°	39’	19.42”
3	105°	26’	51.25”	43°	41’	25.42”
4	105°	32’	31.33”	43°	41’	25.4”

(Source: Energy Resources LLC)

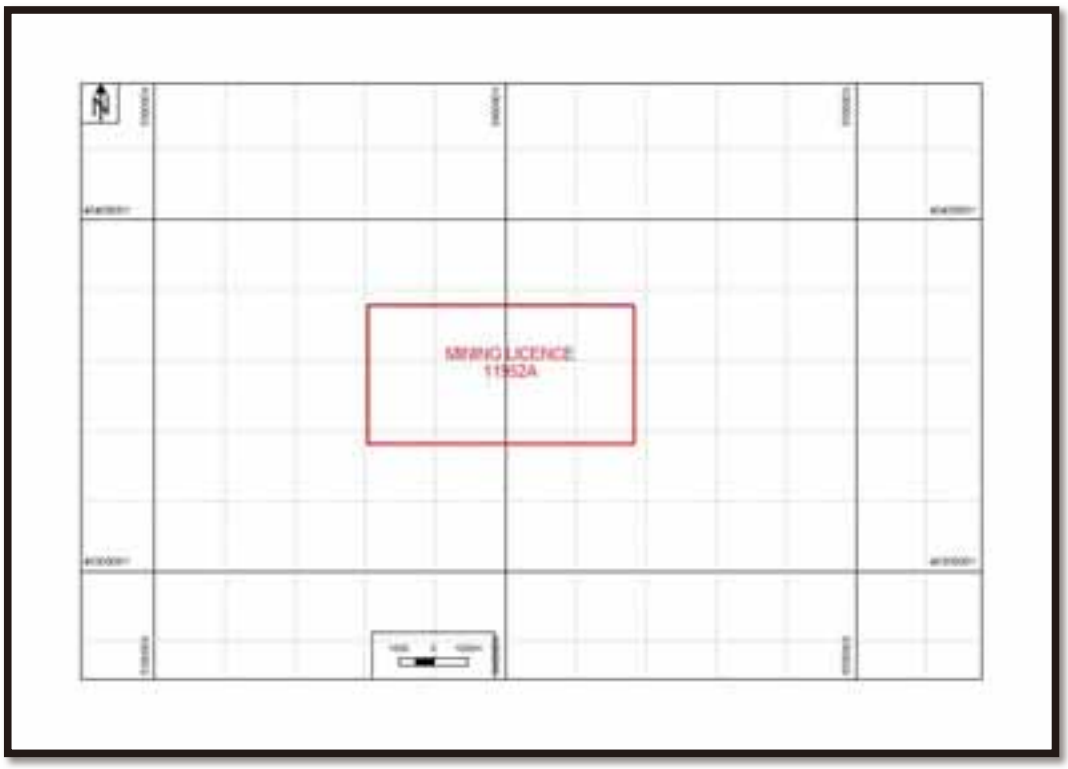


Figure 3-10: Ukhaa Khudag Mineral Tenure

(Source: Energy Resources LLC)

4 Exploration History

4.1 Previous Exploration

The following summary was taken from the '*Report of detailed exploration first mining area at the Tsankhi deposit of Tavan Tolgoi coal deposit Mongolia in 1988'* produced by Ch. Gankhuyag, Tsader. Z.S and others:

- *The Tavan Tolgoi group (TT) of deposits of fossilized coal was discovered and exploited by the local people since early 19th century.*
- *The first official information on the deposit appears in reports by geologist K.D.Pomazkov, who studied the coal in a small opencut pit in 1940. The coal of the deposit was surveyed and tested by the geologist N.A.Marinov in 1943-1953. Analyses concluded that the coal of the deposit had good coking properties. In 1953-1956 the western part of the TT deposit of an area of 35 km^2 was explored and 18 seams with total of 2.8 billion tons of reserves were identified (Shklyaev, 1957).*
- *In 1975, from shafts sunk in the deposit, 5 semi-industrial (pilot-plant rank) samples were taken from seams 4A, 4B, 8A, 8B, 8C, 9A, 9B, 9C by Bulgarian geologists. Their tests showed that the deposit bore high value as a source of metallurgical coke, which however, was characterized by 'moderately difficult' and 'difficult' washability.*
- *In 1977 at the request of the Government, MPR (Mongolian People's Republic), 'LENGIPROSHAHT' conducted technical and economic assessment for detailed exploration, upon the condition that the coal of all seams is coking, relying on the results of incomplete exploration works. The assessment established that it would be feasible to operate an opencut mine with the capacity of 20 Mt, if minable reserves of 700-800 Mt of coking coal are to be produced from the lower seams. Also the assessment resolved the issues of centralized water supply. The assessment had also recommended continuing the exploration works.*
- *The protocol of the 20th session of the COMECON (Council for Mutual Economic Assistance) Standing Committee for Cooperation on Planned Activities envisaged that MPR completes the exploration of the deposit in 1981 and update the Technical and Economic Assessment by GIPROSHAHT Institute against the findings of the exploration works by first quarter of 1983.*
- *With the view to implement this protocol recommendation, in 1978-1981 exploration-evaluation works were carried out throughout the TT deposit area, which resulted in the resource estimation, mainly in categories C2 and P1 beyond 5 billion tons. Besides, sites with most favourable mining and geological conditions were identified to add to the prospective studies on the possibility to extract coking coal – Northern, North-Western (which later were merged with Tsanhi area) and South Western. The exploration-evaluation works identified the spread of the coal tenure to 90 km^2, and fundamental features of the geological structure were clarified, and at the same time economic reserves and forecasting resources of (2,970 and 2,100 Mt respectively) of which 684 Mt were coking coal.*

- *In 1981 – 1983 a preliminary survey was conducted to a depth of 320 m from the surface within the boundary of Tsanhi and South-Eastern parts of the deposit (35 and 4 km^2 respectively). The preliminary calculation of reserves which was made in accordance with the survey was tested in IKZ USSR (18 June 1986). According to the preliminary survey report, economic reserve of coal in the Seam 2 and its 21 patches in categories A+B+CI+C2 was 1589, 4 Mt including the 1021, 7 tons of coking coal. The GKZ USSR (State Commission on Mineral Reserves of the USSR) estimated that only the coals of seams 3 and 4 were good for coking and partly of seam 0 amounting 504 Mt, but the reserves of the rest of the seams were appropriate for energy production.*
- *A detailed survey of the area of initial exploitation, Tsankhi was carried out along with technical and economic evaluation made by Mongolian specialists and at the order of the Committee of Ministers of MPR (Mongolian People's Republic). A systematic exploration program began in the summer of 1985 and finished in the third quarter of 1986. The materials of the detailed survey, together with materials of the previous studies have been integrated in the present report* (1988 report).
- *In 1985-1987 exploration-evaluation works were conducted in areas directly connected to the Eastern, Bor Tolgoi and Ukhaa Khudag. More perspective and potential among these was the area of Ukhaa Khudag, which underwent a preliminary survey in 1987. As results of exploration-evaluation work it was established that the most valuable coal seams by quality and thickness are located within the Ukhaa Khudag deposit. Therefore geology-exploration work for this deposit was continued and in 1987 preliminary exploration had been carried out. Presently* (1988) *the deposit is evaluated by the core boreholes which are located on 11 north-south exploration lines. Distance between exploration lines on the east wing is 125-500 m, while it increases up to 625-750 m for other areas of the deposit. Distance between boreholes on the exploration lines is 250-300m. Opened area of the Tavan Tolgoi formation sections of 674 m thickness contains 11 seams with total cumulative thickness of 51.43 m. At the Ukhaa Khudag deposit more industrial significance is related to seams 0, 3, 4, 8 and 9. According to information of this exploration work in Ukhaa Khudag deposit the total reserves and resources of coal with regard to categories B+C1+C2 = 288.6mln.t (B-46.7 mln.t, C1-156.0 mln.t, C2-85.8 mln.t), and coking coal with regard to categories B+C1+C2 = 206.8mln.t(B-46.4, C1-115.2, C2-45.2).*
- *In 1984-1989 continual testing of coal by the USSR's VUHIN Institute of Minchermet; the Institute completed studies of the chemical characteristics of the coking coal for Tsankhi & preliminary reports of the coal from Ukhaa Khudag and Tavan Tolgoi South.*

The following summary was taken from the '*Ukhaa Khudag Technical Report: Geology and Coal Resources'* produced by Norwest Corporation, 13th May 2009.

- *The first systematic exploration of the area commenced in the 1950's. In total, approximately 3,000 boreholes (primarily core holes) were drilled in the district and most of the coal core was subjected to thorough coal quality testing.*
- *In 1990 a major feasibility study was completed by the Giproshakht Institute entitled, Feasibility Study of the Mining of the Tavan Tolgoi Coking Coal in the Mongolian People's Republic. In 1998, two confirmation drilling and testing projects were conducted, one by Norwest as part of a preliminary feasibility study for the Mongolia Ministry of Infrastructure Development and the other by BHP as part of their commitment to the Mineral Resource Authority of Mongolia. Norwest drilled five boreholes, whereas BHP drilled six boreholes. Coal from these boreholes was subjected to various coal quality and coking tests. In early 1999 the results from these two projects were reported in separate feasibility studies.*
- *ER conducted a 10 borehole exploration project on their former exploration license at Tsankhi during the fall of 2007. Subsequently, Norwest produced a geologic model for the entirety of Tavan Tolgoi coalfield along with resource estimations for the various coalfields, provided to ER on January 23, 2008.*
- *Prior to 2008, the UHG coalfield had largely been explored by the Mongolian-Russian teams of the 1980's as part of the larger effort to understand the Tavan Tolgoi deposit. Review of records and reports indicate exploration techniques at UHG included a combination of surface mapping, core drilling, trenching and auguring. The historic exploration and mining studies identified a substantial coal resource in the UHG coalfield and were successful at delineating its larger structural characteristics with a fair degree of accuracy. The drilling density, however, was determined to be insufficient for defining smaller-scale features within the coalfield and for determining detailed seam correlations with a high degree of confidence throughout the property. Additionally, the Russian coal quality data required infill and modern validation to provide an adequate database for assessing the institute coal quality to current international standards. ER conducted an infill drilling and bulk sampling program at UHG in 2008, which was planned and managed by Norwest. The purpose of this program was to address the issues identified above and bring the bulk of the UHG resource to a level of geologic assurance sufficient for mine planning and feasibility level study. The primary objectives of ER's 2008 exploration program were to:*
    - *Develop the resource to a measured and indicated level of geologic assurance.*
    - *Infill the historic in-situ coal quality data locations.*
    - *Validate the historic in-situ coal quality data.*
    - *Improve the confidence of detailed seam and bench correlations.*
    - *Gather geotechnical data for analysis and use in mine planning and pit design.*

  - *Gather hydrogeological data for use in mine planning and ground water management.*
  - *Collect bulk samples of key seams for detailed coal processing tests and characterization of metallurgical properties.*

- *A total of 111 Russian holes were used in the final model, the majority being cored holes. The Norwest program included a total of 121 holes, comprised of 17 slim gauge core holes (PQ/HQ), 99 slim rotary holes (± 100mm) and 5 large diameter core/bulk sample locations. A grand total of 232 holes were used in the creation of the current* (2008) *geologic model with an average drilled depth of approximately 200m.*
- *The 2008 program sufficiently increased the prior borehole density and validated the historic Russian data to an extent sufficient for categorizing the UHG mine area as a measured plus indicated resource according to the JORC Code and thereby permitting advanced mine planning and economic evaluations to be conducted at current international standards. The drilling plan will also penetrate to a depth of 600m, thus bringing potentially underground mineable resources into a higher level of confidence.*

Mining operation at UHG commenced in October 2008 based on the previous exploration work. During this time it became apparent that further work was required, and so during 2009-2011 ER extended the drilling with an additional 1,435 boreholes for 166,384 drilled metres. In addition to drilling, during 2010 and 2011, 71 km of 2D high resolution seismic data was collected. With the combination of very deep drilling in the west (over 700m) and the seismic data, an updated JORC (2004) Resource estimate was completed in June 2012, with JORC (2004) Reserve subsequently updated in December 2012.

4.2 Previous Resource and Reserve Estimates

4.2.1 May 31, 2010 - Norwest

The UHG air-dried coal resources as of 31st May 2010, were estimated according to JORC (2004) standards by Norwest as indicated in Table 4-1.

Table 4-1: Total air dried Resources – 300m depth limit, minimum apparent seam thickness of 0.6m

Category	Resource Volume (m^3) '000	Density air dried (g/cm^3)	Total Tonnes ($Mt^{\#1}$)
Measured	137,043	1.52	208.9
Indicated	136,892	1.52	207.6
Inferred	7,241	1.52	11.0
Total	**281,176**	**1.52**	**427.5**
#1. Mt = Million metric tonnes (air dried)			

(Source: Norwest Corporation)

4.2.2 June 30, 2012 – ER

The UHG air-dried coal resources as of 30th June 2012 were estimated according to JORC (2004) standards by ER as indicated in Table 4-2.

Table 4-2: Total air dried Resources – 300m depth limit, minimum apparent seam thickness of 0.5m and maximum Ash cut-off of 50%

Category	Resource Volume (m^3) '000	Density air dried (g/cm^3)	Total Tonnes ($Mt^{\#1}$)
Measured	184,036	1.56	287.9
Indicated	102,399	1.58	161.6
Inferred	43,355	1.59	68.8
Total	**329,790**	**1.57**	**518.3**
#1. Mt = Million metric tonnes (air dried)			

(Source: Energy Resources LLC)

4.2.3 December 31, 2014 – ER

The UHG air-dried coal resources as of 31st December 2014 were estimated according to JORC (2012) standards by ER as indicated in Table 4-3

Table 4-3: Total air-dried Resources – 400m depth limit, minimum apparent seam thickness of 0.5m and maximum Ash (dry base) cut-off of 50%

Category	Resource Volume (m^3)'000	Density air dried (g/cm^3)	Total Tonnes ($Mt^{\#1}$)
Measured	208,069	1.56	324.72
Indicated	111,432	1.57	175.17
Inferred	54,412	1.59	86.63
Total	**373,913**	**1.57**	**586.51**
#1. Mt=Million metric tonnes (air dried)			

(Source: Energy Resources LLC)

4.2.4 January 01, 2013 – Runge Pincock Minarco

RungePincockMinarco (RPM) was commissioned by MMC to complete Reserve estimation for UHG as at the 31st December 2012. The following paragraphs were taken from the final report (ADV-SY-04083, RPM, August 2013), which can be viewed in Appendix 22. The report was an integrated study including both MMC owned deposits; UHG and Baruun Naran (BN). However, for this report only the Reserve estimate for UHG is discussed below.

RPM was commissioned by MMC to undertake an update of the Reserves Statement for the UHG and BN Projects, in addition to a LOM Study to a feasibility study level of accuracy (+/-15%). The overall objectives of the LOM Study was to review the mining method for the moderate to steeply dipping deposits, determine the mining fleet requirements, and generate practical LOM pit designs and mining schedules that can be used on-site for short-term planning and design purposes. RPM key focus was on assessing the Projects as part of an integrated mining schedule to determine the potential synergies that exist for the blending of ROM coal in relation to achieving MMC's contract specifications. The primary focus of this document is UHG with only a summary provided for BN.

The LOM Study is based on the geological model generated in July 2012 by MMC for UHG, which identified 689.9 Mt (as received moisture basis) of JORC Code Compliant Measured, Indicated and Inferred Geological Resources to a depth of up to 800 m. An economic pit-shell was defined as part of the LOM Study with mineable ROM coal estimated at 342 Mt at a strip ratio of 5.9:1 (bcm:t ROM) at 1 January 2013. Of the 342 Mt ROM coal contained in the economic pit-shell, 315 Mt are JORC Coal Reserves and 27 Mt are mineable quantities in the Inferred Resource category that will be mined as a result of mining the complete economic pit-shell.

The average annual UHG coal production reaches a maximum of 16 Mtpa run of mine ('ROM') after 2016, and results in a mine life of 28 years, with completion in 2040. The mined coking coal is processed through a Coal Handling and Preparation Plant ('CHPP') located at UHG, while the thermal coal will be processed through a Jig Plant to be operational at UHG in 2016.

4.2.5 January 01, 2018 – GLOGEX

Glogex was commissioned by MMC to complete Reserve estimation for UHG as at the 01st January 2018. The following paragraphs were taken from the final report (UHG Jorc Reserve Study Report as at 01 Jan 2018), which can be viewed in Appendix 22.

Table 4-4: Total Coal Reserve

Probable (Mt)	Proved (Mt)	Total (Mt)
119	214	333

(Source: GLOGEX)

4.3 Mining History

The opening up of the first box-cut at UHG began in October 2008 with the top of coal being intercepted in April 2009. The UHG mine uses conventional truck and excavator mining methods to mine coal and overburden in a terrace style operation.

A steady mine production ramp-up to the end of 2012 achieved a production rate of 10Mpa. Ramp up of installed capacity continued into 2013, but due to deterioration of global coking coal market conditions, utilisation of full available capacity has been delayed.

The ability to achieve higher production levels will depend on many factors including market conditions, availability of equipment and labour as well as geological conditions. The total ROM coal mined since commencement of production at UHG as at 31st December 2021 is 78.8 Mt and the following schedule lists the ROM coal mined per year;

- 2009 - 1.8 Mt ROM coal
- 2010 - 3.9 Mt ROM coal
- 2011 - 7.1 Mt ROM coal
- 2012 – 8.6 Mt ROM coal
- 2013 – 9.2 Mt ROM coal
- 2014 – 4.6 Mt ROM coal
- 2015 – 2.7 Mt ROM coal
- 2016 – 2.9 Mt ROM coal
- 2017 – 8.2 Mt ROM coal
- 2018 – 9.4 Mt ROM coal
- 2019 – 9.7 Mt ROM coal
- 2020 – 6.9 Mt ROM coal
- 2021 – 3.8 Mt ROM coal

(Source: Energy Resources LLC)

5 Geology

5.1 Regional Geology

The UHG deposit forms part of the Ulaan Nuur coal bearing depression which is found in the South Gobi coal bearing basin or otherwise known as the TT coalfield. The Ulaan Nuur depression includes the south-eastern continuation of the Ikhshanhai hills which are located between the mountains of Tsetsii and Ikhshanhai in the south and Tsagaan Ovoo and Nariin Har Nuruu in the north (Said L. et.al, 2011).

TT coalfield is separated into seven separate subfields, namely Tsankhi, Southwest, Borteeg, Ukhaa Khudag, Eastern, Bortolgoi and Baruun Naran (Figure 5-1). Baruun Naran is also owned and operated by Mongolian Mining Corporation (Figure 3-9) through Khangad Exploration LLC.

The coalfields are separated by either seam crop limits or block faulting. The boundaries between these seven subfields are not well defined, and have migrated somewhat in the Russian reports from the 1970's onwards. Generally, UHG represents the north-eastern extension of the greater Tavan Tolgoi deposit (Norwest 2009).

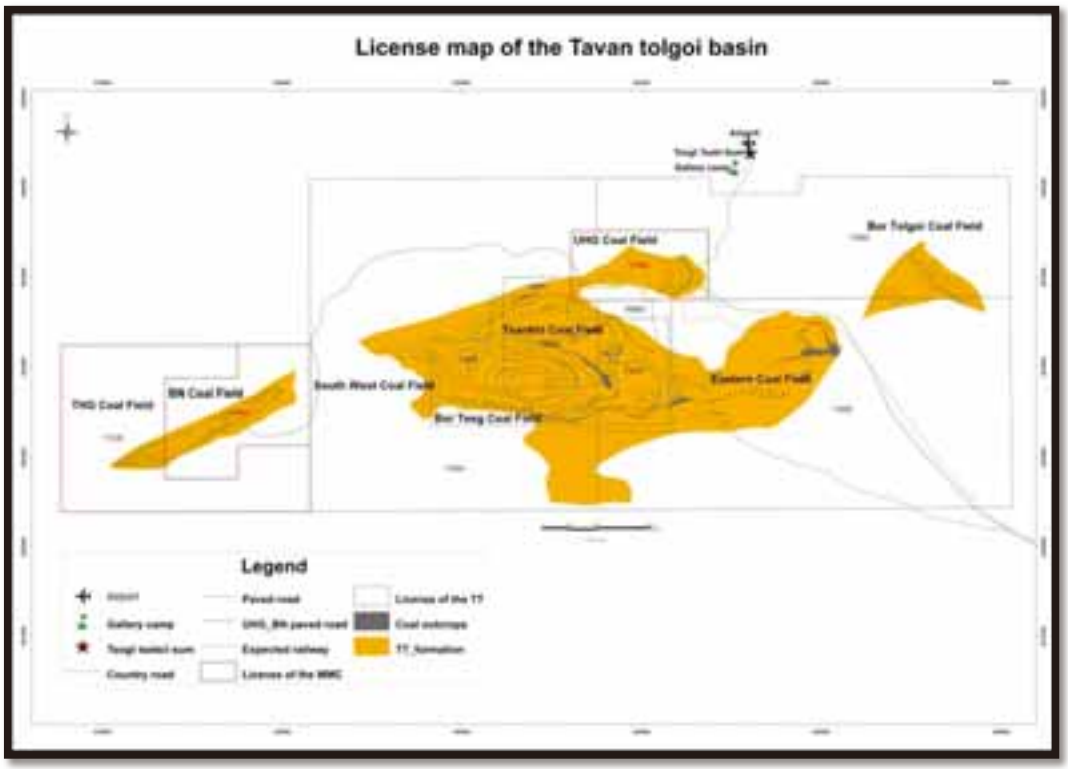


Figure 5-1: Regional map of the Tavan Tolgoi coal basin

(Source: Energy Resources LLC)

5.2 Regional Stratigraphy

UHG is located within the TT synform, which is also a part of the South Gobi coal bearing basin. UHG is composed of the Tsankhi and Tavan Tolgoi formations of upper Permian age. Underlying these formations are the volcanic and tuff-sediments of the Dushiin Ovoo and Tsogttsetsii formations of upper Carboniferous-lower Permian age.

Rocks of the latter two formations outcrop in the south-west and north-east parts of the deposit, forming mountain uplifts surrounding the core of the syncline. These formations have been delineated by a number of boreholes. The north-west border of the deposit runs along the large Tsanhi's thrust-fault (Tavan Tolgoi Fault, refer Figure 5-2). Along this fault, upper Paleozoic rocks overlap with Devonian rocks of the Tsetsgershand formation.

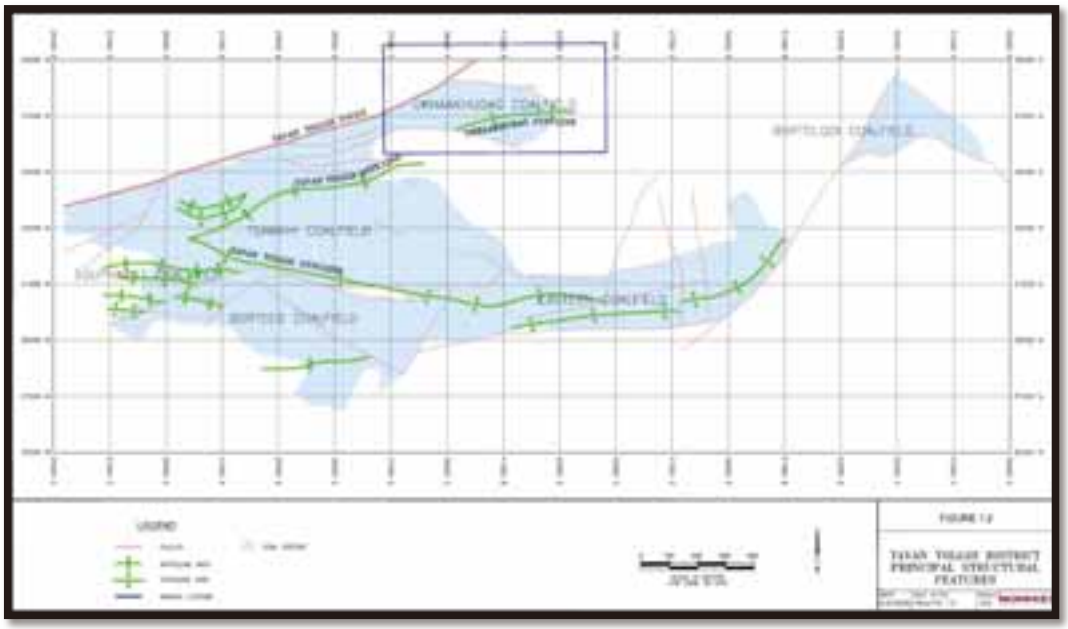


Figure 5-2: Regional map of the Tavan Tolgoi basin Structural Features

(Source: Norwest 2009)

The following geological descriptions included within Sections 5.2.1 through 5.2.9 are taken from the *'Report of detailed exploration first mining area at the Tsankhi deposit of Tavan Tolgoi coal deposit Mongolia', (*Gankhuyag C. and Tsader Z. (1988) and translations from the *'Detailed Exploration Results and Resource Estimation of Ukhaa Khudag Coking Coal deposit',* (Said L. et.al, 2011). Refer to Figure 5-3 for a regional geological map.

5.2.1 Devonian system

5.2.1.1 Tsetsgershand formation ($D_{2\text{-}3}cs$)

Sediments of this age are distributed only in a small area at the north-west edge of the Ukhaa Khudag deposit where they were observed in conjunction with the volcanics of Dushiin ovoo formation and with coal bearing sediments of Tavan Tolgoi formation. The rocks of this formation are siliceous, clay-siliceous siltstones, siliceous cleaving stones with horizontal jasper, ash tuff and limestone.

5.2.2 Carbonaceous system

5.2.2.1 Dushiin ovoo formation (C_3-P_1ds)

Sediments of the Dushiin ovoo formation are described as volcanogenic rocks and are distributed throughout the deposit as elevated areas. They were identified in natural outcrops and in borehole cores. They underlie the Tsogttsetsii, Tsankhi and Tavan Tolgoi formations. The rocks of this formation consist of light-grey, rose-coloured lipatites, dacite-lipatitous porphyry, dark-grey and greenish-grey andesite and andesite-porphyry.

5.2.3 Lower Permian

5.2.3.1 Tsogttsetsii formation (P_1CC)

Sediments of this formation cover a wide area of the deposit. They are found within the rocks of the Dushiin ovoo formation at an angular unconformity. The formation consists of pebble sized, poorly sorted, tuff-conglomerates mainly of light-brown and dark green colour, as well as tuffeaous-sandstones and siltstones with plant fragments. In the lower sections there are ash tuffs, tuff breccia and agglomerates of andesites. The thickness of the formation is variable (from 1 to 900 m.) and averages around 250 to 300 m. The formation appears to thicken to the east with a maximum thickness of around 900m.

5.2.4 Upper Permian

5.2.4.1 Tsankhi formation (P_2ch)

Sediments of this formation cover a wide area of the deposit. They were described as mainly black mudstones interbedded with sandstones and siltstones of dark-grey and light-grey colour. Thickness of the formation is variable. At the Ukhaa Khudag deposit this formation varies in thickness from 1 to 48 m.

5.2.4.2 Tavan Tolgoi formation (P_2tb)

Sediments of this formation have been investigated extensively. This formation contains most of the coal seams of interest. The area of distribution within the Ulaannuur depression is 160 km^2 while within the Ukhaa Khudag deposit is 29.5 km^2. The formation is represented mainly with polymictic mono-granular sandstones and psammite siltstones with minor conglomerates, argillite's, carbonaceous rocks and coal seams.

The Tavan Tolgoi formation has been identified into 3 sub-formations; Upper, Middle and Lower (refer Table 5-1).

- *Upper sequence of Tavan Tolgoi formation. Dark grey siltstone, sandstone and coal seams from seams 10 to 15, rare limestone with 'cone in cone' texture, fossil vegetation and fauna.*
- *Middle sequence of Tavan Tolgoi formation. Greenish, irregular grained conglomerate, gravel-stone, light grey sandstone. Coal-bearing seams are rich in flora, especially within seams 7 and 9.*
- *Lower sequence of Tavan Tolgoi formation. Dark grey siltstone, carboniferous mudstone and shale, grey-colour sandstone package, and some gravel-stone, coal seams from 0 to 6 (profiles), and fossil-rich limestone's with 'cone in cone' texture, rich with fresh water molluscs.*

Included in the formation is evidence of burnt coal resulting in red beds associated with Bentonite or fireclay. As more work has been completed with drilling and mining, it is now thought that magnetic rich hot hydrothermal fluids, generated during major thrusting events, are the main cause (Ballantine 2012). The affected rocks appear to leach the sediments to a red colour and where they have intercepted coal have burnt the coal and left Bentonite clay or what is known as Fireclay (refer Figure 5-17). The affected areas appear to be limited to the upper approximately 100m of the formation.

5.2.5 Triassic system (T)

Sediments of this system are mainly represented by continental red and multi-colour, coarse fragmental rocks.

5.2.6 Cretaceous system

5.2.6.1 Sainshand formation (K_2ss)

Sediments of Sainshand formation are developed in the southern section of the Bortolgoi deposit. They are not found in the Ukhaa Khudag deposit. In the Bortolgoi deposit they have a sharp angular unconformity with the weathered upper Permian sediments. The formation is mainly represented as light-red, red and pink colour clay-stone and break stone's sediments of lacustrine-proluvial genesis.

5.2.7 Cenozoic group (Kz)

Within the contents of these deposits are outlined paleogenic (lower middle-Oligocene), Neogene (upper Miocene and Pliocene) and quaternary sediments.

5.2.8 Paleogenic system (P)

5.2.8.1 Lower and middle Oligocene ($P_{1, 2}$)

Oligocene is attributed to mafic volcanic rocks which intersect upper Permian and lower Mesozoic sediments. The mafic volcanics are represented by olivine basalts with thickness's ranging from 5 to 40 m. They are located at the Tavan Tolgoi hills.

5.2.9 Neogene system (N)

5.2.9.1 Miocene (N_1)

Rocks of this age are scattered as remnants at the Bortolgoi and the Eastern deposits. They are laid with an angle unconformity on the sediments of the Tavan Tolgoi formation. They mainly consist of red colour clays with lenses of sandstone-gravel materials and gypsum with a thickness less than 4.4 m.

5.2.9.2 Pliocene (N_2)

Pliocene sediments are widely distributed at the Eastern and Bortolgoi deposits. They are represented by light-grey fine-pebble conglomerates of poor cementation, sandstones, red clays with marl lenses and marl clays. Thickness of the Pliocene sediments varies greatly.

5.2.10 Quaternary sediments (Q_{3-4})

Quaternary sediments were identified over the majority of the deposit. They are represented by yellowish-grey loams, sandy loams, sands and clays containing fragments of underlying rocks. The transition from unconsolidated sediments to bedrocks is gradual. The Quaternary sediment thickness ranges from 4 to 5m.

Table 5-1: Generalized Stratigraphic Column, Tavan Tolgoi

Period	Unit Name		Description	Thickness
Lower Jurassic			Greenish grey siltstones and mudstones with interbedded yellow sandstones.	Varied
			Conglomerate, conglomeratic sandstone, siltstone and mudstone	Varied
~~ Unconformity ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
Upper Permian	Tavan Tolgoi Group	Upper Unit	Dark grey siltstone, sandstone, conglomeratic sandstone; minor calcareous beds; flora fossils; COAL SEAMS X to XV.	965 to 1,990 m
		Upper Part Lower Unit	Greenish conglomerate and conglomeratic sandstone. Light grey, poorly to well sorted sandstones. Grey and dark grey siltstones and claystones. Abundant flora fossils; COAL SEAMS VI to IX.	
		Lower Part Lower Unit	Dark grey to light grey sandstone, occasionally conglomeratic. Coaly sandstone. Abundant flora fossils and fresh water mollusks. COAL SEAMS O to V	
	Tsankhi Group		Vari-colored claystones, paper shales, marly shales, sandstone and conglomeratic sandstone. Calcareous beds, limestone and aragonite. Abundant flora fossils and fresh water mollusks.	200 m to 250 m
	Girem Group		Red to reddish brown conglomerate and breccio-conglomerate, sandstone, siltstone, clayey shale.	300 m to 1,200 m
~~ Disconformity ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
Lower Permian	Tsogt-tsetsii Group		Siltstone with flora fossils, andesitic breccia, andesite and dacite.	400 m to 900 m
	Dushiin ovoo Group		Light green massive andesite, basalt, dacite, tufaceous conglomerate, and tuff.	800 m to 1,100 m

(Source: Norwest 2009)

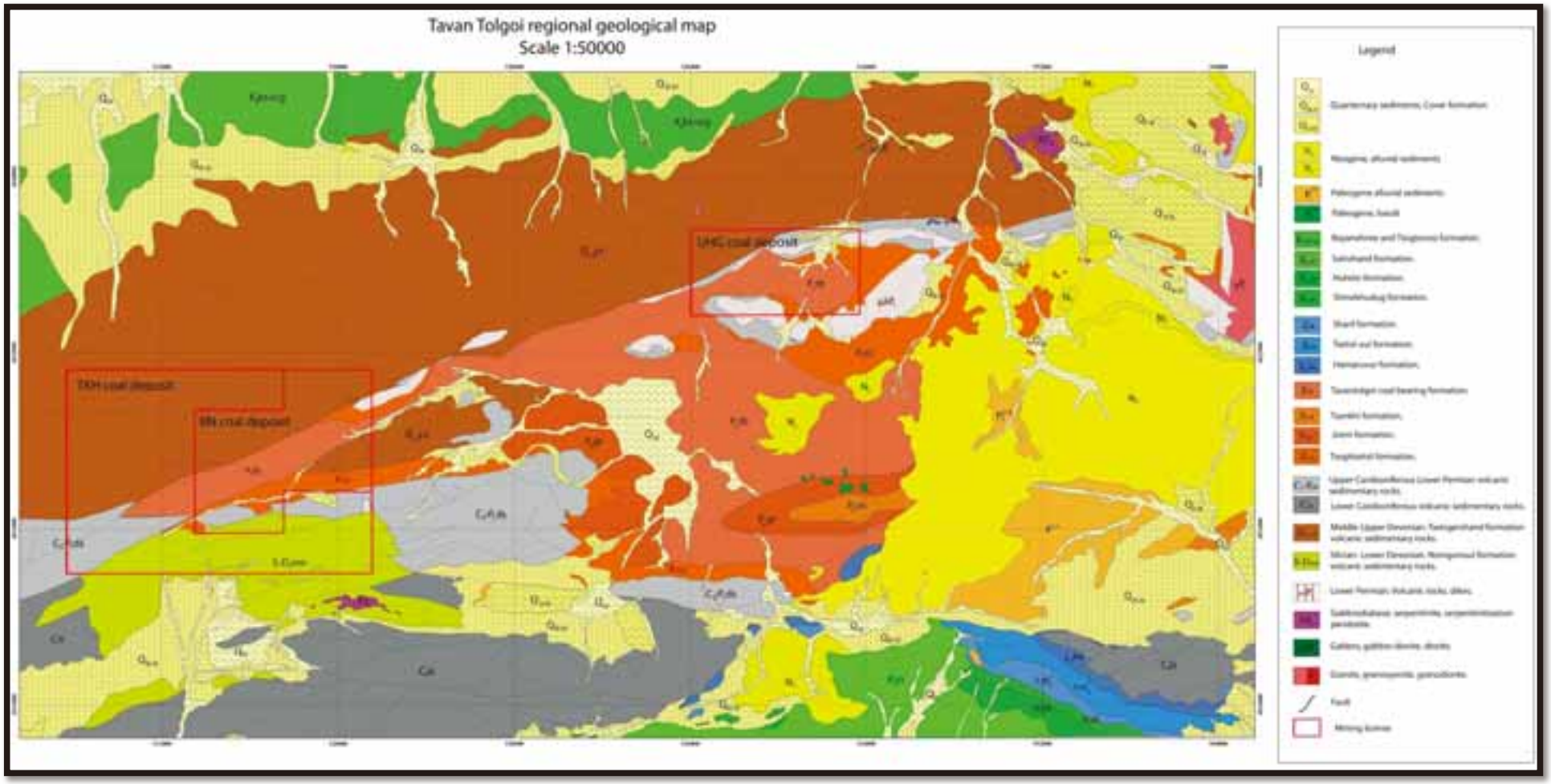


Figure 5-3: Regional geological map of Tavan Tolgoi coalfield

(Source: Energy Resources LLC)

5.3 Local Stratigraphy

The stratigraphic sequence of the UHG deposit includes fragments of the Tavan Tolgoi series of upper Permian age. Underlying these sediments are the lower and middle Devonian, upper Carbonaceous and lower Permian aged sediments. In some places they are covered with rock sediments of Triassic and Cretaceous systems, and of middle-upper Oligocene, Miocene, Pliocene and Quaternary ages.

The reference for the detailed descriptions of these formations comes from previous work (J. Dashkhorol, P. Tumurbaatar, D.Tuya 'Preliminary exploration of Ukhaa Khudag and Prospecting and Evaluation of the Eastern and Bor Tolgoi in 1989. 7-14).

The formations that have been identified through mapping and bore cores were, Tsetsgershand formation ($D_{2\text{-}3}CS$), Dushiin ovoo formation ($C_3\text{-}P_1ds$), Tsogttsetsii formation (P_1CC), Tavan Tolgoi formation (P_2tb) and Quaternary sediments ($Q_3\text{-}4$) (refer Figure 5-4).

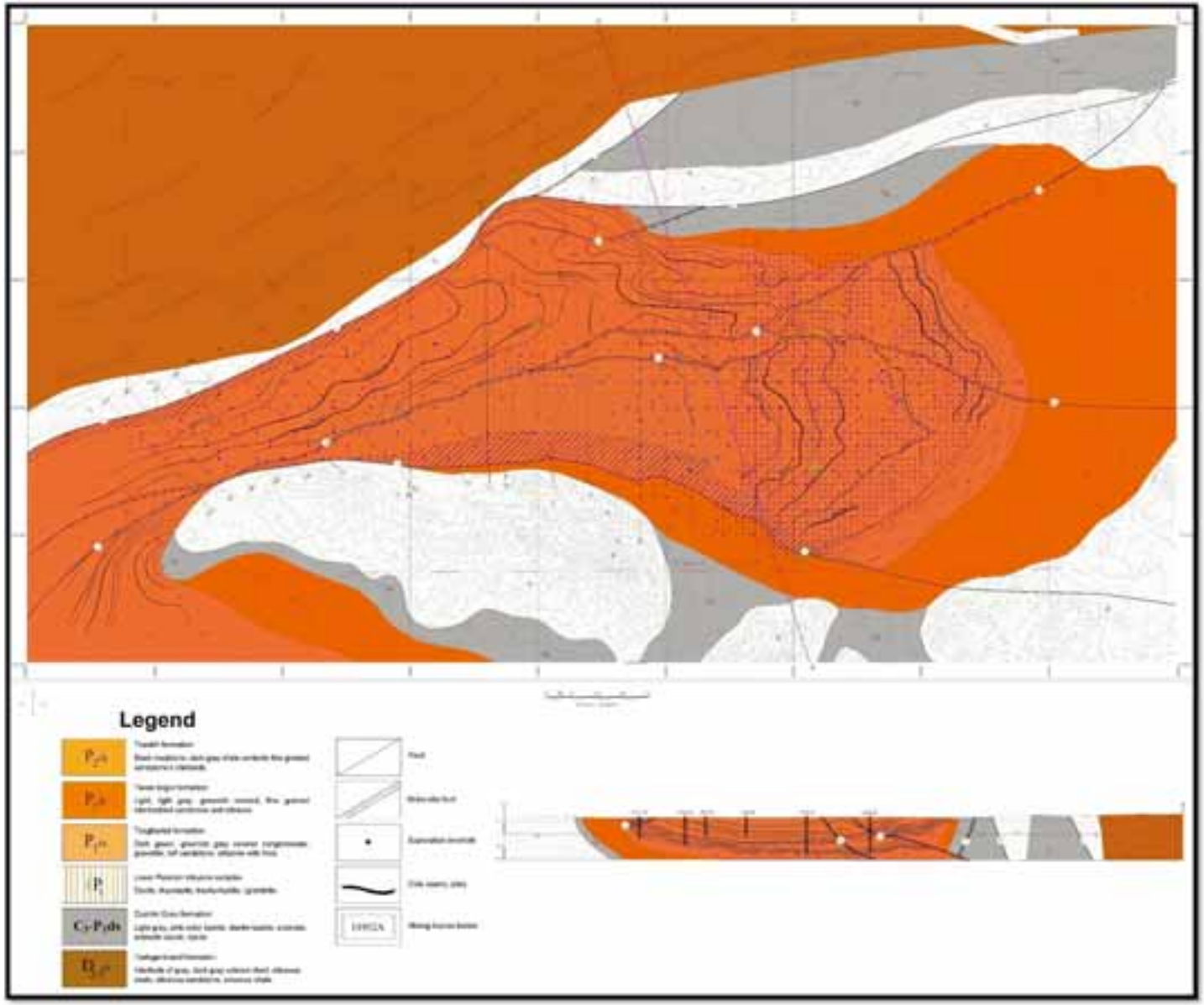


Figure 5-4: Geological map of Ukhaa Khudag deposit

(Source: Energy Resources LLC)

The Tavan Tolgoi formation within the UHG deposit demonstrates 18 seam groups (Refer seam group Table 5-4.). The seam groups of 0A, 0B, 0CL, 0CU, 25-0D, 3A, 4A, 4A10-20, 4B, 4C, 5 and 6, which outcrop in the east and south of the area dipping west and north-west. In addition, seam groups 7, 8, 9, 10, 11 and 12, outcrop in the central-west of the deposit and dip north-north-west.

The seams have been intercepted by drilling to depths of 700m. The overall thickness of this formation was limited by the borehole depth but is much greater than 700m. Seams split and merge throughout the deposit with 49 discrete plies being identified with 48 partings that form 97 seams. The detailed geology from west and east can be seen in Figure 5-5. Note that thick coal seams occur at shallow depths whether in the west or the east.

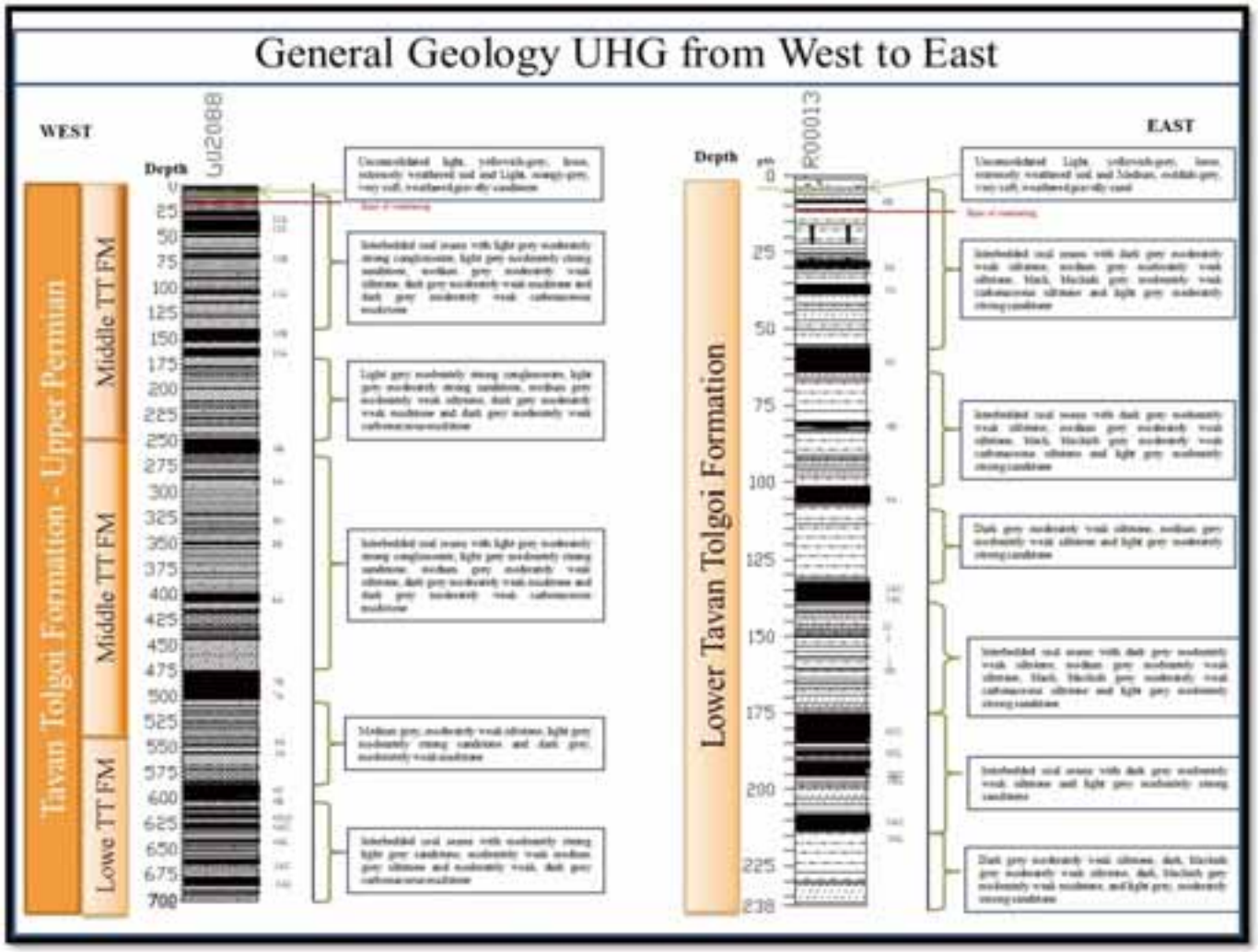


Figure 5-5: General Geology UHG from West to East

(Source: Energy Resources LLC)

5.4 Deposit Type

The deposit type is an important section to be defined; as it comes under the JORC section 'Competence and Responsibility' more importantly it is one of the defining criteria for the Competent Person:

'A 'Competent Person' must have a minimum of five years' experience, which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which that person is undertaking.'

The late Paleozoic was marked by the continental collision of a number of small micro-continents that came together as convergent margins. As the Siberian Craton and the North China block converged, ancient continental crust was thrust onto the continental margin and small island arcs, subduction wedges, and ophiolitic belts were accreted as pre-existing basement rock was deformed and faulted, and uplift initiated.

Island arc geometry, similar to how the Bowen Basin (Eastern Australia) was formed, coincides with the formation of the late Permian systems that formed the belt of Late Permian coal measures that are found in the south and south-west of Mongolia of which, the Tavan Tolgoi deposit forms one of. These types of deposits form large basins that have vast lateral continuity. Unfortunately, due to the collision of India in the Tertiary, these basins in the southern regions of Mongolia have undergone later stage deformation, which appears to be more severe in the west and moderates eastward. This also explains the close proximity of large younger rift type basins that contain thick lignite deposits close to these Permian basins.

The Competent Person has worked at UHG since March 2010 and is familiar with this deposit type. This style of deposit forms multi-seam environments that have extensive seam formation both along strike and down dip. They offer opportunities for large open-cut mines at shallow depths that allow access to deeper parts of the basin through underground means. Due to the complexity of the structure and multi seam environment, this deposit would be considered complex.

5.5 Structure

The work completed up until the end of 2008 was mainly mapping of surface geology and drilling of boreholes at irregular intervals. At the conclusion of the work program by Dashkhorol et.al. 1989, the following table and associated structure map was produced (refer to Table 5-2 and Figure 5-6).

Table 5-2: Characteristics of the disjunctive dislocations at the UHG deposit

Number	Name and type of dislocations	Dislocation outlined for boreholes (No of exploration lines)	Length, (km)	Characteristics of dislocations			
				Dip azimuth, degrees	Angle of dip, degrees	Displacement amplitude, (stratigraphy) metres	Thickness of dislocation zone, (m).
UKHAA KHUDAG deposit							
1	Ukhaa Khudag reversed fault	(expl.lines 11-1) boreholes 10, 12, 15, 869, 867, 1222, 1228, 868,843, 1238, 467	3.2	175-200	35-70	More than 1000	20-150
2	Naran Tsankhi reversed fault	(expl.lines 11-5) boreholes 1228, 865, 1258, 432, 1233	2.7	330-335	70-80	More than 1000	60-100
3	Reversed fault A	(expl.lines 8-13) boreholes 1264, 1288, 1241, 801, 803, 1220, 1267, 1226, 866, 1242, 865, 1255	2.2	350-360	15-80	10-40	1-40
4	Reversed fault B	(expl.lines 5-8) boreholes 802, 1260, 857, 1263	1.5	315-345	55-60	5-10	30-40
5	Reversed fault B	(expl.lines 10)	0.1	345-	55	30	1
6	Reversed fault –R4	(expl.line 12) borehole 1223	0.8	330-360	70-75	20-35	1.0-25
7	Gilberiin Tsankhi reversed fault	expl. lines 5-10	1.2	0	80	More than 70	Not available
8	Reversed fault G	(expl.line 5) borehole 840	0.9	220-340	80	260	40
9	Reversed fault D	(expl.line 11) borehole 1242	0.2	355	70	20	10

(Source: Dashkhorol et.al.)

At the completion of the Norwest Resources report 2008, it was quoted: - *'other than the main coalfield bounding faults, no readily identifiable fault displacements were identified in the 300m (average) spaced borehole data. However variations in seam thickness and/or partings suggest that faulting, if present, may be shallow (parallel to bedding) and similar to small scale imbricate faults/thrusts. An alternative hypothesis in explaining the variation in seam thickness is the occurrence of clastic channelling that have incised (scoured) the coal seams resulting in local thinning of the coal seams.'*

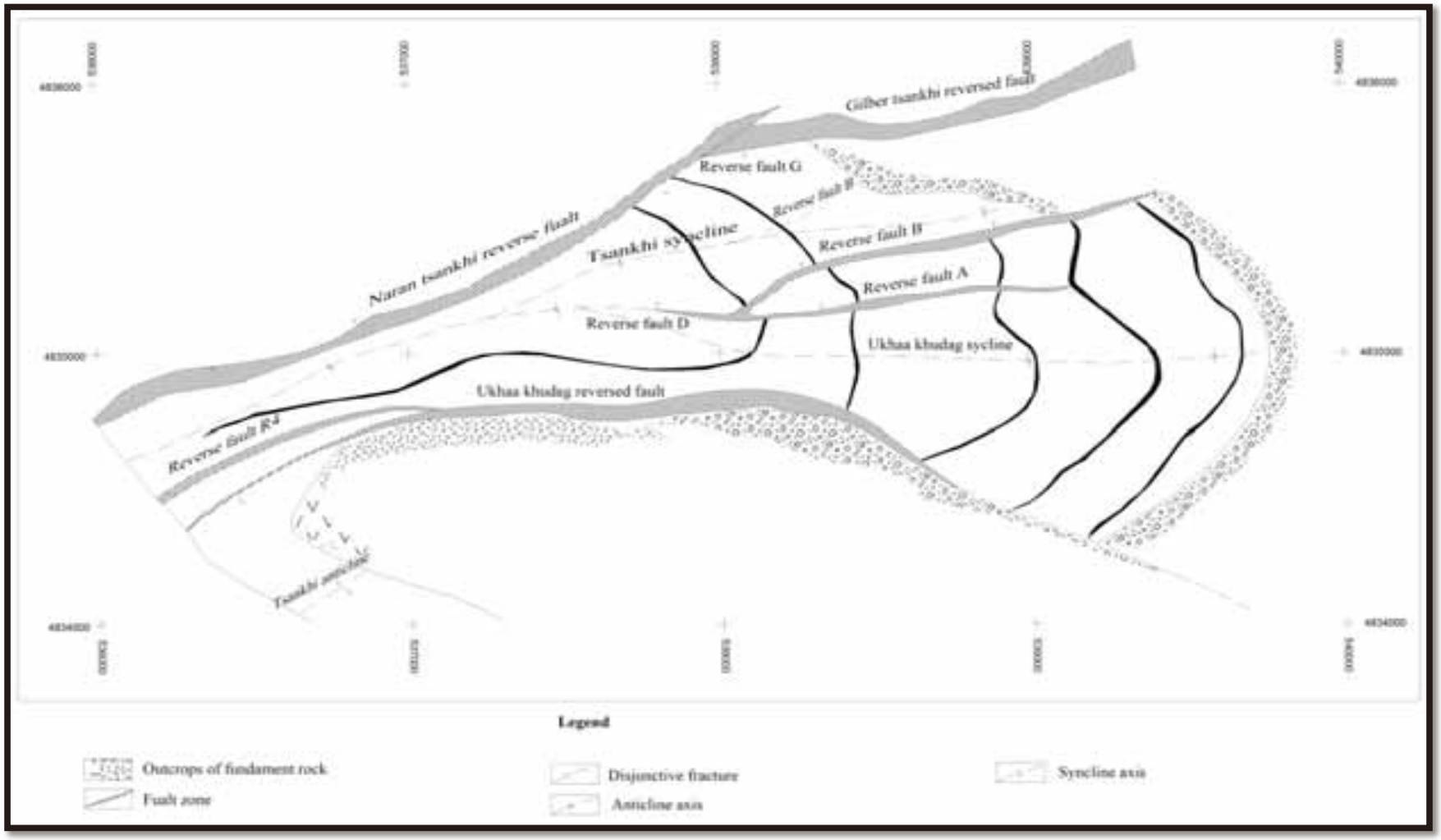


Figure 5-6: 1989 Geological map of the UHG deposit

(Source: Dashkhorol et.al.)

The following paragraphs were taken from the June 2012 UHG JORC Resource report:

Although this previous work by Dashkhorol et.al., and Norwest was done to a high standard and has its merits, it was soon apparent to the mining operation and the ER exploration team and Competent Person that faulting at UHG was far more complex than first thought.

The drilling program undertaken in 2009 demonstrated that boreholes alone were having difficulty in some areas proving seam continuity, while other areas showed good seam continuity. The mine started coal extraction in April 2009 with the emerging pit showing structures, not picked up by drilling. As part of the 2010 and 2011 programs, a 2D seismic program with boreholes drilled along these seismic lines were planned and executed. It must also be stated that the Norwest Resources report of 2008 recommended 2D seismic, as well as, additional infill drilling.

The results of the 2D seismic program and additional drilling showed the deposit to be highly faulted with complex structures where previous work only indicated simple single faults. An example of this, (Figure 5-7 below) is a seismic section where the seismic line 10-02 and the Russian Borehole line X111-1V both intersect the fault labelled 'Reverse Fault A' (Figure 5-6). It is quite clear from the seismic profile that the nature of 'Reverse Fault A' is not a single thin fault but a complex fault swarm. It is also interesting to note from this example that north (right) of 'Reverse Fault A' in the borehole section, there appears to be little or no displacement in the seams. When observing this part of the section in the seismic line, when noting the orange reflector (0CU seam), this seam is severely up-thrown north of the fault.

This is evidence that in these highly faulted zones, the risk of miss-interpretation is high, but with the seismic data the true results have been resolved with high confidence.

Further evidence and confirmation of the seismic results are illustrated in Figure 5-8 showing what this fault system appears like, once mined. The seam in Figure 5-8 is the same seam (3A) highly faulted, rotated, duplicated and sheared.

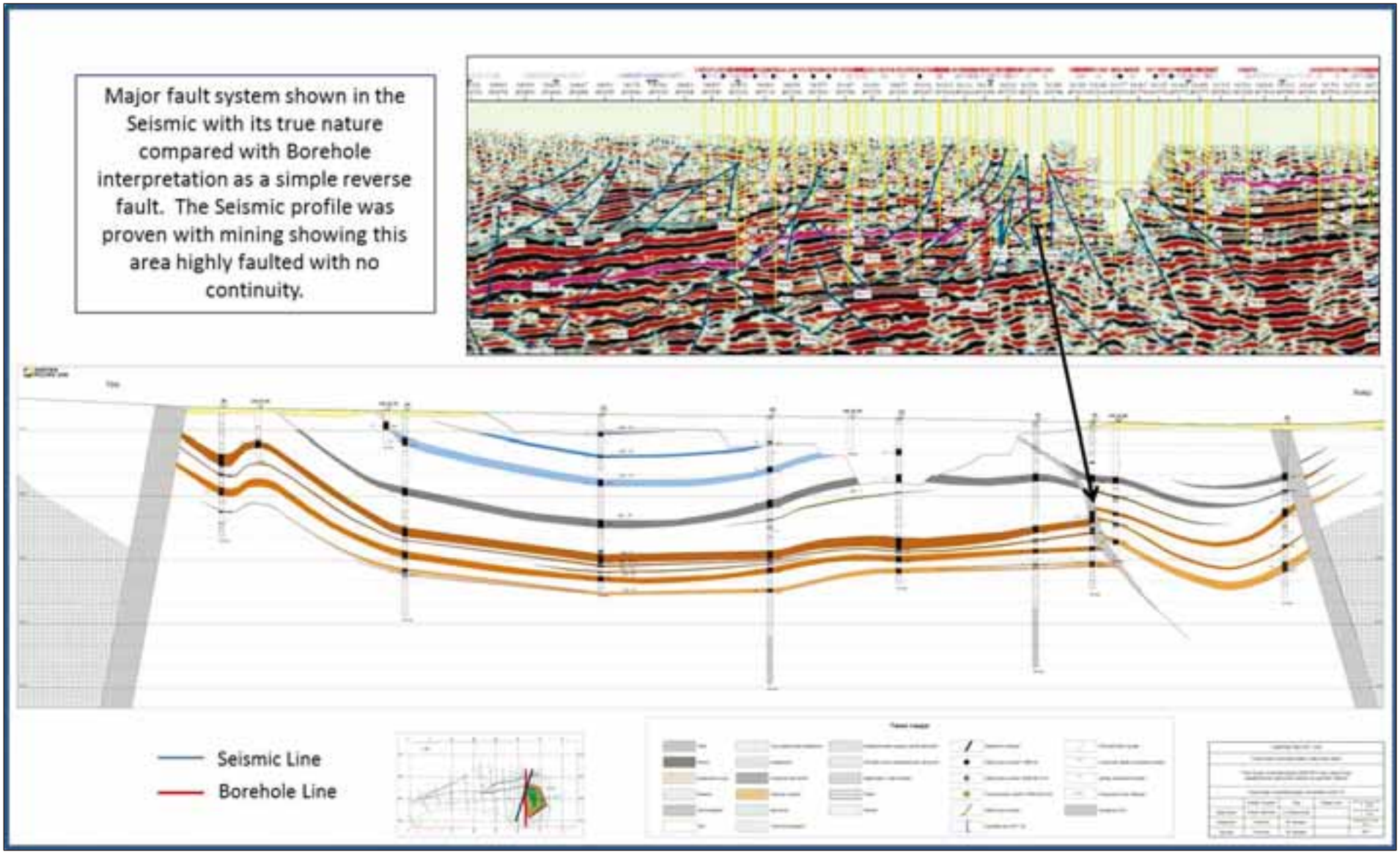


Figure 5-7: Comparison of Seismic and Borehole interpretation of 'Reverse Fault A'

(Source: Energy Resources LLC)

Figure 5-8: Fault 'Reverse Fault A' recently uncovered at UHG.

(Source: Energy Resources LLC)

Boreholes alone were insufficient to determine accurately the nature, type and location of the fault systems involved. The addition of the seismic program proved invaluable in locating and understanding these fault systems but also, just as importantly, showed areas of little to no structure and this is one of the great positives in using seismic (refer Figure 5-9). Boreholes have to be used in conjunction with seismic as they provide the identification and calibration for determining true depth for the seismic reflectors (coal seams). In addition, with the advent of the seismic program, the Competent Person has estimated that drill spacing can be increased saving the Company more than USD10M in drilling costs over the life of the mine. The results of this work will provide a very high level of confidence in the Reserves estimate, future mine planning and scheduling. The seismic sections can be reviewed in Appendix 10.

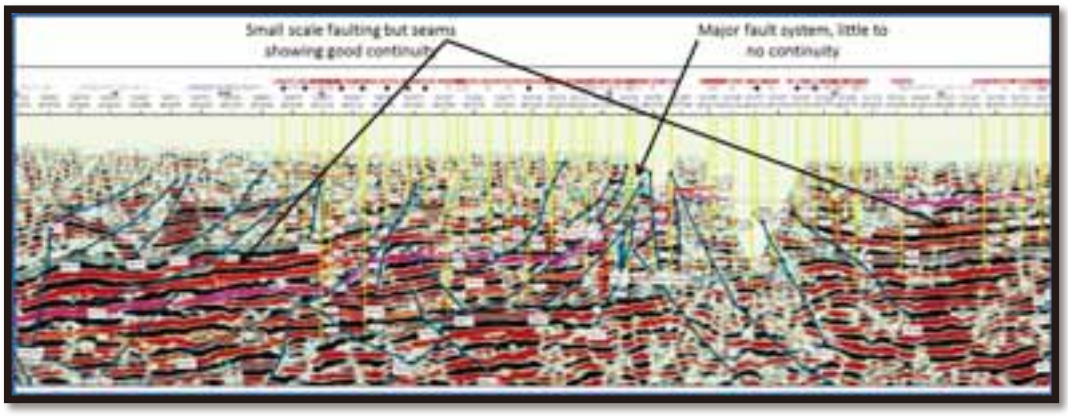


Figure 5-9: Seismic section showing seam continuity and complex fault system

(Source: Energy Resources LLC)

Although the seismic program has determined areas of fault displacement, the resolution of the faults is still high level on the scale of the seismic data and the actual mine scale complexity must be determined from good geological mapping practises from the mine geology team with continuous updating of short term plans that incorporate these faults.

To illustrate the increase in knowledge and understanding of the structural regime for the Ukhaa Khudag deposit the following statements refer to Figure 5-10.

Figure 5-10 shows a comparison of the 1989 structural interpretation from Dashkhorol et.al, which Norwest did not add to in the 2008 program and the ER work, completed early 2012. Two seismic lines 10-15 and 10-17 were used to do the comparison and are consistent with the other seismic lines (Appendix 10) of the deposit. To simplify the seismic lines for illustration purposes, the main faults were highlighted in red and blue with the faulted basement contact in orange. All the seams present were mapped on the seismic lines, but the 3A and 4C seams were highlighted in purple and light blue respectively.

Two major faults were interpreted from the 1989 program as 'Reverse Fault B' and 'Reverse Fault A'. These were identified on the seismic lines as corresponding green and blue boxes respectively. 'Reverse Fault A' is shown on the map and borehole sections (refer Figure 5-7) as a simple reverse fault covering a relatively small cross-sectional area. Both seismic lines show this fault zone as complex thrust systems propagating from the faulted basement boundary with associated smaller sympathetic normal and reverse faulting covering a wide area of disruption.

Associated with these 'Reverse Fault B & A' zones are a series of folds. The major syncline named Tsankhi Syncline (dark blue vertical lines-: seismic lines, number 1-: map), is associated with thrust faulting, which is identified in the seismic lines. The location of the Tsankhi Syncline on the seismic lines matches closely with the 1989 program. The associated antiformal structure label '2' on the map is very close and runs parallel to 'Reverse Fault B'. This would suggest this fold is very much related to the thrust faulting. At the point label '6' on the map, this antiformal structure seems to develop into an overthrust structure and appears to line up with the 'Reverse Fault R4'. This is best represented on the seismic line 10-14, which is illustrated in Figure 5-11 (refer Appendix 10).

The Ukhaa Khudag Syncline was another major feature in the deposit interpreted in the 1989 program. Its location is shown to be between 'Reverse Fault A' and the deposit boundary to the south. Illustrated on the seismic lines with a black vertical line is the location of the interpreted syncline. Upon inspection of both seismic lines there does not appear to be any indication of the synclinal axis. However, a synformal structure (point 3 on the map), an antiformal structure (point 4 on the map) and a lessor synformal structure (point 5 on the map), all demonstrate that this region has been folded and that this folding is associated with faults. In addition, these folds do not appear to extend any great distance and are contained within the limits of the oxidation of seams 3A to 4C.

Additional findings from the 2012 work derived from the close spaced drilling and resulting limits of oxidation (LOX) lines for each seam, is the extension of 'Reverse Fault A' at map point '7', and the extension of the thrust faulting environment at map point '8' from the extension of the Ukhaa Khudag reverse fault.

In summary, the basement contact appears to have acted as a major decollement plane, where subsidiary thrusts splayed as listric ramps, often associated with back-thrusts and pop-up structures and folding (refer Figure 5-12).

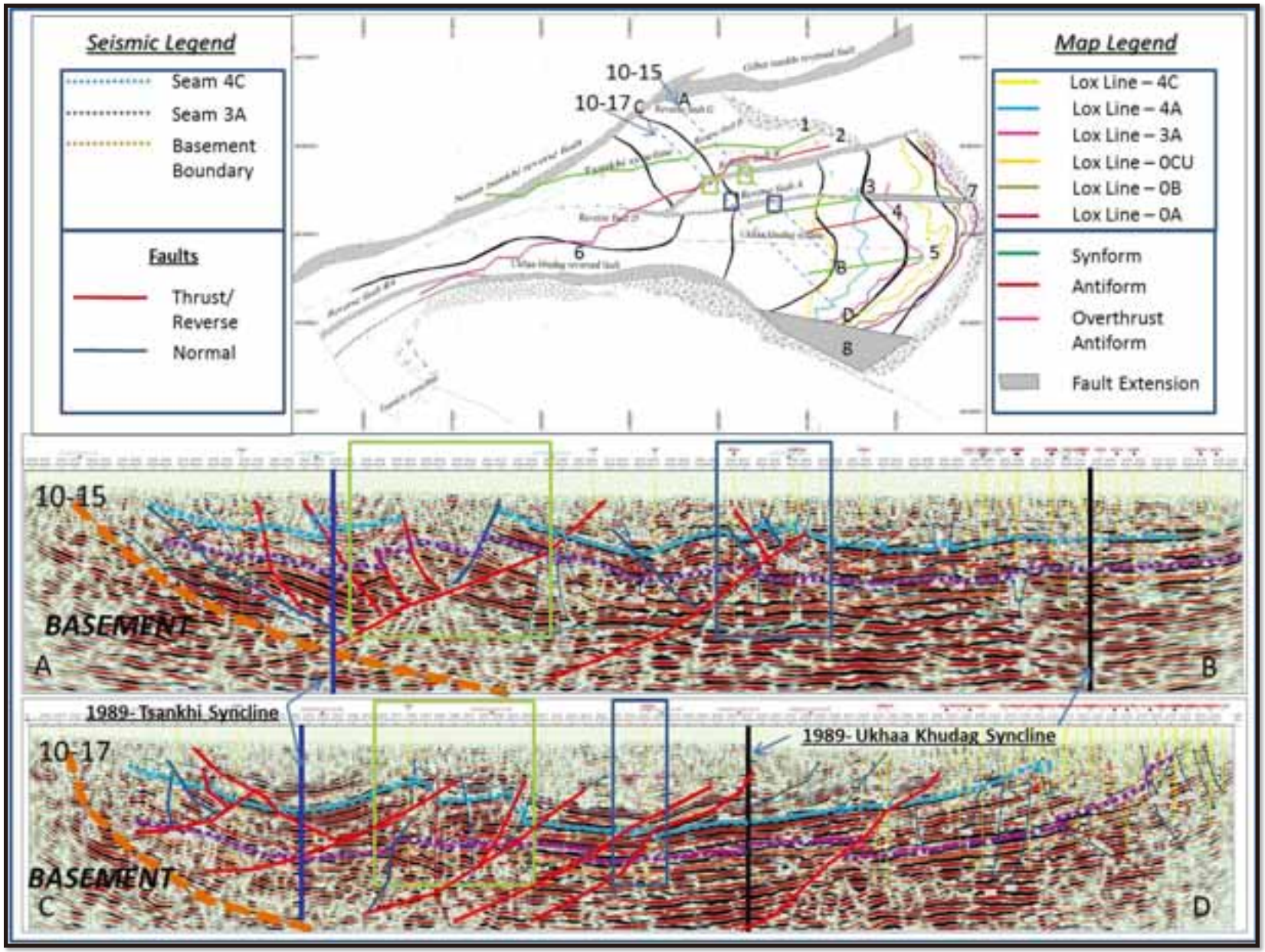


Figure 5-10: Structure comparison from 1989/NW with 2012 program

(Source: Energy Resources LLC)

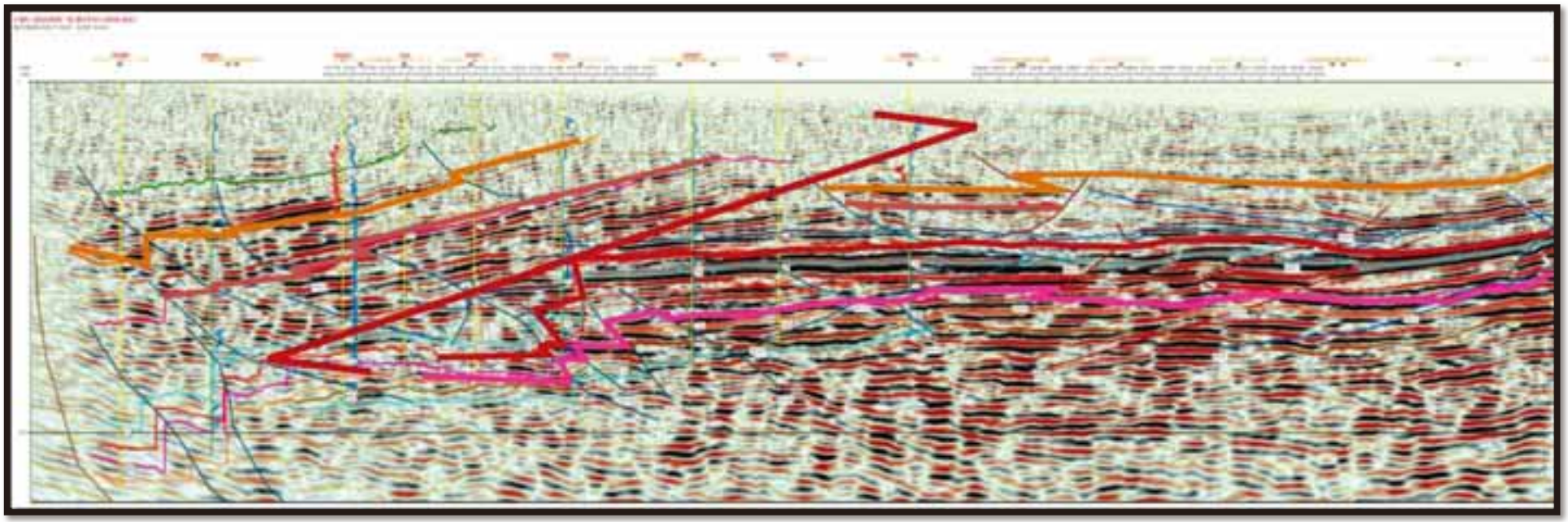


Figure 5-11: Seismic line 10-14 showing overthrust zone of 'Reverse Fault B'.

(Source: Energy Resources LLC)

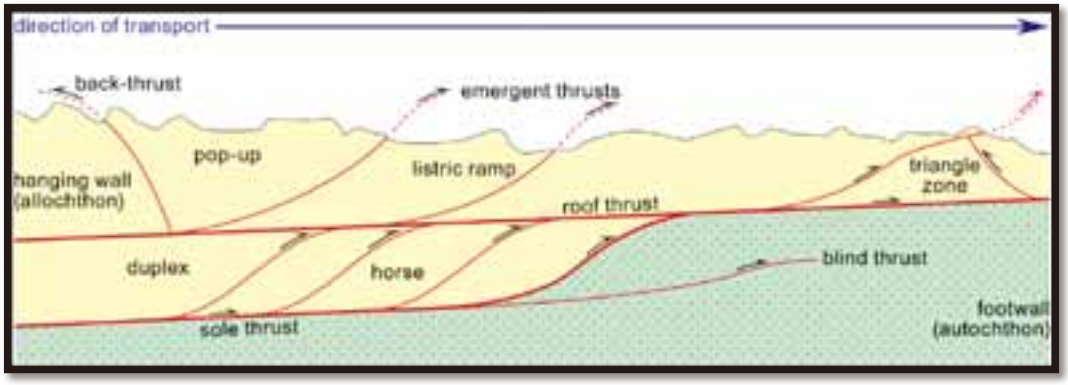


Figure 5-12: Imbricate structure

(Source: Burg 2011)

The suggested cause of such structures is due to major compressional forces on the deposit, which has seen UHG transported some distance, indicated and confirmed by seismic over the boundary faults; 'Naran Tsankhi Reverse Fault' and 'Ukhaa Khudag Reverse Fault'. Once the 'block of rock' (UHG) became buffered and stopped its movement, the compressional forces continued to ramp up into the coal measure creating numerous thrust ramps and associated structures. Many of these structures are low angle and would have accessed the weaker coal seams, which has been observed as bedding plane shears in the coal.

The results of this activity is a series of up-thrown blocks in the north-east that appear to have formed folds but are actually fault derived. A further revelation resulting from this massive block thrust shearing is shown in report section 5.7.2.2 - Variability of the volatile matter. It appears the heat which was generated from these block movements is such that the local geothermal gradient increased to such an extent that there has been coal rank upgrading and devolatisation of the coal seams. Figure 5-24 and Figure 5-26 best illustrate this observation.

From the detailed drilling and excellent seismic results, a high understanding of the structures has now been developed. This has provided very accurate and highly confident information for the Resources estimate and will form an important basis for subsequent Reserves and mine planning. However, the seismic data is still high level and the need for continuous mapping and monitoring from mine geologists in the mine is fundamental and highly recommended.

Since the fault systems were mainly zonal, for purposes of the Resources where continuity is one of the main criteria, the seismic lines were found to be an important tool for checking seam continuity. In the following Figure 5-13, the seismic lines were categorized as clear (no faulting), continuous (simple faulting allowing seam continuity) and non-continuous (coal present but not continuous). The following map (Figure 5-13) was derived with the colour blue (clear) and purple (continuous) showing continuous areas and the orange areas showing non-continuous areas. The continuous areas will be modelled under normal JORC criteria; while the non-continuous areas will be mandatory 'Inferred' classified Resources. The areas showing mandatory 'Inferred' and 'Indicated' categories for Resources are shown in Figure 5-14. The areas in the mandatory 'Inferred' areas are still considered as Resources as there is still coal within these areas but, due to the inability and low confidence to determine continuity no higher Resource category other than 'Inferred'

could be considered. These areas will still be mined and any coal mined will be considered as bonus.

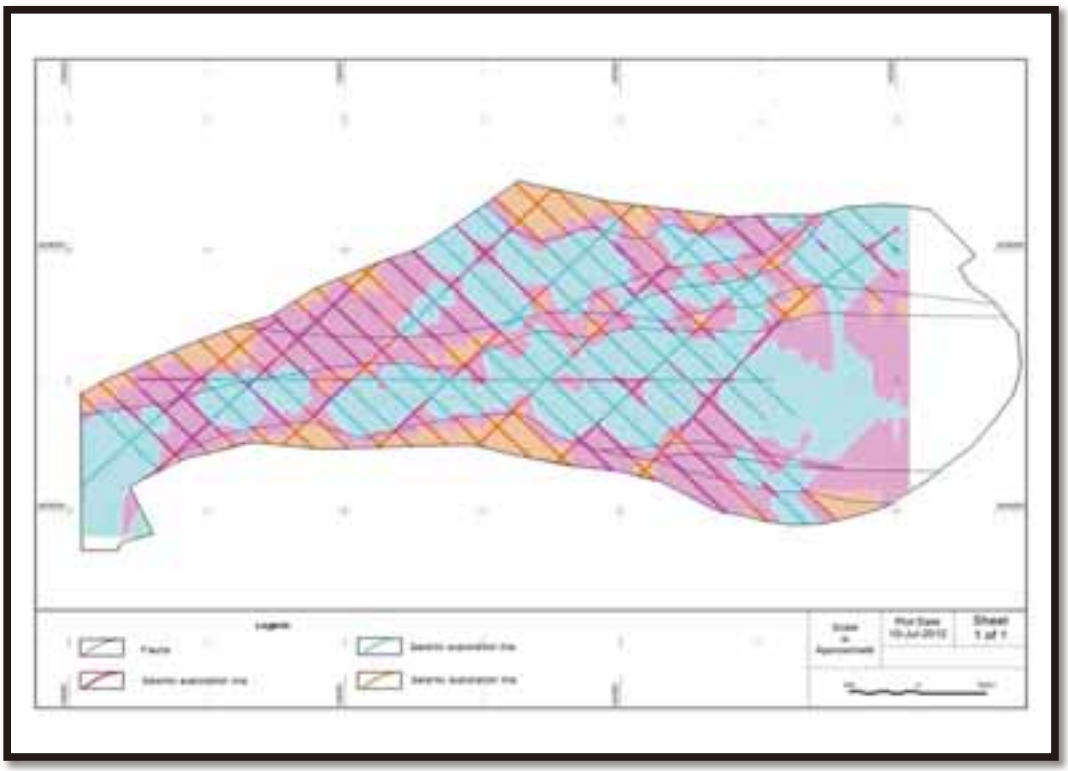


Figure 5-13: Fault area plan/ seismic interpretation on the fault.
(Source: Energy Resources LLC)

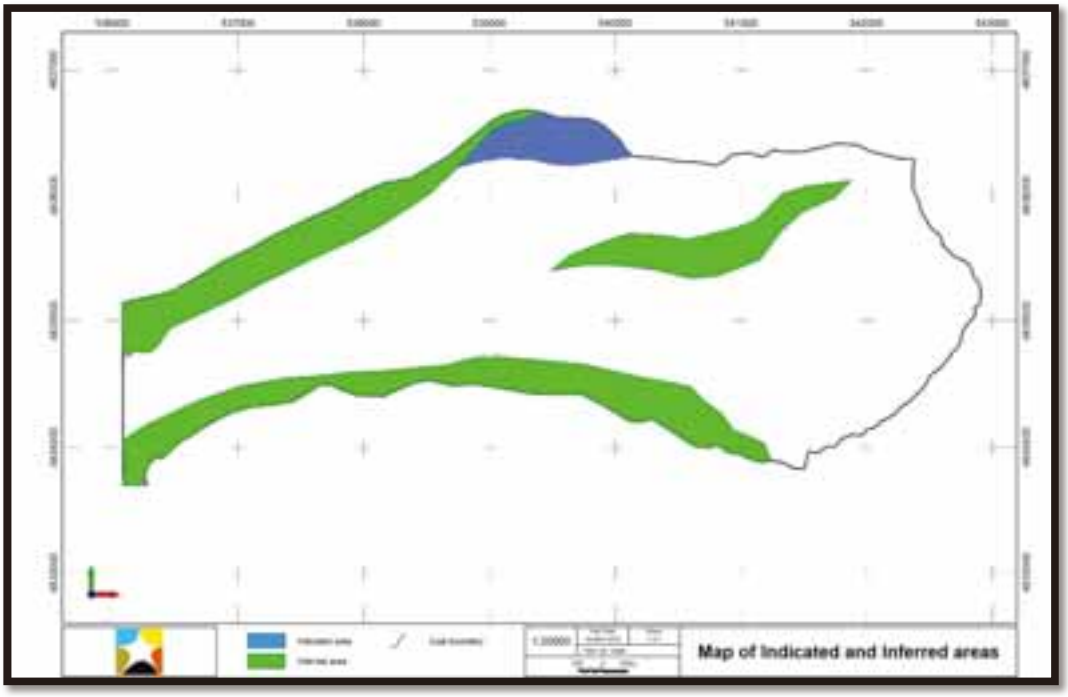


Figure 5-14: Mandatory areas for Indicated and Inferred based on structure.
(Source: Energy Resources LLC)

Since June 2012, no further seismic work was completed, however the legacy seismic work of 2010 and 2011 is still providing sound information on structure. Detailed in-pit mapping has confirmed the major structural regimes in the mining area which were reflected by the seismic. The seismic work is a high level technique that for example, may show one major displacement, however once the detailed mapping results are reviewed in the same area this major structure may actually be a number of small displacement faults that cumulatively add up to the displacement first indicated by the seismic.

As part of the duties of the mine geology team, mapping and monitoring of faults within the pit has been ongoing. As the mine has progressed a good understanding now exists of these faults. The following figure (Figure 5-15) is the in-pit structural map constructed by the mine geology team.

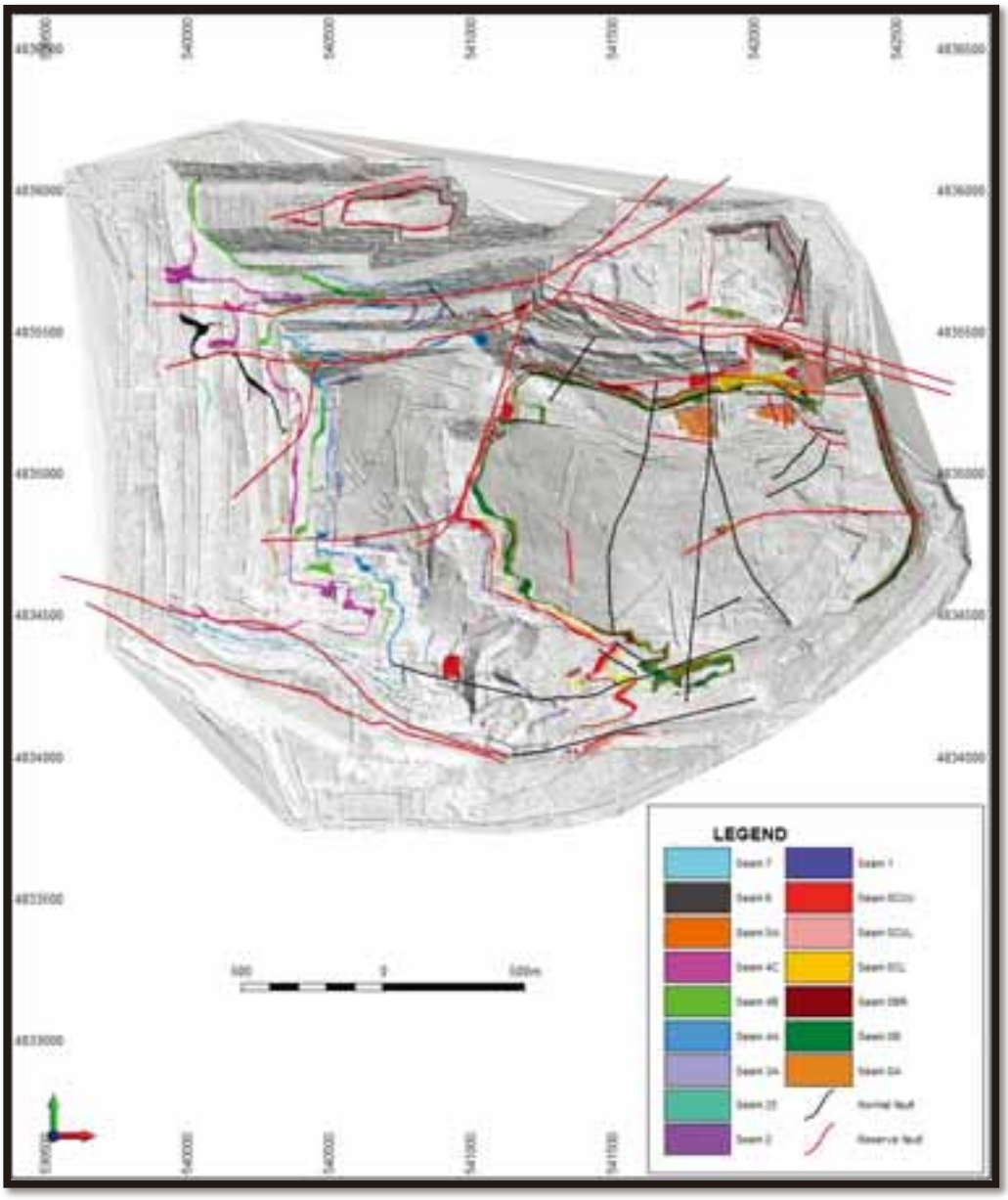


Figure 5-15: UHG Mine Fault Map

(Source: Energy Resources LLC)

5.6 Intrusives

The following paragraphs were taken from the UHG JORC (2004) Resources report June 2012:

There has been no evidence of volcanic dykes or sills within the coal measure recorded from surface mapping or boreholes. However, in early 2009 a magnetic survey was completed, which showed numerous magnetic anomalies (refer Figure 5-16).

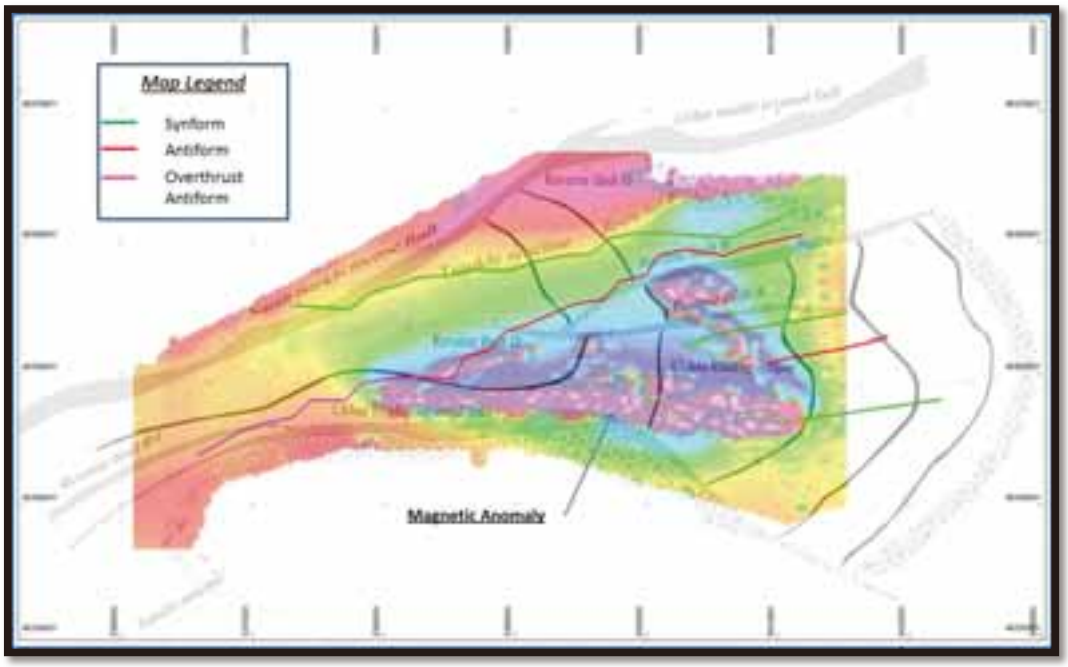


Figure 5-16: Magnetic anomaly map

(Source: Energy Resources LLC)

As more work was completed with drilling and mining, it is now thought that this magnetic anomaly is associated with hot magnetic hydrothermal fluids from either underlying volcanic rocks probably from the older Dushiin ovoo formation or the result of major crustal movement along the basement decollement plane and resulting listric ramp thrusts into the coal measure or both. These fluids are strongly magnetic (source unknown at present). They appear to leach rocks to a red colour and where intercept coal have burnt it, depositing a residue of Bentonite clay or what is known as Fireclay (refer Figure 5-17).

Figure 5-17: Hydrothermal leaching - Fireclay

(Source: Energy Resources LLC)

The magnetic anomaly appears to be confined to the shallow elevations of the coal measure (refer Table 5-3). Boreholes that have intersected this anomaly can be viewed in Table 5-3. Other effects on the coal are still under investigation but at this time it is not thought that these magnetic hydrothermal fluids have had a great impact.

Since finding the fireclay material an investigation was completed to determine the merits of exploiting the fireclay as an industrial mineral in ceramics. A number of boreholes were sampled where fireclay was intercepted. These results were analysed for the potential of clay minerals.

The samples were determined to have approximately 20% of Al203, which compared well with commercial ceramic clays. With more detailed pit mapping and further sampling, it was determined that the material was too inconsistent to separate out by normal mining and would impact severely in the coal mining operation.

This, in combination with there being no nearby customers, has resulted in the idea for mining of the fireclay for commercial means has been (for now) abandoned.

Table 5-3: List of boreholes which have intersected the magnetic anomaly

№	BHOLE_ID	DEPTH_FROM	DEPTH_TO	INTERVAL
1	G00374	3.00	5.00	2.00
	G00374	6.00	13.00	7.00
2	G00452	3.00	4.00	1.00
3	G02045	12.00	16.00	4.00
4	G02127	9.40	13.00	3.60
5	G02261	2.00	6.00	4.00
6	G02055	5.00	6.00	1.00
	G02055	25.00	29.00	4.00
7	G02054	6.00	8.00	2.00
8	G02273	3.00	12.00	9.00
	G02273	12.00	18.00	6.00
	G02273	21.00	24.00	3.00
9	G02060	37.50	39.50	2.00
10	G02114	12.00	15.00	3.00
11	G02059	20.00	25.00	5.00
12	G02056	3.00	5.00	2.00
13	G02094	4.00	6.00	2.00
	G02094	10.00	12.00	2.00
	G02094	19.00	24.00	5.00
14	G02121	6.00	7.00	1.00
	G02121	9.00	10.00	1.00
15	G02042	7.00	9.00	2.00
16	G02220	13.00	14.00	1.00
17	G02107	6.00	9.00	3.00
	G02107	18.00	23.00	5.00
	G02107	31.00	33.00	2.00
	G02107	39.00	40.00	1.00
18	G02201	1.00	3.00	2.00
19	G02074	22.00	23.00	1.00
20	G02095	3.00	5.00	2.00
	G02095	10.00	13.00	3.00
21	G02084	6.00	9.00	3.00
22	G02044	2.00	10.00	8.00
23	G02247	3.00	6.00	3.00
24	G00288	8.50	8.62	0.12
	G00288	12.00	13.36	1.36
25	G00718	35.77	36.94	1.17
	G00718	37.00	37.12	0.12
26	G01826	62.83	65.41	2.58
27	G01828	0.00	2.96	2.96
	G01828	4.14	7.15	3.01
	G01828	14.22	15.83	1.61
	G01828	18.50	18.95	0.45
	G01828	20.04	27.67	7.63
	G01828	31.00	37.54	6.54
	G01828	38.92	48.73	9.81
28	G01833	0.00	22.89	22.89
29	G01837	0.00	28.00	28.00
30	G01838	0.00	10.24	10.24
31	G01839	81.77	84.23	2.46
32	G01843	120.65	123.93	3.28
	G01843	123.93	124.23	0.30
33	G01845	35.73	50.47	14.74
	G01845	122.34	130.70	8.36

№	BHOLE_ID	DEPTH_FROM	DEPTH_TO	INTERVAL
34	G01861	36.16	38.53	2.37
	G01861	45.30	50.65	5.35
35	G01867	30.50	45.65	15.15
	G01867	91.69	94.72	3.03
	G01867	97.15	98.00	0.85
	G01867	98.78	102.19	3.41
	G01867	105.53	106.80	1.27
36	G02354	0.00	15.30	15.30
	G02354	15.30	21.20	5.90
37	G02355	0.00	33.80	33.80
	G02355	35.95	36.23	0.28
38	G02362	16.03	21.35	5.32
39	G02381	0.95	12.44	11.49
40	G02390	0.22	20.94	20.72
	G02390	41.27	51.52	10.25
41	G02391	35.38	43.16	7.78
	G02391	43.75	53.48	9.73
	G02391	54.58	58.06	3.48
	G02391	60.98	75.73	14.75
42	G02602	1.49	3.72	2.23
43	G02604	4.50	15.50	11.00
44	G02605	6.16	13.50	7.34
	G02605	23.00	24.40	1.40
	G02605	28.83	30.37	1.54
	G02605	31.28	33.57	2.29
	G02605	48.42	51.33	2.91
	G02605	52.27	53.74	1.47
	G02605	152.93	155.12	2.19
45	G02606	0.65	6.50	5.85
	G02606	11.75	17.85	6.10
	G02606	59.30	64.10	4.80
	G02606	71.80	87.50	15.70
	G02606	90.90	99.50	8.60
46	G02607	18.60	20.62	2.02
47	G02610	0.00	1.70	1.70
48	G02612	0.40	10.00	9.60
	G02612	10.00	12.50	2.50
	G02612	12.50	18.50	6.00
	G02612	52.00	70.50	18.50
	G02612	78.00	81.00	3.00
49	G02613	15.50	20.00	4.50
	G02613	24.50	29.50	5.00
50	G02614	5.50	6.80	1.30
51	G02623	1.00	11.90	10.90
	G02623	13.50	16.00	2.50
	G02623	16.00	21.20	5.20
52	G02628	0.40	5.90	5.50
	G02628	9.70	17.95	8.25
53	G02631	1.00	3.10	2.10
	G02631	3.10	5.60	2.50
54	G02633	0.00	6.50	6.50
55	G02646	22.62	23.29	0.67
TOTAL				575.12

(Source: Energy Resources LLC)

5.7 Coal seams

The following some sections were taken from the UHG JORC (2004) Resources report- June 2012. The majority of observations have not changed. But as a result of the exploration of 2020, seams 6 and 8 thickness and coal quality changed due to the new correlation of the seam.

5.7.1 Seam/ply Hierarchy

The primary coking coal seams considered for mining at UHG are seams 0C, 3, 4, 6, 7 and 9. Of these, seams 3 and 4 are best developed, thickest and most continuous and contain a substantial portion of the coking coal resource within the license. These two seams, particularly seam 3, were targeted for production early in the mine development. Seams 6 and 9 contribute to the majority of the currently defined coking coal resource in the western half of the property. The remaining seams contribute to a resource suitable for thermal power generation, or possibly as various types of blended coking products (Norwest). Table 5-4 shows the seam hierarchy and basic seam statistics within UHG. A brief description of these 18 seam groupings follows.

The naming nomenclature adopted for the seam groups comes from the original work done by the Mongolian-Russian teams. However, with modern exploration techniques for these multi seam environments where seams split and merge regularly a more definitive naming system was adopted. The current program, coal was logged on a ply basis, which is the most basic component of a coal seam. In addition, all the partings were logged and named. All previous work was recorrelated using this system (Appendix 8). The database consists of 49 base plies and 48 partings that when merge and split make up 97 seams. The seam naming nomenclature for this report is top ply-bottom ply (e.g. where 0AL, P0AU, 0AU are merged the resulting seam name will be 0AU-0AL).

5.7.1.1 Seam Group 0

This group consists of first order ply 0A, which is made up of 3 second order plies, first order ply 0B, which is made up of 3 second order plies, first order ply 0C, which is made up of 2 second order plies and 8 third order plies.

0A is continuous over most of the deposit and acts as a good marker for the bottom of the coal measure. It splits in the south-east and north-east of the deposit. 0B is continuous over the majority of the eastern and south-eastern parts of the deposit splitting centrally to the north and west. 0C is very continuous with a very strong recognizable gamma/density signature making it easy to identify. 0C is recognised by 2 second order plies, 0CU and 0CL. 0CU is consistent over the majority of the deposit only splitting into 3 third order plies in the far west of the deposit. The 0CL for most of the deposit is a series of thin coaly bands, which develops in the west as a thick clean coal seam with the 0BR ply coalescing with the floor of 0CL.

0A, 0B and 0CL were logged with mainly dull to some moderately bright lithotypes. Norwest considered these plies as mostly thermal coal, which would be consistent with current findings. 0CU was logged as moderately bright and was considered by Norwest as a lower yielding coking coal, which is consistent with current findings. 0B was logged as low bright and was considered by Norwest as a higher yielding low potential coking coal, which is consistent with current findings. 0C and 0B ply is being mined and blended with seam groups 3 and 4 and washed to produce a hard

coking coal product. 0A ply mined and washed in UHG CHPP. As a result, it was determined to produce low-yield, high-ash products.

5.7.1.2 Seam Group 0D, 1, 2 and 25

These small thin seams are mainly used for stratigraphic horizons. They are sometimes discontinuous and mainly noneconomic, although in some areas where the seam groups merge, they are economic. They are mostly coaly carbonaceous layers of variable thickness.

5.7.1.3 Seam Group 3

This group has 3 second order plies and splits centrally in the deposit to the west. In the east where the 3 plies are merged the corresponding seam is well developed, continuous and of high quality. The seam, where coalesced, was logged with very bright lithotypes and had a very strong recognizable gamma/density signature making it easy to identify. Norwest has identified this seam as one of the main hard coking seams and was the target seam to open the coal mine in April 2009. This seam was initially mined and sold as ROM hard coking coal (higher ash) and continues being mined and now blended with other lower quality seams before washing to produce a hard coking coal product.

5.7.1.4 Seam Group 4

This group consists of first order ply 4A, which is made up of 3 second order plies, first order plies 4A10 and 4A20, which only form in the west of the deposit, first order ply 4B, which is continuous over most of the deposit, but degrades into a carbonaceous claystone in the south-east and first order ply 4C, which is continuous over most of the deposit, but from time to time will have a small rider seam develop in the roof.

4A is similar to seam group 3, in so much as in the east the 4A plies are coalesced and form a well-developed seam, but once split, degrades in seam thickness and quality. 4A10 appears to develop from carbonaceous layers starting in the central part of the deposit and dips steeply north north-west. Along dip and strike to the west the seam develops into a moderately thick seam. 4A20 develops close to the floor of the 4B ply forming in the central part of the deposit. It is mainly a marker horizon and is non-economic. The plies 4B and 4C are very consistent throughout the deposit and merge into one thick seam (>10M) in the south-west. 4C also produced a very good reflector for seismic. Where plies 4B and 4C are merged the resulting gamma and density signatures are strongly recognizable.

Seam 4A where its second order plies have coalesced was logged with very bright lithotypes and was identified by Norwest as a good coking coal seam, which is consistent with current findings. This seam was initially mined and sold as ROM hard coking coal (higher ash) and continues being mined and now blended with other lower quality seams/plies before washing to produce a hard coking coal product. 4B is general dull with some brighter bands. The ply has some coking properties and is presently being blended with better coking seams/plies and washed to be sold as a blended hard coking product. 4C is a very brightly banded coal and was identified by Norwest as a good hard coking coal ply, which is consistent with current findings. This ply is being mined and blended with other lower quality seams/plies before washing to produce a hard coking coal product.

5.7.1.5 Seam Group 5

Seam 5 is quite variable in its development and distribution. It occurs as 3 third order splits. The plies coalesce through the central parts of the deposit to economic thickness but to the west become mainly carbonaceous and discontinuous. The plies are logged as dull to thinly bright lithotypes. The seam group has some coking properties and is presently being mined and blended with better seams/plies and washed to be sold as a blended hard coking product.

5.7.1.6 Seam Group 6

As a result of the exploration of 2020, this group thickness and coal quality changed due to the new correlation of the seam. This group consists of 3 plies that split. It appears to develop from carbonaceous layers starting in the central part of the deposit and dips north north-west. Along dip and strike to the west, the plies develop into very thick coal layers and towards the edge of the deposit coalesce into one thick seam. The plies are logged as dull to moderately bright lithotypes. The seam has high potential on a RAW coal basis for coking coal.

Mining has reached Seam 6, where it is being exploited were devolatilised with very low volatile levels in east area. The seam group has coking properties and is presently being mined and blended with better seams/plies and washed to be sold as a blended hard coking product.

5.7.1.7 Seam Group 7

This group is very interesting, consisting of 2 first order plies and only found in the west. It appears to develop from carbonaceous layers starting in the central part of the deposit and dips north north-west. Along dip and strike to the west, the plies develop into very thick coal layers and towards the edge of the deposit coalesce into one thick seam. The brightness of the lithotypes increase as the plies develop. The seam has high potential on a RAW coal basis for coking coal. The seam group has some coking properties and is presently being mined and blended with better seams/plies and washed to be sold as a blended hard coking product.

5.7.1.8 Seam Group 8

As a result of the exploration of 2020, this group thickness and coal quality changed due to the new correlation of the seam. This group only found in the west. 8B is thin mainly non-economic stratigraphic layers that at times are discontinuous. The seam has medium potential on a RAW coal basis for coking coal but is yet to be exploited.

5.7.1.9 Seam Group 9

This group consists of 2 first order plies with the main ply named 9B. 9A is thinner and less well developed. 9A and 9B are very continuous, outcropping in the central parts of the deposit and dipping north north-west. Both plies contain bright lithotypes and were identified by Norwest as high Volatile semi soft coking coal seams, which is consistent with the current work. The seam has high potential on a RAW coal basis for coking coal but is yet to be exploited.

5.7.1.10 Seam Group 10, 11 and 12

These seam groups are constrained to the western region of the deposit and dip north north-west. Their general continuity appears disturbed and this maybe due to their proximity to the basins northern fault boundary. The thickness of any of the plies making up these seam groups is variable, again associated with structure. They

appear to outcrop at shallow depths but dip at steep angles. Continuity will be limited due to the basin fault boundary. The opportunity to gain some moderate coal tonnage from these groups is high. The seam has medium potential on a RAW coal basis for coking coal but, is yet to be exploited.

Table 5-4: Seam Hierarchy for Ukhaa Khudag

№	Seam Master	First Order Ply	Second Order Ply	Third Order Ply	Minimum Seam Thickness (m)	Maximum Seam Thickness (m)	Average Seam Thickness (m)	Data Points	Seam Group	Partings	Seam Recovery
1	12	12C			4.5	9	5.04	2	Seam 12		=>95
		12B			2	4.9	3.81	2		P12C	=>90
		12A			1.3	4.4	3.79	8		P12B	=>95
2	11	11C			0.4	5.8	3.92	11	Seam 11	P12A	=>95
		11B			0.6	40.1	19.2	17		P11C	=>95
		11A			0.8	9.9	4.31	22		P11B	=>95
3	10	10B			0.01	10.2	2.72	29	Seam 10	P11A	=>95
		10A			0.2	10.9	4.12	45		P10B	=>95
4	9	9B			1.4	24.3	12.55	76	Seam 9	P10A	=>95
		9A			0.1	11.5	4.95	73		P9B	=>95
5	8	8B			0.2	5.6	2.25	71	Seam 8	P9A	=>95
6	7	7B			0.04	4.3	1.49	54	Seam 7	P8B	=>95
		7A			0.16	13.7	5.6	126		P7B	=>95
7	6	6C			0.01	9	3.58	285	Seam 6	P7A	=>95
		6B			0.01	11.4	4.14	289		P6C	=>95
		6A			0.01	9.1	3.61	295		P6B	=>95
8	5	5A	5AU	5AU	0.01	6.1	0.89	228	Seam 5	P6A	=>95
				5AL	0.01	7.36	3.03	232		P5AU	=>95
			5ALL	5ALL	0.01	1.82	0.81	204		P5AL	=>95
9	4	4C	4CR		0.2	1.8	0.6	23	Seam 4C	P5ALL	=>95
			4C		0.01	30.89	6.13	434		P4CR	=>95
		4B	4B		0.01	16.35	5.93	505	Seam 4B	P4C	=>95
		4A20	4A20		0.01	2.2	3.09	49	Seam 4A20	P4B	=>95
		4A10	4A10		0.01	7.7	0.87	63	Seam 4A10	P4A20	=>95
		4A	4AR		0.01	0.95	0.44	39	Seam 4A	P4A10	=>95
			4AU		0.08	11.32	2.59	561		P4AR	=>95
			4AL		0.17	14.35	3.25	634		P4AU	=>95
10	3	3A	3AU		0.01	14.55	3.01	701	Seam 3A	P4AL	=>95
			3AM		0.01	5	1.82	686		P3AU	=>95
			3AL		0.01	14.5	3.63	806		P3AM	=>95
11	25				0.01	2.4	0.66	425	Seam 25	P3AL	=>95
12	2				0.01	2.4	0.8	412	Seam 25	P25	=>95
13	1				0.01	2.75	1.01	403	Seam 1	P2	=>95
14	0	0D			0.01	1.55	0.54	378	Seam 0D	P1	=>95
		0C	0CR		0.01	0.9	0.23	50	Seam 0CU	P0D	=>95
			0CU	0CUU	0.01	8	1.71	780		P0CR	=>95
				0CUM	0.01	7	1.49	779		P0CUU	=>95
				0CUL	0.2	14.26	3.46	826		P0CUM	=>95
				0CL4	0.01	4.9	0.72	771		P0CUL	=>95
				0CL3	0.01	4.05	0.65	784		P0CL4	=>95
			0CL	0CL2	0.01	3.81	0.86	788	Seam 0CL	P0CL3	=>95
				0CL1	0.15	3.9	1.38	814		P0CL2	=>95
		0B	0BR		0.01	6.99	2.35	760	Seam 0BR	P0CL1	=>90
			0BU		0.01	8.57	2.69	824	Seam 0B	P0BR	=>90
			0BL		0.1	14.4	3.34	880		P0BU	=>90
		0A	0AR		0.01	1.85	0.73	89	Seam 0A	P0BL	=>90
			0AU		0.13	13.1	3.74	801		P0AR	=>90
			0AL		0.18	18.15	3.12	823		P0AU	=>90
			0ALL		0.16	1.77	0.9	30		P0AL	=>90

(Source: Energy Resources LLC)

Seam thickness is taken from the Points of Observation data.

5.7.2 Coal Quality

This section was prepared by Ms Tsolmon Adiya, the Manager of ER Coal Petrographic Laboratory, who is a member of Australasian Institute of Mining and Metallurgy. She has extensive experience in coal exploration, coal quality, and coal petrography, with over 12 years working experience in a coal industry. She assisted in preparing coal quality section of UHG JORC (2004) Standard Resource Estimation, prepared UHG JORC (2012) Standard Resource Estimation Report, and qualified as a Competent Person as defined in the JORC (2012) Code. She is also a member and an

accredited petrographer (ICCP/SCAP-464/AB) of International Committee for Coal and Organic Petrology.

5.7.2.1 Database

The following Excel file contained the original analytical database and was used for this discussion of the coal quality on a sample basis:

- 'UHG_WSM Coal Quality_2020' contains four datasets, 40522 ply samples from ER Central Chemical Laboratory (formerly ERML), 1787 ALS data, 581 SGS data, and 808 ply samples from the VUHIN data.

Laboratory certificates can be found for the 'UHG_WSM Coal Quality_2020' data in Appendix 5. No laboratory certificates were supplied with the Norwest reports, only soft copy Excel spreadsheets. Hard copy reports from the Mongolian-Russian work are in Appendix 5.

The number of ply and composite samples and the available laboratory determined analytical results are summarised in Table 5-5.

Table 5-5: Summary of the analytical database.

Type	Number	%
Total number of ply samples	43,711	100
True relative density	40,126	91.8
Total moisture	40,467	92.6
Air-dry moisture	43,631	99.8
Ash	43,655	99.9
Volatile matter	42,341	96.9
Calorific value	32,831	75.1
Total sulphur	40,581	92.8
CSN	35,797	81.9
Chinese G Index	7,678	17.6
Composite CSN	22.967	52.5
Composite Chinese G Index	22,922	52.4
Phosphorus	1294	3.0

(Source: Adiya)

The objective of this section of the report is to give an overview of the coal quality database with general remarks regarding coal quality characteristics. This is on a sample basis and the methodology used to estimate missing values in order to provide a full set of analytical data for each of the 43,711 samples. This approach maximises the use of the coal quality data and ensures that a full coal quality data set is available at each point of observation, which is used for estimating the coal resource and coal quality. Estimating missing values did not include CSN and Chinese G Index.

For additional coal quality information in particular washability results, the reader is referred to the '*Norwest Corporation Ukhaa Khudag Technical Report: Geology and Coal Resources* and the *Addendum to Ukhaa Khudag Technical Report: Final Model and Resources (2008)'*.

The sampling procedure for both ER and ALS data required that in-seam rock partings were not included with coal samples but sampled separately. The procedure also required sampling of the immediate roof and floor of each coal seam and it must be noted that the analytical data includes a relatively large number of separate rock

sample analyses. These in-seam partings and roof and floor samples were generally only analysed for relative density, ash, moisture, and total sulphur.

The three data sets were compared by means of a number of cross plots shown in Figures 5-18 to 5-22.

Figure 5-18 shows that for most of the 43,711 samples the air-dry moisture is less than 4 percent, and the total moisture is less than about 20 percent. Figure 5-18 also shows a number of values outside the ranges mentioned, but in relation to the total population, it is a small percentage. Samples analysed at the VUHIN laboratory do not include total moisture determinations.

Figure 5-19 shows the relationship between ash and true relative density for the four data sets. The ER and ALS data shows greater variations in relative density than the SGS data. The SGS data shows a much better correlation between ash and relative density. Both the ER and ALS data shows samples with a higher than expected density. The ER data shows a number of anomalous relative density values that are less than expected for ash values greater than 50 percent.

In Figure 5-20 the relationship between ash and volatile matter shows large variations in volatile matter. The variability of volatiles will be discussed in more detail later in this section of the report. Samples analysed at the VUHIN laboratory do not include volatile matter determinations. The SGS data suggests that the volatile matter was estimated from a linear relationship between ash and volatile matter. Again, the ER data shows a number of high volatile matter values for ash values greater than about 40 percent. This observation illustrates the problem of proximate composition determinations on non-coal samples.

Figure 5-21 shows the relationship between ash and calorific value. The data shows a good correlation between these two parameters. However, a number of samples show anomalous high calorific values. As a percentage of the total population the number are relatively small. A greater number of samples show low calorific values in relation to the ash content and could be indicative of some degree of weathering.

Figure 5-22 shows the relationship between ash and total sulphur. The differences between the data sets are probably a result of different methods for the determination of total sulphur. The VUHIN data shows very low sulphur values, generally less than about 1.5 percent. The ALS data shows slightly higher sulphur, up to about 2.5 percent with some scattered higher values. The ALS data shows a maximum of 4 percent sulphur. The ER data generally shows sulphur values less than 5 percent. The ER data also shows number of samples with much higher sulphur values.

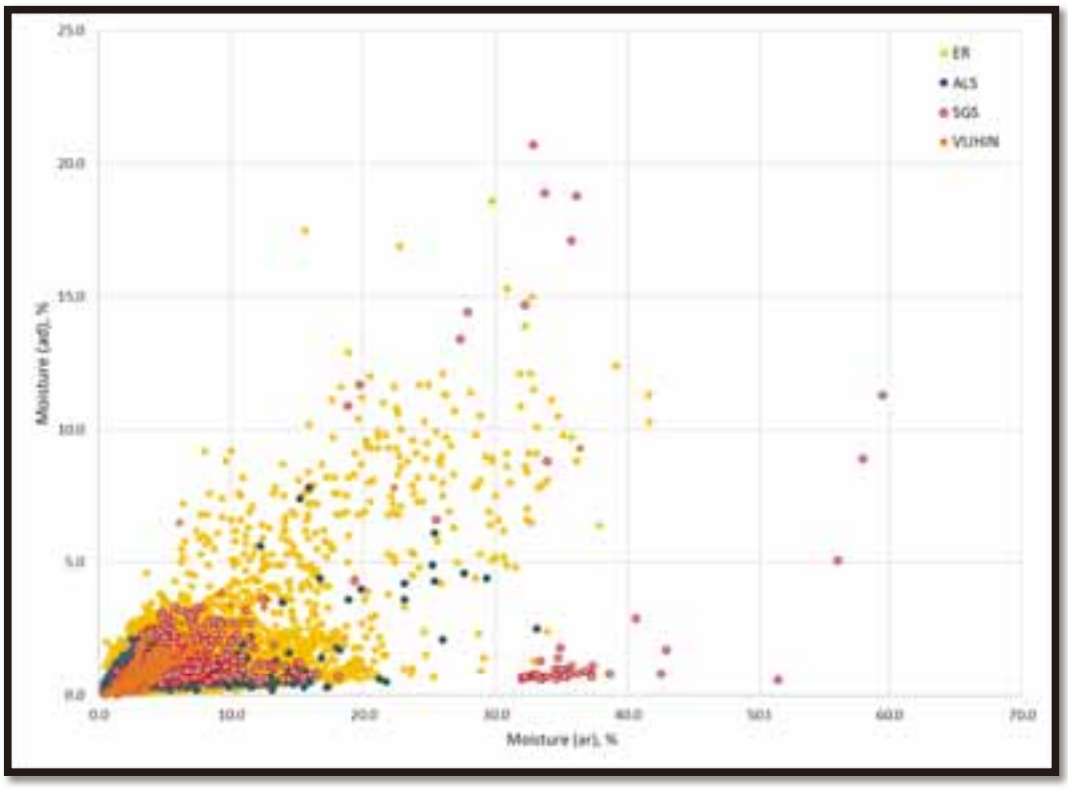


Figure 5-18: Relationship between total moisture and air-dry moisture.

(Source: Adiya)

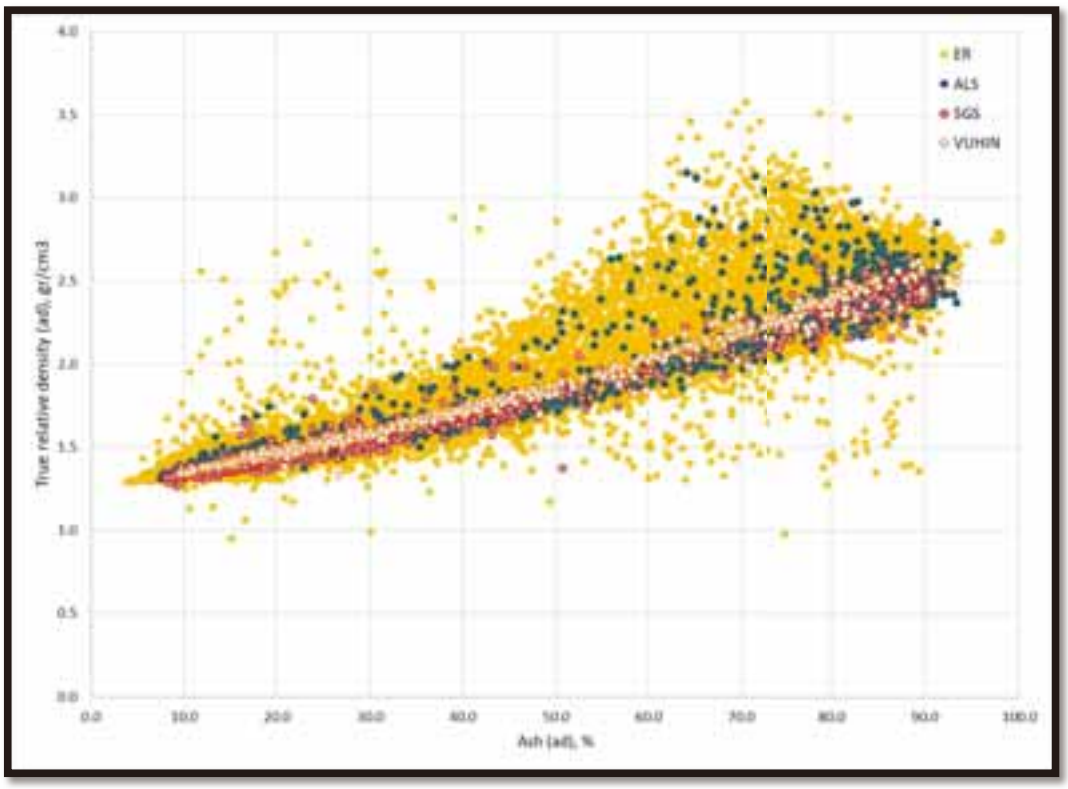


Figure 5-19: Relationship between ash and true relative density.

(Source: Adiya)

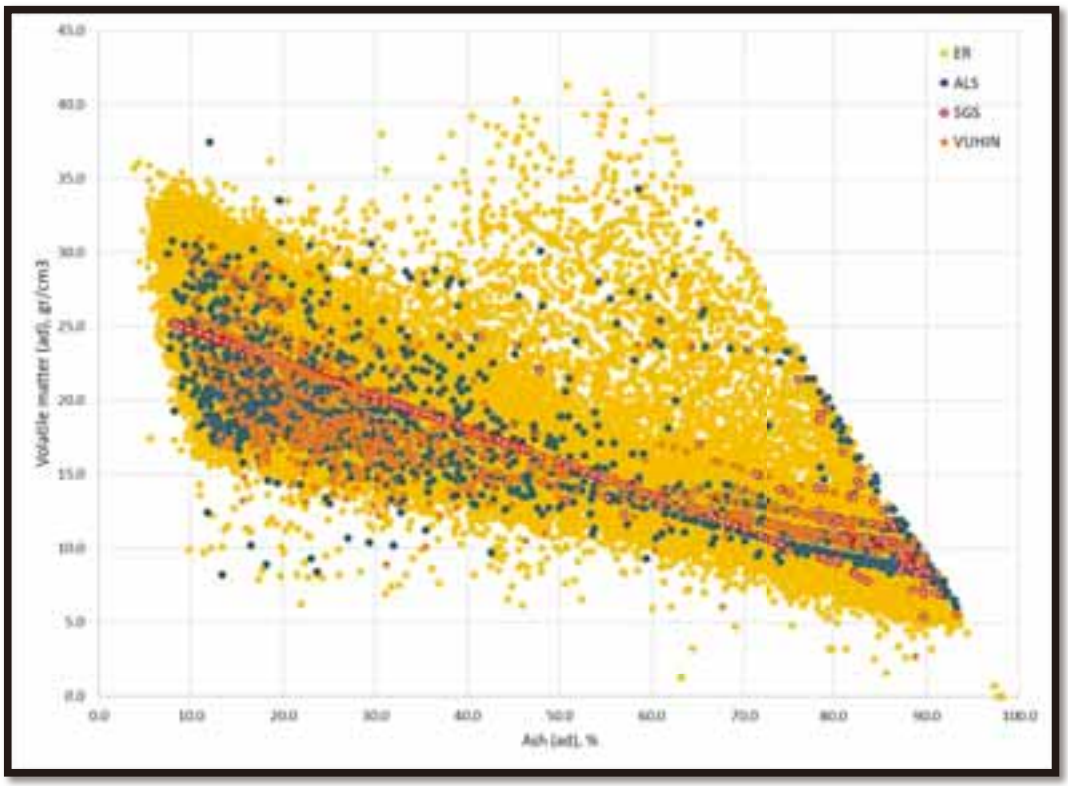


Figure 5-20: Relationship between ash and volatile matter.

(Source: Adiya)

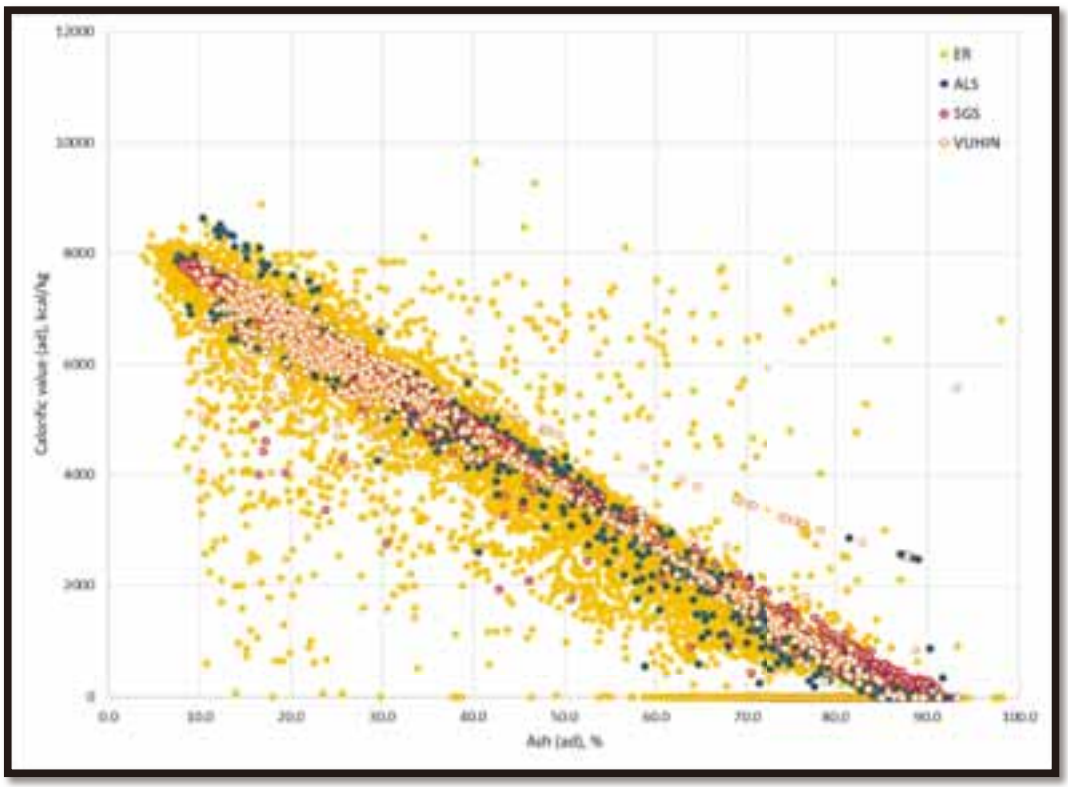


Figure 5-21: Relationship between ash and calorific value.

(Source: Adiya)

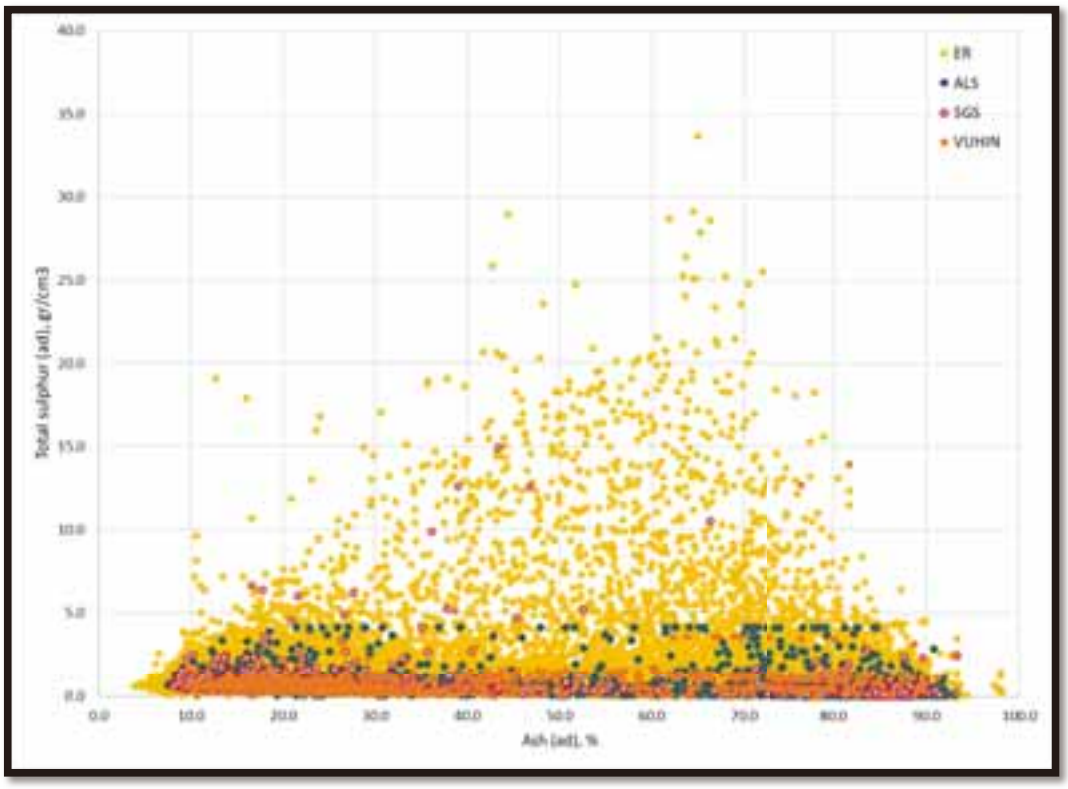


Figure 5-22: Relationship between ash and total sulphur.

(Source: Adiya)

The ER and ALS data comprises the bulk of the available analytical data and from the comparison of the four data sets it was noted that the variations in the ER and ALS data was not greater than any differences between the four data sets. For this resource estimate the four datasets are combined into one database.

5.7.2.2 Variability of the volatile matter

The relationship between the average ash (air-dry) and average volatile matter (air-dry) for each of the coal seams is illustrated in Figure 5-23. Only coal samples with less than 50 percent ash (dry basis) were selected for the data plot in Figure 5-23.

Figure 5-23 shows that the average volatile matter values for the lower seam groups, seams 0A to 25 are less than 20 percent. The average volatile matter values for the middle seams, seams 3A to 5A (excluding 4C) are in the range 20-23 percent volatile matter. The upper seams, seams 4C to 12 (excluding 5A) have the highest average volatile matter values, which are above 23 percent volatile matter.

Based on the above observations regarding the variability of the volatile matter (Figures 5-20 and 5-23) it was decided to do the regressions and estimates of analytical data on a seam by seam basis, rather than just one data set and one set of regressions applicable for the whole deposit.

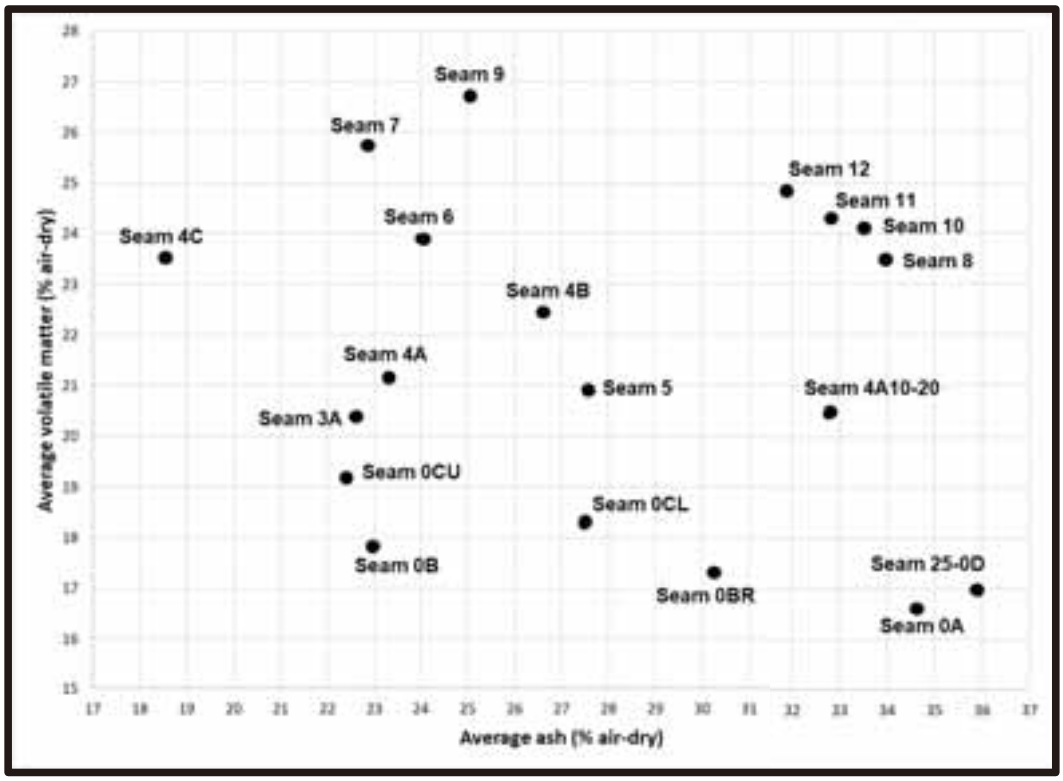


Figure 5-23: Relationship between ash and volatile matter on a seam basis.

(Source: Adiya)

It has been noted in the cores and in the pit that there are evidence of hydrothermal rock alteration as well as in situ coal combustion, thus, it is possible that some of the coal of this deposit shows the effects of heat alteration or devolatilization.

In South Africa, coal geologists generally accept that coal that has been affected by the heat from nearby dolerite intrusions, will have dry, ash-free volatile matter content less than about 28 percent.

When the 28 percent dry, ash-free rule was applied to the coal samples from this deposit, it was noted that most of the coal samples in boreholes were either above or below 28 percent dry, ash-free volatile matter and that boreholes with mixed results were in the minority. If these assumptions are valid, it appears as if the coal has been affected by a heat source situated below the coal seams resulting in a lower volatile matter in the lower coal seams and the higher volatile matter in the upper coal seams, as shown in Figure 5-23. The resulting devolatilization of the coal also has a lateral component with the coal in the eastern portion of the deposit devolatilised and the coal in the western portion of the deposit not affected as shown in Figure 5-24.

The diagram in Figure 5-24 showing the lateral variability of the volatile matter on a dry, ash-free basis was constructed as follows:

The number of coal samples (less than 35 percent ash) collected from all seams intercepted, were determined for each borehole. The number of samples with less and with more than 28 percent dry, ash-free volatile matter was determined for each borehole. The boreholes were then classified as follows:

- If more than 45 percent of the coal samples had more than 28 percent dry, ash-free volatile matter, the borehole was considered not to be affected by devolatilisation.
- If more than 30 percent of the coal samples had less than 28 percent dry, ash-free volatile matter, the borehole was considered to be affected by devolatilisation.
- The remainder of the boreholes were considered to be in a transition zone between affected and non-affected coal.

The statistical cut off percentage of 45 and 30 were selected to diminish the effects of naturally high volatile coal seams in the west of the deposit.

A similar exercise was completed for Seam 4C in which the areas of un-affected and devolatilised coal of Seam 4C were identified.

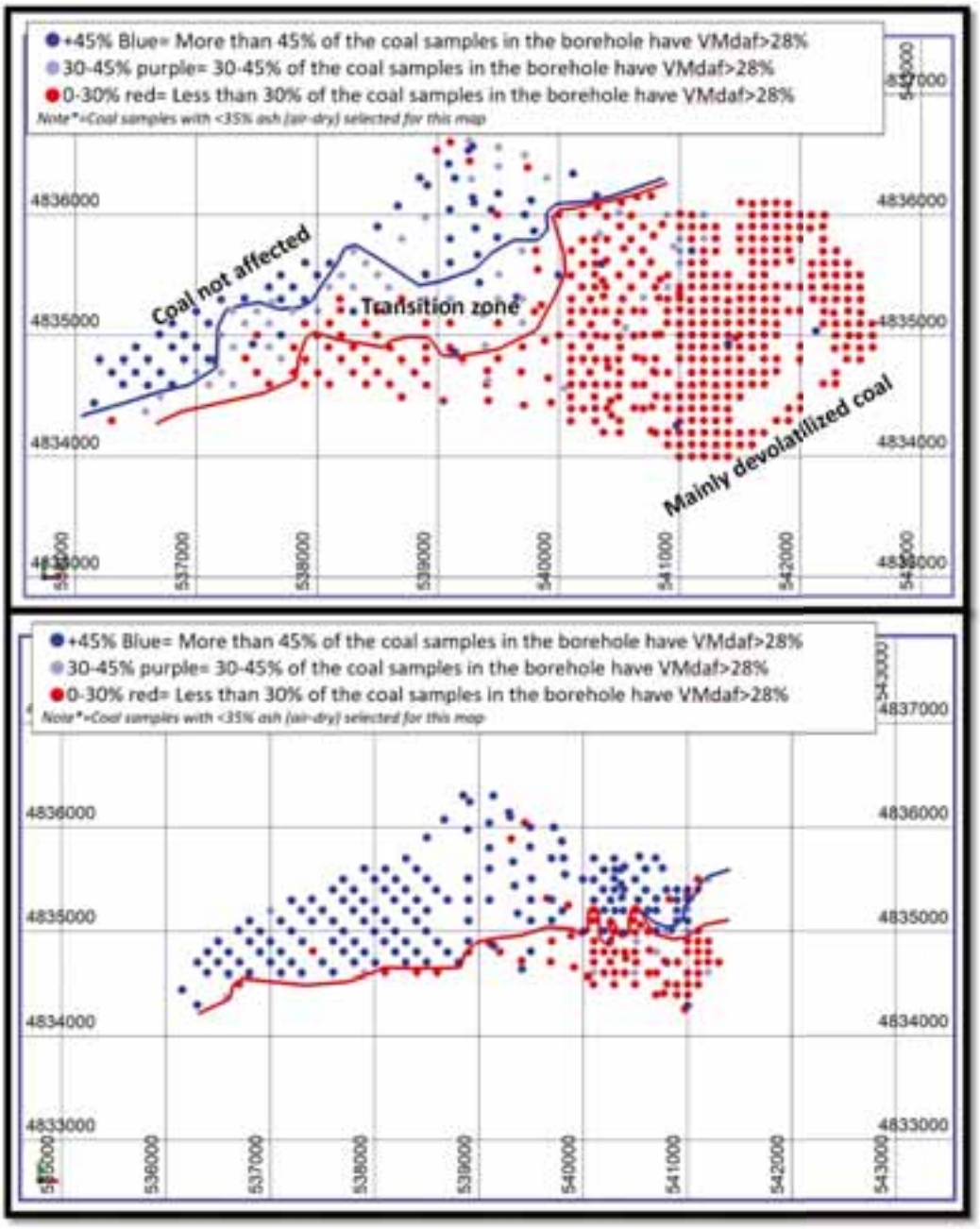


Figure 5-24: Areas of un-affected coal and devolatilised coal.

(Source: Pretorius)

It was recommended in the previous JORC (2004) Resource report issued June 2012 that the vertical and lateral components of the variable volatile matter and its relationship to the structure of the deposit be investigated in more detail. Following this recommendation, ER established a Coal Petrographic Laboratory to examine the deposits' coal seam rank variation as well as end product quality. A total of 1655 increment ply samples from 21 boreholes were sampled from 2020 drilling campaign. Samples were composited and analysed under a microscope to elucidate each major seams' lateral and vertical vitrinite reflectance variability. Petrographic laboratory results can be found in Appendix 5.

Results from the petrography confirmed the vitrinite reflectance of the major seams change across the deposit including 0 seam group. Vitrinite reflectance maps show an area of un-affected coal in the northern, western portion of the deposit and an area of devolatilised coal in the eastern portion of the deposit separated by a transition area (Figure 5-25).

Figure 5-26 shows the areas of un-affected and devolatilised coal (Figure 5-24; 5-25) superimposed on the regional structure of the area. The upper map shows the distribution of un-affected and devolatilised coal for all seams on a 0C vitrinite reflectance map, the lower map shows same distribution but only for seam 4C.

Evidently, the areas with higher vitrinite reflectance coincide with the devolatilized boreholes and the lower vitrinite reflectance coincide with the unaffected boreholes. It is also noted (Figure 5-26) that the changes in the vitrinite reflectance coincide with the position of a major structural domains, the basin bounding reverse fault to the south of the deposit called “Ukhaakhudag” and antiform- synform over thrust called “A thrust” in the centre of the deposit. Both faults can be traced from the south-western to the north-eastern extent of the coal deposit. From the mine geology team’s observations in the pit concluded that there is a direct relationship with complex structure and rank.

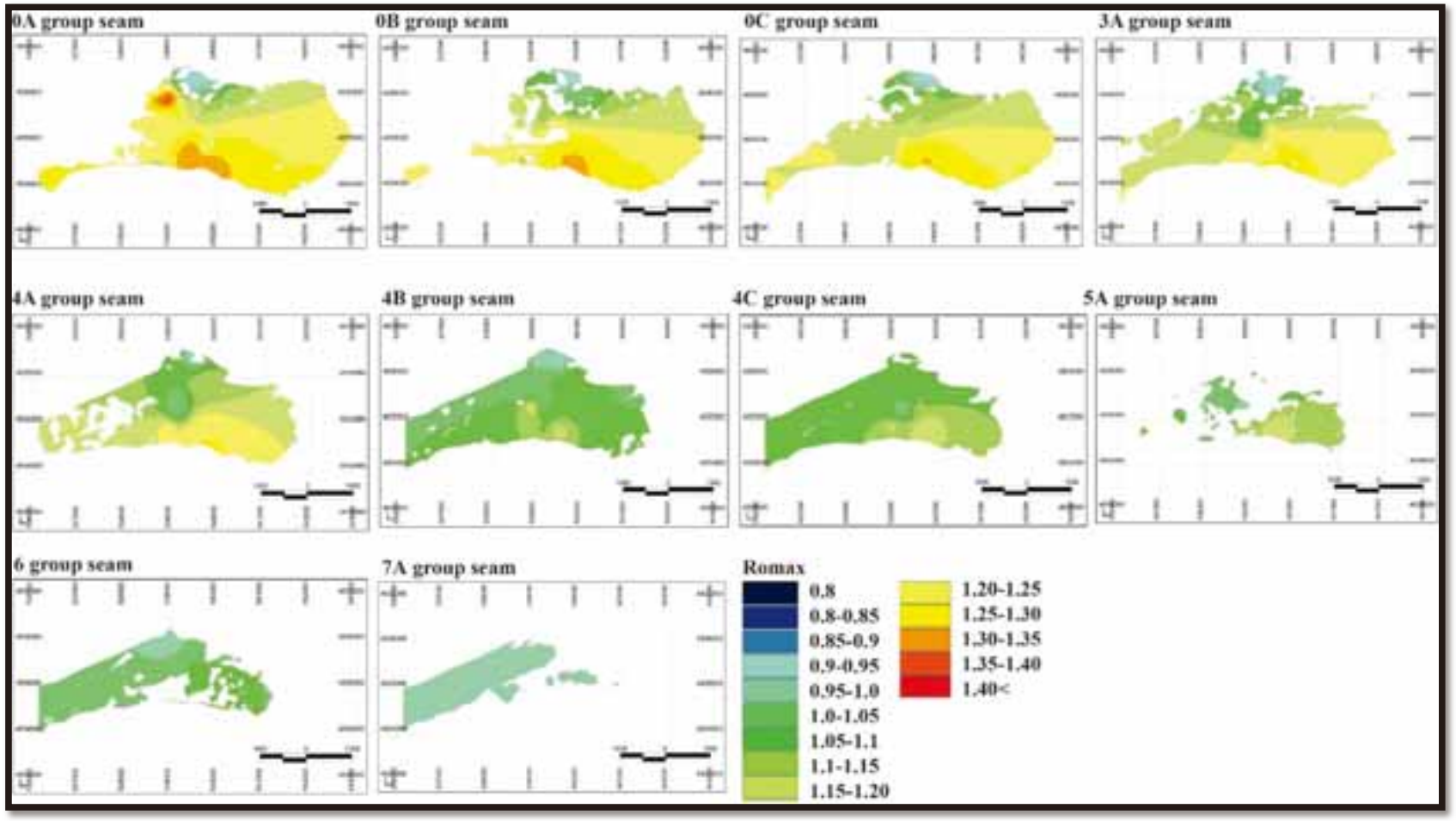


Figure 5-25: Vitrinite mean maximum reflectance map of major group seams.

(Source: Adiya)

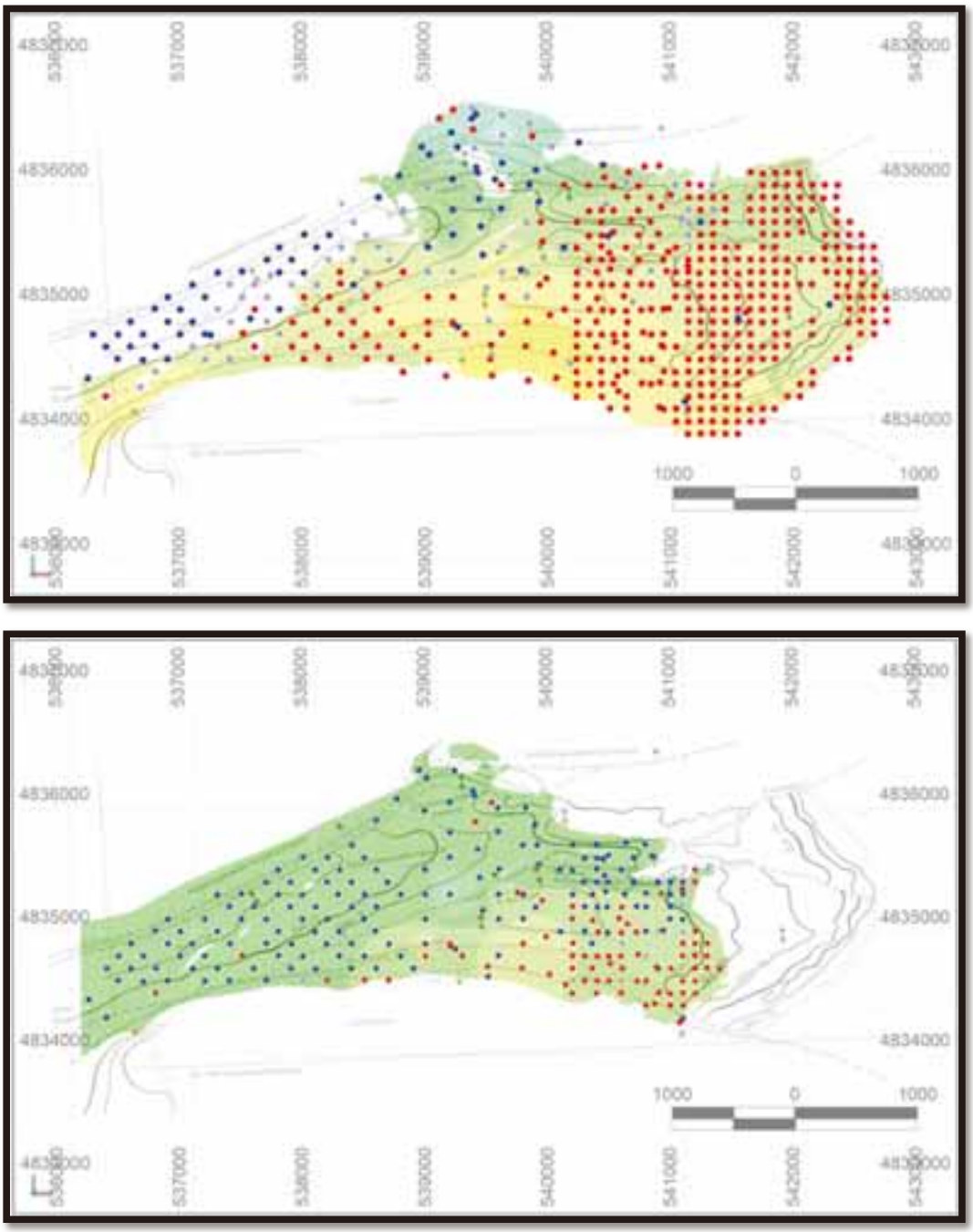


Figure 5-26: Structure and areas of devolatilisation. All coal seams in the upper map and Seam 4C in the lower map.

The above finding is strongly recommended to use in the 'day to day' mine geology tasks. This recommendation was implemented and has been a critical factor in mining selective blocks based on coal rank to define the end product. Figure 5-27 shows the resulting model based on vitrinite reflectance, used as a guidance for detailed in-pit sampling prior to mining for the seam 4C.

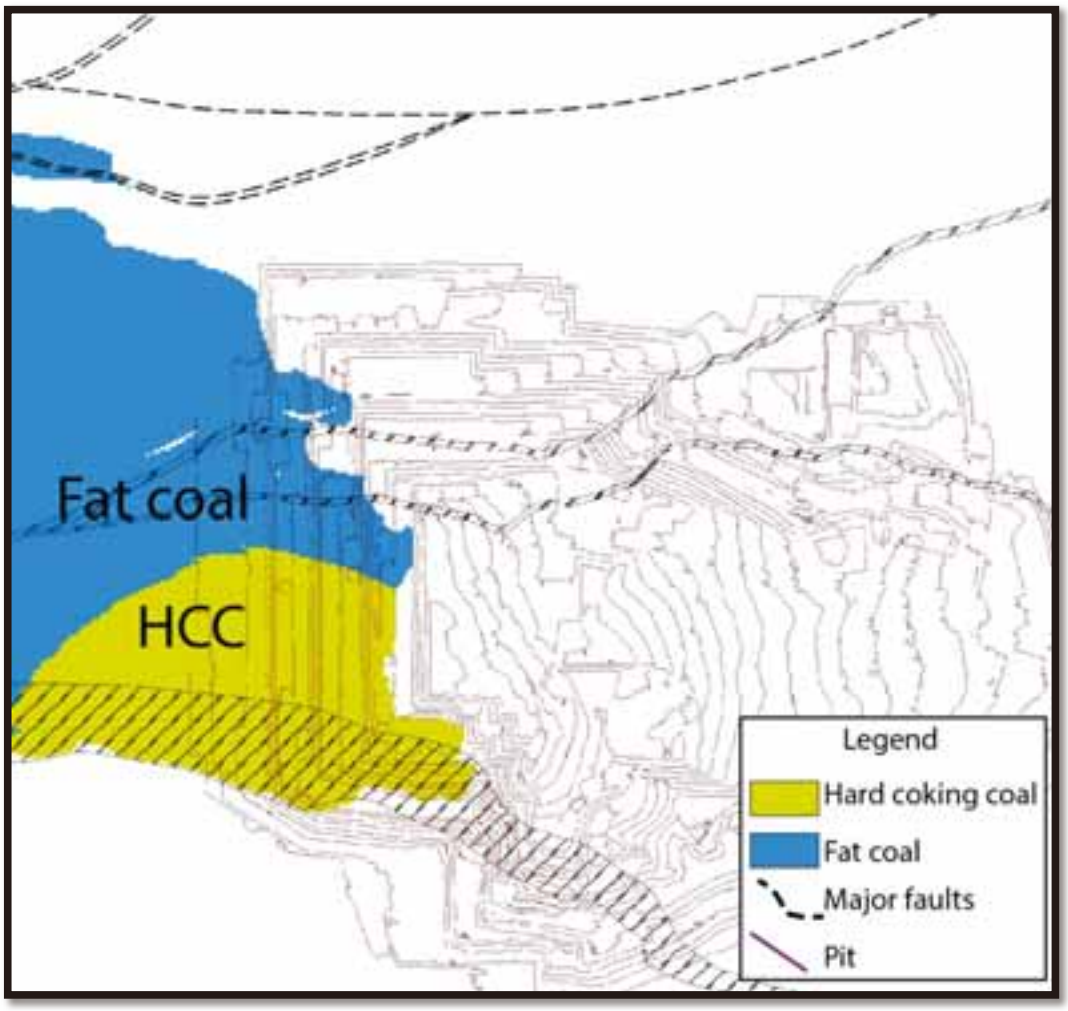


Figure 5-27: Product definition for Seam 4C from detailed in-pit sampling
(Source: Energy Resources LLC)

5.7.2.3 Rank of the coal

The ASTM classification of coal by rank takes into account the fixed carbon content on a dry, mineral matter free basis and the calorific value in Btu/lb. on a moist, mineral matter free basis. This classification uses the bed moisture content of the coal, which includes the in-situ moisture of the coal and excludes visible moisture on the surface of the coal. If it is accepted that the total moisture content reported for samples from this deposit, resembles the bed moisture, then the rank of the coal (less than 35 percent ash) can be estimated according to the ASTM classification as shown in Figure 5-28.

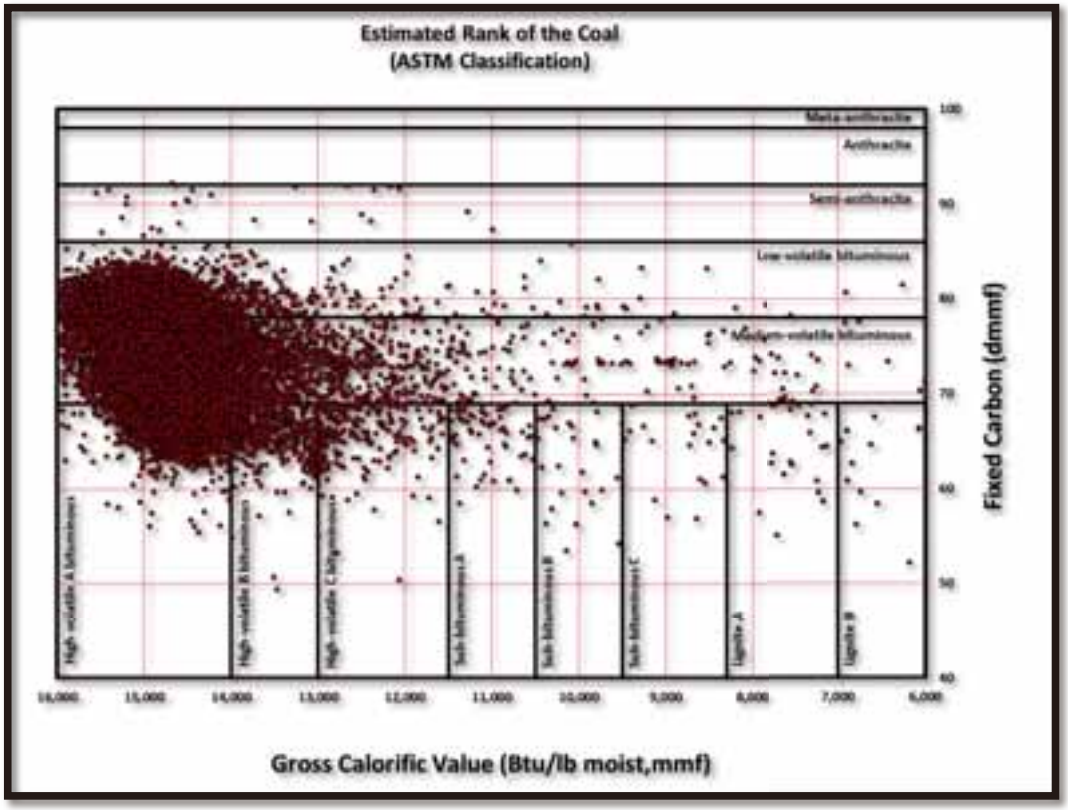


Figure 5-28: The ASTM classification of the coal based on rank.

(Source: Pretorius)

The diagram in Figure 5-28 is in accordance with the wide range in volatile matter discussed earlier. According to the rank estimate shown in Figure 5-28, the coal is classified as ranging from high-volatile 'A' bituminous coal to low-volatile bituminous coal with most samples in the medium-volatile bituminous group.

5.7.2.1 Justification of using regression formulae from previous Jorc (2012) Resource report

Out of 43,711 ply sample results, 37,707 is from the pre 2020 drilling program which was reported in the JORC (2012) Resource report. A total of 6004 ply sample results added to the laboratory database from 2020 drilling program with no missing values excluding calorific value results for samples with over 50% ash (dry base).

Figure 5-29 shows the comparison of the relationship between ash (air-dry) and calorific value (air-dry) from pre 2020 drilling program, and 2020 drilling program. There is no shift between the 2 datasets as indicated by the overlaying regression trendlines. Based on this observation, the regression formulae from the JORC (2012) Resource report are used to calculate missing values of 2020 drilling program as they are proved to be still viable.

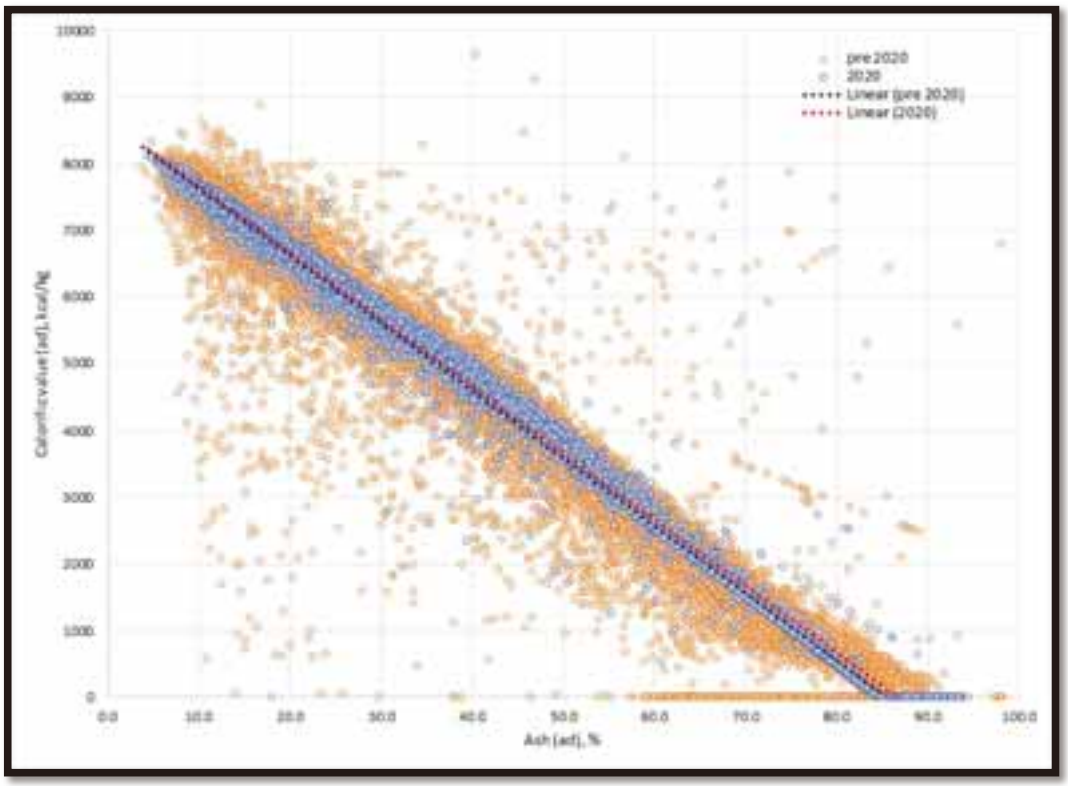


Figure 5-29: Comparison of the ash and calorific value. Orange dots show Pre 2020 drilling program results (From Jorc (2012) Resource report), blue dots show 020 drilling program results.

5.7.2.2 Regression formulae to estimate missing coal quality data

As mentioned earlier, regression formulae were developed on a seam by seam basis, mainly due to the variation in the volatile matter of the coal as shown in Figure 5-20.

As an example of the regression formulae developed, Figure 5-30 through Figure 5-34 shows the Microsoft Excel graphs and relationships for seam 0CU, which is the seam with the most samples. Similar graphs and relationships were developed for the remainder of the coal seams and the regression formulae for the coal quality parameters on a seam by seam basis are listed in Table 5-6Table 5-6: Regression formulae for coal quality parameters on a seam basis. and a full set of the graphs, also on a seam by seam basis and for each coal quality parameter is shown in Appendix 7.

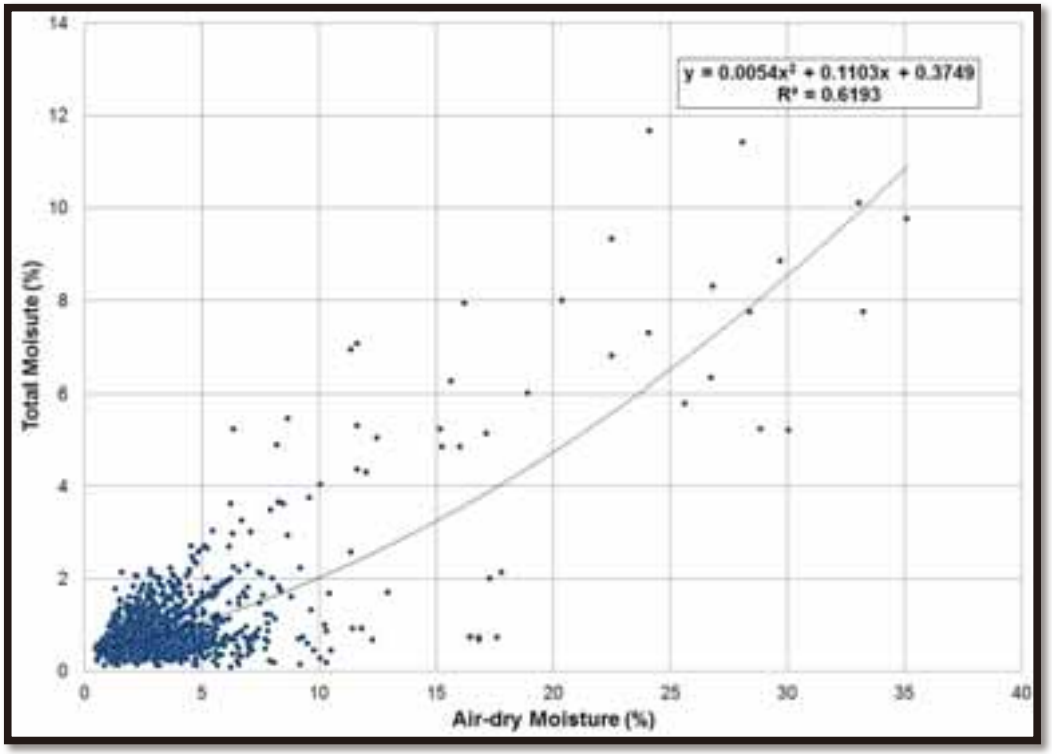


Figure 5-30: Relationship between air-dry moisture and total moisture for Seam 0CU.

(Source: Adiya)

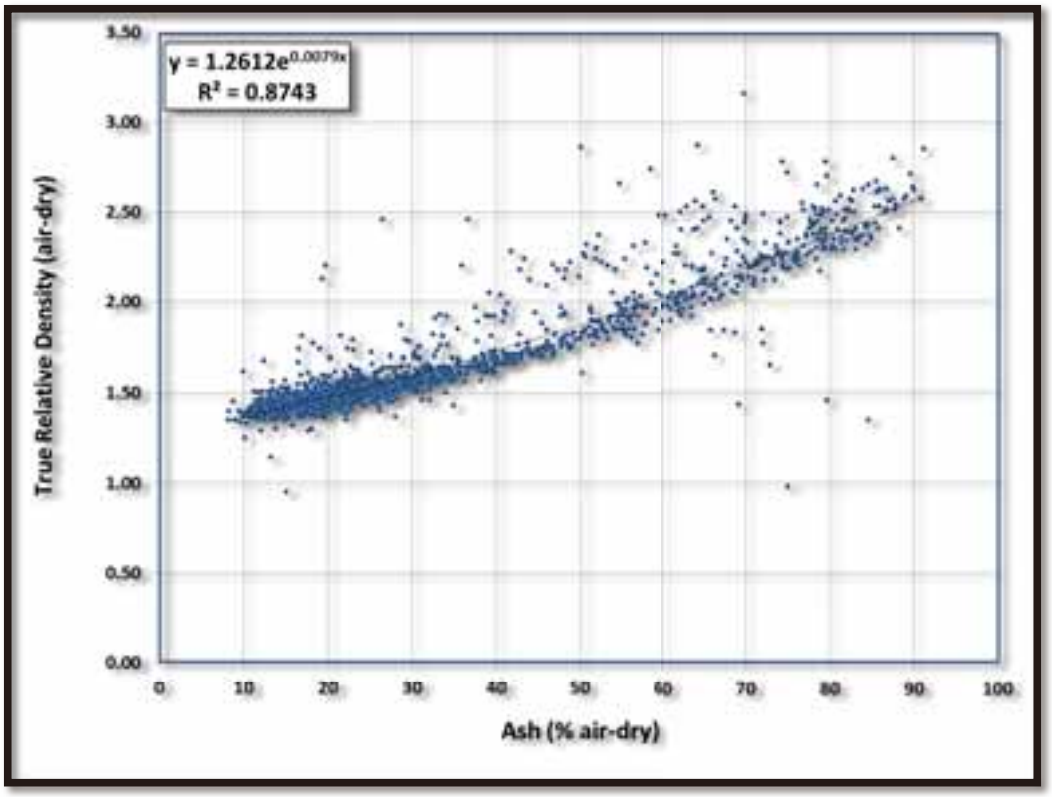


Figure 5-31: Relationship between ash and true relative density for Seam 0CU.

(Source: Adiya)

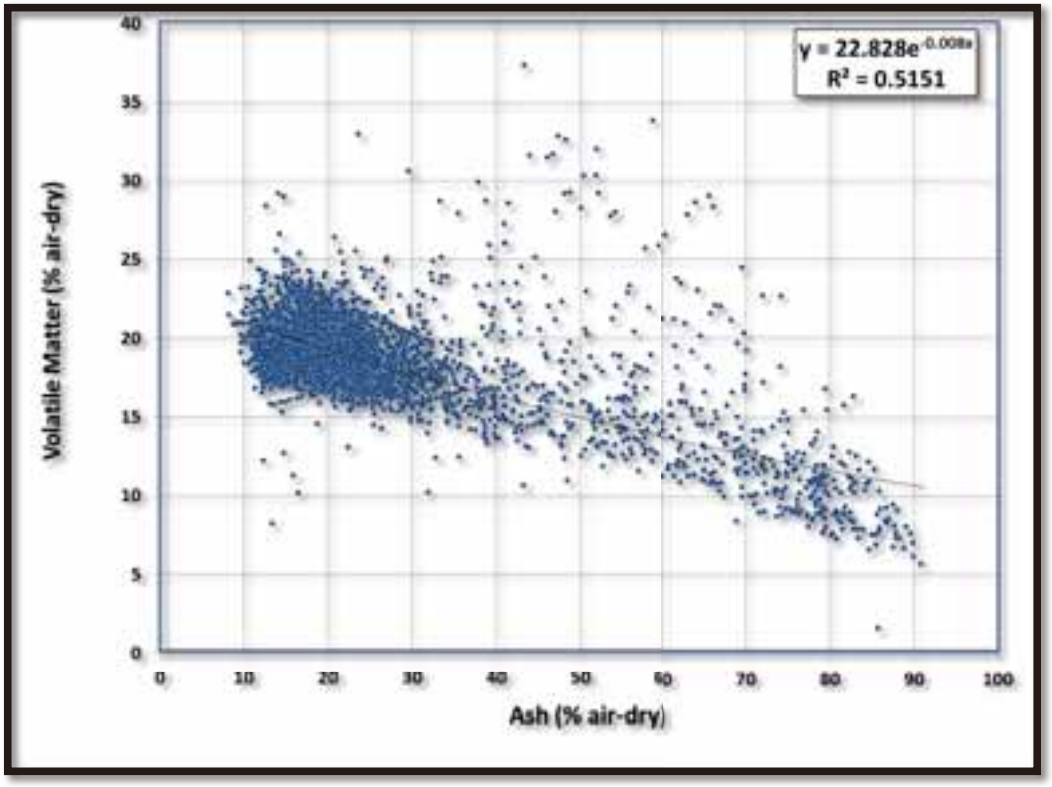


Figure 5-32: Relationship between ash and volatile matter for Seam 0CU.

(Source: Adiya)

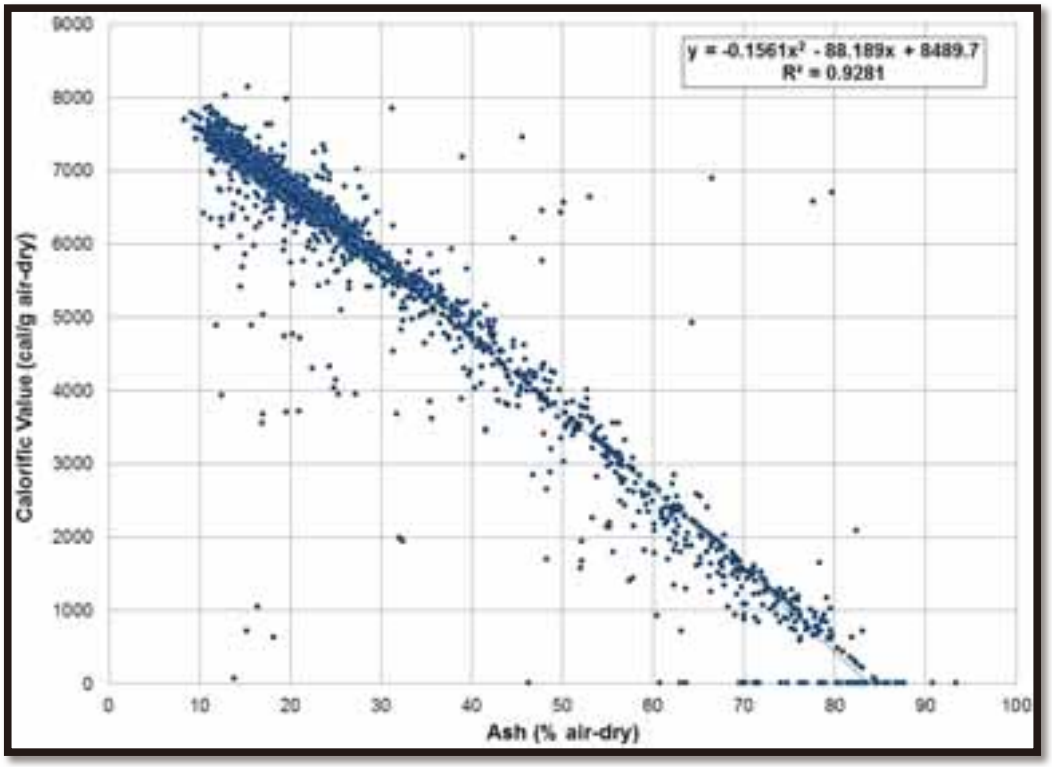


Figure 5-33: Relationship between ash and calorific value for Seam 0CU.

(Source: Adiya)

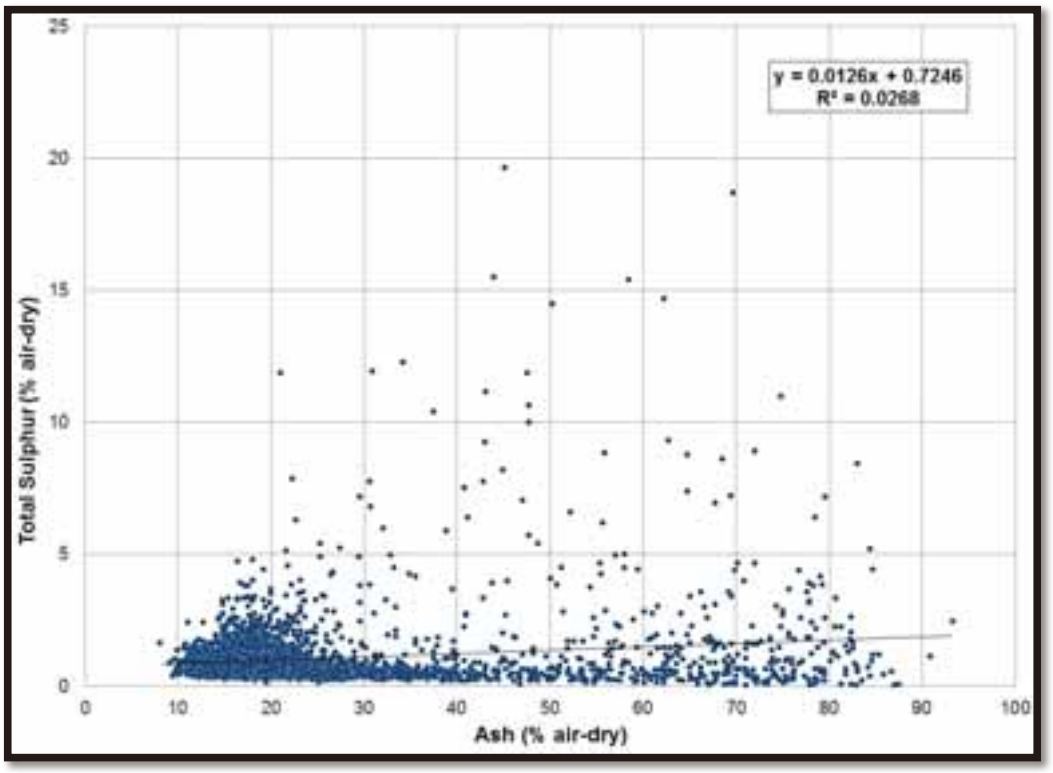


Figure 5-34: Relationship between ash and sulphur for Seam 0CU.

(Source: Adiya)

Table 5-6 shows the mathematical relationships that were established for each seam. The data used included all the samples which were provided with a seam/ply name, but exclude the partings between seam and roof and floor samples.

These relationships were used to estimate missing coal quality data for the seam samples as well as missing data for the partings between seam, roof and floor samples.

Samples without a seam/ply name, or not indicated as being a parting between seams or roof or floor samples, were treated as one population and the same relationships were developed for this population to estimate missing values.

The following abbreviations are used in Table 5-6:

- TRDad = True Relative Density (air-dry)
- Aad = Ash (% air-dry)
- Mt = Moisture total (%)
- Mad = Moisture (% air-dry)
- VMad = Volatile Matter (% air-dry)
- CVad = Calorific Value (cal/g air-dry)
- TSad = Total Sulphur (% air-dry)
- e = constant ($\ln(e^x) = x$)
- ln = natural logarithm

- ^ = 'to the power'

Table 5-6 shows the better correlations of ash with true relative density and calorific value. The correlation between ash and volatile matter is generally poor and the correlation between ash and total sulphur as well as the correlations between the different moisture parameters are also very poor.

Although some of the regression formulae shows poor correlation between parameters, these formulae were used to fill in the missing analytical data to complete the coal quality information that goes with the points of observation for the modelling of the Coal Resource and Coal Quality Estimates.

The complete analytical database is attached in Appendix 6a & 6b showing as-received and air-dry coal quality. The as-received values were calculated from the total moisture and air-dry values and for true relative density conversion, the Preston Sanders formula was used to convert air-dry relative density to as-received (in-situ) relative density.

Table 5-6: Regression formulae for coal quality parameters on a seam basis.

Seam 12	
TRDad = 1.2209 * e^(0.0082 * Aad)	R2 = 0.9810
Mt = 1.0387 * Mad^2 – 1.8944 * Mad + 5.4962	R2 = 0.5270
Mad = 0.0028 * Mt^2 + 0.1218 * Mt + 0.7013	R2 = 0.4521
VMad = - 0.2788 * Aad + 33.742	R2 = 0.9092
CVad = -0.3059*Aad2 - 80.478*Aad + 8203.6	R² = 0.9778
TSad = 1.2223 * e^(-0.012 * Aad)	R² = 0.2505
Seam 11	
TRDad = 8 * 10^(-05) * Aad^2 + 0.0072 * Aad + 1.3	R2 = 0.9110
Mt = 0.042 * Mad^2 + 2.0786 * Mad + 2.2142	R2 = 0.7704
Mad = 0.0042 * Mt^2 + 0.1849 * Mt + 0.4502	R2 = 0.7802
VMad = 0.0005 * Aad^2 – 0.3475 *Aad + 35.401	R2 = 0.9069
CVad = 0.0661*Aad2 - 100.79*Aad + 8155.6	R² = 0.9094
TSad = -0.0002*Aad2 + 0.0212*Aad + 0.5526	R² = 0.0142
Seam 10	
TRDad = 1.2414 * e^(0.0083 * Aad)	R2 = 0.9025
Mt = - 0.1198 * Mad^2 + 3.541 * Mad – 0.0124	R2 = 0.7655
Mad = 0.0124 * Mt^2 + 0.0496 * Mt + 0.8287	R2 = 0.8145
VMad = 38.475 * e^(- 0.015 * Aad)	R2 = 0.8154
CVad = 0.0436*Aad2 - 104.21*Aad + 8357.1	R² = 0.9318
TSad = 1.0017 * e^(- 0.006 * Aad)	R² = 0.0248
Seam 9	
TRDad = 1.2339 * e^(0.0086 * Aad)	R2 = 0.9103
Mt = 1.2707*Mad2 - 2.3034*Mad + 5.2827	R² = 0.0139
Mad = 0.0458 * ln(Mt) + 0.9745	R2 = 0.0053
VMad = - 0.0012 * Aad^2 – 0.1545 * Aad + 32.128	R2 = 0.7327
CVad = 0.0207*Aad2 - 102.01*Aad + 8459.5	R² = 0.9247
TSad = 0.7394 * e^(0.0143 * Aad)	R² = 0.1231
Seam 8	
TRDad = 1.2341 * e^(0.0089 * Aad)	R2 = 0.8624
Mt = 2.5025*Mad + 1.6006	R² = 0.3488
Mad = 0.0009 * Mt^2 + 0.0641 * Mt + 0.695	R2 = 0.3394
VMad = 33.248 * e^(- 0.011 * Aad)	R2 = 0.6146
CVad = 0.0481*Aad2 - 105.38*Aad + 8558	R² = 0.9276
TSad = - 0.0009 * Aad^2 + 0.1194 * Aad – 0.5269	R² = 0.1185
Seam 7	
TRDad = 1.232 * e^(0.0083 * Aad)	R2 = 0.9022

Mt = 1.5796*Mad + 2.8408	R^2 = 0.048
Mad = 0.6886 * Mt^(0.1668)	R2 = 0.0665
VMad = -0.0006 * Aad^2 - 0.176 * Aad + 29.372	R2 = 0.7595
CVad = -0.0449*Aad2 - 97.11*Aad + 8558.4	R^2 = 0.956
TSad = - 0.0007 * Aad^2 + 0.0774 * Aad – 0.1441	R^2 = 0.0504
Seam 6	
TRDad = 1.2431 * e^(0.0081 * Aad)	R2 = 0.9104
Mt = 0.1475 * Mad^2 + 2.0933 * Mad + 1.7911	R2 = 0.6197
Mad = 0.0097 * Mt^2 + 0.0092 * Mt + 0.7692	R2 = 0.7060
VMad = - 0.0027 * Aad^2 + 0.0658 * Aad + 21.17	R2 = 0.4728
CVad = -97.735*Aad + 8445.2	R^2 = 0.8988
TSad = 0.7803 * e^(- 0.006 * Aad)	R^2 = 0.0284
Seam 5	
TRDad = 1.2481 * e^(0.008 * Aad)	R2 = 0.8382
Mt = - 0.2234 * Mad^2 + 2.8884 * Mad + 1.5758	R2 = 0.3949
Mad = - 0.0013 *Mt^2 + 0.2501 * Mt + 0.0836	R2 = 0.3743
VMad = 26.586 * e^(- 0.01 * Aad)	R2 = 0.4841
CVad = 0.0393*Aad2 - 99.564*Aad + 8471.9	R^2 = 0.9374
TSad = 0.832 * e^(- 0.008 * Aad)	R^2 = 0.0526
Seam 4C	
TRDad = 1.251 * e^(0.0082 * Aad)	R2 = 0.9157
Mt = 2.3812*Mad + 1.8978	R^2 = 0.4073
Mad = 0.0033 * Aad^2 + 0.0715 * Aad + 0.5407	R2 = 0.3701
VMad = 29.424 * e^(- 0.013 * Aad)	R2 = 0.7165
CVad = -0.0024*Aad2 - 101.14*Aad + 8589.1	R^2 = 0.9211
TSad = - 0.0006 * Aad^2 + 0.0661 * Aad + 0.1374	R^2 = 0.0427
Seam 4B	
TRDad = 1.2284 * e^(0.0083 * Aad)	R2 = 0.8952
Mt = 2.2961*Mad + 1.9626	R^2 = 0.2385
Mad = 0.5417 * Mt^(0.3225)	R2 = 0.2073
VMad = 30.602 * e^(- 0.013 * Aad)	R2 = 0.6906
CVad = 0.0634*Aad2 - 107.12*Aad + 8756.6	R^2 = 0.9265
TSad = - 0.0005 * Aad^2 + 0.0513 * Aad + 0.0736	R^2 = 0.0174
Seam 4A10-20	
TRDad = 1.2349 *e^(0.0082 * Aad)	R2 = 0.9087
Mt = 2.8961*Mad + 1.7284	R^2 = 0.1118
Mad = 0.5505 * Mt^(0.2874)	R2 = 0.1936
VMad = 31.476 * e^(- 0.014 * Aad)	R2 = 0.7468
CVad = -103.2*Aad + 8808.1	R^2 = 0.9642
TSad = 0.8067 * e^(-0.014 * Aad)	R^2 = 0.1458
Seam 4A	
TRDad = 1.2386 * e^(0.0084 * Aad)	R2 = 0.8744
Mt = 2.0151*Mad + 2.3097	R^2 = 0.302
Mad = - 0.0023 * Mt^2 + 0.1502 * Mt +0.3453	R2 = 0.1712
VMad = - 0.0011 * Aad^2 – 0.0596 * Aad +23.43	R2 = 0.5668
CVad = -100.67*Aad + 8651.9	R^2 = 0.9379
TSad = -0.0002*Aad2 + 0.0357*Aad + 0.3264	R^2 = 0.0472
Seam 3A	
TRDad = 1.2454 * e^(0.0081 * Aad)	R2 = 0.9152
Mt = 1.617*Mad + 2.0273	R^2 = 0.1746
Mad = 0.0099 * Mt^2 - 0.0309 * Mt + 0.7219	R2 = 0.4422
VMad = 25.875 * e^(-0.011 * Aad)	R2 = 0.6699
CVad = -101.66*Aad + 8703.4	R^2 = 0.9389
TSad = -0.0002*Aad2 + 0.0284*Aad + 0.4361	R^2 = 0.0238
Seam 25-0D	
TRDad = 0.0001 * Aad^2 + 0.0011 * Aad + 1.4156	R2 = 0.8494
Mt = 0.1446*Mad2 + 1.2154*Mad + 1.5441	R^2 = 0.7464

Mad = 0.0031 * Mt^2 + 0.193 * Mt + 0.2749	R2 = 0.7054
VMad = 25.499 * e^(- 0.0012 * Aad)	R2 = 0.6753
CVad = -0.3119*Aad2 - 67.605*Aad + 8044.8	R^2 = 0.8347
TSad = 0.8359 * e^(- 0.011 * Aad)	R^2 = 0.1159
Seam 0CU (See cross plots)	
TRDad = 1.2612 * e^(0.0079 * Aad)	R2 = 0.8743
Mad = 0.0047 * Mt^2 + 0.1036 * Mt + 0.3778	R2 = 0.6003
Mt = 0.1055*Mad2 + 1.7529*Mad + 1.4652	R^2 = 0.5935
VMad = 22.828 * e^(- 0.008 * Aad)	R2 = 0.5151
CVad = -0.1561*Aad2 – 88.189*Aad + 8489.7	R^2 = 0.9281
TSad= 0.0126*Aad + 0.7246	R^2 = 0.0268
Seam 0CL	
TRDad = 1.254 * e^(0.0077 * Aad)	R2 = 0.8952
Mt = 2.4069*Mad + 0.5715	R^2 = 0.6851
Mad = 0.0002 * Mt^2 + 0.2121 * Mt + 0.2458	R2 = 0.4753
VMad = 24.303 * e^(- 0.012 * Aad)	R2 = 0.7382
CVad = -0.2991*Aad2 - 73.685*Aad + 8300.3	R^2 = 0.9441
TSad = 0.5749 * e^(0.0009 * Aad)	R^2 = 0.0007
Seam 0BR	
Mt = 0.0007*Mad2 + 0.1677*Mad + 0.3479	R^2 = 0.3994
CVad = -99.763*Aad + 8735.2	R^2 = 0.9617
TSad = 0.6309 * e^(-0.011 * Aad)	R^2 = 0.1018
Seam 0B	
TRDad = 1.2842 * e^(0.0076 * Aad)	R2 = 0.8760
Mt = 0.2889 * Mad^2 +0.699 * Mad + 2.3728	R2 = 0.3307
Mad = 0.0076 * Mt^2 + 0.0085 * Mt + 0.5721	R2 = 0.3921
VMad = 20.889 * e^(-0.008 * Aad)	R2 = 0.4315
CVad = -99.415*Aad + 8633	R^2 = 0.9485
TSad = -0.0002*Aad2 + 0.0077*Aad + 0.9262	R^2 = 0.0082
Seam 0A	
TRDad = 1.2269 * e^(0.0084 * Aad)	R2 = 0.8775
Mt = 1.3478 * e^(0.5192 * Mad)	R^2 = 0.2345
Mad = - 0.0282 * Mt^2 + 0.372 * Mt + 0.1194	R2 = 0.2828
VMad = 22.291 * e^(- 0.009 * Aad)	R2 = 0.4646
CVad = -104.73*Aad + 8860.9	R^2 = 0.9204
TSad = 0.7129 * e^(- 0.006 * Aad)	R^2 = 0.0166
Samples with no Seam Name & rock (all sample regression)	
TRDad = 1.2408 *e^(0.0082 * Aad)	R2 = 0.9520
Mt = 0.2451*Mad2 + 1.1784*Mad + 1.3419	R^2 = 0.4292
Mad = 0.0027 * Mt^2 + 0.0164 * Mt + 0.662	R2 = 0.1714
VMad = 27.426 * e^(-0.013 * Aad)	R2 = 0.7083
CVad = -102.32*Aad+ 8656.9	R^2 = 0.9487
TSad = -0.0005*Aad2 + 0.053*Aad + 0.1443	R^2 = 0.0209

(Source: Adiya)

5.7.2.3 Observations regarding the distribution of CSN values

A total of 35,797 samples were analysed for CSN (Table 5-5).

Table 5-7 shows the distribution of the CSN values on a seam by seam basis. As an example, for seam 3A there is two CSN equal to 9.0 and nine CSN determinations equal to 8.5.

Table 5-7: Distribution of CSN values by coal seam.

CSN	Seam 0A	Seam 0B	Seam 0BR	Seam 0CL	Seam 0CU	Seam 25-0D	Seam 3A	Seam 4A	Seam 4A10-20	Seam 4B	Seam 4C	Seam 5	Seam 6	Seam 7	Seam 8	Seam 9	Seam 10	Seam 11	Seam 12
8.5	0	0	0	0	0	0	2	1	0	0	3	0	3	0	0	0	0	0	0
8.0	0	0	0	0	3	0	11	2	0	5	29	1	46	4	0	0	0	0	0
7.5	1	0	1	0	9	2	34	20	0	47	92	2	92	15	0	3	1	0	0
7.0	4	0	1	2	19	8	121	62	0	90	183	6	181	40	0	22	1	0	0
6.5	9	2	2	7	51	12	291	145	0	143	292	17	250	63	3	47	2	1	1
6.0	17	9	4	18	125	23	552	271	1	218	447	32	318	90	6	109	8	7	1
5.5	27	25	9	33	226	30	797	454	6	303	630	51	406	129	12	242	20	20	3
5.0	42	36	11	52	311	35	927	573	8	387	744	68	486	194	17	368	29	37	9
4.5	65	45	19	89	430	48	1092	711	20	489	896	91	617	276	24	509	40	57	13
4.0	91	60	29	126	577	64	1261	833	35	603	1062	112	761	391	33	649	50	70	18
3.5	127	96	46	193	783	85	1455	988	55	737	1281	131	966	539	46	775	62	87	20
3.0	161	114	65	231	954	106	1607	1083	71	834	1436	150	1095	630	56	840	73	89	22
2.5	199	148	93	288	1116	115	1728	1172	86	915	1556	168	1228	694	64	900	84	101	26
2.0	262	191	113	352	1264	125	1832	1262	105	987	1632	182	1307	747	71	952	92	108	27
1.5	350	269	133	420	1455	146	1929	1352	124	1058	1709	202	1381	796	82	1000	102	124	32
1.0	457	412	162	480	1638	171	2042	1430	140	1134	1771	226	1452	833	85	1032	116	133	35
0.5	1462	1201	384	736	2703	244	2396	1639	210	1316	1917	267	1602	917	103	1150	147	170	50
0.0	1734	1483	429	844	3076	257	2560	1704	228	1383	1966	277	1649	952	107	1173	155	177	51
Σ	2416	2001	494	943	3431	279	2715	1803	245	1449	2036	322	1793	1014	113	1213	190	224	59

(Source: Adiya)

Table 5-8 shows the cumulative percentage of CSN values by seam. As an example, for seam 3A one percent of the CSN determinations are equal to 7.5 or higher. Three percent of the CSN values are equal to 7.0 or higher.

Table 5-8 shows that some seams have higher percentages of high CSN values and some seams have less of the higher CSN values.

The data in Table 5-8 is illustrated in the diagram in Figure 5-35 where the seams are colour coded according to the distribution of CSN values as follows:

- Seams 0A, 0B and 0BR have very low CSN values, most likely with low to no potential for coking coal.
- Seams 3A and 4A have high percentages of high CSN values and are most likely the best coking seams of the deposit. Seams 4B, 4C, 6, 7 and 9 also show high percentages of high CSN values. These seams are grouped together as a group of seams with the best potential for coking coal.
- Seams 0CU, 0CL, 25-0D, 4A10-20, 5, 8, 10, 11 and 12 forms a transition group of seams with a medium potential for coking coal.

Table 5-8: Cumulative percentage distribution of CSN values.

CSN	Seam 0A	Seam 0B	Seam 0BR	Seam 0CL	Seam 0CU	Seam 25-0D	Seam 3A	Seam 4A	Seam 4A10-2	Seam 4B	Seam 4C	Seam 5	Seam 6	Seam 7	Seam 8	Seam 9	Seam 10	Seam 11	Seam 12
8.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8.0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0
7.5	0	0	0	0	0	1	1	1	0	3	5	1	5	1	0	0	1	0	0
7.0	0	0	0	0	1	3	4	3	0	6	9	2	10	4	0	2	1	0	0
6.5	0	0	0	1	1	4	11	8	0	10	14	5	14	6	3	4	1	0	2
6.0	1	0	1	2	4	8	20	15	0	15	22	10	18	9	5	9	4	3	2
5.5	1	1	2	3	7	11	29	25	2	21	31	16	23	13	11	20	11	9	5
5.0	2	2	2	6	9	13	34	32	3	27	37	21	27	19	15	30	15	17	15
4.5	3	2	4	9	13	17	40	39	8	34	44	28	34	27	21	42	21	25	22
4.0	4	3	6	13	17	23	46	46	14	42	52	35	42	39	29	54	26	31	31
3.5	5	5	9	20	23	30	54	55	22	51	63	41	54	53	41	64	33	39	34
3.0	7	6	13	24	28	38	59	60	29	58	71	47	61	62	50	69	38	40	37
2.5	8	7	19	31	33	41	64	65	35	63	76	52	68	68	57	74	44	45	44
2.0	11	10	23	37	37	45	67	70	43	68	80	57	73	74	63	78	48	48	46
1.5	14	13	27	45	42	52	71	75	51	73	84	63	77	79	73	82	54	55	54
1.0	19	21	33	51	48	61	75	79	57	78	87	70	81	82	75	85	61	59	59
0.5	61	60	78	78	79	87	88	91	86	91	94	83	89	90	91	95	77	76	85
0.0	72	74	87	90	90	92	94	95	93	95	97	86	92	94	95	97	82	79	86
Σ	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

(Source: Adiya)

Figure 5-35 shows the three groups of seams based on their potential for coking coal. Note the overlap between the group with high potential and the group with medium potential for coking coal with CSN values equal to or greater than 4.

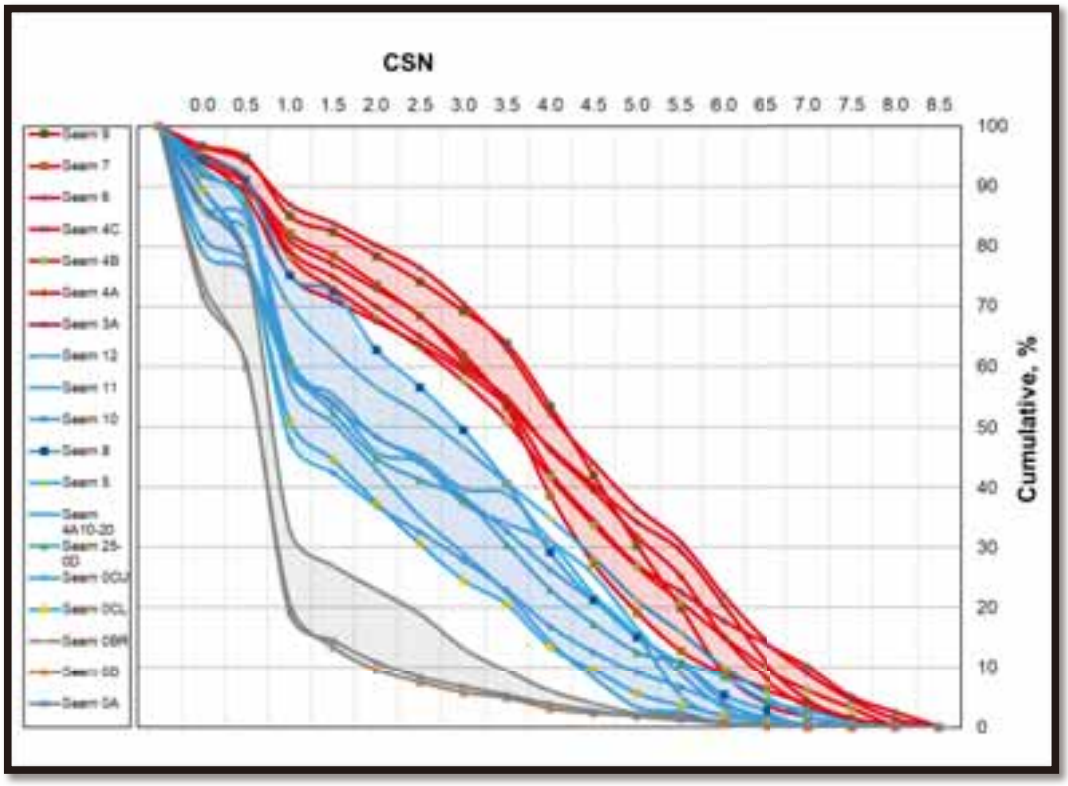


Figure 5-35: Cumulative percentage distribution of CSN values.

(Source: Adiya)

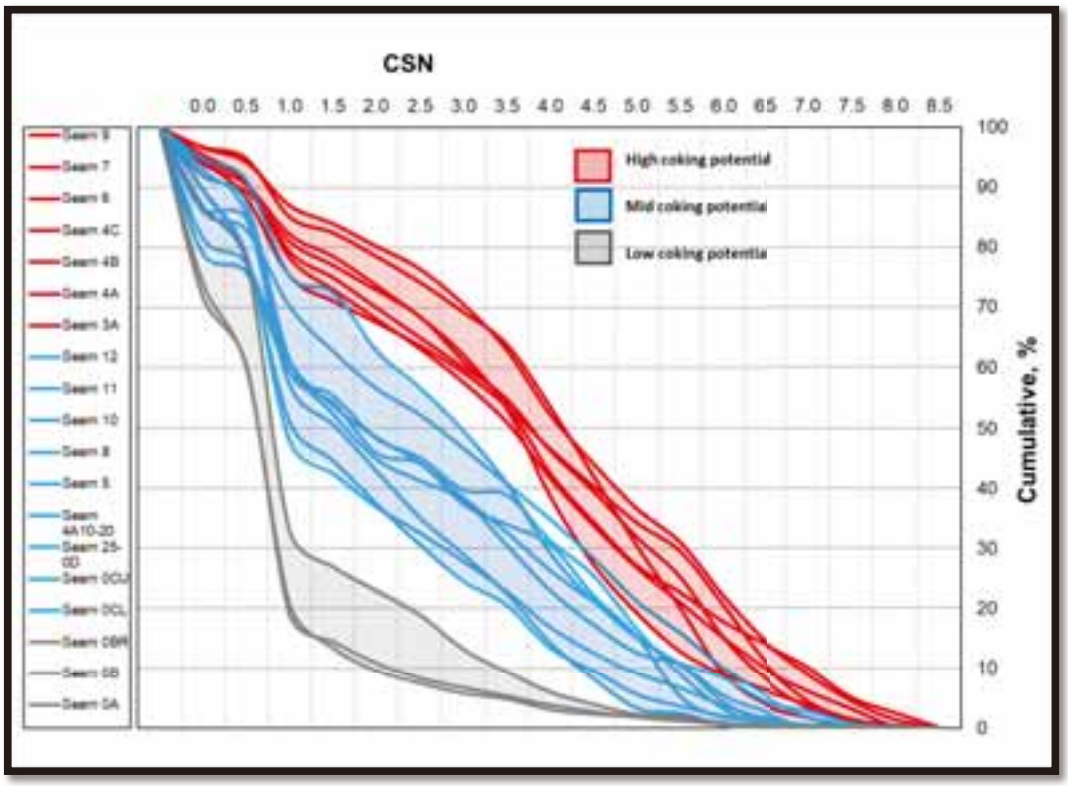


Figure 5-36: Three groups of seams according to CSN distributions.

(Source: Adiya)

The previous discussion of the variability of the volatile matter included Figure 5-23, which shows the relationship between ash and volatile matter on a seam by seam basis. The following diagram in Figure 5-37 combines the ash/volatile relationships of the individual seams with the CSN distributions of the individual seams.

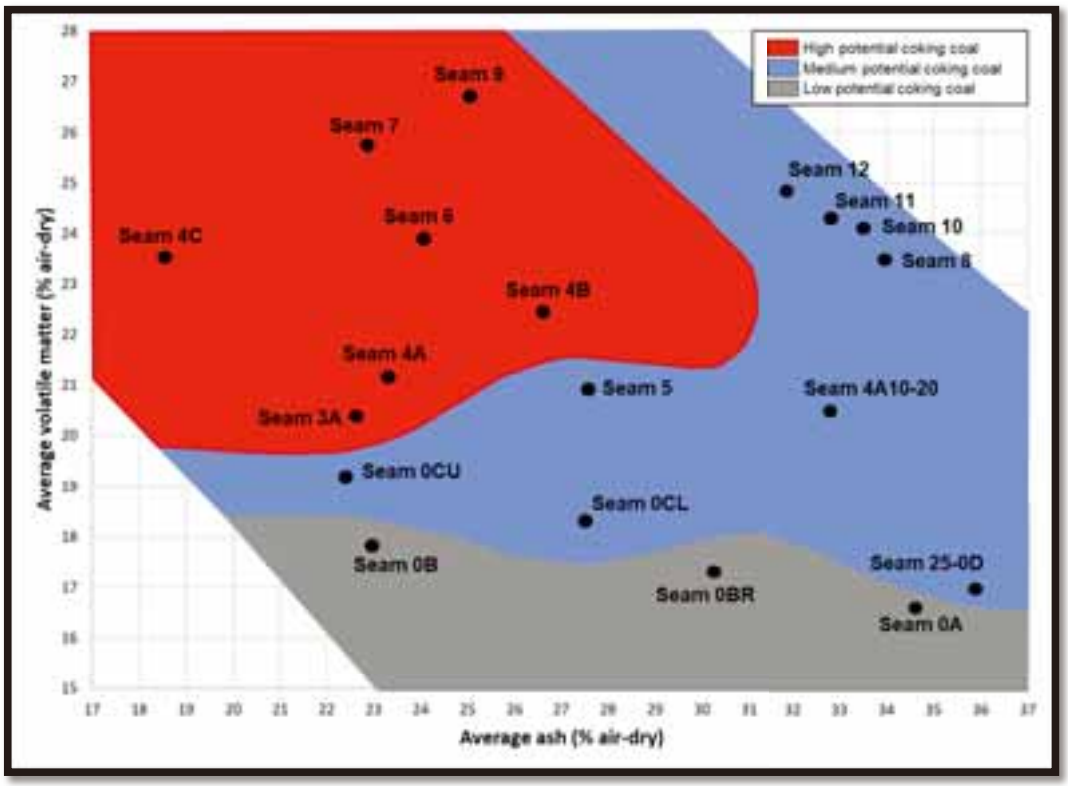


Figure 5-37: Ranking of the coal seams according to coking coal potential.

(Source: Adiya)

Based on the discussion above, the coking potential of the coal seams are as follows (note: all below coal qualities are RAW coal qualities);

- Seams 0A, 0B and 0BR have very low CSN values, most likely with low or no potential for coking coal. These seams are grouped together as a group of seams with no or little potential for coking coal. There is a wide range in ash content between 22 and 35 percent, and the volatile matter of this group is less than about 18 percent.
- Seams 3A, 4A and 4C have high percentages of high CSN values and are most likely the best coking seams of the deposit with ash between 18 and 24 percent, and volatile matter between 20 and 24 percent. These seams have the best potential for coking coal. Seam 4B in this group has a higher ash content of about 27 percent. Although Seams 6, 7 and 9 also show high percentages of high CSN values, the volatile matter is 23 percent and greater, so it is possible that these seams have a potential for soft coking coal rather than for hard coking coal.
- Seams 0CU, 0CL, 25-0D, 4A10-20, 5, 8, 10, 11 and 12 forms a transition group of seams with a possible potential for coking coal. The ash content of these seams are also in the 22 to 34 percent range, but the volatile matter of seams 0CU, 0CL, 4A10-20, 5, 8 and 25-0D have less than 23 percent volatile matter and Seams 10, 11 and 12 have more than 24 percent volatile matter.

The reader is also referred to the work by Norwest in correlating CSN values with ash content. It must be emphasised that the CSN determinations were done on RAW

coal and that the coking properties discussed in this report might vary for washed coal.

5.7.2.4 Washability and Coke testing

For the previous Resources report 2012, Norwest had completed some washability and coke test work which formed the basis of the current CHPP design. It was recommended in this report that further work should be completed.

As recommended, a number of large diameter borehole samples were taken of the currently mined seams and were compared with the original Norwest results. This information is shown below in Table 5-9.

Table 5-9: Comparison of Bulk sample Coke Tests

SEAM	Norwest, March 2010					ER, August 2012			
	DI 30/15	Stability	Hardness	CSR	CRI	M40	M10	CRI	CSR
0C	94.2	64.2	67.5	69.5	21.3	86.6	7.4	27.1	65.6
3A	94.1	67.5	68.8	64.8	28.4	85.0	7.5	26.4	66.2
4A	94.1	68.2	70.9	69.4	24.1	82.9	8.2	26.5	61.5
4C	94.2	67.6	71.2	66.3	25.3	83.2	7.8	34.6	51.8
8	93.6	51.4	64.2	39.5	40.0				
9	93.0	51.9	63.6	40.4	40.0				

CSR and CRI between the 2 sets of data compare relatively well, except for seam 4C showing some downward change. It has been mentioned in the above sections, rank of the coal is variable, so individual results can also be expected to be variable.

With the CHPP and mining at UHG now having been active for some years, actual typical washed coal results can be reported. Table 5-10 shows some typical average CHPP washed coal results.

Table 5-10: Typical average CHPP washed coal product results

Seam	Product	Yield (%)	CSN	G index	Mt ar, %	Mad, %	Aad, %	VM ad, %	Vdaf, %	St, ad	Qgr, ad
0C	Feed CQ		2.5	42	4.14	0.67	23.70	18.86	24.98	1.18	6461
	Primary	23.70	7.5	77	9.22	0.72	11.11	21.06	23.89	0.62	7586
	Second	21.53	1.5		4.31	0.58	18.00	18.45	22.67	0.79	6887
3A	Feed CQ		7.0	77	4.91	0.67	18.34	21.02	26.01	1.30	6928
	Primary	47.54	8.0	88	8.73	0.74	10.26	22.92	25.75	0.71	7680
	Second	15.35	3.5		6.98	0.68	18.38	19.95	24.65	1.08	6988
4A	Feed CQ		7.0	78	4.70	0.70	16.75	22.14	27.39	0.70	6984
	Primary	45.11	8.0	85	8.81	0.65	9.68	23.30	26.00	0.57	7755
	Second	3.08	1.0		5.05	0.60	19.41	19.62	24.56	1.05	6920

The hard coking coal product that UHG produces has had very good market acceptance from China, Japan and Germany. Table 5-11 shows a typical multi-laboratory testing with customer specifications acceptance that the UHG products undergo upon sale.

Table 5-11: Typical product testing prior to acceptance

Coal type	Company	Tested Lab	G index	Y	Mt	Ad	Vdaf	Sd	CSR
HCC	Customer requirement		≥80	16	≤8	≤10.5	≤26	≤0.7	
	Tianjin Tiantie	TT lab	86	16	6.5	10.5	24.69	0.57	NT
HCC	Customer requirement		≥80	≥15	≤10	≤11	≤26	≤0.7	
	JV (Jian Long)	JL lab	87	16	8.5	10.48	24.4	0.58	NT
HCC	Customer requirement		≥80	≥15	≤10	≤11	≤26	≤0.7	
	JV (Jiujiang)	JJ lab	83	16	7.5	10.85	24.49	0.58	67.04

Further bulk sample work is recommended for the western area yet to be mined seams, for washability and coke testing so a full understanding of how these seams behave so the current CHPP performance can be ascertained and viable saleable products can be determined and scheduled for the mining operation.

5.8 Outcrop, sub-crop and oxidation

The coking characteristics of a coking coal are very sensitive to oxidation and the coal will lose its coking propensity when the coal is even slightly oxidised as shown by the position of (A), the limit of oxidation (refer Figure 5-38). This point will be indicated by an increase in the moisture content and a sharp drop in the crucible swelling index (CSN) of the coal. In the case of a coking coal prospect, the depth of weathering at the limit of oxidation (LOX) would be (x) at a point (A) in the diagram.

In the transition zone the coal is only partially affected by weathering and most of the coal seam will still have its combustion properties (volatile matter) un-affected, but with a slightly higher moisture content and slightly weaker in its strength. A thermal coal is less sensitive to oxidation and it is expected that the depth of weathering, shown as (y) will be less than the depth of weathering for a coking coal, which is (x) in the example.

Beyond point (B), in the shallow weathered zone, the weathered coal will be a dark soft clayey material with very high moisture and all its combustion properties destroyed by weathering.

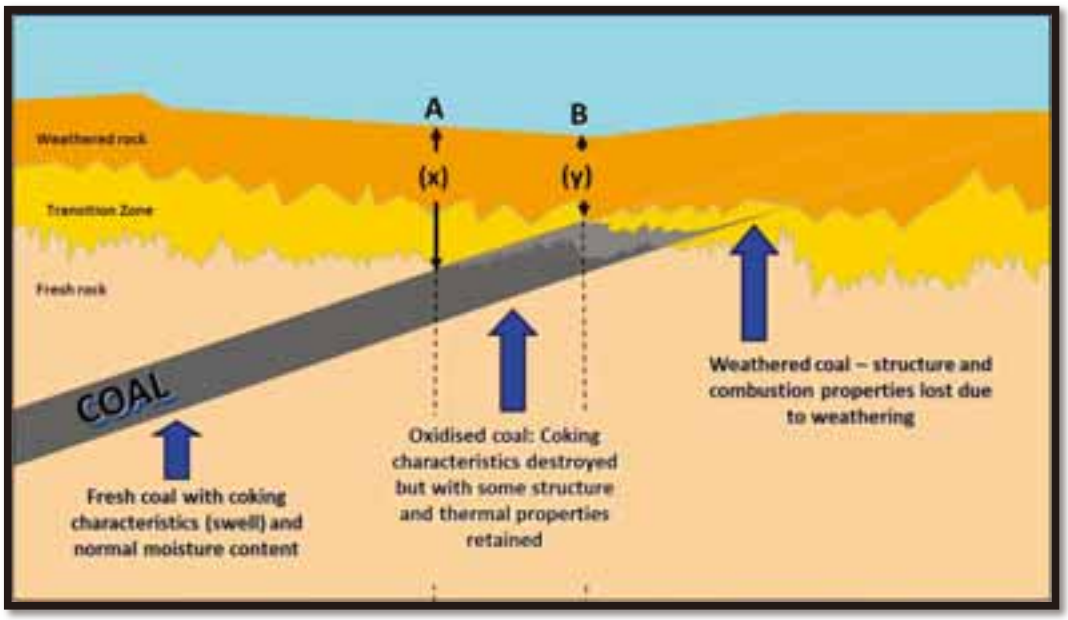


Figure 5-38: Determining Limits of weathering

(Source: Ballantine 2007)

Closely spaced openhole drilling was used to determine the zone of oxidation and weathering. For the drilling from 2009 to present, 0.5m chip samples were taken and tested for CSN. Where CSN had values above 1 and then dropped to zero, this was the depth defined as the base of oxidation for coking coal ('A' in Figure 5-38). Where the seam thickness has weathered to half the true thickness of the seam, this was defined as the base of weathering for coking coal ('B' in Figure 5-38). The coal between points 'A' and 'B' (Figure 5-38), was deemed as thermal coal and has been included as a Resource in the estimate.

Limit of oxidation (LOX) work has been completed for the immediate mining area for seam groups 0, 3, 4, 5 and 6 (refer Figure 5-39).

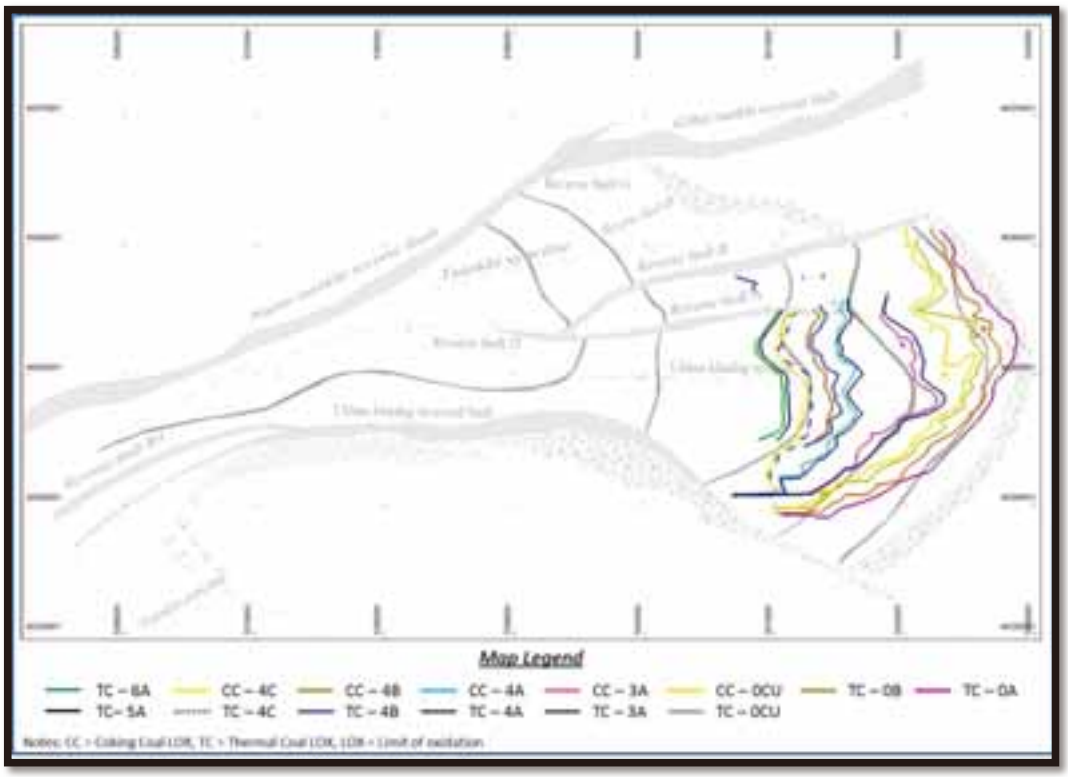


Figure 5-39: Current Limits of weathering

(Source: Energy Resources LLC)

For the base of weathering cut-off for the Resource estimate, where LOX lines were determined, the Thermal coal LOX line was used and where seams have had no LOX line determined as yet, then the base of weathering from the boreholes was used.

It is recommended that LOX drilling is carried out as part of the ongoing exploration programs. In addition, as mining faces progress, detailed sampling of newly exposed seams should be completed to gain a more accurate LOX line for final mine planning.

A list of all the borehole results for base of weathering and base of Quaternary is in Appendix 3.

5.9 Geochemistry

The following paragraphs were cited from the *'Geochemical Assessment of Overburden/Interburden from the Ukhaa Khudag (UHG) Coal Project'* completed by Environmental Geochemistry International Pty Ltd (EGI), April 2012. The complete report can be reviewed in Appendix 21.

EGI was commissioned by ER in September 2010 to carry out geochemical assessment of overburden/interburden at UHG mine. The objectives of this work were to: assess the acid rock drainage (ARD), salinity and elemental solubility (including neutral mine drainage, NMD) potential of overburden/interburden materials; identify any geochemical issues; and provide recommendations for materials management and any follow up test work required.

A total of 631 samples were tested from these holes, including coal and parting samples. All holes were sampled continuously except where there were missing intervals. Sample intervals were selected by site geologists in conjunction with EGI to match geological boundaries, with intervals ranging from less than 0.5m to over 5m. Standard ARD testing was carried out on these samples by the Stewart Mongolia LLC Ulaanbaatar laboratory, with EGI providing advice on testing methods and carrying out quality control and specialised testing on a sub set of 42 samples.

Results indicate that the vast majority of overburden/interburden and pit floor materials represented by the samples tested are unlikely to be acid producing or release significant salinity. The non-acid forming (NAF) overburden/interburden has excess acid neutralising capacity (ANC), providing a high factor of safety and offering a potential source of materials to mitigate ARD from potentially acid forming (PAF) washery waste materials. PAF low capacity (PAF-LC) samples made up only 2 percent of samples tested and PAF samples accounted for 0.3 percent. PAF/PAF-LC materials occur in the immediate 0.5m of a number of coal seams, and could potentially produce localised ARD if not mixed effectively with the NAF overburden/interburden. Near surface (within 5 to 10m of surface) materials have higher salinity due to salt accumulation.

5.10 Geotechnical issues

As part of the procedures adopted for JORC compliant data collection, all core was logged for natural fractures including joints, bedding breaks, shears, and faults (Refer Appendix 2 - Procedures). Rock samples were taken and kept air and watertight for future testing of major rock mass units. This data resides in the geological database.

Once mining began, AMC was commissioned to provide geotechnical consulting services at UHG. The lead consultant working for AMC with ER is John Latilla. The following is a technical summary as at 2014 from AMC, based upon the UHG Mine Geotechnical Design Document (GDD) that is reproduced in full in Appendix 15.

A major slope failure occurred in 2013, 2018 due to slippage along bedding plane shears associated with the 0CU seam. Geotechnical Study of Ukhaa Khudag Open Cut Operations (Jeff Price Principal Geotechnical engineer,) SRK Consulting in 2019. SRK has completed analyses of the 2019 and 2018 pit slope failures to assess asequence for re-mining the slope, whilst minimising the risk of reactivating the slope failure.

5.10.1 Pit Slope Stability

Pit slope stability is chiefly impacted by the very complex geological structure. Secondary to the impact of structure is the rock mass strength, which is also generally weak, with a predominantly blocky fabric due to the folding and faulting common throughout the deposit. From a geotechnical perspective, the pit has been sub-divided into pit sectors as illustrated in **Error! Reference source not found.**.

Figure 5-40: Revised geotechnical pit sectors (March 2021)

(Source: Site Geotechnical team)

5.10.1.1 Weathered Overburden

This 20 m to 30 m thick zone covers the whole mining area and is defined as the weathered material lying above the 'base of highly weathered overburden' line in the geological model. While traces of original rock structure are visible (e.g. bedding planes, jointing and faulting) the main failure mode is circular failure through the rock mass. Failure is mostly due to low rock strength and not structure.

It is possible to form very steep free-dig batters in the overburden but the steep batters have a marked tendency to fail sometime later. The slope design for the WOB is mainly based on back analysis of circular failures.

5.10.1.2 Eastern Lowwall

The current low wall is non-permanent due to underlying seams still to be mined. It consists of weathered and moderately weathered overburden and the strata dips into the pit by about 5°. Eventually the low wall is planned to reach a depth of about 100 m. In 2018, SRK conducted a study on in-pit dumping. The initial dump is proposed to be constructed in the eastern part of the UHG pit.

5.10.1.3 Western Highwall

The western highwall is the chief coal producing area of the pit and is planned to reach a depth of 250 m by the end of 2021. The upper 20 m or so is highly weathered and below this the strata is slightly weathered for a further 10 m to 15 m. The coal seams generally dip into the face by between 3° and 17° 6 although dips less than 6° are by far the most common.

The present advancing highwall incorporates the western highwall and SEW4 pit sectors. SEW4 pit sector is described in the southern endwall part of this summary.

5.10.1.4 Northern Highwall

Lies outside the current planned (2021) mining area.

This pit sector is relatively narrow in the N-S direction and longer E-W. The strata dip steeply by 17° to 35° towards the north. Mining this area towards the north would result in the strata dipping into the slope. However, very steep pit floors would result and may need special treatment, especially if in-pit dumping is planned.

5.10.1.5 Northern Endwall

- NEW1

Northern End Wall 1 (NEW1): This temporary end wall runs parallel with fault zone which separates the main pit area from the upthrown block along the northern flank of the reserves. It is currently the existing northern end wall area and is characterised by coal seams dipping into the pit (to the south) by up to 10°. The strata dip out of the endwall and into the pit by roughly 5 to 10° and folding and thrust faulting has been observed in the sidewalls of the ramp. Slope failures have occurred towards the eastern end along a bedding plane shear in the no 3A seam as well as along a fault zone at the switchback. In addition, slope movement has been experienced beneath the dispatch office during 2013 and this was managed by buffer blasting and reducing blast vibrations.

- NEW2

Lies outside the current planned (2021) mining area.

This end wall runs parallel with a set of faults with associated shears and deeper weathering which demarcate the northern limits of the pit. It is not being mined currently.

Folding and thrust faulting is expected in this sector and it is likely that a significant portion of the end wall in this area will be formed within faulted ground. Strata dip is expected to be quite flat at around 5° (maximum), dipping out of the slope.

- NEW3

This temporary endwall runs parallel with fault zone which separates the main pit area from the up thrown block along the northern flank of the reserves. It lies to the west of the existing northern end wall area (NEW1) and is characterised by coal seams dipping into the pit (to the south) by up to 10° and a faulted zone with variable rock strength and structure.

- NEW4

Lies outside the current planned (2021) mining area.

This endwall sector lies to the west of NEW2 and runs parallel with a set of faults with associated shears and deeper weathering which demarcate the northern limits of the pit. It is not being mined currently. The sector is characterised by coal seams dipping to the south by between 15° and 40° but the predominant seam dip is between 20° and 30° and this range accounts for 85 percent of the area.

- NEW5

Lies outside the current planned (2021) mining area.

The stratum in this end wall area features a syncline adjacent to a fault which dips steeply towards the pit. The slope toe is proposed to be formed on the flat base of the syncline and much of the slope features bedding dipping steeply into the pit adjacent to the fault.

5.10.1.6Upthrown Block

The upthrown block lies between pit sectors NEW1 / NEW3 and NEW 2 / NEW4 (between reverse faults A and B in the geological model). It is an area of relatively shallow dipping coal seams which lie at a higher elevation to the WHW area. The coal seams have the appearance of a shallow basin when viewed in a roughly N-S cross-section.

The slope behaviour is dependent on the direction in which this block is mined.

In the event that it is mined from East to West the face should be similar to the WHW pit sector. The mining block will be separated from the existing pit by the temporary end wall sectors NEW1 and NEW3 but in this case the slope orientation through NEW1 and NEW3 will be roughly N-S.

If the reserves are mined from South to North as a series of cutbacks the strata will dip out of the pit wall by around 5° to 10° as pit sector NEW is approached. This configuration is similar to pit sector SEW1.

A relatively small area has been mined in this pit sector to date and it is located between the N4 and N5 ramps along its northern extent and for a distance of about 300 m along the N5 ramp.

5.10.1.7 Southern Endwall

- SEW1A

This endwall is up to 107 m high and runs parallel to the faulting which demarcates the southern limit of the pit. The strata dip out of the slope and into the pit by up to 14°.
By the end of 2021, the 0C seam of the front wall will be completely excavated, and it is planned to excavate the 0B seam in some parts.
A major slope failure occurred in 2013, 2018 due to slippage along bedding plane shears associated with the 0CU seam. High blast vibration levels are thought to have triggered the slippage along the bedding shears in this instance.
Numerous assessments and recommendations have been made for the recovery of coal around the major failure zone.

The South Wall has suffered two failures, a recent one in 2018 and a historical one in 2013. **Error! Reference source not found.** presented the initial material properties, s lightly modified from those used in the AMC analysis, that were adopted for the assessment of the failed South Wall rockmass. Modelling of the re-mining options included reduction of the destabilising load, assessment of the sensitivity to groundwater conditions, and the use of extra intervention (e.g. disruption of weak seams by targeted buffer blasting)

Table 5-12: Preliminary shear strength properties – South Wall re-mining analyses

Material name	Unit weight (kN/m3)	Cohesion c (kPa)	Friction Angles (°)
Coal seams (sheared)	18	0	15, 13, 10
Coal seams (unsheared)	18	15	30
Faults	20	0	20
Overburden	22	30	35
Intact rock mass	22	150	35
Blasted rock mass (in situ)	20	50	35

SRK proposes that mining of the failed block is undertaken from top-down i.e., higher elevation to lower elevation, and from south to north, with the regions of steepest seam dips mined first, as shown in **Error! Reference source not found.**.

Figure 5-41: Plan view (above) and cross-section (below) showing the proposed mining sequence for southern failed zone re-mining

- SEW1

This end wall is currently around 110 m high at its deepest point and generally runs parallel to the faulting which demarcates the southern limit of the pit. In places (south of the boundary fault) the end wall is formed within the steeply dipping (70°) but hard Tsogttsetsii formation. Elsewhere, the coal bearing strata dip into the pit by around 10° to 15° and significant strata folding plus thrust faults are present. Occasional slope failures occurred in the past in the weathered overburden due to movement along bedding planes as well as relaxation along jointing.

- SEW2

The end wall has only recently entered this pit sector where the strata dip is expected to be up to 10° into the pit to the north of the boundary fault.

The faulted zone itself is expected to have variable rock strength and structure and will form a significant proportion of the endwall.

- SEW3

Lies outside the current planned (2021) mining area.

This endwall sector has yet to be reached by the pit. Strata dip is expected to be mostly in the range of 25° to 30° for around 83% of the end wall slope in this sector.

- SEW4

This pit sector consists of a faulted zone with a narrow area of relatively undisturbed ground to the south of it. Presently it forms part of the western highwall but there is potential for it to form a temporary endwall in the event that only the western highwall is targeted for mining at some stage in the future. Shallow dipping seams butting onto faulted zone which contains thrust faults and seam remnants at varying dips.

Analysis on the Southwest wall in 2019 (John Latilla, Principal Geotechnical Engineer, Thiess Pty Ltd)

It is proposed to mine the 4A and 4B seams between RL1330m and RL1350m in strip 123. This area lies beneath a cracked and slumped old blasted block at ~RL1476m. Cross sections CS01, CS02 and CS03 were produced and analysed using Slide 2018 (RocScience).

The image in the following slide (**Error! Reference source not found.**) shows the c racked area (red), planned mining area (light blue), cross sections (gold) and the 4A seam floor dip in selected spots. **Error! Reference source not found.** shows an o blique view of the area to aid clarity. From the cross sections it appears that the crest area has displaced about 3m vertically. The horizontal displacement is more difficult to determine but appears the be in the range of 3m to 4.5m.

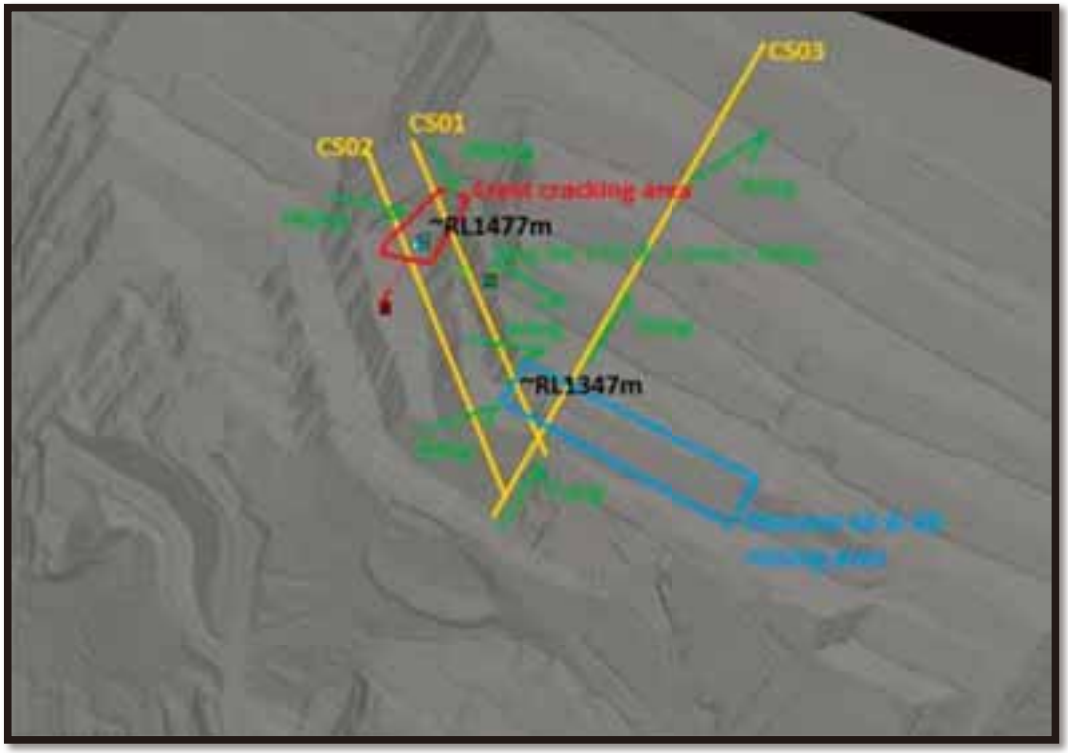


Figure 5-42: SW Corner - oblique view

The Pre-mining FOS values for CS01 and CS02 are fairly similar (i.e., 0.64 and 0.78 respectively, average ~0.7) as is the identified potential failure path. The post-mining FOS values were unchanged from the pre-mining situation. This is expected due to the seam geometry at the slope of the toe (i.e., dipping into the slope).

Considering the slope geometry as well as the strata dip in this area, the following observations are made:

The tendency for the strata represented by CS01 and CS02 to fail along the cross-section line will be modified by the secondary slope of the strata across the CS01 and CS02 into the western highwall. In other words, the potential failure would need to overcome the slope which would be forcing it towards the solid western highwall.

It is difficult to determine the FOS in this 3D case from 2D cross sections, but it would be reasonable to conclude that the 3D FOS would lie somewhere between 0.7 and 2.0. In the absence of guidelines to the contrary it may be fair to assume that the FOS would be in the region of 1.35.

It is known that 2D limit equilibrium analysis overestimates the FOS for convex shaped slopes (considered in plain view) and underestimates the FOS for concave shaped slopes. The reason for the concave slope shapes being more stable, is due to the lateral constraint supplied by the surrounding strata. Obviously, the increase in FOS will differ from slope to slope depending on geometry and geology. Pike (2017) indicates that the increase of FOS for a concave slope geometry can be as high as 25%. A similar reduction is applicable for a convex wall shape.

Ignoring the saw-tooth effect (in plain view) it is evident that the overall slope geometry in the region of CS01 is concave, therefore more stable than would be the case for CS02. (UHG – SW Corner stability assessment) that is reproduced in full in Appendix 16.

5.10.1.8 Rock fall analysis

Rock fall calibration test in 2017 (John Latilla, Principal Geotechnical Engineer, Thiess Pty Ltd)

For the purpose of this analysis, it has been assumed that the 60m high batters will have the same angle and composition as the current highwalls.

Two areas with current highwalls slopes of 40 and 60m (due to narrow, or undersized, berms about mid-height) have been selected for the purpose of estimating realistic physical batter conditions for the RocFall analysis. An additional slope was selected in the SEW2 pit sector which features a considerable amount of the Tsogttsetsii. This sector was selected for analysis because most of the east-facing faces are designed as if they are part of the highwall.

These slopes have been analysed individually with the RocFall software to further refine the material constant based on observed conditions of each slope.

The slope geometries have been estimated from the GPS surveyed crest and toe pick-ups and the 5° adjustment described in item 3. The angles derived from the photographs were used to estimate angles for the various sectors of the slope and to identify solid rock from scree.

Table 5-13: Estimated slope heights and angles for slopes A, B and C

Measurement	Slope A	Slope B	Slope C
Slope height (m)	~44m	~55m	~34m
From crest and toe survey (GAP plan)	36°	41°	41°
Corrected slope angle (GAP+5°)	41°	46°	46°
Estimated from photographs	37 to 50°	37 to 70°	40 to 58°
Slope condition	Large amount of scree – initial slope angle would be steeper than it would appear in current photographs	Mostly solid rock with some scree fans at toes of batters	Clean – mostly solid material

The 60m high batters constructed for this simulation use the following design geometries (based on the May 2015 Modelling and analysis quick reference – version 1, as supplied by AMC Consultants):

- Current configuration for a 60m batter stack: 3 x 20m high 70° batters with 10m wide berms
- Single 60m high batter: 1 x 60m high 70deg batter
- A single, 1.5m high safety bund about 4m wide, with the inner bund toe 5m from the slope toe was included as a first "guess"

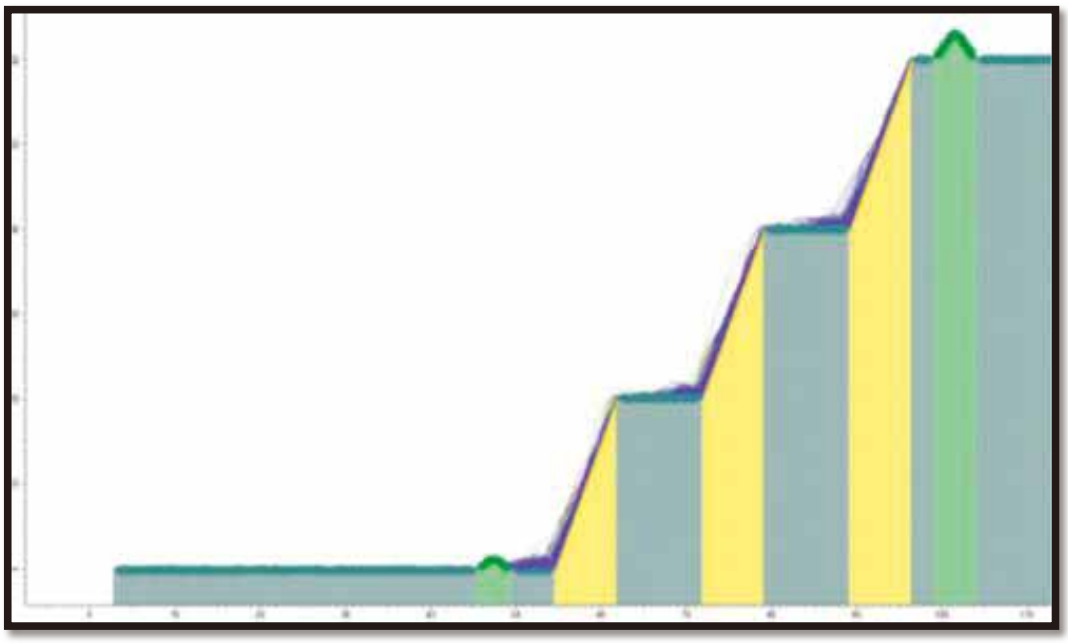


Figure 5-43: 3 x 20m high batters - 1.5m safety bund

(UHG 170818 – Rock Fall Site Specific Calibration Exercise & 60m Highwall Batter Rock Fall Investigation) that is reproduced in full in Appendix 17.

- Rock fall analysis in 2018 (Jeff Price, Principal Geotechnical, SRK Consulting (U.S.), Inc.)

The relative exposure to rockfall was illustrated by assessing various in-pit dump designs with a range of statistical rockfall analyses using Trajec3D software. Trajec3D is a 3D rigid body rockfall analysis program developed by BasRock (2018, 2012) that is freely available online1 and performs simulations of likely trajectory paths down a particular slope geometry for rocks of various shapes and masses.

The waste dump slope scenarios considered were:

- 40 m high, 30° face angle
- 40 m high, 35° face angle
- 80 m high, 30° face angle
- 80 m high, 35° face angle.

As the pit will have personnel and plant operating nearby, a 5 m high windrow was included 20 m from the toe of the waste dump to retain any fallen rocks. The toe zone has been modelled on a 5° incline to represent the site conditions of the pit floor.

Simulations indicated that the rockfall potential from the 80 m high, 35° slope angle geometry can be managed by the windrow at the base of the pit, with 97% of rocks retained, as shown in **Error! Reference source not found.**. This analysis considered r ough, round rocks of 0.1 tonne and with soft and low friction properties for the dump face. The figure also demonstrates the sensitivity of rock size to the simulation, with many more 1 tonne rocks travelling over the windrow. However, it is unlikely that the rocks in the dump will be greater than 0.1 tonne. When considering other rock shapes, such as tabular, rectangular, and disks, and modelled at 0.1 tonne, all rocks were retained by the windrow.

With a greater understanding of the spoil material, the windrow may be able to be located closer to the toe of the dump and increased in height to retain most rocks. It is important that the rockfall risk is managed appropriately in an in-pit dump where plant and personnel may be operating nearby.

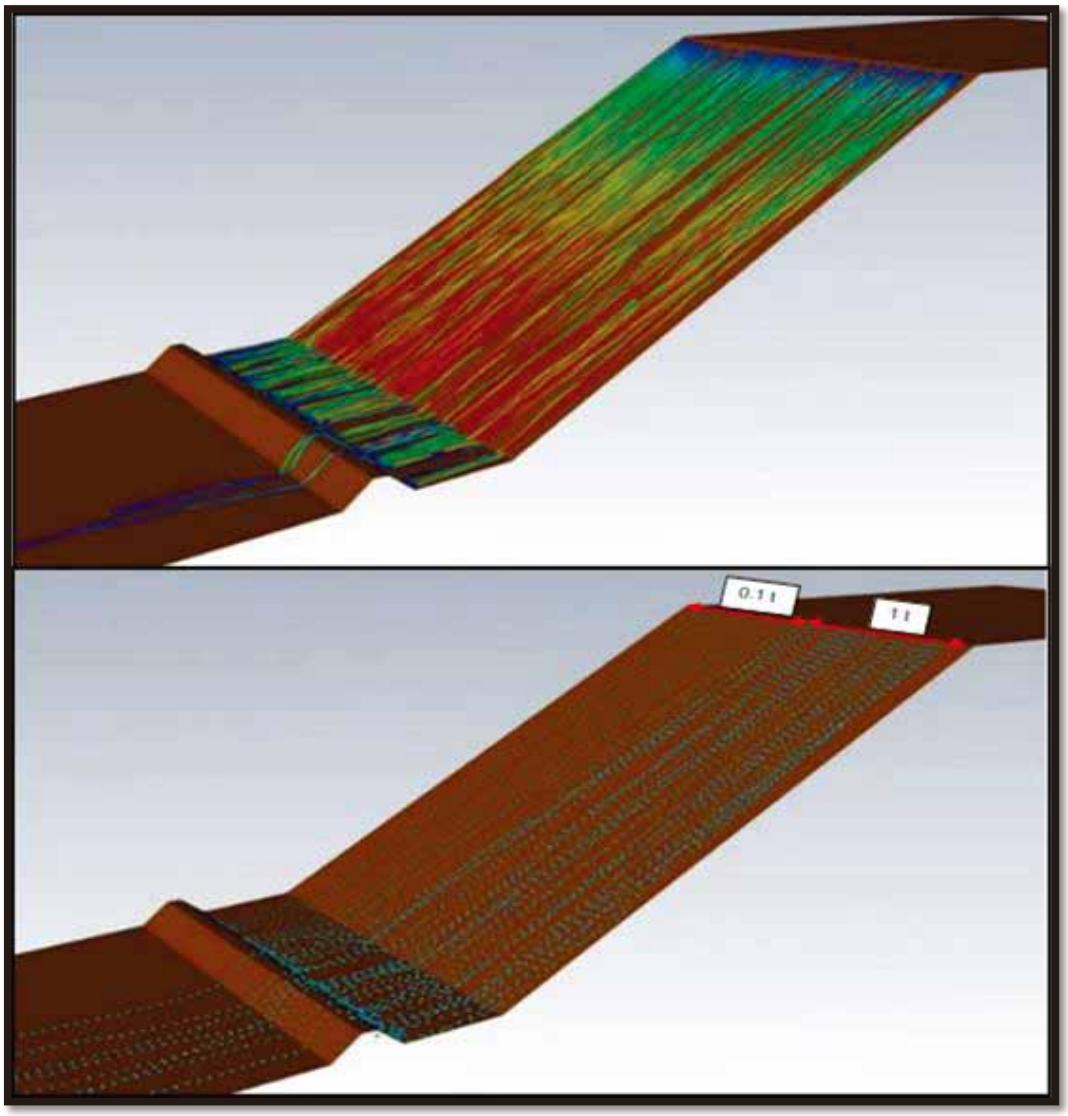


Figure 5-44: Isometric views showing a 80 m high, 35° face angle and indicative rockfall trajectories for: 0.1 tonne rocks (top) and both 0.1 and 1 tonne rocks (bottom 3 x 20m high batters - 1.5m safety bund

5.10.1.8.1 Rock fall analysis

The position of the water level behind and beneath the slope has previously not been very well defined at UHG. This is an important input for limit equilibrium models and represents the current situation (natural water level) prior to dewatering. Recently, more work has been done on obtaining in-pit water level data from blast holes followed by interpretation of the data. The in-pit water level data has not been as comprehensively assessed in previous reports and as a result this section of the GDD is dealt with in somewhat more detail than others.

The locality of the water level (phreatic surface) behind the slope can have a significant effect on the slope factor of safety (FOS) as is illustrated in **Error! R eference source not found.**. For example, a slope may need to be just less than 23° where no dewatering is done but could be steepened to over 30° if the phreatic surface is drawn back to 100 m behind the slope.

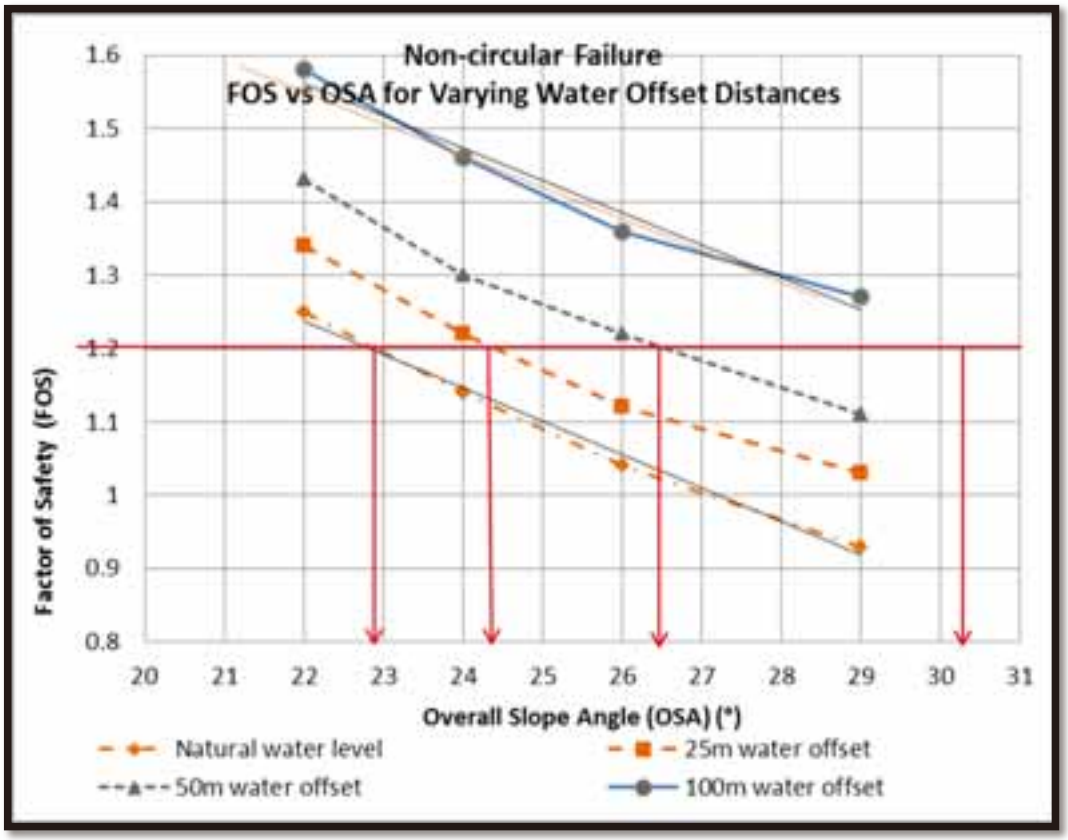


Figure 5-45: FOS vs. OSA for Non-circular Failure

(Source: AMC Consultants)

5.10.1.9 Revised In-Pit Water Level Model without Dewatering

Extensive in-pit measurements of water levels in blast holes have been taken by the site geotechnical team during 2013 and these have been added to the original in-pit measurements taken in 2011 (AMC, 2013b). This data was analysed, and an in-pit water level model was determined.

The following simplified (generic) model for the depth of the actual average in-pit water level is suggested: 6 m below slope or batter toes, 15 m below bench crests, 23 m below surface and 1 m below the floor of the pit.

5.10.2 Dewatering

A particularly important requirement is a review of the current dewatering program and where it may be possible to improve it to increase the water offset around the pit.

Three dewatering methods commonly used are, slope toe sumps, horizontal drains, and pumped drainage. It is likely that a combination of methods will be most suitable at UHG.

The success of natural drainage at UHG is doubtful as is evidenced by the recent in-pit water level survey.

5.10.3 Blast Vibration

Blast vibrations have been identified as being triggers of slope slippage along bedding plane shears at UHG on both the North and South End Walls (AMC, 2013b).

While additional investigation is required, there is a very good case for reducing the PPV value for all end wall slopes and especially any in proximity to major structure or bedding plane shears dipping steeply into the pit as well as for box cuts.

The varying constants applied in various PPV formulae result in a wide range of results and as such are difficult to be used by site based blasting engineers. It must be borne in mind that PPV is dependent on changes in lithology as well as geological structure between the blast block and the area of interest and so is very dependent on local conditions. A set of site specific constants can only be derived once actual PPV values are measured at UHG.

The equation recommended by Müller et al (2007) to determine the PPV for sedimentary rocks is reproduced below:

PPV = k * LB0.6 * r m

Where:

LB	=	Charge weight per delay (kg)
r	=	Distance between blasting point and point of interest (m)
k and m	=	k and m are constants of 969 and -1.51 (respectively)

Shots #457 and #481 have been used to determine the modified constant k for the equation proposed by Muller (2007); constant m was left at –1.51. The PPV for three different distances (r) of 100 m, 200 m and 300 m was determined for both shot #457 and #481. The maximum instantaneous charge weight per 9 ms was left as determined previously for both shots.

It was found that for shot #457 a value for k of 1,500 gave fairly good agreement to the average values obtained at various distances from the blast. For the lower maximum instantaneous charge (MIC) value for shot #481, the best fit for the average values was found to be with a value of 1,320 for constant k with constant m left unchanged at –1.51. It is proposed that an average of these two values is used for k, namely 1,410. Since 2014, blasting monitoring tool (Blastware) using until now, after using this machine is result deducted some blasting materials. It is mean WHW and NEW zone’s blasting material deducted 2300 kg, SEW and SEW4 zone’s blasting material deducted 1300 kg.

5.10.4 Waste Dump stability

Currently all waste is being placed ex-pit and the dumps are constructed in line with recommendations made by Norwest. Waste dump design plus the optimum stand-off distance between the planned final pit crest and the dump toes was analysed in detail during 2021 and the results are included in the GDD.

5.10.4.1 In-pit Dumping

SRK proposes that the dump is built starting from the flatter areas and later infilling in stages over the higher dipping areas.

The slope stability was assessed and optimised with a series of conceptual Slide models, varying the following parameters:

- Dip of the pit floor: angles from 6° to 24°
- Height of the dump: heights from 40 to 80 m
- Face angle: models include face angles of 35° and 30°.

Construction sequence

Based on the analysis results, the flatter areas of the dump (30° dump face angle) are expected to be stable under static conditions, meeting the design acceptance criteria (FoS ≥ 1.23), especially where founded on the flatter dipping sections of the pit floor (6 to 12°). Seismic loading analysis of such dumps also shows stability that meets design acceptance criteria FoS (≥ 1.14). SRK proposes that the dump is built starting from the flatter areas and later infilling in stages over the higher dipping areas. Figure 2 shows the strips that have been proposed as a preliminary design of the dumping sequence.

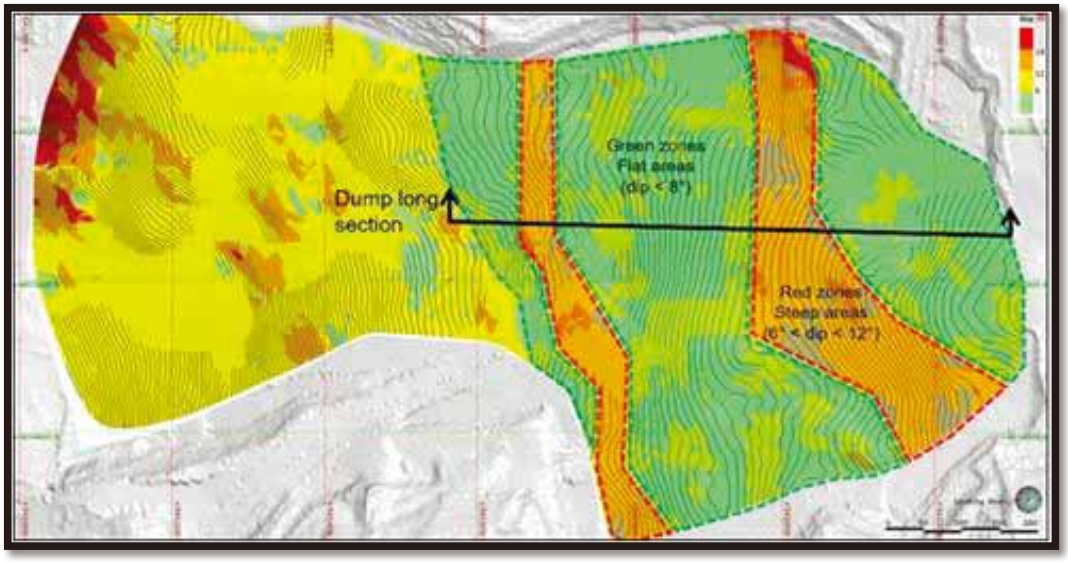


Figure 5-46: Waste dump construction sequence

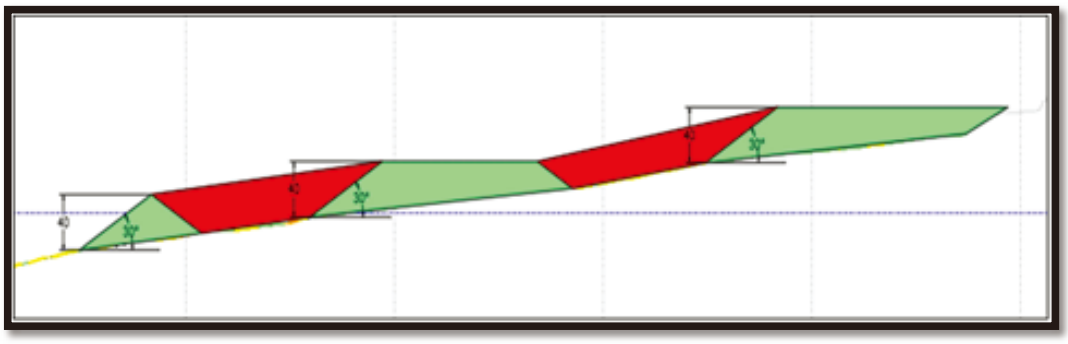


Figure 5-47: Cross-section looking north showing staged in-pit dump construction sequence

Error! Reference source not found. shows a long section for a 40 m high dump, c oloured green and red to differentiate between dump construction on flat and steep floor dip respectively. SRK proposes to construct the green areas first and the red areas once the green have been completed. Higher composite dump heights could potentially be achieved subject to improved confidence in spoil material properties, flatter overall dump slope angles, groundwater management criteria and resolved seismic design criteria.

5.10.5 Slope Monitoring

Monitoring is an essential part of the mine design process as it enables the assessment of the suitability of the slope and batter design. In addition, it is also a vital tool from a mine safety perspective in identifying potential failures at an early stage thereby allowing men and machinery to be evacuated to a safe place ahead of major slope movement.

5.10.5.1 Visual

Visual monitoring includes pit and ramp inspections by geotechnical and production personnel, and as its name suggests it can only pick up changes visible to the human eye such as tension cracks, dilation cracks, floor heave, potentially unstable geological structures, groundwater make, and loose rock on highwalls. All slopes and batters above and below working areas are regularly inspected and conditions recorded.

5.10.5.2 Direct Measuring

Direct measuring refers to extensometer methods such as crack meters and borehole extensometers. These can be fairly simple manual reading installations readily made on the mine or more sophisticated instruments capable of setting off an electronic alarm once certain trigger levels are reached.

Currently, crack meter and extensometer measurements and plotting of deformation trends is the most widely used and trusted monitoring method at UHG.

Trigger action response plans (TARPS) have been developed on site to assess conditions and prescribe an escalating regime of controls as conditions deteriorate.

5.10.6 Geotechnical Principal Hazard Management Plan

UHG Mine has implemented a Geotechnical Principal Hazard Management Plan (GPHMP). This document lists all the ground related hazards associated with the UHG Open Pit mining operation and the relative controls. It also details aspects to be considered during both design and implementation of the GPHMP as well as measuring compliance with the GPHMP.

5.10.7 Geotechnical Design Document

The aim of the GDD is to provide an easy-to-use geotechnical design guideline document for use by the following mine personnel:

- Production Manager
- Technical Manager
- Geotechnical Engineers
- Planning Engineers
- Blasting Engineers
- Surveyors

It is based upon detailed geotechnical reports and recommendations from external geotechnical consultants (referred to as 'external expert reports') as well as the current version of the Ground Stability Management Plan (GSMP), (UHG, 2013).

The individual external expert reports must be clearly referenced in this document as any detailed discussion in the reports is not included in this document. Any person wishing to study the reasoning and logic behind any design requirements should refer to the external expert reports for more details. The contents of the GDD must be reviewed by the UHG Geotechnical Engineer (GE) on receipt of any such external expert report so that any changes are reflected timeously. The GE must ensure that all affected persons are informed that a new GDD revision is in force and that previous copies are no longer referred to.

A number of slope design projects have been carried out for life of mine (LOM) and short term planning purposes, with the latest set in early 2013 (AMC, 2013a). These are based on expected average conditions and as such the models are not constructed in great detail. LOM design assessments are only carried out when required and may be considerably further apart than every year. The next level of slope design is the more detailed assessment of the pit design for each production year. This is done in the first month or so of each year and typically includes cross-sections for each planned mining strip. Seam geometry as well as expected structure is much more site specific for this assessment level.

The structure of this document is designed to make information as easy to find as possible and also to allow for the identification of conditions which are outside the current design guidelines. As UHG has been divided into a number of pit sectors for slope design purposes each pit sector will have a separate design summary taking into consideration the following:

- Expected geological structure
- Identified geotechnical hazards
- Geohydrological model

5.10.8 Pit Layout Fundamentals

The following design table (Table 5-14: UHG Mine slope design table updated Sep 2015

) is sourced from AMC (2013a) with a column added to show the water level offset applied in each case (from AMC, 2013b). Note that this table is intended for information only. The detailed design guidelines for each individual pit sector should be referred to for any slope design work.

Table 5-14: UHG Mine slope design table updated Sep 2015

Permanent Slopes												*Semi- Permanent Slopes**	*Interim Slopes***
Pit Sector	Description	Number of Ramps in End Wall	Max. Depth (m)	Max. OSA (°)	IRA Below Ramp (°)	Ramp (°)	Max. Batter Angle (°)	Max. Batter Height, (m)	Min. Berm Width (m)	Minimum water level offset (m)	Other design requirements	Batter Angle (°)	Batter Angle (°)
All	Weathered Overburden (WOB)	NA	30	27	–	–	40 (or ≤ strata dip)	20	10 (13 m berm at base of weathering)	25		40	40
Eastern Low Wall (ELW)	Critical slopes FOS 1.5 Strata dips gently out of pit wall	NA	75	32	–	–	60	20	10 (40m bench at 30 m depth)	25		70	70
	Other slopes FOS 1.2 Strata dips gently out of pit wall	NA	75	35	–	–	60	20	10	25		70	70
Western High Wall (WHW))	Strata dipping between 3° and 17° into pit wall	NA	300	27	–	–	70	20	Berms 10 plus 4 x 50 m wide coaling benches	Natural		70	70
Northern High Wall (NHW)	Strata dips 17° to 35° into pit wall if mined in a northerly direction	NA	300	29	–	–	50	20	Berms 10 plus 4 x 50 m wide coaling benches	Natural		50	60

Permanent Slopes												*Semi- Permanent Slopes**	*Interim Slopes***
Pit Sector	**Description**	**Number of Ramps in End Wall**	**Max. Depth (m)**	**Max. OSA (°)**	**IRA Below Ramp (°)**	**Ramp (°)**	**Max. Batter Angle (°)**	**Max. Batter Height, (m)**	**Min. Berm Width (m)**	**Minimum water level offset (m)**	**Other design requirements**	**Batter Angle (°)**	**Batter Angle (°)**
Northern End Wall	Northern End Wall+8:15	1	120	25	31	30	70	20	5	100		70	–
	NEW2 Coal wedge at toe Maximum strata dip 5°	1	150	24	28	27	45	20	10 50 m coaling benches	50	70 m wide buffer blasted strip required at toe	45	–
	NEW2 Mine up to fault, end wall defined by faulted zone	1	150	37	31	30	50	20	10	Natural		50	–
	NEW2A	1	200	34	-	-	47.5	20	10	Natural	Dewatered to a distance of around 150 m behind the face and 5 m below the slope toe	47.5	-
	NEW2B	1	260	26.5	-	-	40	50	10	25	In addition to the buffer blast strip a 100 m wide waste rock buttress needs to be placed in front of the buffer blasted strip.	40	-
	NEW3 Temporary endwall Coal seams dipping up to 10° into the pit plus faulted zone	1	300	21	–	–	30	20	Berms 10 plus 50 m wide coaling benches and 60m wide	100	220m wide buffer blasted bench required at toe.	35	–
	NEW4 21° to 28° strata dip (25° dip model) (most common dip condition in NEW4 is 20° to 30° (~85%))	2	200	22	25 (or ≤ strata dip) (or ≤ strata dip)	25	25 (or ≤ strata dip)	50	10	25		45	–
		3	200	20	25 (or ≤ strata dip)	25 (or ≤ strata dip)	25 (or ≤ strata dip)	50	10	25	Detailed analysis required for each strip once mining gets closer	45	–

Permanent Slopes												*Semi- Permanent Slopes†*	*Interim Slopes††*
Pit Sector	**Description**	**Number of Ramps in End Wall**	**Max. Depth (m)**	**Max. OSA (°)**	**IRA Below Ramp (°)**	**Ramp (°)**	**Max. Batter Angle (°)**	**Max. Batter Height, (m)**	**Min. Berm Width (m)**	**Minimum water level offset (m)**	**Other design requirements**	**Batter Angle (°)**	**Batter Angle (°)**
Northern End Wall	NEW4 13° to 20° strata dip (15° dip model)	NAa	200	15	–	–	Unbenched	Unbenched	Unbenched	25	Detailed analysis required for each strip once mining gets closer	Unbenched	–
	NEW5 15° to 35° strata dip into end wall then reversing. (17° dip model)	1 (in addition to coaling benches)	280	28	28	34	45	20	10 below ramp 5 above ramp 3 x 50 m coaling benches	100	Extensive buffer blasting required below ramp to stabilize steeply dipping strata	55	–
Upthrown block (UTB)	If mined E-W, similar to WHW structurally.	NA	300	27	–	–	70	20	Berms 10 plus 4 x 50 m wide coaling benches	Natural		70	70
	If mined N-S, strata dips out of wall by 5 to 10°	1	120	25	31	30	45	20	5	100		45	–
Southern End Wall (SEW)	SEW1 Coal wedge at toe Maximum strata dip 9° (based on NEW 1)	1	160	26	33	27	55	20	10 50 m coaling benches	50	65m wide buffer blast at toe	70	70
		2	160	24	33	Mid IRS 33° Top IRS 30°	55	20	10	100	65m wide buffer blast at toe	70	70
	SEW1A Strata dips out of end wall by 10° (AMC 2011)	NA	150	25	–	–	30	20	10	25	100m wide buffer blast strip required along slope toe	40	40

Permanent Slopes												*Semi- Permanent Slopes**	*Interim Slopes***
Pit Sector	**Description**	**Number of Ramps in End Wall**	**Max. Depth (m)**	**Max. OSA (°)**	**IRA Below Ramp (°)**	**Ramp (°)**	**Max. Batter Angle (°)**	**Max. Batter Height, (m)**	**Min. Berm Width (m)**	**Minimum water level offset (m)**	**Other design requirements**	**Batter Angle (°)**	**Batter Angle (°)**
Southern End Wall (SEW)	SEW2 Coal wedge at toe, end wall defined by faulted zone Maximum strata dip 10°	2	300	21	24	Mid IRS 24° Top IRS 25°	65	20	10 50 m benches (ramps) at 100 m and 200 m	100	190m wide buffer blast strip required at toe	70	70
	SEW3 30° to 40° strata dip (35° dip model, based on NEW4)	1	200	30	–	–	40 (or ≤ strata dip)	50 (70 m > 100 m deep)	10	50		50	–
	SEW3 20° to 30° strata dip (25° dip model) (most common dip condition in SEW3 is 25° to 30° (~83%))	1	250	22	25	24	25 (or ≤ strata dip)	50	10 50 m ramp at 150 m	25	Mine following strata dip or slightly less than dip	50	–
	SEW3 15° to 20° strata dip (15° dip model, based on NEW4)	NA	220	15	–	–	Unbenched	Unbenched	Unbenched	25		50	–
		NA	220	25	–	–	40	20	10 (50 m wide bench at 100 m)	50		50	–
	SEW4 Shallow dipping seams butting onto faulted zone which contains thrust faults and seam remnants at varying dips Currently forms part of WHW	NA	300	31	–	–	55	20	10	50		70	70

Note: NA = Not assessed, IRA = Inter ramp angle, IRS = Inter ramp slope, TBB = Toe buffer blasted,

NEW2, SEW2 and SEW3 batter angles not confirmed by mapping at the time this table was compiled. Lowest of angles determined for NEW1 has been applied to NEW2 and lowest angle for SEW1 applied for SEW2 and SEW3.

5.10.9 Geotechnical pit sectors

UHG has been sub-divided into a number of pit sectors to accommodate differing geological structure and slope geometry.

- Weathered overburden is considered as a pit sector comprised of an approximately 20 m thick (to the base of highly weathered overburden, 'BHWE' in the geological model) covering lying over all the other sectors.
- Eastern Low Wall (ELW)
- Western High Wall (WHW)
- Northern High Wall (NHW), lies outside the 2014 mining area
- Sectors NEW2, NEW4 and NEW5 lie outside the 2021 mining area.
- Southern End Wall (SEW), consisting of five pit sectors i.e. SEW1A and SEW1 to SEW4. Sector SEW3 lies outside the current planned mining area.
- Upthrown Block

The slope design guidelines are based initially on the LOM design and then refined further when detailed analyses are carried out for the area planned to be mined in the current year. The reason for this is that the LOM slope models are based on the expected average conditions and structure for the whole pit sector whereas the assessment of the current mining area includes models for each mining strip. The models used for limit equilibrium (Galena) analysis of the current mining strips therefore include seam geometries and structure which are more detailed than the more generic geometries included in the LOM design. **The current detailed design assessments are valid for 2021 calendar year.**

The slope design guidelines for each pit sector include the following:

- Brief description of the geotechnical conditions expected.
- Description of the geological structure
- Note that the above two items are not simply background information. The detailed and LOM designs are based on the expected conditions as described. It is recommended that if the actual conditions (as indicated by mapping nearby, new borehole information or seismic data) are significantly different, the design may no longer be valid and will require review or revision
- Water level model prior to dewatering (present natural in-pit water levels). Where available, the actual water level model has been given. Where no data exists the generic water table model is quoted
- Blast vibration management strategy
- Detailed design recommendations (for current year's layout). This is to take precedence over the LOM design within the pit layout for the current year.

LOM design requirements for areas distant from the current year's layout and for areas within the layout where a detailed design assessment is not available

5.10.10 Rock strength determination (Geotechnical Domains)

As there is not a great deal of actual laboratory data for UHG and BN, the historical strength assumptions made in the past has also been used. The available rock strength

data has been reviewed in order to determine realistic Mohr-Coulomb strength values (AMC, 2013c). The revised material strength values for future limit equilibrium (Galena) models as shown in the following table have been determined considering the following data, in order of importance:

- Back analysis for UHG and BN
- Average values for laboratory test results for UHG and BN
- Quoted results from published and other sources for similar conditions, predominantly for the Bowen Basin

The final revised rock strengths for each geotechnical domain to be used for limit equilibrium modelling at UHG are shown in Table 5-15 and previous values are shown in brackets where applicable.

It is important to note that as more data becomes available and additional experience in local conditions is gained further adjustments to the rock strength tables will be made. This table should therefore be considered a work in progress.

Table 5-15: Revised Rock Strength Values for Galena Modelling (December 2013)

Geotechnical Domain	Unit Weight	Cohesion	Friction Angle	Slope Height	UCS	Geological Strength Index
	(kN/m^3)	(kPa)	(°)	(m)	(MPa)	(GSI)
Weathered overburden - changed	22.5 (22)	25 (35)	21 (19.2)	20 –	7 –	30 –
Moderately weathered overburden - unchanged	23	126	30	30	14	50
Fresh Overburden (50/50 siltstone and mudstone) - changed	24.5 (25)	360 (283)	33 (37.5)	–	32.3 (30)	53 (56)
Sandstone (new - previously strong sandstone)	24.8	400	36.5	–	40	60
Fresh coal - changed	15 (15.2)	40 (34)	22.5 (25.6)	–	5.8 (7)	38 (35)
Sheared coal - changed	14 –	8 (17)	18 (18.5)	–	3	20
Bedding plane shears – unchanged	18	1.5	13	–	1	20
Blasted rock - changed	21.5 (21)	70 (76)	32 (35)	–	–	–
Weathered coal - changed	17	17	18 (20)	–	–	–
Waste dump rock (unsaturated) - unchanged	18	18	24	–	–	–
Major faults and shear zones - changed	20 –	60 (25)	16.5 (18)	–	5	20 –
Tsogttsetsii formation - changed	25.5 (25)	351 (86)	24.7 (20.4)	–	55	40
Existing failure in weathered overburden (New material definition)	20	10	8	–	–	–
Existing failure in fresh overburden (New material definition)	25	22	20.7	–	–	–
Existing failure in coal (New material definition)	14	5	14	–	–	–
Overall rock mass (New material definition)	24	150	28	–	–	–
Failure plane – residual bedding plane shear strength (New material definition)	18	0	8	–	–	–

5.10.11 Overall Mine Stability

The strategy to avoid unplanned or uncontrolled collapse of any portion of the mine is to ensure that slope angles are designed by a qualified and experienced Geotechnical Engineer (GE) utilising accepted design methods. The overarching detailed mine slope design document at UHG is the GDD. This document gives the current required slope design criteria and also the rationale behind the chosen design values.

- Pit slope angles must be designed by a GE using the following methodology:
- Identify which geotechnical pit sector the slope falls within
- Determine the rock mass strength characteristics
- Review geological structure data for the slope area
- Obtain accurate ground water level data
- Carry out numerical modelling of slopes to determine the maximum batter and overall slope angles using Galena software or equivalent
- Carry out kinematic stability analysis using Dips software or equivalent

Dump slope angles and height must be designed by a GE taking into account the geotechnical properties of the dump material.

Pit slope and waste dump slope designs should be reviewed every two years or after any significant slope failure.

The following precautions will be taken to prevent failure of batters, overall slopes and waste dumps:

- The slope angles will be checked against the design requirements by the mine surveyors at least every month
- The slopes will be geotechnically mapped using photogrammetry or manually. Structural as well as rock strength data will be gathered
- A Geotechnical Hazard Plan will be maintained and updated at least every three months
- Where the need has been identified by the GE or Technical Services Manager (TSM), highwall monitoring prisms will be set up and monitored by the mine surveyors

The following strategy will be applied to prevent people being injured by loose material on batters:

- Operators and supervisors to be reminded of the importance of adequate and timeous batter clean-up during the loading cycle
- Batter angles to be checked by mine surveyors
- Mining supervisory staff to inspect working areas and declare them safe

The TSM must maintain a file of all geotechnical reports and any other geotechnical data and design documents.

5.10.12 Protection of Mine Accesses / Exits

Mine access ramps and haul roads will be protected by the following means:

- Slopes above and beneath ramps are to be designed by a GE and the angles (as built) checked by the mine surveyors
- Protective windrows will be placed at least 5 m away from slope crests to facilitate crest inspections
- Ramps situated beneath waste dumps will have a protective windrow placed between the ramp and the toe of the dump.
- Pit supervisors will carry out regular checks for cracks and other signs of ground instability on ramp surfaces
- GE to inspect ramps quarterly

5.10.13 Mining Operations

Rock related hazards will be managed in the following fashion:

- Pit slopes will be cleaned during the loading cycle and operators and supervisors will be trained to recognise potential hazards and also understand the importance of removing loose rock which may be a safety hazard
- Pit supervisory staff will inspect the working area at start of shift and ensure that any rock related hazards are removed or demarcated prior to work commencing. Any hazard identified during shift must likewise be removed or demarcated and the hand-over to the following shift must include notification of any rock related hazards in the working area.

5.10.14 Rock Breaking

The strategy to minimise blast-induced damage and thus ensure slope stability behind the slope face after blasting will be drawn up by the Blasting Engineer and must cover at least the following aspects:

- Explosive type and initiating systems to be used
- Drilling patterns and required borehole accuracy
- Selecting the explosives and accessories required for each geotechnical pit sector
- Method of sequence and initiation of explosive charges
- Charging and stemming of blast holes

5.10.15 Impact on Neighbouring Mines

If in the opinion of the TM, there is any chance of the mining operation at UHG impacting on any neighbouring mine he must institute a study to determine the extent of such impact and notify the manager of the neighbouring mine of the potential impact.

5.11 Hydrogeology

Hydrogeology studies were completed for UHG by Norwest in 2008 and by RPS Aquaterra in 2011. In 2017, an infiltration water calculation study was conducted for the Ukhaakhudag mine. Reports can be cited in Appendix 23.

Works completed to date have established generally low permeability conditions west of the active mining area. Areas of moderate secondary permeability associated with fracturing have been identified largely associated with east to west trending geological structures located north and south of the active mining area.

In 2014 a number of exploration boreholes on the western line of the program, once completed for geological reasons, were converted into piezometers for measuring the standing water height. As this is a recent event no data at the time of writing the report was available.

Results of the 2017 research report:

*Ukhaakhudag mine hydration of the deposit was determined by comparing the hydraulic conductivity with the cross-section of the exploration borehole. The area has a transmissivity of 0.83-32.8 m^2/day, an average of 10.35 m^2/day and an average storativity of 3.88*104 m^2/day. According to the hydrodynamic calculations, the hydraulic conductivity of the groundwater entering the open pit is 247.9 m^3/day or 2.87 l/s. The maximum daily precipitation will not exceed 3135 m^3/hour at the open pit.*

5.12 Gas

No gas was reported or observed during any of the exploration campaigns so far. For this report there has been no evaluation for gas contained in the project area.

For the sub 400m part of the deposit and due to the high structural activity and lack of reporting of gas occurrences from the current opencut mining operation, it would appear there is little concern for any gas escape during shallow opencut mining operations.

If underground mining is ever considered for this project then investigation of gas will be an essential part of the work program undertaken prior to any mine planning.

It is recommended that for future programs that some gas testing is completed on deeper boreholes to develop an understanding of the potential for coal bed methane at UHG.

5.13 Mining Potential

The UHG mine uses conventional truck and excavator mining methods to mine coal and overburden in a terrace style operation. The mining operation is managed jointly under an alliance style contract with international mining contractor Thiess and other contractors. Under the contract, Thies provides all mining equipment.

The site based mining related workforce is comprised mostly of ER employees, and a small number of Thiess employees who are assigned to control equipment. All equipment operators and maintenance tradespeople are employees of ER.

The mining operation commenced with box-cut overburden removal in October 2008, and coal mining commenced in April 2009 resulting in a total of 1.8 Mt of ROM coal mined within the first year of production. Production output increased to 3.9 Mt in 2010, 7.1 Mt in 2011, 8.6 Mt in 2012, 9.2 Mt in 2013, 4.6 Mt in 2014, 2.7 Mt in 2015, 2.9 Mt in 2016, 8.2 Mt in 2017, 2.1 Mt in 2018, 4.8 Mt in 2019, 4.29 Mt in 2020, 3.8 to the end of 2021.

The main production equipment currently utilised at UHG mine in process of ramping up the production rate to 13 Mtpa includes:

- 1x Liebherr 996 excavators
- 1x Liebherr 9400 excavators
- 3x Hitachi 3600 excavators
- 3x Liebherr 9250 excavators
- 16 Caterpillar 793 rear dump trucks
- 25 Caterpillar 785 rear dump trucks
- 28 Caterpillar 777 rear dump trucks

The typical mining process is outlined as follows:

- Topsoil is pushed up by dozers, before loadout by front end loader to haul trucks for storage in temporary topsoil stockpiles.
- Approximately the first 15m of overburden dug by excavator without blasting, loaded into haul trucks and taken to ex-pit waste dump locations.
- Subsequent overburden and interburden materials are drilled and blasted, using ANFO and emulsion explosives, before removal by excavator and truck to ex-pit waste dumps.
- Coal uncovered is dug typically without blasting by excavator, loaded into haul trucks and taken direct to the Coal Handling and Processing Plant or temporary ROM stockpile nearby.
- Waste dumps when complete are reshaped by dozer, before topsoil is rehandled from temporary stockpiles for dumping and spreading across reshaped overburden dump locations, as part of rehabilitation works.

As of mid-2013, three 5 Mtpa capacity CHPP modules have been commissioned, totalling 15 Mtpa nameplate ROM coal feed capacity. Sedgman Pty Ltd of Australia designed the CHPP, and was involved with Engineering, Procurement, Construction & Management and Operations & Maintenance contracts until end of 2012. Since 2013 the operation and maintenance of this facility has been undertaken wholly by ER employees.

5.14 Coal Economics

The UHG mine has operated since April 2009 on a positive cash basis. Due to the recent ‘tough’ times for the coal business, UHG still makes a margin (cash basis) from the operation.

The Reserve study (GC-03, GLOGEX consulting, 16 April 2018) (refer Appendix 22) completed by GLOGEX 15th March 2018, based on an integrated UHG mines made the following observations on 'life of mine' (LOM) economics.

The key results of the UHG LOM production scheduling are :

- *UHG mine life of 28 years from 1 January 2018, finishing in 2045.*
- *Strip ratio for UHG ranges from 4.1 to 5.3 bcm / t ROM, with overall of 4.8bcm / t ROM,*
- *Coking coal ROM output remains constant at 13 Mtpa across 28 years of the UHG schedule.*
- *The overall product split is: 67.8% hard coking coal, 12.5% semi-soft coking coal, 13.14% middlings and 6.54% thermal coal*
- *Peak average product output is:*
    - *Hard coking coal product – 5.44 Mtpa (2018 – 2045)*
    - *Semi-soft coking coal product – 1.7 Mtpa (2018 – 2045)*
    - *Middlings product – 1.0 Mtpa (2018 – 2045)*
    - *Thermal product – 0.5 Mtpa (2018 – 2045)*
- *Overall, the product ash achieves or is very close to specification for coking and middlings products:*
    - *Hard coking coal product ash ranges from 9.1% (adb) to 11.4% (adb), average 10.9% (adb)*
    - *Semi-soft coking coal product ash ranges from 9.1% (adb) to 9.8% (adb), average 9.5% (adb)*
    - *Middlings coal product ash average 18% (adb)*
- *Mining operation activities (waste and coal mining, drill and blast, support etc.) costs account for approximately 91% of the Total Integrated Operating Cost.*

6 Peer Review and Site Visits

6.1 Initial Site Visit and ongoing Competent Person Visits for JORC (2004) Resource Estimate – June 2012

An initial site visit was completed by Mr Ballantine when working as a consultant for Micromine Pty Ltd in late January 2009. The visit was commissioned by Mr Andrew Little, Technical Director (at the time) for ER.

The purposes of this visit were to, (i) audit the topographical and geological data, (ii) assess the quality of the information recorded into the digital geological database, and (iii) to comment on the implications that this would have on the confidence in the geological model of the UHG coal deposit.

The audit used as reference the 'Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996)' to compare with the data collected and is referred to as the standard.

The following recommendations were made at the end of this visit:

- All future drilling should be done on a regular square or triangular grid.
- A proper Line of Oxidation drilling program with onsite testing should be undertaken immediately.
- All drilling information as stated in the standard should be captured on all future drilling campaigns.
- All available Daily Operational Records (DOR's) should be located and filed onsite. Once acquired all data from these DOR's should be captured.
- All rock type information as stated in the standard should be captured on all future drilling campaigns. In addition to the standard, the identification of sedimentary structures should be added.
- Check with Norwest the code for weathered coal.
- All coal logging for future campaigns should be brightness logged as per the standard.
- All of the Russian rock type data should be reviewed to correct transcription errors.
- All hardcopy geology code sheets should be located and filed onsite.
- All hardcopy wire-line information and digital LAS should be acquired and filed on site.
- The digital LAS from boreholes U15R and ULDSOR should be re-supplied. The density LAS for boreholes U6R, U11R, U27R and U60R should be re-supplied including hard copies. The gamma LAS for U60R should be re-supplied including hard copies.
- The remaining Norwest digital LAS should be audited for corrupted files and reissued where required.
- Review all downhole geophysics and extract if available standing water levels.
- Implement a hydrogeology program for future drilling campaigns where, water flows are taken, standing water levels are measured at least 48 hours after completion of drilling and water samples are taken for analysis.
- For all future exploration campaigns geotechnical data such as description of weathering horizons, rock strength and defect description should be implemented.

- Procedures, training and mentoring on rock and coal logging, hydrogeology measurements and geotechnical logging should be immediately put in place that supports the standard for all exploration geologists that work on ER projects.
- Review all Norwest data using the available downhole geophysics and where possible add major sedimentary units such as sandstone bodies.
- Review all boreholes for seam correlations.
- Once all boreholes have been corrected and updated, a structural geological review should be undertaken.
- A plan for a long term seismic and drilling program to identify structure within the mining area should be done.
- This was outside the scope of this work but a review of coal sampling methodology and all points of observation and Resources are recommended.

From this initial visit, regular visits were organised on an approximate six weekly basis for an onsite period of three to four weeks, where Mr Ballantine was the projects Competent Person and provided planning, procedures and training for required ongoing exploration following the initial visit (January 2009) recommendations. During this time a geological services department under Mr Ballantine's instructions was created internally for ER to undertake this exploration.

In early July 2010, Mr Ballantine was employed directly by ER on a full time basis as Executive General Manager of Exploration and Geology. Budgeting, planning, training and overall oversight of exploration at UHG has continued while Mr Ballantine has held this position.

For estimation of the maiden JORC Resource, or where substantial change is expected in the estimated Resource, requires a level of independence so the reader can be confident that the information is reported in accordance with the JORC Code, and that results are not comprised. Mr Ballantine (Competent Person, Resource estimate June 2012), thought it prudent to have an independent, experienced and qualified geologist, meeting requirements of a Competent Person provide a site visit and peer review. This was done by Mr Todd Sercombe, senior consultant for GasCoal Pty Ltd, a coal geologist with 18 years coal experience. Mr Sercombe's full independent report can be viewed in Appendix 14, which includes his site visit and findings plus recommendations. The following is an excerpt from Mr Sercombe's report, which summaries the results of his peer review.

6.1.1 Conclusions of Audit for JORC (2004) Resource Estimate - June 2012

The UHG exploration procedures and practices are of extremely high calibre, exceeding both the Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996) and the benchmark coal industry best practices (as observed by Mr Sercombe in the Bowen Basin, Australia).

The accurate and unbiased assignment of coal core loss to coal samples, achieved in the UHG practices, is commendable. The coding, for modelling, of all significant stone band partings in the seams and of inter-burden units between the seams is also praiseworthy.

The Exploration and Geology Department are a group of young enthusiastic geologist who have been well trained and led by Gary Ballantine. I would have high confidence in the reportable results obtained from the UHG exploration procedures.

Mr Todd Sercombe – Member AusIMM # 220916 – 17 July 2012

6.2 Summary of ongoing site visits, comments and Internal Audits for JORC (2012) Resource Estimate - December 2014

Mr Ballantine at the time of the report writing was employed employed by ER in the position of Executive General Manager, Exploration and Geology, and has responsibility for budgeting, planning, training and overall oversight of exploration at UHG. As part of the ongoing evolution of the ER geology group and knowledge transfer, supervised and structured succession of capable individuals, is planned.

The exploration group has changed little from that used to prepare the previous JORC (2004) Resources report in June 2012, so the independent peer review by Mr Sercombe is still relevant. Mr Ballantine took on board all of Mr Sercombe's recommendations. Mr Ballantine understands that complacency can creep into a well establish team. To prevent this he does frequent site visits with Mr Said (Competent Person) and together they review different individual team member's capabilities against the exploration procedures.

As part of Mr Ballantine's role as mentor and internal auditor, all final data, (i.e. seam thickness, seam correlation, sampling intervals, coal quality analysis, collar survey and LAS quality) are reviewed once the team (supervised by the Competent Person) has done the work. With the above process it is Mr Ballantine's professional opinion that there is a very high compliance with the team's results and JORC standards. Mr Ballantine has completed an oral review and internal audit with the Competent Person for every step of the data preparation of the points of observation and the modelling stages to the final estimate.

As the above discussion illustrates, spot checks and compliance is continual, however the collar survey is one task that requires a manual audit. Mr Ballantine on his most recent visit to UHG in mid-November 2014 audited the collar survey for boreholes drilled in the period of 2012 to 2014 with a hand held GPS. Table 6-1 contains the results. The results are within acceptable limits.

Table 6-1- Survey Audit on Collar surveys

Bhole	Collar survey			GPS check			Absolute variation		
	Easting	Northing	RL	Easting	Northing	RL	Easting	Northing	RL
G01853	540201.45	4834397.07	1534.46	540199.00	4834398.00	1534.00	2.45	0.93	0.46
G01855	540200.37	4834599.25	1530.91	540201.00	4834598.00	1530.00	0.63	1.25	0.91
G01861	540201.03	4835200.23	1520.79	540199.00	4835201.00	1520.00	2.03	0.77	0.79
G01863	540192.46	4835399.49	1517.32	540194.00	4835401.00	1517.00	1.54	1.51	0.32
G01865	540103.14	4835298.30	1519.21	540102.00	4835296.00	1519.00	1.14	2.30	0.21
G01867	540201.54	4835001.47	1523.79	540201.00	4835002.00	1523.00	0.54	0.53	0.79
G01871	540100.00	4834700.00	1529.24	540101.00	4834697.00	1529.00	1.00	3.00	0.24
G01873	540097.30	4834497.49	1532.75	540098.00	4834498.00	1532.00	0.70	0.51	0.75
G01881	540097.97	4835100.64	1522.09	540098.00	4835101.00	1522.00	0.03	0.36	0.09
G02379	540101.99	4835700.42	1515.39	540100.00	4835702.00	1515.00	1.99	1.58	0.39
G02381	540198.46	4835588.79	1514.87	540198.00	4835591.00	1514.00	0.46	2.21	0.87
G02386	540098.97	4835494.18	1516.29	540099.00	4835495.00	1516.00	0.03	0.82	0.29
G02390	540200.00	4834800.00	1526.76	540199.00	4834797.00	1526.00	1.00	3.00	0.76
G02395	540098.42	4834296.82	1538.69	540099.00	4834297.00	1538.00	0.58	0.18	0.69
Max							**2.45**	**3.00**	**0.91**
Min							**0.03**	**0.18**	**0.09**
Avg							**1.01**	**1.35**	**0.54**

(Source: Energy Resources LLC)

6.3 Internal Peer Review – 2021

Internal peer review of exploration work 2018, 2020 was conducted by Mr. Lkhagva-Ochir Said, the then Executive General Manager of Mining and Processing. These peer reviews confirmed compliance of the Group's work to update the Coal Resource estimations in compliance with requirements of the JORC Code (2012).

7 Exploration

7.1 Drilling

7.1.1 Historical Drilling at UHG

7.1.1.1 Mongolian-Russian Drilling

During the detailed exploration work, there were 111 boreholes drilled on the UHG deposit during the period 1985-1987. Distance between exploration lines on the east limb was 125-500m, while it increases up to 625-750m for other areas of the deposit. Distance between boreholes on the exploration lines is 250-300m. Exploration depth was to 300-320m from the surface (Ch. Gankhuyag, Z.S Tsader et.al.). Table 7-1 summaries the work that was completed during this time.

Table 7-1: Volume of the basic categories of geology-exploration work at the UHG deposit in 1985-1987

Exploration Stadium	No of core-type boreholes	Drilling, linear m		Ditches and back-fill	Distance between, m	
		Core-type	Auger-type		Exploration lines	Boreholes
Prospecting/Exploration evaluation	35	9738	4472	8056	700-1500	250-600
Preliminary exploration	76	15589	7069	10070	350-700	150-300
Total for deposit	**111**	**25327**	**11541**	**17126**		

(Source: Dashkhorol et.al.)

The map in Figure 7-1, illustrates the borehole positions for this program. All coordinates are in Universal Transverse Mercator (UTM) WGS 1984.

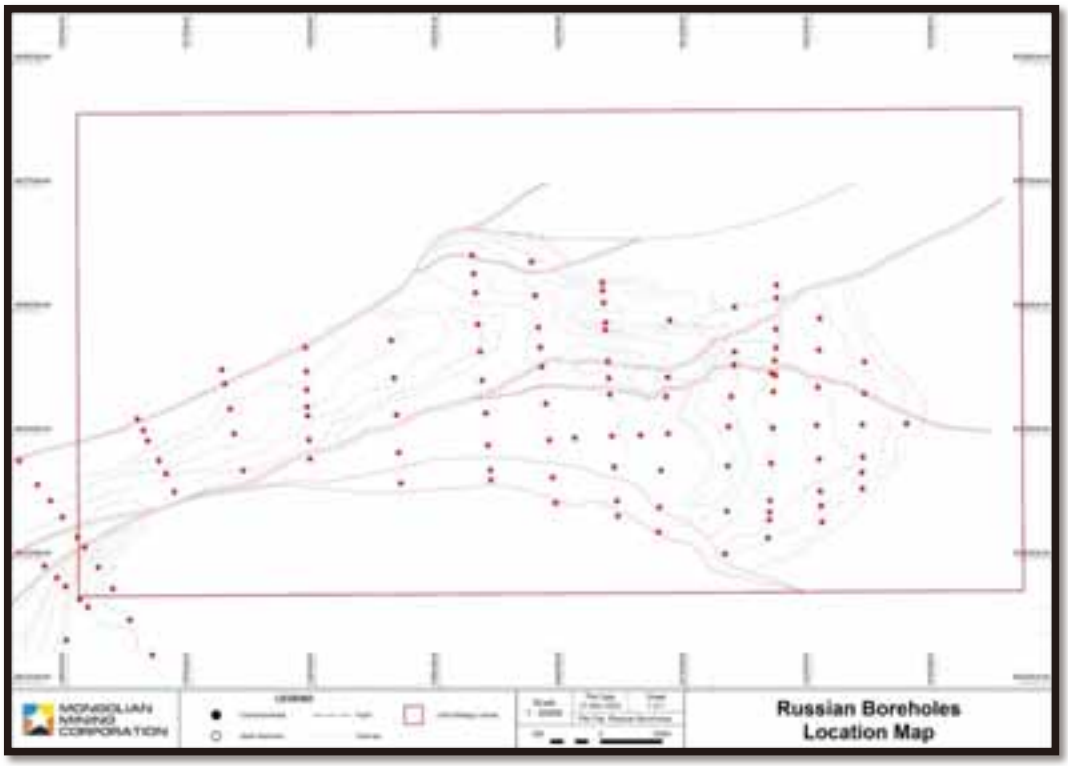


Figure 7-1: Russian Boreholes

(Source: Energy Resources LLC)

7.1.1.2 Norwest Drilling

Prior to 2008, the UHG coalfield had largely been explored by the Mongolian-Russian teams of the 1980's as part of the larger effort to understand the Tavan Tolgoi deposit. Review of records and reports indicate exploration techniques at UHG included a combination of surface mapping, core drilling, trenching and auguring (Norwest 2008).

The historic exploration and mining studies identified a substantial coal resource in the UHG coalfield and were successful at delineating its larger structural characteristics with a fair degree of accuracy. The drilling density, however, was determined to be insufficient for defining smaller-scale features within the coalfield and for determining detailed seam correlations with a high degree of confidence throughout the property. Additionally, the Russian coal quality data required infill and modern validation to provide an adequate database for assessing the in-situ coal quality to current international standards (Norwest 2008).

ER conducted an infill drilling and bulk sampling program at UHG in 2008, which was planned and managed by Norwest. The purpose of this program was to address the issues identified above and bring the bulk of the UHG resource to a level of geological assurance sufficient for mine planning and feasibility level study. The Norwest program included a total of 121 holes, comprised of 17 slim gauge core holes (PQ/HQ), 99 slim rotary holes (± 100mm) and five large diameter core/bulk sample locations. A grand total of 132 holes were used in the creation of the Norwest geologic model with an average drilled depth of approximately 200m (Norwest 2008).

The details of these boreholes are shown in Table 7-2. The map in Figure 7-2, illustrates the borehole positions for this program. All coordinates are in UTM WGS 1984.

Table 7-2: Norwest borehole data summary

Drilling type	Number of Boreholes	Total Depth
Core drilling	17	3325
Open hole drilling	115	11444
Total for deposit	**132**	**14769**

(Source: Norwest Corporation)

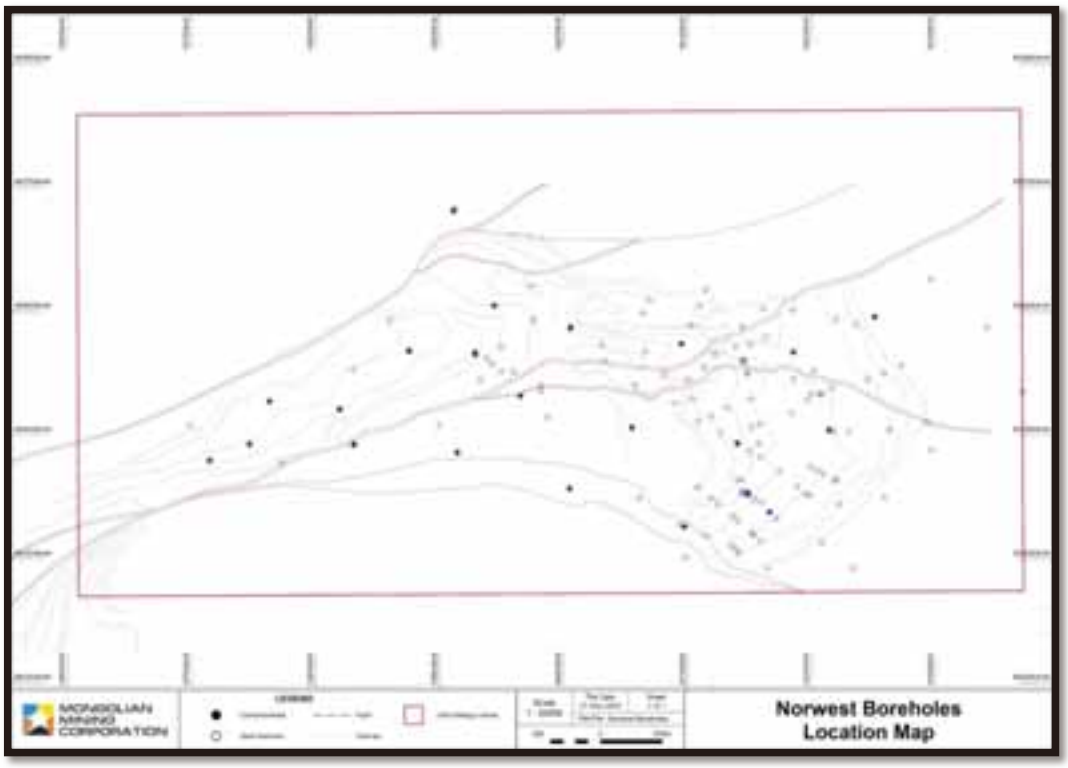


Figure 7-2: Norwest boreholes

(Source: Energy Resources LLC)

7.1.2 ER Drilling 2009 to 2011

When the initial box cut for seam 3A was opened up in preparation to start mining by ER in October 2008, the previous works and planning based on the Norwest model were found to be insufficient.

Numerous small unidentified structures present had affected seam position and LOX lines, which caused the 'mine scale' planning to be inaccurate.

In January 2009, Mr Ballantine was contracted to provide an audit on the available underlying database and provide advice for future exploration requirements given the differences encountered between planned results and actual results. These differences are to be expected, going from a project scale exploration program where resources are estimated, to a mining scale, which requires much more detail.

An infill drilling program and LOX line program was recommended by the Mr Ballantine. It was shown that 50x50m drilling was required for fault delineation and also for location of LOX lines. In addition to the drilling, 10x10m spaced sampling was required to determine the exact location of the LOX line, which was done on the surface of the coal seam once uncovered. This program was completed by the company with company staff trained geologists. At the time the company had no geology team. Mr Ballantine assembled a team of young geologists over the next 12 months and this has been ongoing. Training of skills and JORC procedures were implemented and as the resulting JORC Resource 2012 result was expected to vary from the maiden Norwest JORC Resource, an independent peer review by the senior

geologist Mr Todd Sercombe (also a Competent Person) was completed and can be reviewed in Appendix 14.

In addition, it was found after some time spent processing the available geological database received by Norwest that numerous inconsistencies were present in the Russian translation of the scanned data to coded data. After a full review of the Russian scanned data to the current data there were more than five thousand changes made. For interest a similar comparison was made with the Norwest data to the current dataset and there have been over two thousand five hundred changes made.

The geology team had responsibility for exploration, pit grade-control and setting up of the laboratory. Later the laboratory was able to be managed by its own team. Over time other geological roles were implemented on an as-needs basis. These were reconciliation (to support mining), Geotechnical (to support mining) and coal quality (to support mining and the CHPP). The Geotechnical role was transferred to its own department under the supervision and training of AMC in May 2012. Figure 7-3 illustrates the roles that were introduced to cover 'all bases' with exploration and mining (excluding Geotechnical).

Figure 7-3: MMC Geology department role structure

(Source: Energy Resources LLC)

The 2009 program was all about just staying in front of mining by understanding the LOX lines for box-cut positions for new pits, closer spaced drilling to understand seam continuity within the pit and controlling coal quality to maintain a RAW hard coking coal product. Near the LOX lines, due to the faulting and folding, it was necessary to do close spaced (10x10m) sampling, which could only be efficiently and cost effectively done by in-pit geologists once the seam was exposed. This was setup at the start of uncovered coal and has proved very successful in controlling coal quality with respect to coal oxidation. This process has been established as an ongoing procedure and is now well entrenched.

The results of the 2009 program showed that areas in the mine were very complex in continuity and coal quality, whilst other areas showed good continuity and constant coal quality. Further work was necessary to understand this complexity and location, versus the remaining deposit and how would this affect future mining and planning.

The 2010 and 2011 programs focused on better understand the deposits structural regime and have a better understanding of the western area and in so doing, review

and upgrade the Resources Estimate and provide a better understanding of the whole deposit for 'life of mine' planning and scheduling. It was realized at the end of the 2009 program that boreholes alone were not going to give sufficient information to understand the underlying structural regime, which was going to be necessary to have confidence in planning, scheduling and product control into the future. The boreholes drilled for 2009 through 2011 are shown in Figure 7-4.

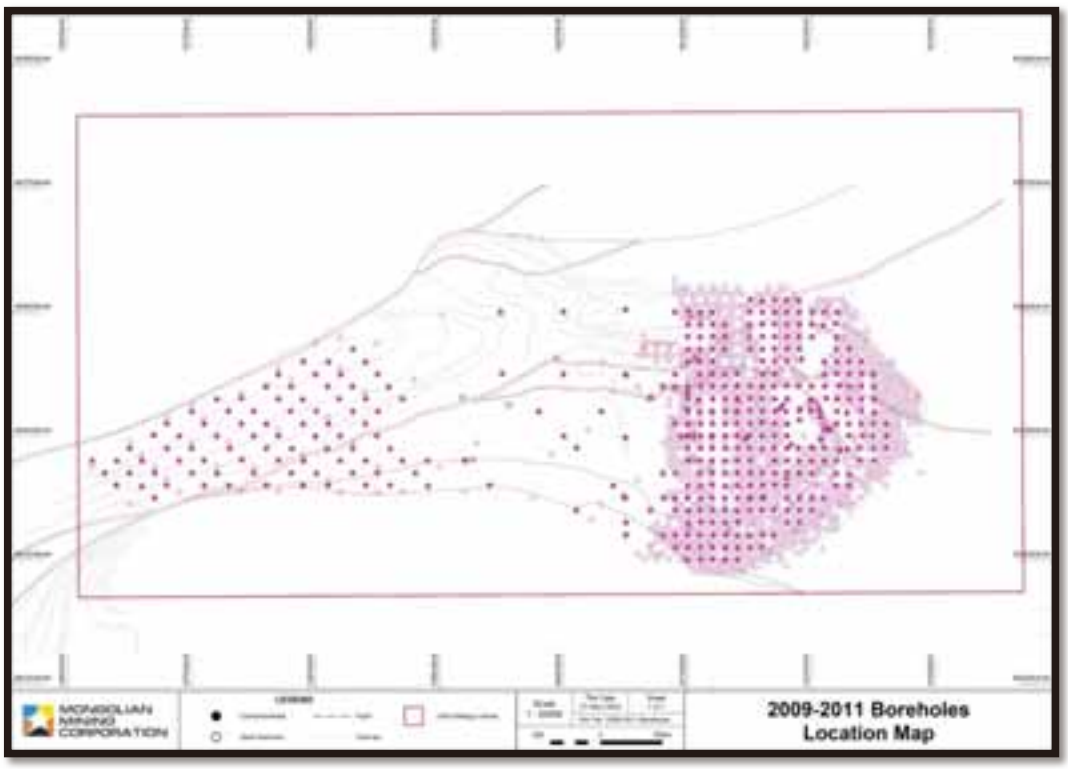


Figure 7-4: 2009-2011 boreholes

(Source: Energy Resources LLC)

The 2009-2011 drilling program included a total of 1,435 boreholes and 166,384 metres drilled. Table 7-3 shows the total drilling results for this period. All coordinates are in UTM WGS 1984.

Table 7-3: Borehole data summary for 2009-2011

	Core drilling		Open hole drilling	
Period	Number Boreholes	Total depth (m)	Number Boreholes	Total depth (m)
2009-2011	443	81959	992	84425
TOTAL	Boreholes		Total depth (m)	
	1435		166384	

(Source: Energy Resources LLC)

During 2010, a 2D seismic program was trialled using a Canadian based company, Polaris International (Polaris), to collect the data and Velseis Pty Ltd (Velseis) based in Australia to design, process and interpret the results. The trial was very successful in demonstrating that the area was conducive to acquisition of high resolution 2D seismic. Approximately 46km of 2D high resolution seismic data was collected in 2010 (refer Figure 7-5 – blue lines).

The results of this first program confirmed the deposit was highly structurally disturbed, but the line spacing was still not sufficient to confirm the major structural directions. In addition, there was insufficient borehole control over the seismic lines to provide an accurate grid of velocity to calculate the time to depth correction. It was decided by the Competent Person to reduce the line spacing in the NW-SE direction and build into the 2011 drilling program good coverage of all the seismic lines. A further approximate 25km of high resolution 2D seismic data was collected in 2011 (refer Figure 7-5 – grey lines).

The 2011 program, with the additional boreholes, was invaluable in resolving the structural regime and also assisted greatly with the seam correlations from east to west, which change considerably. The combined results of the drilling and seismic have provided great confidence with the seam correlation and continuity for the JORC (2004) Resource estimate June 2012. Appendix 13 contains the final reports from Velseis and Polaris for the overall program.

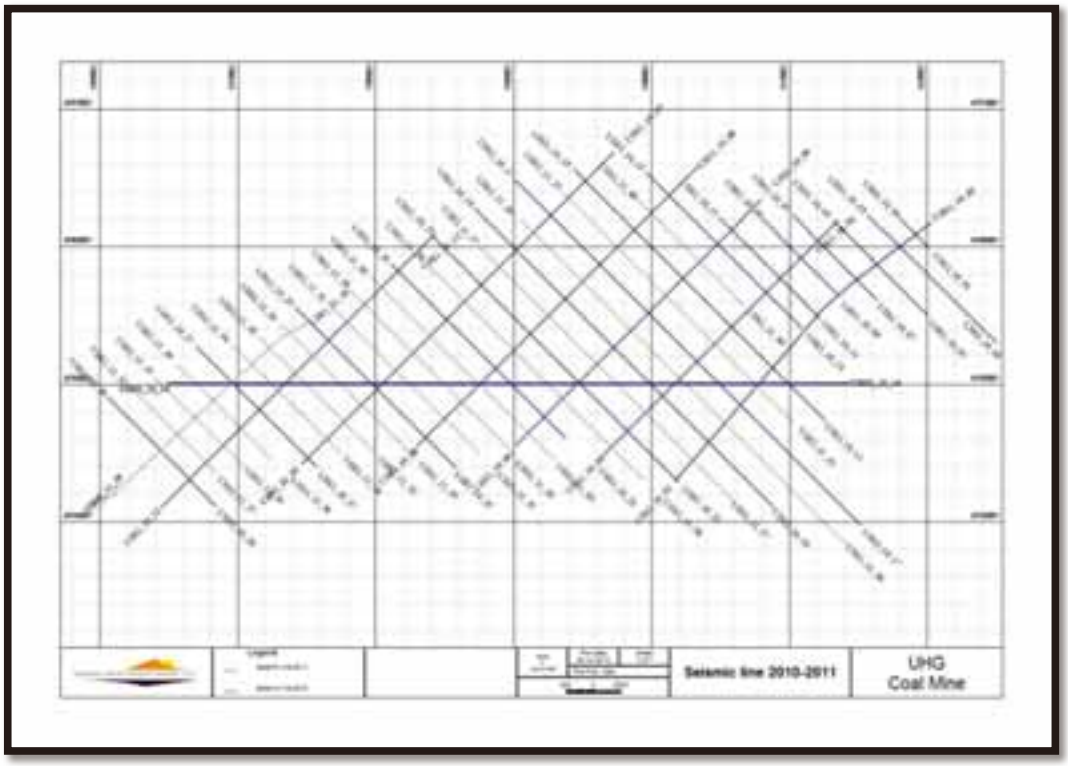


Figure 7-5: Seismic program for 2010 and 2011

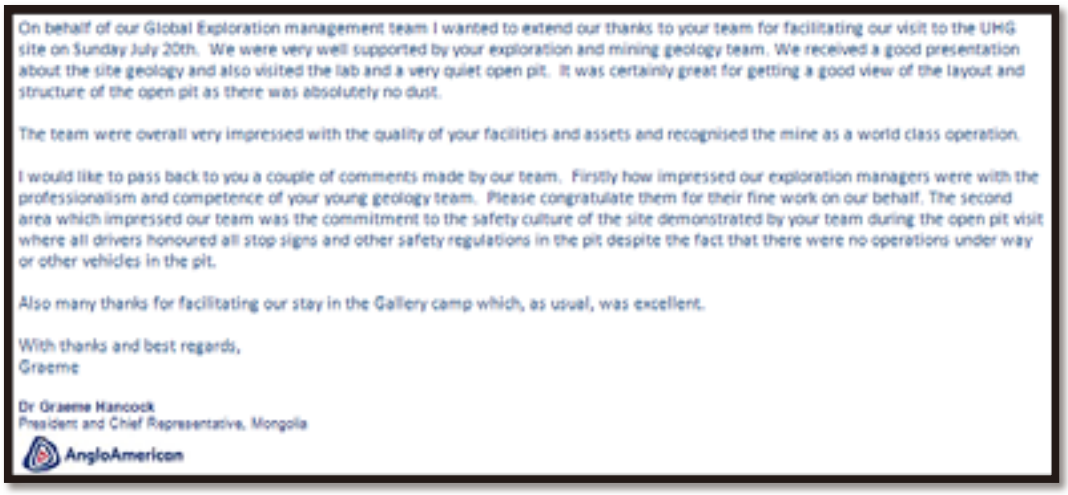
(Source: Energy Resources LLC)

7.1.3 ER Drilling program 2012 to 2014

The previous program focused on the mine area and the western area. This had left a gap in the middle of the deposit. This gap will be explored as part of the ongoing exploration programs for UHG and will stay sufficiently in front of mining and will be the focus of future resource updates.

The geology team responsible for this program, which forms the basis of this new Resource estimate update December 2014. The team has built on its experience and capabilities and very effective and qualified group with a cumulative Mongolian experience base, of **95** years achieved to its credit. In addition, the below email was

received on the 31st July 2014 from Dr Graeme Hancock (President and Chief Representative, Mongolia, AngloAmerican) for a visit his Global Exploration team made to UHG (refer Figure 7-6).



On behalf of our Global Exploration management team I wanted to extend our thanks to your team for facilitating our visit to the UHG site on Sunday July 20th. We were very well supported by your exploration and mining geology team. We received a good presentation about the site geology and also visited the lab and a very quiet open pit. It was certainly great for getting a good view of the layout and structure of the open pit as there was absolutely no dust.

The team were overall very impressed with the quality of your facilities and assets and recognised the mine as a world class operation.

I would like to pass back to you a couple of comments made by our team. Firstly how impressed our exploration managers were with the professionalism and competence of your young geology team. Please congratulate them for their fine work on our behalf. The second area which impressed our team was the commitment to the safety culture of the site demonstrated by your team during the open pit visit where all drivers honoured all stop signs and other safety regulations in the pit despite the fact that there were no operations under way or other vehicles in the pit.

Also many thanks for facilitating our stay in the Gallery camp which, as usual, was excellent.

With thanks and best regards,
Graeme

Dr Graeme Hancock
President and Chief Representative, Mongolia
AngloAmerican

Figure 7-6: Email from Dr Graeme Hancock - AngloAmerican

Boreholes drilled for the 2012-2014 campaign are shown in Figure 7-7.

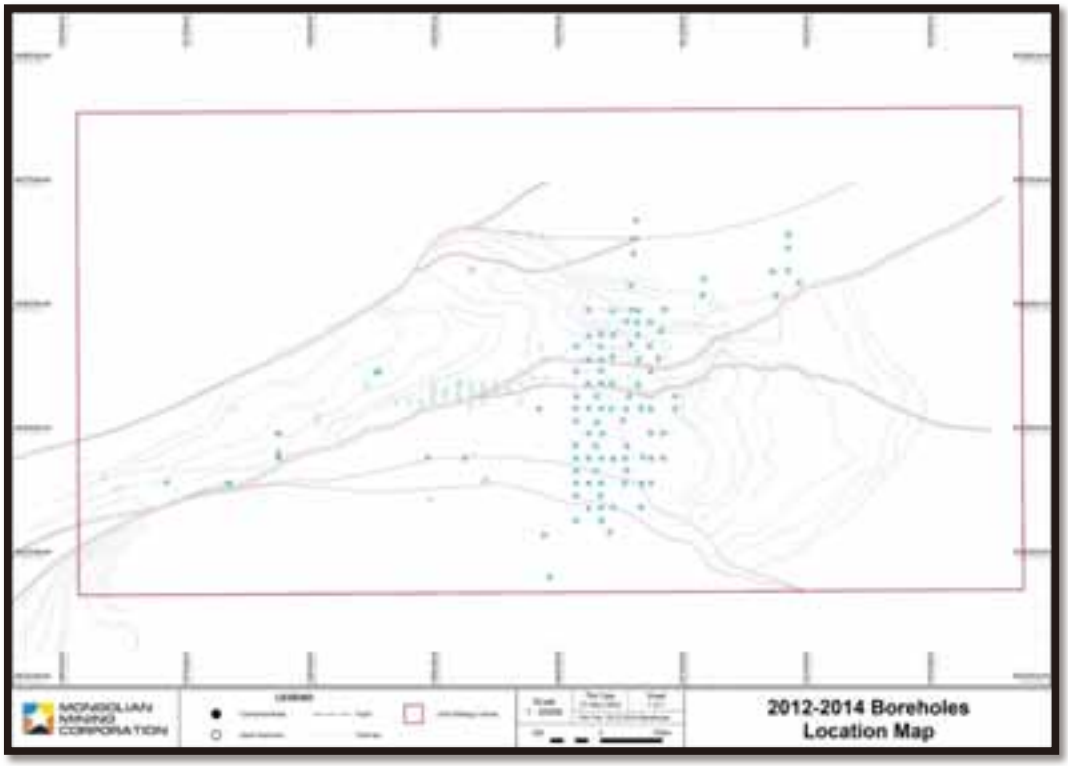


Figure 7-7: 2012-2014 boreholes

(Source: Energy Resources LLC)

The 2012-2014 drilling program included a total of 121 boreholes and 24,890 metres drilled. Table 7-4 shows the total drilling results for this period.

Table 7-4: Borehole data summary for 2012-2014

	Core drilling		Open hole drilling	
Period	Number Boreholes	Total depth (m)	Number Boreholes	Total depth (m)
2012-2014	84	22410	37	2480
TOTAL	Boreholes		Total depth (m)	
	121		24890	

(Source: Energy Resources LLC)

7.1.4 ER Drilling 2018, 2020

The drilling program that covered the period 2018, 2020 was an extension of the central deposit area in front of the mining face. Distance between boreholes on the central limb was 200-300m and southeast limb was 50x50m. Exploration depth was to 21-609m from surface. Boreholes drilled for the 2018, 2020 campaign are shown in Figure 7-8.

The ER geology and geotechnical team responsible for this program, which forms the basis of this new Resource estimate update December 2021. A capability statement was compiled and is shown in Appendix 20.

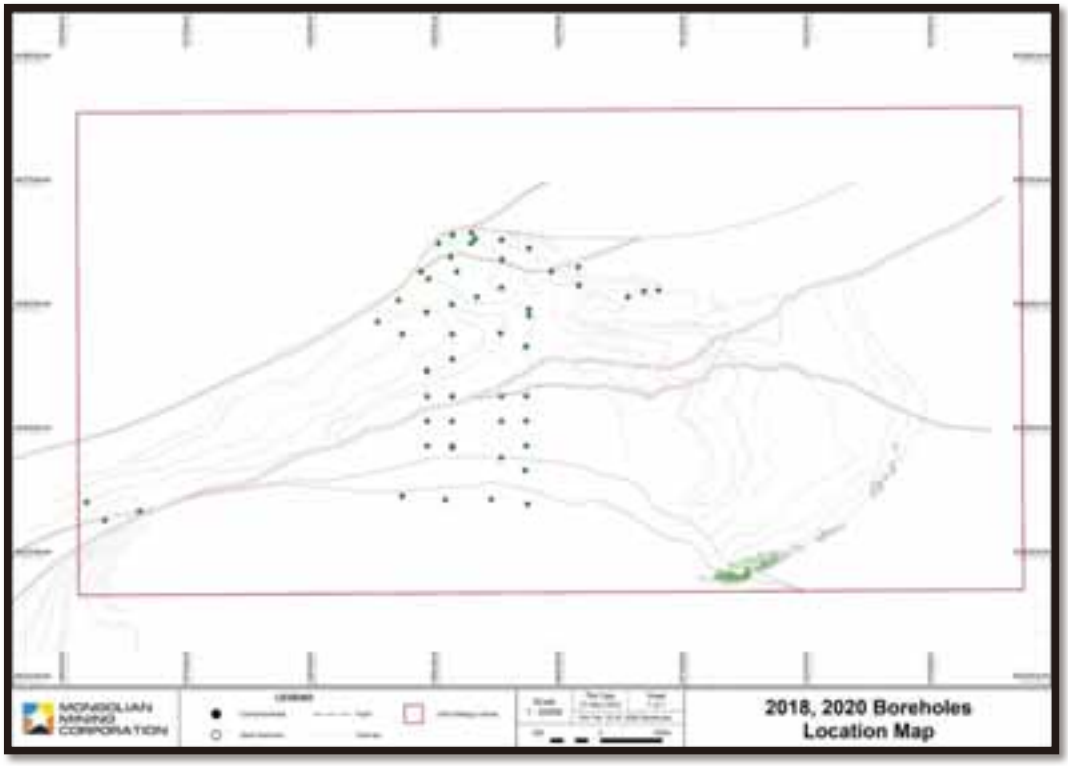


Figure 7-8: 2018, 2020 boreholes

(Source: Energy Resources LLC)

The 2018, 2020 drilling program included a total of 127 boreholes and 18,422 metres drilled. Table 7-5 shows the total drilling results for this period.

Table 7-5: Borehole data summary for 2018, 2020

	Core drilling		Open hole drilling	
Period	Number Boreholes	Total depth (m)	Number Boreholes	Total depth (m)
2018	3	241.5	38	1347.41
2020	48	15346	38	1487.5
TOTAL	Boreholes		Total depth (m)	
	127		18422.41	

(Source: Energy Resources LLC)

Including all available borehole data over the various periods of exploration, the database available for modelling the resources consist of 1,926 boreholes (refer Figure 7-9). The approximate amount of drilled metres over this period is 249,802 metres of which approximately 148,608 metres was cored and 101,183 metres was open hole.

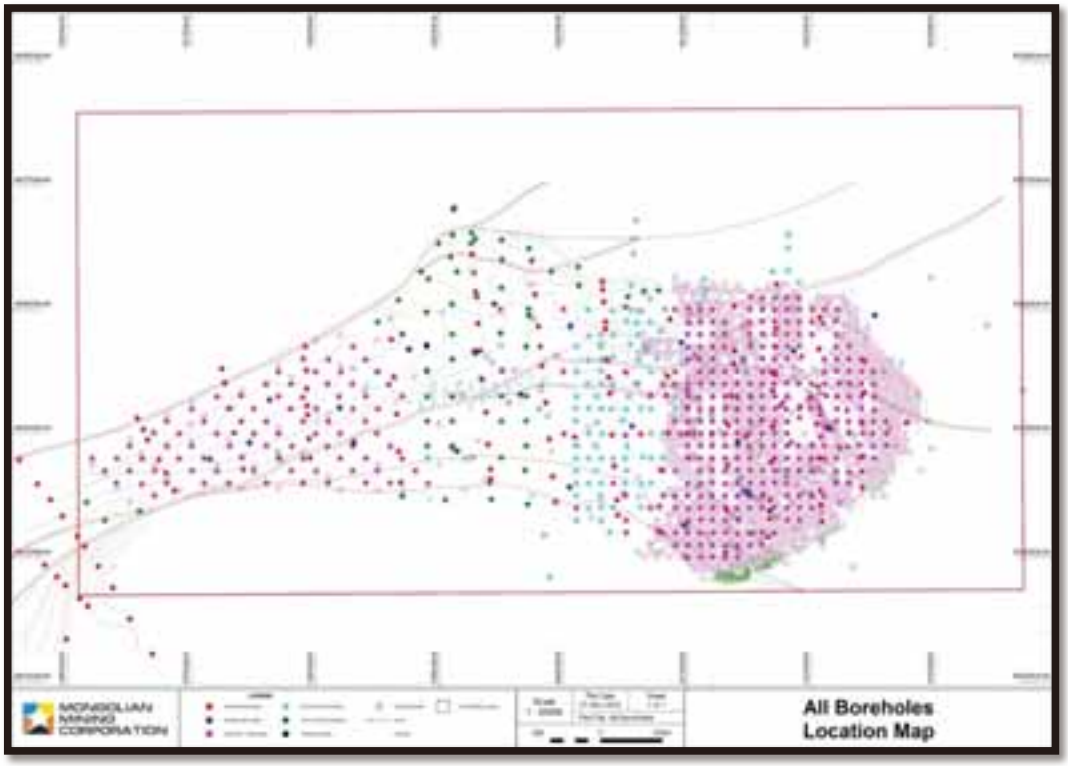


Figure 7-9: All boreholes end of 2020

(Source: Energy Resources LLC)

7.2 Geophysics

7.2.1 Seismic survey

Polaris Seismic International was awarded the contract to conduct 2D Land High Resolution Seismic Survey at UHG in 2010 and 2011. The objective was to assess the suitability of the seismic technique for mapping coal seam stratigraphy and to delineate and characterize structure and other features of interest.

The 2D UHG 2010 seismic program recorded 22 lines totalling 46,000m and the 2011 seismic program recorded 15 lines totalling 25,270m using Roll On and Roll Off

methodology with 240 maximum active channels and using dynamite as the source (refer Figure 7-5). The reports for both programs can be viewed in Appendix 13.

Once the raw seismic data was collected, it was passed onto Velseis Processing Pty Ltd for final processing and migration with subsequent interpretation. All the final interpreted seismic lines are shown in Appendix 10. The final report for this exercise can be found in Appendix 13.

7.2.2 Downhole Geophysics

All geophysical downhole borehole surveys for the period 2009 to 2020 were carried out by Monkarotaj LLC and Lithopro LLC, Ulaanbaatar. The logging systems used by both contractors were made by Auslog Pty Ltd (Australia) and the full details of the equipment can be found in Appendix 16. The geophysical logs that were produced included Caliper, Short Spaced Density (SSD), Long Spaced Density (LSD), Resistivity (PR), Gamma (GAMM), Sonic (SONN), Dipmeter (DIP), Acoustic and Deviation. Hard copy logs were supplied to the field geologists with a set of digital Log ASCII Standard (LAS) files. The standard of this service has been average at best.

7.2.3 Ground Magnetic and Gravity

A ground Magnetic and Gravity program was undertaken by Monkarotaj LLC in November 2010. The results were high level and provided some guidance with understanding the magnetic hydrothermal fluids which have been previously mentioned and broad coal basin limits.

8 Quality Assurance and Quality Control

8.1 Drilling Method

8.1.1 Drilling Method prior to 1989 (Dashkhorol et.al.)

The drilling equipment used during this time of exploration prior to 1989 were, stationary drilling machines ZIF-650M and ZIF-1200 MR, assembled on metal sledges with a tower of MRUGU- category.

Drilling pumps NB 32 or 2 GRI, pipe rotating machine RT 1200 M and power unit DESS 60P assembled on a portable trailer.

Drilling work at all deposits was undertaken with utilization of hard-alloy crowns of SA-3, 4 categories combined to steel drilling unit of 50 mm diameter, connected by clutch-lock coupler. Elevator of MZ-50/80 category with diving heads was also used.

Data related to core recovery was reflected in the logging and is recorded as lost core and illustrated in Appendix 8. The core loss data was taken from original scan logs.

Measurements intended for increasing core recovery basically consist of the second re-drilling of coal intervals with low core recovery or intervals with omission of coal seam. At the Ukhaa Khudag deposit there are 22 boreholes where 28 coal layers were re-drilled. As results of this core recovery of these seam-intersections were increased from 52.3 to 72.2%.

8.1.2 Drilling Method Norwest (2008)

AIDD was contracted to complete this drilling program. The drilling equipment used was a UDR-650 and Wirth AL-06. Open-hole drilling and coring (HQ and PQ) were completed by these rigs. Five sites were selected for bulk sample testing where a 6 inch barrel was used.

Borehole completion reports were completed for each borehole, which recorded all drilling and recovery information for the borehole. Core recoveries were generally high with boreholes with poor recoveries re-drilled.

8.1.3 Drilling Method 2009 - 2014

Drilling in 2009-2014 was carried out by Elgen LLC using diamond drill rigs. The rigs used were manufactured by Hanjin Drilling Co. Ltd in South Korea, and PQ and HQ sized core was used. At any one time up to 12 drilling rigs were being operated.

Initial core recoveries were measured at the rig by the drillers and confirmed by the rig geologist. These recoveries were recorded in the drilling sheet. Once the core was being logged, the thickness of the core was measured against the geophysical logs and loss was logged in the lithology sheet. Core recoveries were high with boreholes with poor recoveries re-drilled.

8.1.4 Drilling Method 2018, 2020

Elgen LLC and Mera LLC were contracted to complete this drilling program. The drilling equipment used was Yong Jin and Epiroc DM 45. Open-hole drilling and coring (HQ, PQ) were completed by these rigs. Initial core recoveries were measured at the rig by the drillers and confirmed by the rig geologist. These recoveries were recorded in the drilling sheet. Once the core was being logged, the thickness of the

core was measured against the geophysical logs and loss was logged in the lithology sheet. Core recoveries were high with boreholes with poor recoveries re-drilled.

In 2020, at any one time up to 6 drilling rigs were being operated.

8.2 Borehole Survey

8.2.1 Survey Method prior to 1989 (Dashkhorol et.al.)

The Tavan Tolgoi deposit area was provided with topographical map of 1:100000 scale with relief sections in each 20 m. In the area of prospected deposits there are second category posts of the national ground triangulation. Moreover, in this area mapping of 1:25000 scale had been carried out involving an area of 700km^2 with horizontal relief sections provided to 5 metre intervals. Topographical maps of the Ukhaa khudag, The Eastern and Bortolgoi deposits were drafted from an enlargement of the regional 1:25000 scale topographic map. All geology-exploration work was coordinated in accordance to GUGK of MPR (Coordinate catalogue) and was captured using the 'Tpeo 020a' category theodolite and theodolite motion method of mapping.

8.2.2 Survey Method Norwest (Norwest 2008)

Monmap Engineering Services Co. Ltd. (Monmap) was used for all survey requirements for this program. Monmap is a reputable Mongolian land survey company. The surface topography data was comprised of digital AutoCAD format surface contours at 2m elevation intervals. The data was spatially referenced using the UTM (WGS84 projection) and all elevation contours were in meters above mean sea level. Topographic data was obtained using real time kinematic GPS ground survey on a dense grid and closely spaced data points on crests and toes of surfaces showing more than the relatively flat relief characteristic of the resource area.

During the 2008 drilling program Norwest geologists conducted field surveys to confirm the surface exposure (or absence) of coal bearing sediments as mapped and interpreted by previous geologists. Norwest did not identify any surface geology that departed from available geological maps and interpretations. Publically available satellite imagery (Google Earth) was used in validating the previous Russian surface geology mapping. Additionally, approximately 80% of the historic Russian drill locations were relocated during field mapping and staked for GPS base station surveys along with the borehole locations from the 2008 program.

8.2.3 Survey Method 2009 - 2020

The topographic and borehole collar survey was carried out by Energy Resources Mining's own survey team using Trimble equipment. The topographic survey was carried out in 2008 and the borehole collar survey was carried out during the exploration period in 2009-2020. Figure 8-1 shows a difference map comparing the grid based on borehole collars and the grid based on topography.

Most differences are less than 1.5m, which is acceptable with a few areas greater than this around the boundaries where there is no borehole control.

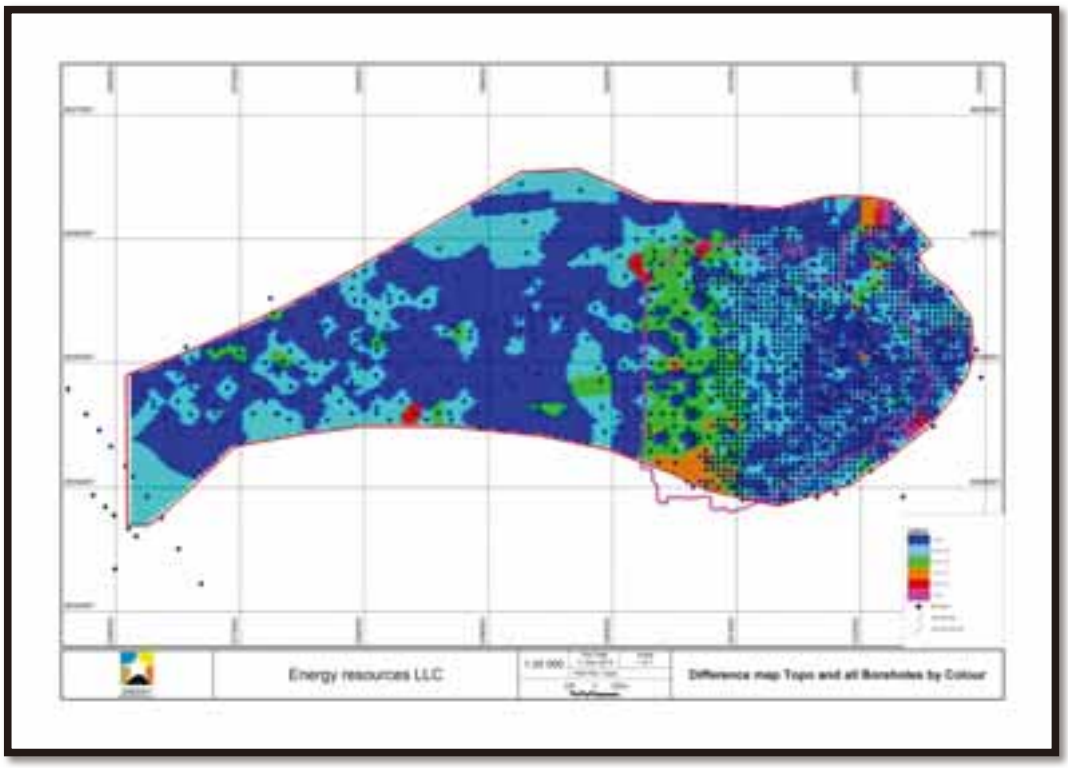


Figure 8-1: Difference map of Collar survey and Topography survey Geophysics

(Source: Energy Resources LLC)

8.3 Geophysics

8.3.1 Geophysics Method prior to 1989 (Dashkhorol et.al.)

Surveys of seams were carried out with utilization of logging station SK-1-74 combined with stationary apparatus and equipment. Cable of KTZ-67-180 type graduated with depth identifiers for every 10 m. Calibration and graduation of radiometric (KURA-2) and inclinometer apparatus were made in conformity with instruction for geo-physical survey of boreholes', so calibrations were made once a quarter or after each repair. Diagrams were registered in 1:200 survey scale and in 1:50 detailed scale. Quality and accuracy of measurements were evaluated visually in comparison with basic examination records. Records on examinations of graduation were made once a quarter in presences of officials from geological team of the crew. Logging surveys were carried out to decide the following geological tasks:

Identification of coal seams within the boreholes sections and definition of thickness and depth of their location,

- *Determination of symmetry of coal seams and correlation of the sections,*
- *Lithological differentiation of mine rocks,*
- *Study of the tectonic conditions of borehole's wall,*
- *Determination of spatial location of borehole's bore.*

To decide the above geological tasks following sets of geophysical methods were use:

- *Method of pseudo resistance (KS),*
- *Method of natural radioactivity (GK),*
- *Method of infused gamma ray (GGK-P),*
- *Inclinometer (IK),*
- *Zawn-meter (KM)*

After completion of measurements in boreholes, preliminary data related to depth and structure of coal seams was given to geological authority and then results of the complete interpretation of logging diagram as geology-geophysical sections for each borehole were transferred within the defined term of time.

8.3.2 Geophysics Method (Norwest 2008)

Norwest's 2008 drilling campaign comprised a combination of open hole, slim core and large diameter core (bulk sample) drilling. All drilling was vertical and where possible, all holes were geophysical logged by Monkarotaj LLC, a Mongolian logging contractor allied with Auslog, an Australian geophysical wireline company. Logs included the standard parameters for coal suite logging, including natural gamma, gamma-gamma density, resistivity and caliper.

8.3.3 Geophysics Method 2009 - 2014

All geophysical logging was carried out by Monkarotaj LLC in 2009-2011 and Lithopro LLC in 2012-2014. The logging systems used by both contractors were made by Auslog Pty Ltd of Australia. The curves that were used by both contractors were natural gamma, gamma-gamma, density, resistivity, sonic, deviation and caliper.

The consistency of all geophysical data in LAS format supplied by both contractors was reviewed prior to being processed in LogCheck software. This generally occurs through various audit functions within LogCheck software. The audit revealed that the LAS data resolution varied between 5cm, 2cm and 1cm for the various parameters.

Following a review of the LAS variance for the deviation data, the Competent Person decided to assume that boreholes were vertical for modelling purposes. This was due to the low variance of deviation of the boreholes from the vertical plane.

LAS thickness for various coal sequences were then compared to the lithology log thicknesses (and where necessary coal core photography). Where there were differences, the lithology data was corrected (adding core loss) to match the LAS thickness for various coal seams to ensure the lithology data matched the LAS. In general, this would mean the addition of a core loss code to ensure that the original lithology log was not altered drastically. The drilling records were also referenced to ensure integrity in the final production of the lithology log.

Two calibration boreholes (G02251 and R00020) were setup to regularly test all logging tools as they came onto the site and at regular periods whilst onsite.

8.3.4 Geophysics Method 2018, 2020

All geophysical logging was carried out by Monkarotaj LLC in 2018, 2020. The logging systems used by contractor was made by Auslog Pty Ltd of Australia. The

curves that were used by contractor were natural gamma, gamma-gamma, density, resistivity, dipmeter, acoustic, deviation and caliper.

The consistency of all geophysical data in LAS format supplied by both contractors was reviewed prior to being processed in LogCheck software. This generally occurs through various audit functions within LogCheck software. The audit revealed that the LAS data resolution varied between 5cm, 2cm and 1cm for the various parameters.

Following a review of the LAS variance for the deviation data, the Competent Person decided to assume that boreholes were vertical for modelling purposes. This was due to the low variance of deviation of the boreholes from the vertical plane.

LAS thickness for various coal sequences were then compared to the lithology log thicknesses (and where necessary coal core photography). Where there were differences, the lithology data was corrected (adding core loss) to match the LAS thickness for various coal seams to ensure the lithology data matched the LAS. In general, this would mean the addition of a core loss code to ensure that the original lithology log was not altered drastically. The drilling records were also referenced to ensure integrity in the final production of the lithology log.

One calibration borehole (G02637) were setup to regularly test all logging tools as they came onto the site and at regular periods whilst onsite.

8.4 Geological Logging and Sampling

8.4.1 Mongolian-Russian Logging and Sampling prior to 1989 (Dashkhorol et.al. 1989)

Sampling work had been provided to identify the banded contents and group of coal seams and to define the variation rules of the basic quality indicators of coal: ash-contents, volatiles, and thickness of plastic rock beds for simple samples for all seam-intersections and investigation of petrographic contents of coal, physical and mechanical properties of included rocks.

Collection of samples was made from all surveying boreholes. Testing has been undertaken with utilization of differential or differential-sectional methods. All coal seams and rocks of the different lithological contents were subjected to sampling. To select cored, coal samples the following method was used: Core was installed in the drill core box in such sequence, for which it will be derived from core barrel. Washing of core with clean water was used only for whole cylinders or large size fragments by hand, but fine-grained and crushed coals are not recommended for washing in the field conditions to avoid distorting of samples because of loss of any lithotypes. Interval length included in the sample has been estimated depending on thickness of a split or coal seam of any lithotype. Usually in average it equals to 1.0-1.5 m, but sometimes was more when really homogeneous components were sampled separately. If drill core contains some intersections of original lithological component, they were selected together in one sample. Then these intersections were verified through logging. Sometimes, if separation of rock intersections from coal splits was not possible they were selected together with coal, which were recorded in appropriate documents. For the calculation of medium-weighed quality indicators of coal for seam intersections, the results of analyses made for such samples were related to appropriate complicated structure interval of a seam without any amendment. In such cases, a complicated structure interval as a rule was defined and

accepted through logging. Core recovery for coal was determined with utilization of volumetric and linear methods into sample divisions, which were organized by crew. Coal core documents were also examined there and completed preparation of samples, labelling and packing into the synthetic bags was made. Selected samples were sent monthly to laboratory.

The Mongolian-Russian raw geological database was recorded on detailed scanned logs that were done to a high standard. However, since all the other data for Norwest and the current program were on digital platforms, it made the Mongolian-Russian data difficult to compare. The Mongolian-Russian geology data had been translated into coded data so this was digital, but as previously mentioned, this was not done well.

For the Competent Person to be totally assured and confident in using the Mongolian-Russian data that had been recorded originally to a very good standard it was necessary to have the Mongolian-Russian LAS data converted from scanned data to digital LAS data.

These were done using the Micromine software to geo-reference the scanned files and then digitise the geophysical curves to create a LAS file. These LAS file were then imported into the LogCheck software, which held the geological database and hence all data was in the same format and platform. An example of a comparison of the typical scan data and the LogCheck typical output is shown in Figure 8-2.

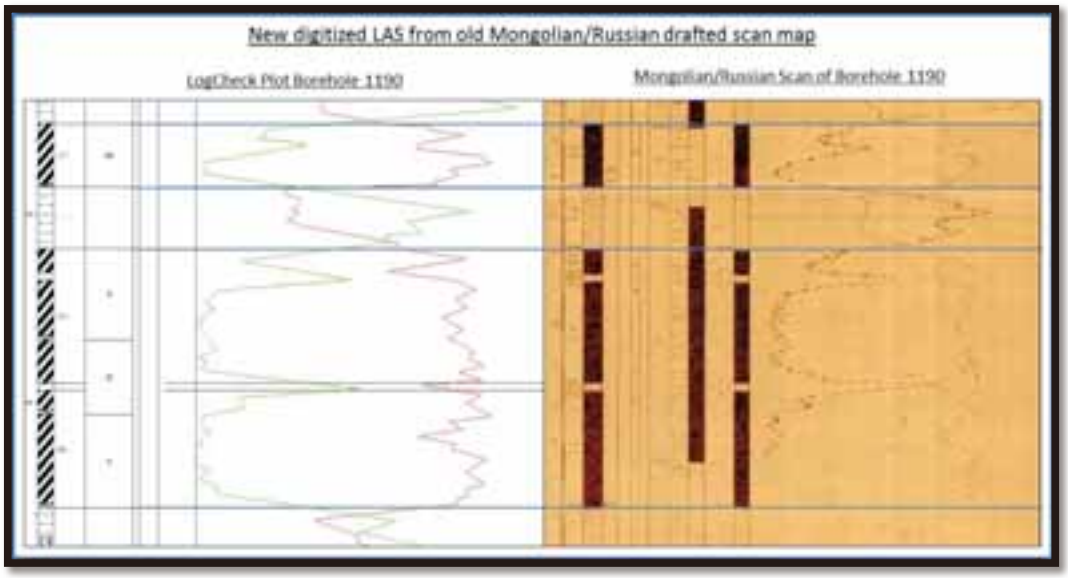


Figure 8-2: Example of a comparison of Scan data and LogCheck output
(Source: Energy Resources LLC)

8.4.2 Norwest Logging and Sampling (Norwest 2008)

All field logging and sampling was undertaken and supervised by Norwest. Only borehole core samples were assayed. Coal assays were separated into the following:

- *Field samples, usually no more than 0.5m of core length.*
- *Incremental samples consisting of combined groups of field samples based on consistent lithological units interpreted from core and geophysical logs.*

- *Physical composite samples, consisting of combined incremental sample intervals representing logical mining or integral coal seam units.*
- *Large diameter (150mm) core samples of key seams for washability analyses, processing plant simulation and metallurgical characterization.*
- *Geotechnical rock strength samples taken of waste (non-coal) and coal core.*
- *Acid Generating Potential (AGP) samples taken of waste (non-coal) core.*

All coal quality analyses of incremental and physical composite samples were performed by SGS Laboratories, Tianjin, China. SGS Tianjin was also charged with the washability and metallurgical characterization analyses.

8.4.3 2009-2020 Logging and Sampling

Core logging and sampling procedures were developed by Mr Ballantine and include procedures for drilling, core handling, geological and geotechnical logging, sampling and data recording and data entry (Appendix 2).

The following process was carried out by the ER Geologists:

- Core pumped into PVC split.
- Core marked up (if drilling at night and coal is intersected core secured in the PVC split to be processed the next day in better light).
- Core cleaned.
- Recovery measured.
- Core geologically and geotechnically logged.
- Core photographed wet and dry in core box.
- Coal, rock (Geotech), roof and floor samples collected.
- Rock and coal parting samples were collected for acid rock drainage (ARD).
- Geophysically logged.
- Reconciled coal depths and sample intervals against the geophysical log.

8.4.3.1 Geological Logging

Geologists carried out detailed lithological and coal logging, which included descriptions of the depth, lithotype, colour, estimated strength, weathering, bedding, sedimentary structures, fossils and minerals (Appendix 2). Photographs were taken of all the cored sections. An example can be viewed in Figure 8-3.

Figure 8-3: Example of core photographs

(Source: Energy Resources LLC)

Once all logging was completed and corrected to the geophysical data such that the two datasets were consistent, the downhole coal data was correlated by the Competent Person to ensure that coal seams were consistently correlated across the deposit. This process is generally a sectional process where the various boreholes were plotted along section lines and the neighbouring holes were checked for seam correlation. The correlation is built up in a multi-directional sense to ensure that the seam consistencies are valid in all directions. The LogCheck software is a very powerful tool for doing this work quickly and accurately. East-west and north-south sections created from LogCheck can be viewed in Appendix 9.

8.4.3.2 Sampling

Coal intervals of 0.5m and thinner, not including any rock partings, were considered to be coal plies and were sampled. Each coal sample and rock parting was sampled separately. Individual coal samples (without rock partings) had a maximum length of 2.0m. Coal samples were selected on coal brightness to reflect plies.

The geological procedures (Appendix 2) required rock partings of 0.02 m to be sampled with the coal and rock partings over 0.02 m were to be sampled separately. Rock partings equal to or less than 0.02 m with coal on either side were considered to be in-seam rock partings and were to be sampled. Rock partings, greater than 0.5m in thickness was considered to be a parting between two coal seams and was not to be sampled. In addition, a 0.3m sample of the immediate roof and the immediate floor of each coal seam were collected. These were analysed to estimate the effect of diluting the coal if some roof or floor rock was mined with the coal. This data will be used in the Reserve estimate.

All samples were wrapped in double plastic bags, which were securely closed with zip ties. The plastic bags were marked with the borehole number, the sample number, the sample interval and the sample type (i.e. rock or coal). A sample ticket with the same information was also placed between the two sample bags. The samples were stored in a freezer (Figure 8-4) before being analysed onsite at the ERCCL.

Figure 8-4: Photograph of freezer where coal samples were stored while waiting for analysis

(Source: Energy Resources LLC)

Lithology logs were updated with the sample number as despatched to the laboratory. These sample numbers were then cross referenced (by depth and thickness) to the coal quality data once it was received from the laboratory. For further information review Appendix 2.

8.5 Analytical Method

8.5.1 Mongolian-Russian sample Analysis (Dashkhorol et.al. 1989)

Research of coal quality of Ukhaa Khudag was mainly executed by Central Geological Laboratory in Ulaanbaatar. The ECCRI (Russia) also made research by studying a limiting number of samples.

Crushing and processing of coal samples were carried out in the Central Geological Laboratory in accordance with the scheme developed in advance and immediately sent to the coal chemical division and to the section responsible for enrichment. There after crushing and processing backup samples were selected from the original ones which were kept at the storage of central geological crew. Backups from investigated samples were storied in the Central geological laboratory.

Coal and petrographic explorations of coal were executed by Mongolian petrographers P. Tserensodnom and L.Jargal, and also by soviet specialists V.P. Shorin and A.P. Demin (ECCRI). Coal samples were taken from 31 boreholes of the mining area for coal and petrographic exploration. 157 determinations of Vitrinite reflectance (Ro, %), 80 estimations of micro component composition of coal were performed with regard to these samples. The ECCRI made exploration of Ukhaa Khudag deposit with respect to two boreholes #1176 and #1181.

8.5.2 Norwest Analysis (Norwest 2008)

All coal quality analyses of incremental and physical composite samples were performed by SGS Laboratories, Tianjin, China. SGS Tianjin was also charged with the washability and metallurgical characterization analyses.

ISO standards were used for the analyses and evaluation of the coal quality samples. Additionally, certain analyses used in the Chinese metallurgical coal market (caking index and Sapozhnikov plastometry tests) were performed under the supervision of SGS. For further information the reader is referred to the Norwest Corporation, Ukhaa Khudag technical report: Geology and Coal Resources, 2009.

8.5.3 2009-2020 Analyses

All samples were analysed at the ER Central Chemical Laboratory (formerly ERML), which is located onsite at UHG. With respect to sample preparation, the top size of the sample was reduced and split into two quarters and one-half portions. The sample preparation took into account the top size of the sample material required for each of the analytical determinations following the MNS GB/T474:2015 standard. One of the quarter portions was used for analysis and the remaining portions were retained.

Coal samples were analysed for:

- True relative density MNS GB/T 217:2015
- Total moisture MNS ISO 589:2003
- Analytical moisture MNS GB/T 212:2015
- Ash MNS GB/T 212:2015
- Volatile matter MNS GB/T 212:2015
- Calorific value MNS ISO 1928:2009
- Total sulphur ASTM D4239:2005
- Crucible swelling number MNS ISO 501:2003
- Caking index MNS ISO 15585:2014

Rock samples were analysed for:

- True relative density MNS GB/T 217:2015
- Total moisture MNS ISO 589:2003
- Analytical moisture MNS GB/T 212:2015
- Ash MNS GB/T 212:2015
- Total sulphur ASTM D4239:2005
- Volatile matter MNS GB/T 212:2015

Under instruction from the Competent Person the coal quality data was checked for basic integrity, typing errors and poor data in general. Poor data was retested using residual sample material.

8.5.4 Accreditation

The ER Central Chemical Laboratory was accredited to ISO/IEC 17025:2017 (MNS ISO/IEC 17025:2018) standard in May 2012 and renewed in November 2020 which will expire in July 2023 without further renewal. Laboratory audits were completed in October 2010 and March 2012 by competent independent bodies to assure training, standards, and procedures were being met. These audits are described in the following section and the full reports appear in Appendix 12. Figure 8-5 is the current accreditation certificate provided from The Mongolian Accreditation System.

ИТГЭМЖЛЭЛИЙН ГЭРЧИЛГЭЭ

Дугаар TL 24-04

ISO/IEC 17025:2017 (MNS ISO/IEC 17025:2018)
стандартын шаардлагыг хангасан

"Энержи ресурс" ХХК-ийн
Өмнөговь аймгийн Ухаа худаг
дахь Тев лабораторийг

хэвлэлтэд зассан итгэмжлэлийн хүрээнд
сорилт гүйцэтгүүлэхээр итгэмжлэв

APAC

0000044

Figure 8-5: Laboratory Accreditation Certificate

(Source: MNAS)

8.6 Laboratory Inspection

Mr Ballantine assisted and then managed the setup of the ER Central Chemical Laboratory at UHG. All pit, stockpile, and core samples collected were analysed using the onsite laboratory.

8.6.1 Laboratory Inspection October 2010

The first audit was carried out between 12th and 14th October 2010 by John Snijders, QHSE Manager from Stewart Inspection and Analysis B.V. based in Rotterdam, the Netherlands, and part of the Stewart Group. John Snijders leads the quality team in the Netherlands which are ISO 17025 accredited on Solid Fuels by the Dutch Accreditation Council as from 27 June 2003.

The general results from the inspection follow and the whole report can be viewed in Appendix 12.

- *I was impressed by the structured way of working and documenting. If this lab should apply for an accreditation it would probably be certified with only some small adjustments which have to be made.*
- *The objectives as mentioned in the introduction can be concluded as follows:*
- *Procedures and manuals are present for all machines, ovens, scales and methods. These procedures have also been evaluated and found in accordance with the present standards.*
- *All procedures as set on paper are carried out as mentioned by the analysts. All is done in a very clean environment which is cleaned on a regular base by a special crew. Health & Safety is a big item in which everybody has to work with the rules set by Energy Resources LLC.*
- *Machines are not older than 2 years and therefore in perfect condition. All analysts have had sufficient training before performing analysis on their own.*
- *The packing of the taken samples outside and the open window in de preparation shed are the only majors which we can address while an analyses result can never be accurate is the sample is contaminated by outside influences.*
- *Therefore if we look back to the key objective we can say that with reference to our recommendations the quality level is already on a high level and would only be even better when our recommendations are followed up.*

8.6.2 Laboratory Inspection March 2012

The second audit was carried out between 12th and 13th March 2012 by Barry Drew, Project Manager with ALS Mongolia, located in Ulaanbaatar, Mongolia and ALS Coal Brisbane, located at Richland's, Australia.

The purpose of this visit was to evaluate the methods and quality system used at the laboratory in preparation for the upcoming application for 'ISO 17025' accreditation. This report will focus on the methods used at the Central Coal Laboratory. The key objective in this work was to provide ER with recommendations in order to improve their business practices and to help achieve their ISO17025 accreditation. Within this objective the following tasks were set up:

- Audit the existing procedures for sample preparation and analysis to the relevant standards.
- Audit the procedures against the actual work in progress.

The general results from the inspection follow and the whole report can be viewed in Appendix 12.

- *Work being performed at the Central Coal Laboratory was generally of excellent standard. I would like to thank all staff there, especially Mr Ganbat, Mrs Khantantuul and Mrs Temuulen whose assistance was much appreciated.*
- *I was most impressed with the dedication to accuracy and proper adherence to standard methods. The laboratory also has a well set out documentation layout which was examined and details provided in a separate audit.*
- *Staff was very friendly and it was a pleasure working with them.*

- *When this laboratory applies for accreditation, I have no doubt that it will most likely be certified with minor changes being required. If the work practices in the existing laboratory are carried over to the new site, Energy Resources will certainly have a high class facility for their quality testing.*

8.7 Reproducibility of Analyses between Laboratories

The following sections describe a duplicate sample testing program to compare the ER Central Chemical laboratory with other commercial laboratories. The comparison was updated from the the previous JORC (2012) Resource estimate – November 2014 report.

8.7.1 Database

ER Central Chemical Laboratory prepared and analysed a number of samples and submitted duplicates of these samples for analysis at the SGS Laboratory Mongolia branch in Ulaanbaatar. A total of 712 samples were sent and analysed for reproducibility analysis. The ER Central Chemical Laboratory analytical results were compared to the SGS laboratory by means of cross plots and basic statistical parameters tabulated in

Table 8-2 to 8-4.

8.7.2 Comparison of ER Central Chemical Laboratory and SGS laboratory results

The average, minimum and maximum values reported by the two laboratories for 100 samples are shown in Table 8-1. The average values and ranges of values compare as expected and both data sets show wide ranges in total sulphur values.

Table 8-1: ERCCL Laboratory and SGS Laboratory compared.

Analysis type	ER Central Chemical Laboratory			SGS		
	Av	Min	Max	Av	Min	Max
Moisture (ad)	0.7	0.2	15.0	0.8	0.2	9.5
Ash (d)	31.23	7.9	79.3	31.17	7.4	94.2
Volatile matter (d)	19.78	5.3	32.8	19.85	2.6	34.1
Total Sulfur (d)	0.8	0.0	9.4	0.8	0.0	5.3
Calorific Value (d)	5578	583	7859	5680	144	7925
True Relative Density (ad)	1.6	1.3	2.4	1.6	1.3	2.5
Free swelling index	2.6	0.0	9.0	2.5	0.0	8.5

**Note: Free Swelling Index (FSI) = Crucible Swelling Number (CSN)*

(Source: Adiya)

Table 8-2 shows the average values reported by the ER Central Chemical Laboratory, and the percentage point differences between the ER and SGS values. A negative average difference indicates that the ER values are higher, or over stated when compared to SGS values.

Table 8-2 shows that the ER values for analysis moisture, volatile matter, and calorific values were over stated and all the other parameter values were under stated when compared with the SGS results.

Table 8-2: Average ER Central Chemical Laboratory values and differences compared.

Analysis type	Average value	Average Difference	Minimum Difference	Maximum Difference
Moisture (ad)	0.7	-0.13	-0.03	5.42
Ash (d)	31.2	0.06	0.45	-14.88
Volatile matter (d)	19.8	-0.07	2.61	-1.29
Total Sulfur (d)	0.8	0.04	-0.01	4.14
Calorific Value (d)	5578	-102	439	-66
True Relative Density (ad)	1.6	0.02	0.02	-0.15
Free swelling index	2.6	0.10	0.00	0.50
*Negative difference = ER values lower				

**Note: Free Swelling Index (FSI) = Crucible Swelling Number (CSN)*

(Source: Adiya)

Various analytical standards list the limits of acceptable differences of analytical results between laboratories. For a comparison of the analytical results, the limits of acceptable differences between laboratories as shown in Table 8-3 were used (Queensland Coals, Physical and chemical properties and colliery and company information, 12th edition).

Table 8-3: Reproducibility limits between laboratories.

Analytical parameter	AS 1038	BS 1016	ISO	MNS GB/T
Ash (10-30%)	0.25	0.4	3% of average	0.3
Volatile matter (>10%)	1	1	0.5	0.3
Sulfur (<1.5%)	0.08	0.1	0.1	0.05
Calorific value	72	72	72	-
True relative density	0.03	-	-	0.04
CSN	1	1	1/2	-

**Note: Crucible Swelling Number (CSN) = Free Swelling Index (FSI)*

(Source: Adiya)

Note that these limits apply to certain ranges. Only ash values in the range 10 – 30 percent are compared, and values should be reproducible within 0.25 percentage points according to AS 1038.

Table 8-4 shows the percentages of the values that are within the acceptable limits of reproducibility of analyses between laboratories. In Table 8-4, the second column shows 'n', which indicate the number of samples that were used according to the applicable ranges shown in the first column. As an example, in Table 8-4 for ash values n = 397. This indicates that 397 of the 712 samples have ash between 10 and 30 percent, and that 56 percent, 72 percent, 74 percent, and 63 percent of the results are within the acceptable range of reproducibility defined by the three standards respectively.

In theory all the samples should fall within the limits of reproducibility. However, the relative results indicate a high level of confidence (say about 90 percent) for volatile matter and sulphur reproducibility and a moderate level of confidence (say about 80 percent) for ash and CSN reproducibility. The confidence in the reproducibility of the true relative density and calorific value is poor.

Table 8-4: Reproducibility of results between ER Central Chemical Laboratory and SGS Laboratory

Analytical parameter	n	AS 1038	BS 1016	ISO	MNS GB/T
Ash (10-30%)	397	56%	72%	74%	63%
Volatile matter (>10%)	707	91%	91%	91%	89%
Sulfur (<1.5%)	652	85%	95%	95%	73%
Calorific value	705	29%	29%	29%	-
True relative density	712	42%	-	-	54%
CSN	712	81%	81%	62%	-

**Note: Crucible Swelling Number (CSN) = Free Swelling Index (FSI)*

(Source: Pretorius)

8.7.2.1 Analysis moisture

Figure 8-6 shows a comparison of analysis moisture determinations. Analysis moisture is the moisture content (air-dry) of the coal sample at the time of the analysis.

The average analysis moisture value reported by ER Central Chemical Laboratory was 0.66 percent, and the SGS laboratory reported values that are on average 0.13 percentage points higher.

It can be expected that the reproducibility of analysis moisture values in different laboratories will vary according to the prevailing humidity conditions at the time of analysis. It is therefore necessary to compare the rest of the analyses on the same moisture level. In this exercise the coal quality parameters will be compared on a dry basis to exclude the effect of varying moisture content. The true relative density values were adjusted according to the Preston Sanders formula from an air-dry to a dry basis.

8.7.2.2 Ash

Figure 8-7 shows a comparison of ash determinations. The average ash value reported by ERCCL is 31.2 percent, and the SGS laboratory reported values that are on average 0.06 percentage points lower. Of the total number of samples, there were five samples that the SGS laboratory reported values that were more than 2 percentage points different from the ERCCL results.

8.7.2.3 Volatile matter

Figure 8-8 shows a comparison of volatile matter determinations. The average volatile matter value reported by ERCCL is 19.8 percent, and the SGS laboratory reported values that are on average 0.07 percentage points higher.

8.7.2.4 Total sulphur

Figure 8-9 shows a comparison of total sulphur determinations. The average sulphur value reported by the ERCCL Laboratory is 0.8 percent, and the SGS laboratory reported values that are on average 0.04 percentage points lower.

8.7.2.5 Calorific value

Figure 8-10 shows a comparison of calorific value determinations. The average calorific value reported by ERCCL was 5,578 cal/g, and the SGS laboratory reported values that are on average 102 cal/g higher. There are seven samples with differences between 1,000 and 6,000 cal/g.

8.7.2.6 True relative density

Figure 8-11 shows a comparison of true relative density determinations. The average true relative density value reported by ERCCL is 1.6, and the SGS laboratory reported values that are on average 0.02 percentage points lower.

8.7.2.7 Free Swelling Index (equivalent of CSN)

Figure 8-12 shows a comparison of CSN values. The average CSN reported by ERCCL is 2.6, and the SGS laboratory reported values that are on average 0.1 units lower.

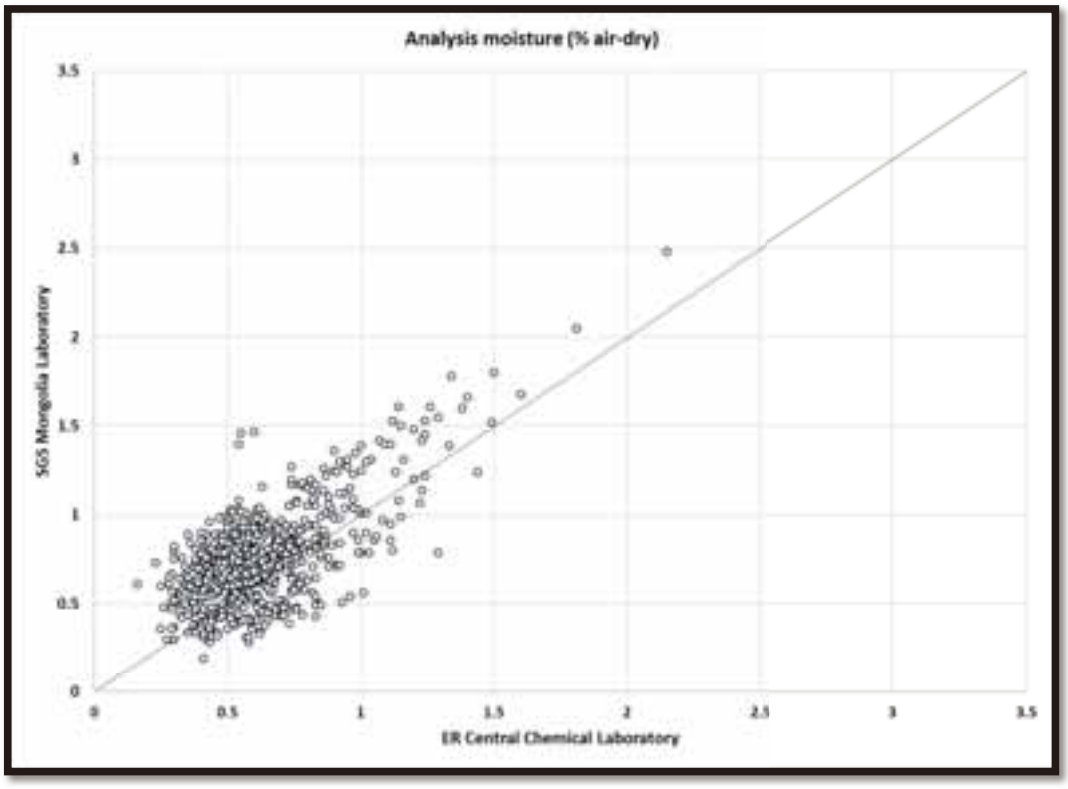


Figure 8-6: Comparison of analysis moisture determinations.

(Source: Adiya)

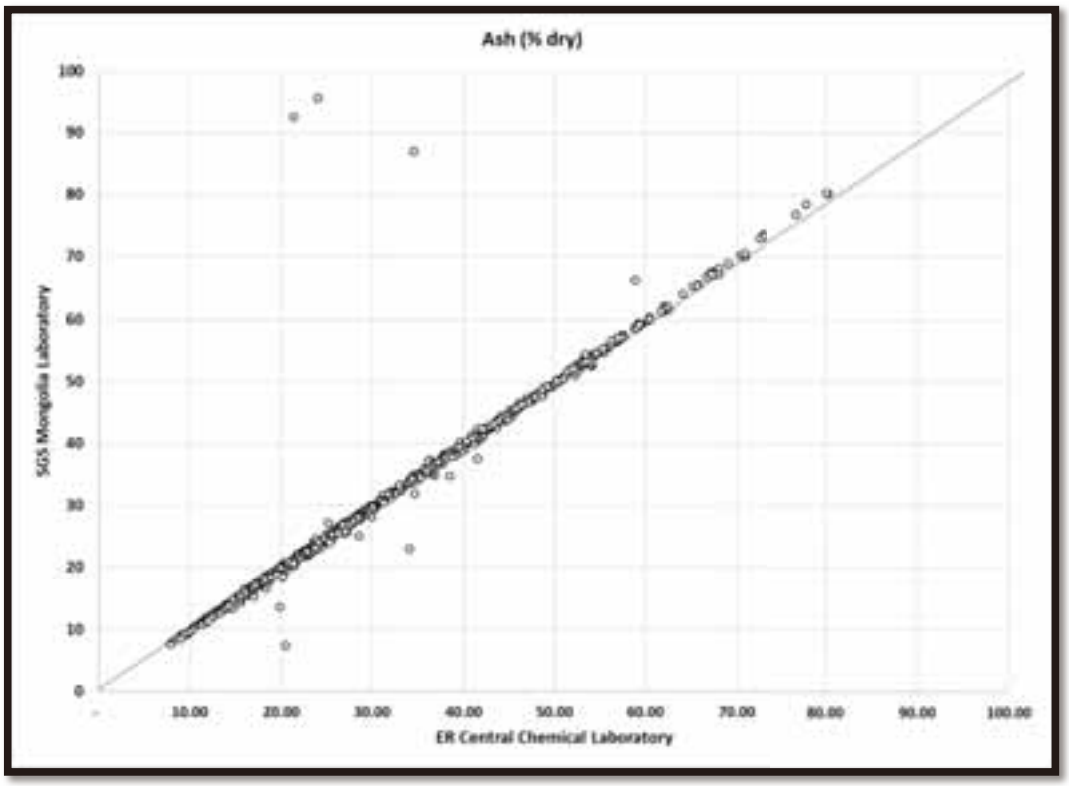


Figure 8-7: Comparison of ash determinations.

(Source: Adiya)

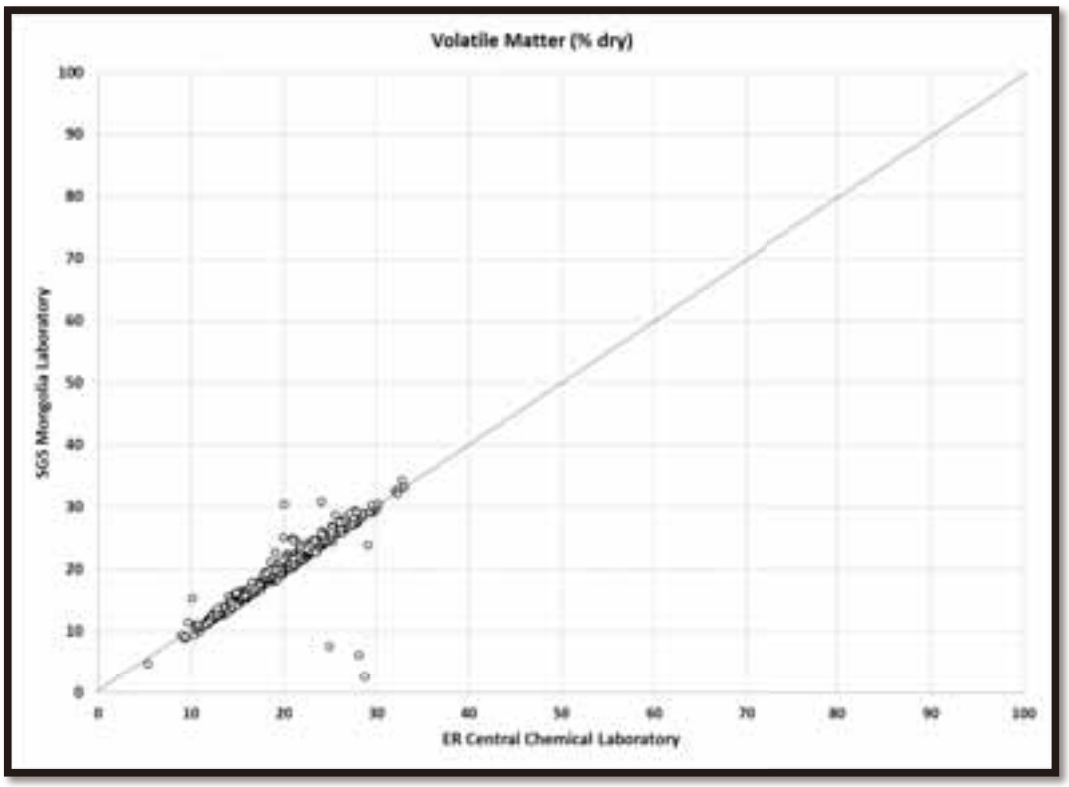


Figure 8-8: Comparison of volatile matter determinations.

(Source: Adiya)

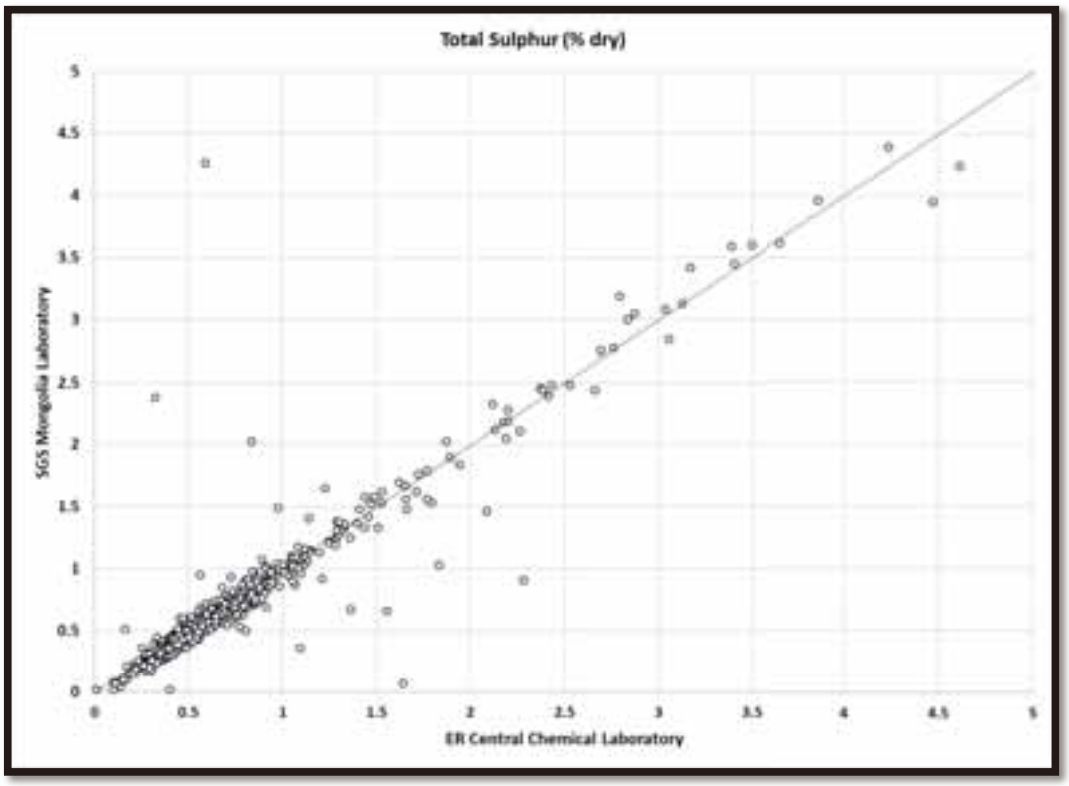


Figure 8-9: Comparison of total sulphur determinations.

(Source: Adiya)

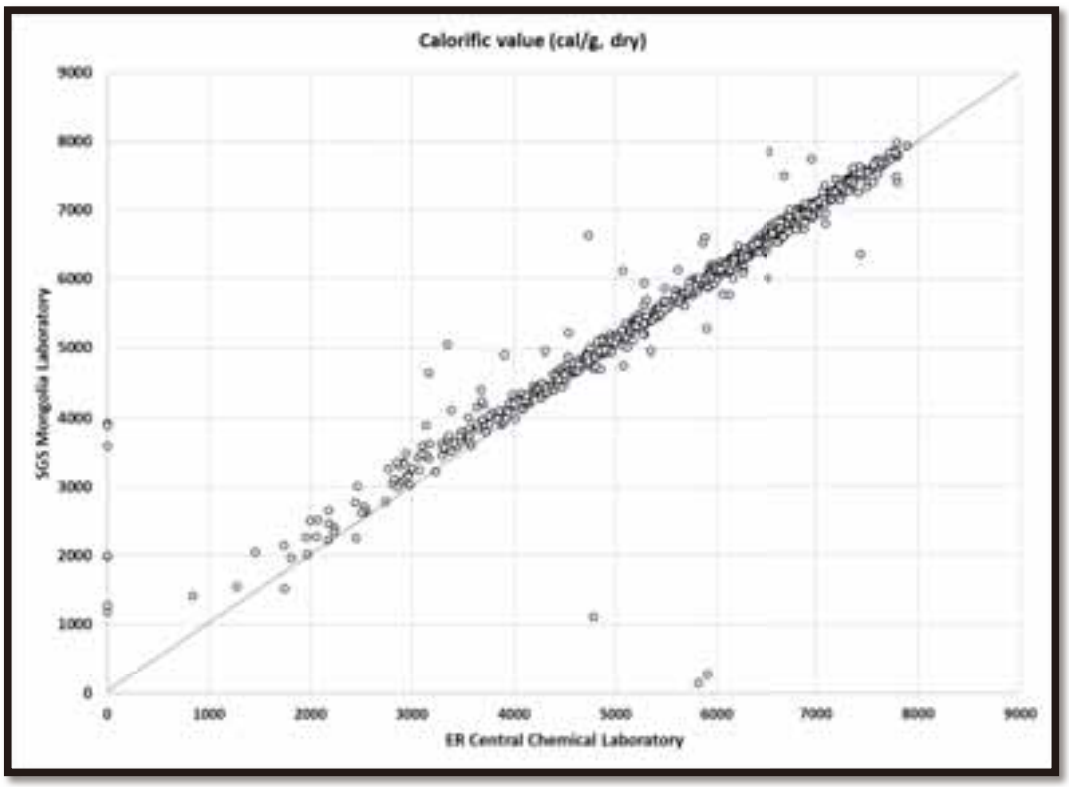


Figure 8-10: Comparison of calorific value determinations.

(Source: Adiya)

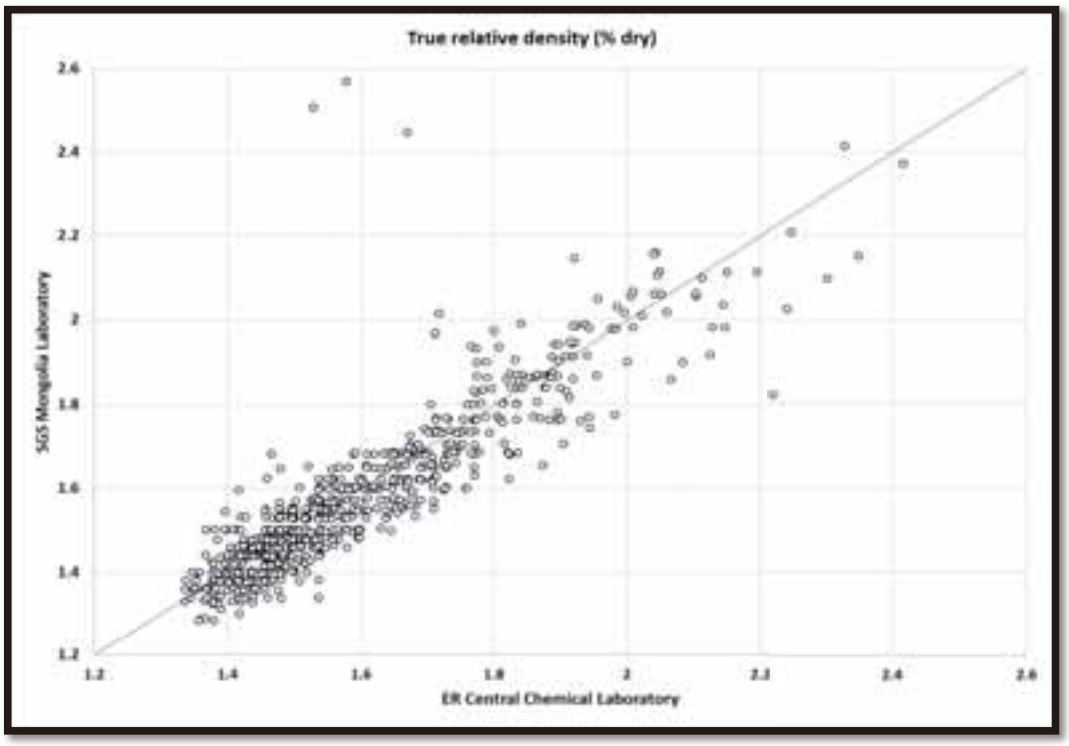
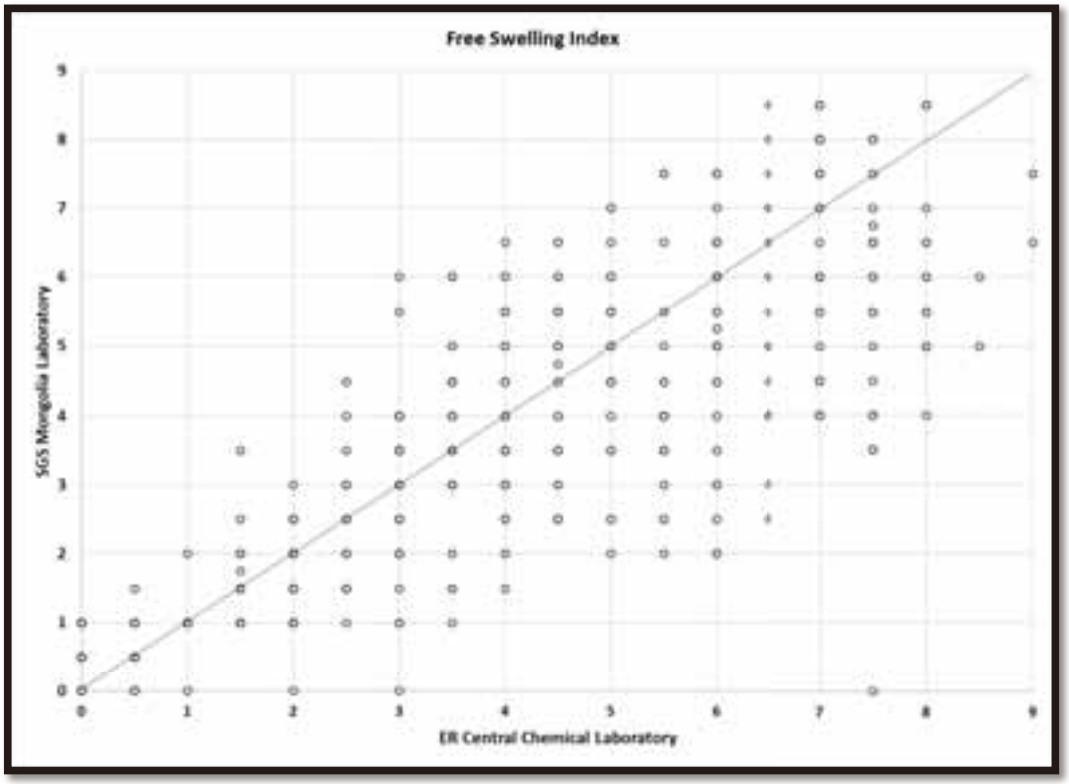


Figure 8-11: Comparison of true relative density values.

(Source: Adiya)



**Note: Free Swelling Index (FSI) = Crucible Swelling Number (CSN)*

Figure 8-12: Comparison of Free Swelling Index determinations.

(Source: Adiya)

8.7.3 Conclusions for reproducibility of analyses between labs

The ER Central Chemical Laboratory reported values are considered to be acceptable for the estimation of Coal Resources and Coal Quality.

Compared with the analytical results from the SGS Mongolia laboratory, the ER Central Chemical Laboratory reported on average:

- a lower volatile matter value (0.07 percentage points);
- a higher ash value (0.06 percentage points);
- a higher sulphur value (0.04 percentage points);
- a lower calorific value (102 cal/g);
- a lower true relative density (0.02 units);
- a higher CSN (0.1 units).

8.8 Point of Observation definition and calculation

Under the Competent Person authority, a point of observation (POO) has a very clear definition to allow it to be used as a valid data point for evaluation and modelling purposes.

A point of observation for this Resource Estimate for UHG was based on:

1. A complete lithology log for a borehole.
2. Complete LAS data including Caliper, Density, and Gamma as a minimum for a borehole.
3. Ability to cor1rect the lithology log to the LAS data using core photos and other data,
4. Seams/plies to be fully sampled including all stone partings.
5. Complete (and corrected) coal quality data set for seams drilled.
6. Equal to, or greater than 95 percent core recovery in coal seams deemed moderate to high potential coking coal and equal to, or greater than 90 percent core recovery in coal seams deemed, low potential coking coal.
7. Adequate easting, northing and relative level data for all borehole collars.
8. Adequate topography data for the project area covered by boreholes.

Normally the JORC Code and coal guideline mentions 95 percent or greater linear core recovery in coal. This mentioned figure is however a guideline, but it has been the experience of the Competent Person experience over many projects, where coking coal is involved, 95 percent linear core recovery or greater should be mandatory, while for thermal coal a 90 percent or greater linear core recovery is sufficient.

The reasoning for this is that coking coal has very bright and brittle macerals referred to as Vitrinite. It is this Vitrinite that holds the coking potential of the coal and is normally very low in Ash. It is also this Vitrinite that is mostly lost in the coring process, hence lowering the coking potential and also increasing Ash of the overall sample. Thermal coals tend to be duller and stronger coal and hence any minor loss does not affect the overall coal quality.

The Competent Person determined the acceptable linear core recovery for a point of observation based on the potential for coking coal (Figure 5-36) is shown in Table 8-5.

Table 8-5: Core recovery limit per seam

Seam Group	Coking potential	Core Recovery limit
12	Medium	≥95
11	Medium	≥95
10	Medium	≥95
9	High	≥95
8	Medium	≥95
7	High	≥95
6	High	≥95
5	Medium	≥95
4C	High	≥95
4B	High	≥95
4A10-20	Medium	≥95
4A	High	≥95
3A	High	≥95
25-0D	Medium	≥95
0CU	Medium	≥95
0CL	Medium	≥95
0BR	Low	≥90
0B	Low	≥90
0A	Low	≥90

(Source: Energy Resources LLC)

8.9 Use of Conditional Simulation Geostatistics to determine the expected error of estimation as an aid in the understanding of confidence in the classification categories.

Under the newly released 'Australian Guidelines for the Estimation and Classification of Coal Resources' 2014 edition (The Guidelines), which JORC (2012) refers to, it is expected that the Competent Person provides an estimate of confidence in the classification categories used. The Guidelines provide a number of geostatistical methods that can be used to aid the estimation and classification of coal resources.

Once the geological data has been collected, corrected and finally reported in accordance with the JORC Code, an understanding is required on expected error in the estimate so reliable spatial influences for classification categories can be determined. This step estimates the cumulative error of all the processes involved in the JORC Resource estimate. These include geological procedures, geological capability in following those procedures, drilling, sampling, laboratory and modelling/reporting errors.

The result will be an expected error for each parameter used, so it is important that parameters critical to the estimate are selected. Geostatistical techniques can be very computationally intensive and are very dependent on data spacing and the number of data points. The use of variograms in geostatistics is a critical step but, their interpretation can be more art than science. It is important to recognise geostatistical techniques can have limitations but are also, a very good aid in checking category classification limits are realistic and sensible.

The approach undertaken for this report was to take the seam with the greatest number of data points by area that formed a consistent seam (limited splitting/merging), Seam 4C. This assumes that all seams were laid down under similar environmental conditions and have had a similar tectonic history so can be expected to have a similar variability to Seam 4C. In addition, volume and tonnage are critical values for any in-situ estimate; the parameters focused on were seam thickness (volume), total moisture (tonnage), relative density (tonnage) and ash (tonnage).

Mr Ballantine having experience in this type of evaluation undertook the study with each step supervised by the Competent Person. Mr Brett Larkin (GeoCheck Pty Ltd), who has a Masters in Geostatistics from Stanford University, provided expert guidance and advice, in particular, the variogram interpretation. The technique used was Sequential Gaussian Simulation.

The software used was SGeMS, version 2.5b, which is Stanford geostatistical modelling software.

The method used is described in the following steps:

- Data preparation and import into SGeMS;
- Data analysis and domaining;
- Checking for anisotropy;
- Histogram transformation;
- Grid creation;
- Omnidirectional variogram interpretation on resulting transformation (due to no discernible anisotropy);
- Sequential Gaussian Simulations (500 simulations);
- Checking results of simulations;
- Data masking;
- Calculating e-type average;
- Calculating expected error at 95 percent confidence for drill hole spacing from 50m to 1000m in 50m increments;
- Taking the simulated results for seam thickness (volume) and relative density, and average the results to calculate another simulated result; and
- Calculating ‘loss’ factor (maximum error) for each category.

The results are illustrated in Figure 8-13. The associated variograms are shown in Appendix 24.

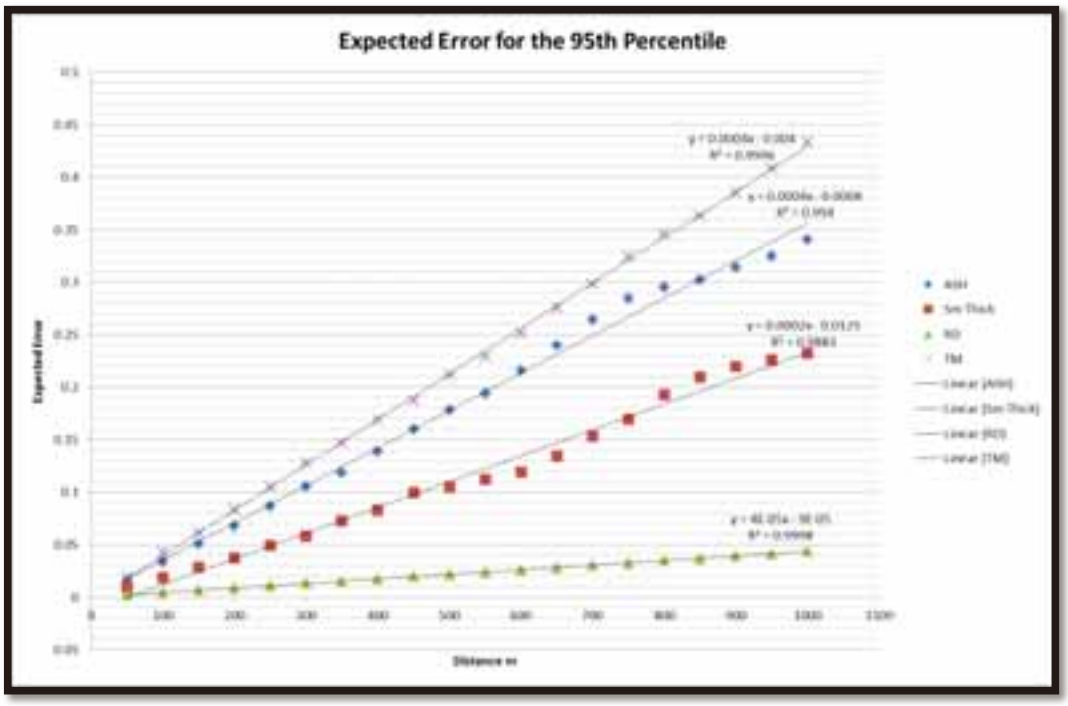


Figure 8-13: Expected error for seam 4C for the 95th Percentile

The total moisture proved to have the greatest expected error and relative density the least expected error. This followed logic as free moisture in the field whilst collecting coal samples is an area of high inaccuracy due to numerous outside influences. Relative density is a reasonably reliable and repeatable test so should have less variability. Seam thickness also gave a good result which makes sense as seam thickness is corrected against downhole geophysics minimising observational and procedural error. Ash has the second highest error and would follow that it has a number of sources of error greater than seam thickness and relative density.

Once the expected error is reasonably known, the issue becomes how to use it. The Guidelines removed the suggested recommended maximum distances as they proved to be confusing due to critical variables differ between deposits and how these variables vary in space will differ between deposits. As stated by the Guidelines *'By removing suggested maximum distances between points of observation for each confidence category in the Coal Guidelines, the responsibility is placed back with the Competent Person to determine the criteria for classification'*. Using expected error as a guide for spatial control for categories and not just arbitrary ('gut feel') measurements, there becomes a more consistent and empirical way of determining spatial control.

Mr Mark Biggs (ROM Resources), a very senior and well respected coal geologist and a member of the committee revising the Australian Coal Guidelines, produced a graph of expect error and resource classification for an early draft of the Guidelines (Biggs 2013). It represents the culmination of results of approximately 50 projects that he had recently worked on, with the resulting expected error and associated resource classification (refer Figure 8-14). This can be used as a guide in justifying expected error results and spatial limits on resource classifications. The focus of this study is on the Measured and Indicated categories only, as these are the categories converted to Reserves requiring the highest confidence. The Inferred category was

decided by the Competent Person that not only the expected error was an influence but also the broader geological continuity needed to be taken into consideration.

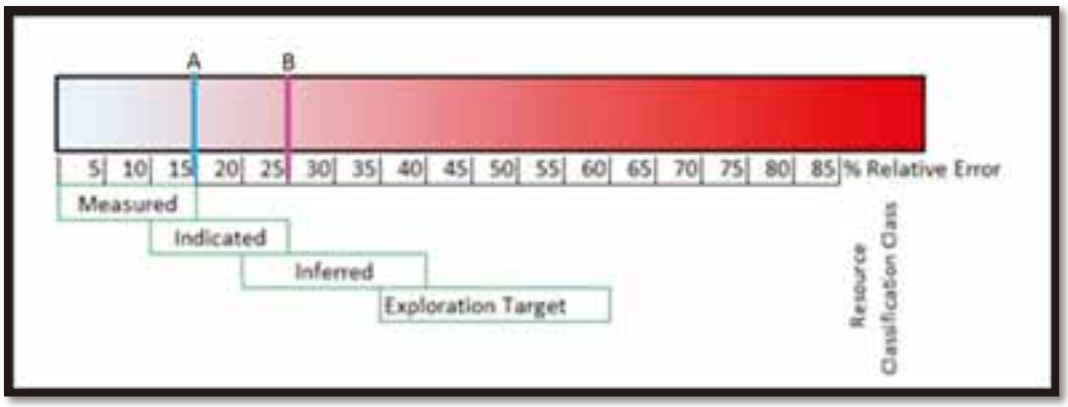


Figure 8-14: Biggs 2013 expected error

Referring to Figure 8-14, at point (A), this represents 15 percent error and is the maximum error for the Measured category. The location at point (B) represents 25 percent error and is the maximum error for the Indicated category. The values in Figure 8-14 at points (A) and (B) were used as guides to compare with the category distances being applied to the UHG model. The results of expected error at the 95th percentile with the corresponding probabilities at points (A) and (B) from Figure 8-14 is shown in Figure 8-15.

It was observed in Figure 8-15 that the corresponding point (A) matches well with the Measured category distance of 350m, point (C). In the corresponding point (B), the Indicated category distance of 700m, point (D), meets all variables except total moisture. Since for high rank Coal Measures, moisture is a small component (average 3 percent) of the total material then this distance is acceptable.

The Inferred category was not determined using this method as the narrow dimensions in the west of the deposit may impact the result as a variogram can only be inferred about half the distance of the data points. The Inferred category was reduced to 1,500 m data spacing and in most cases is truncated by the deposit boundary well before the limit.

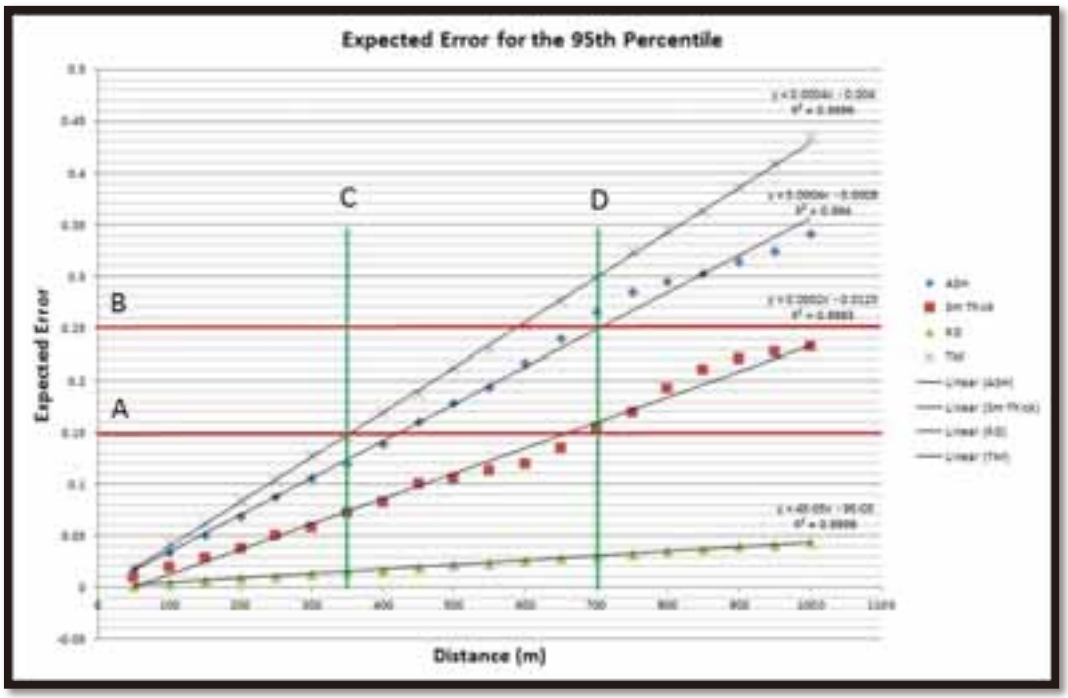


Figure 8-15: resulting category distances from expected error for seam 4C

It is important to note, total moisture is the absolute maximum for expected error at the 95 percent level of confidence and the other variables are less than the maximum. The 'average' of the errors could be used but, care is required as there is a question of whether averaging the errors makes sense. This comes back to what is referred to as a 'loss' function for each variable. Essentially this is an estimate of how much it will impact the result if a variable is in error, as a function of the error, in that variable.

Investigating the 'loss' function is a way of determining maximum overall error for the category result. Since the result of most interest in a resource statement is the tonnage and tonnage is 'area' multiplied by 'volume' multiplied by 'relative density'. If the 'area' can be assumed to have no error (high quality precision survey) then only the expected error for 'volume' (seam thickness) and 'relative density' needs to be investigated. One approach could be just averaging the resulting expected error curves in Figure 8-15 however, a better method is to average the simulated realisations for 'volume' (seam thickness) and 'relative density' and calculate a resulting set of realisations. From this a new curve for expected error can be determined. The result of this exercise is found in Figure 8-16.

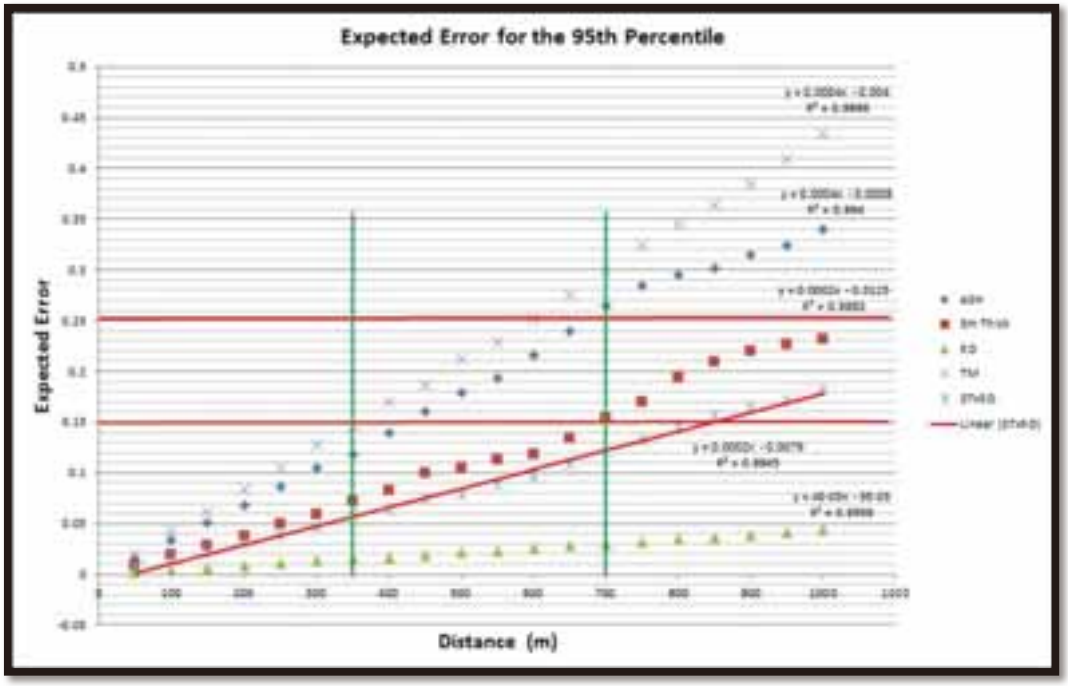


Figure 8-16: resulting category distances from expected error for seam 4C with 'loss' factor

It is noted from Figure 8-16 that the maximum expected error for the Measured category result is 6 percent and for the Indicated category result is 12 percent. For interest, using the regression for 'loss' factor and applying it to the Inferred category distance the maximum expected error is 30 percent. All of the resource category maximum error numbers fit well within the ranges suggested in Figure 8-14.

Using expected error to determine spatial category requirement and then calculating resulting maximum error has been a good exercise in determining confidence. It is recommended that this should now be expanded to the other major seam groups to compare with the assumption made for Seam 4C.

9 Resource Estimation Methodology

The method used for estimating Resources at UHG involved modelling an elevation grid for the major ply, 0AL, and modelling thickness grids for the other plies and partings. These thickness grids for the plies and partings were then stacked on top or below of the elevation grid to form a 3D block model.

To create an accurate and reliable 3D model of the coal seams a kriging algorithm with semivariogram modelling for the seam elevation and thickness was used. Kriging is a geostatistical gridding method for constructing a minimum-error-variance linear estimate at a location where the true value is unknown. This method produces accurate maps from irregularly spaced data, such as coal seam elevation points. Kriging attempts to model trends suggested in the data, so that, for example, low points might be connected along the bottom of the basin rather than isolated by bull's-eye type contours. Kriging is a very flexible gridding method that can be custom-fitted to any data set by specifying the appropriate semivariogram model. Kriging incorporates anisotropy and underlying trends.

9.1 Software Used

The UHG Resource estimate was carried out using Micromine's Version 2021.5 and LogCheck Version 7.277 using the COALLOG geology data format as the database.

9.2 Database Compilation

The points of observation data were supplied by the Competent Person (Appendix 4a & 4b) in LogCheck format and a summary of the data is shown in Table 9-1. The exploration licence coordinates were supplied by the Competent Person (Appendix 1).

Table 9-1: Summary of Points of Observation File

Data Type	Number of Records
Collars	2022
Intervals for modeling seam morphology	29669
Intervals for modeling coal quality	19131
Points for modeling base of weathering	1546
Points for modeling Quatermary Surface	1493

(Source: Energy Resources LLC)

9.3 Data Validation

The raw data was collected under the full supervision of the Competent Person, following the procedures in Appendix 2.

Following initial modelling, a review of the seam correlation was undertaken. Numerous boreholes and parts of boreholes were found to show anomalous thickness

and elevations. This was due to faulting so these plies were removed from the resource estimate. A list of these plies is shown in Appendix 17. The final validated data is shown in Table 9-2.

Table 9-2: Summary of data used for Resource Estimate

Data Type	Number of Records
Collars	1,847
Intervals for modeling seam morphology	18,171
Intervals for modeling coal quality	16,995
Points for modeling high weathering	1,901
Points for modeling base of weathering	2,022
Points for modeling Quaternary Surface	1,614

(Source: Energy Resources LLC)

9.4 Exploratory Data Analysis

The summary statistics for all of the coal quality values is shown on an as-received and air-dry basis respectively in Table 9-3 and Table 9-4.

Table 9-3: Summary statistics for As-Received Coal Quality

As-Received STATISTCS	RD (g/cc)	TM	Ash	VM	FC	Gross CV	S
		%	%	%	%	(Kcal/kg)	%
MINIMUM	0.7	0.3	3.76	0	0	0	0
MAXIMUM	3.6	59.5	93.1	41.17	77.01	9524	32.85
NUMBER OF POINTS	43,711	43,711	43,711	43,711	43,711	43,711	43,711
MEAN	1.56	3.1	32.2	17.55	45.23	5217	0.62
VARIANCE	0.17	9.02	678.03	40.48	463.89	7070777.8	2.8
STD DEVIATION	0.42	3	26.03	6.36	21.53	2659.09	1.67

(Source: Energy Resources LLC)

Table 9-4: Summary statistics for Air-Dry Coal Quality

Air-Dry STATISTCS	RD (g/cc)	IM	Ash	VM	FC	Gross CV	S
		%	%	%	%	(Kcal/kg)	%
MINIMUM	0.95	0	3.80	0	0	0	0
MAXIMUM	3.58	20.70	98.10	41.30	79.10	9650	33.67
NUMBER OF POINTS	43,711	43,711	43,711	43,711	43,711	43,711	43,711
MEAN	1.60	0.80	33.10	18.00	46.70	5378	0.64
VARIANCE	0.18	0.63	714.71	43.25	489.65	7488755.82	2.95
STD DEVIATION	0.43	0.79	26.73	6.57	22.12	2736.55	1.71

(Source: Energy Resources LLC)

9.5 Data Processing

To create the block model an elevation grid was created for the major lower ply 0AL and then the thickness grids for the other plies and partings were stacked above or below this as required. In order to use this method each borehole needed to contain an

interval for each ply and parting even if the ply or parting was 'pinched out' and was not intersected by that borehole.

Some plies were not intersected by the boreholes and so ‘virtual’ plies with a thickness of zero were inserted in order to model the seam morphology. The location of these virtual plies was determined by using the MICROMINE extrapolation tool, which uses Inverse Distance Weighting with a power of two.

This is shown in the example in Figure 9-1 where the temporary grids for all plies under ply 3AL have been interpolated for borehole S00930 as per the seam hierarchy. Where boreholes intercepted plies, but these plies were not present due to deterioration as a result of changing sedimentary environments, these plies were inserted as zero thickness plies at the roof or floor of a logged ply as indicated in borehole G00106.

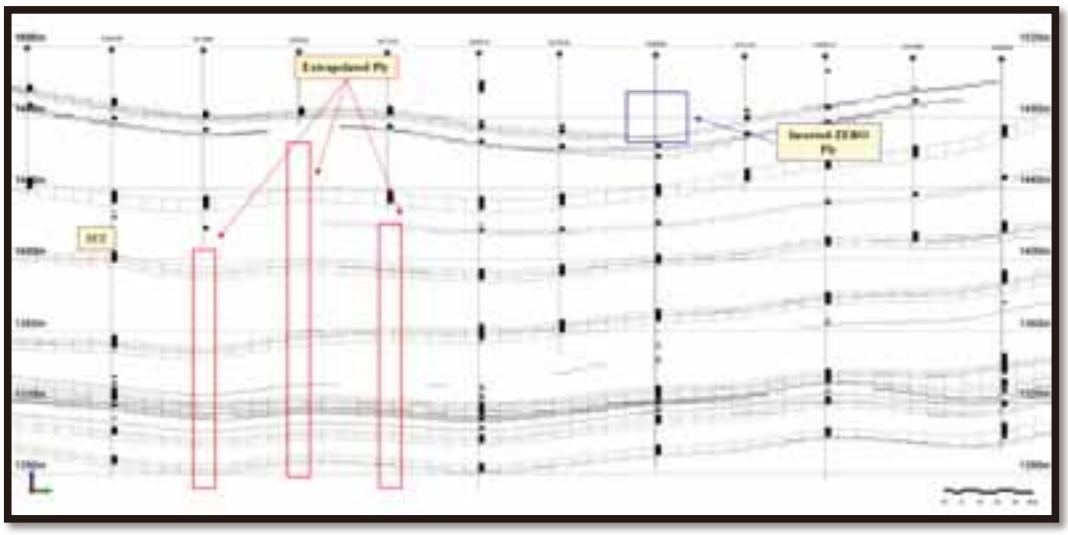


Figure 9-1: Interpolated virtual plies

(Source: Energy Resources LLC)

Virtual plies inserted into the database by temporary grids, or zero thickness plies above and below existing plies, are contained in Appendix 18

Stone parting intervals were logged in the raw database, but where they were missing they were added to all ply groups for each borehole even in cases where the parting thickness was zero.

As a result of this processing, each borehole contained intervals for all plies and all stone partings.

9.6 Model Geostatistics

The purpose of geostatistical analysis was to generate a series of semivariograms that could be used as the input weighting mechanism for the Kriging algorithm. To be able to conduct reliable geostatistical analysis there is a requirement to have sufficient number of points.

The structure is divided into 5 zones (SFZ, CZ, NFZ_1, NFZ_2, NFZ_3) to create a more accurate model.

As such, ply 0AL was used for geostatistical analysis as it was intersected by the largest number of boreholes and is the most consistent ply across the area. The

omnidirectional semivariogram for the mid-point elevation of ply 0AL is shown in Figure 9-2.

Figure 9-2: Omnidirectional Semivariogram for Elevation of ply 0AL

(Source: Energy Resources LLC)

Figure 9-3: Omnidirectional Semivariogram for Thickness of ply 0AL

(Source: Energy Resources LLC)

When the kriging algorithm was used, the weights of the values on the distances beyond semivariogram range were minimal if the semivariogram was modelled using spherical, exponential or Gaussian models. Therefore the general linear model was used to model the semivariograms for the seam elevations and thicknesses. Using this method, all of the values within the search ellipse will have some weight and hence used for the block estimation.

9.7 Gridding

In order to create a reliable model of the seam morphology a cell size of 10x10m was selected for gridding. Gridding with exact interpolation using ordinary kriging was used to generate grids for the elevation of the mid-point of the plies and Kriging with a omnidirectional semivarigram was used to generate grids for the thicknesses of the plies. Exact interpolation will honour data points exactly only when the data point falls directly in the grid cell being interpolated. With kriging this means that the coincident data point carries a weight of essentially one and all other data points carry a weight of essentially zero. This means that if the intersection of the borehole and the ply falls within the interpolated cell, then this cell is populated with the value of that point.

The structure is divided into 5 zones (SFZ, CZ, NFZ_1, NFZ_2, NFZ_3) to create a more accurate model is shown in Figure 9-5.

To allow the grids to cover the necessary areas, a circular search radius of 10,000m with maximum of 12 points was used to create the elevation grids. The five structure zones elevation grids for the reference ply 0AL is shown in Figure 9-5 together with the data points used to make the grid. The thickness grids were created using a circular search radius of 10,000m with maximum of 12 points per sector.

The base of Quaternary grid was produced using IDW with a power of two search radius of 500m with maximum of 4 points per sector.

The extremely weathering grid was produced using IDW with a power of two search radius of 500m with maximum of 4 points per sector.

The base of weathering grid was produced using IDW with search radius of 500m with maximum of 4 points per sector. The base of weathering grid was used in conjunction with mapped LOX lines as the upper most cut-off for coking coal.

Weathered coal can be calculated between the base of weathering and extremely weathering grid. This coal has been successfully mined and used for the onsite PowerStation feed as well as commercial sold as Thermal coal. For the purpose of this resource estimate it has been included in the estimate but should be noted that it is a lower quality material.

A Topography surface grid was produced using Implicit model. This was then converted into a digital terrain (DTM) model.

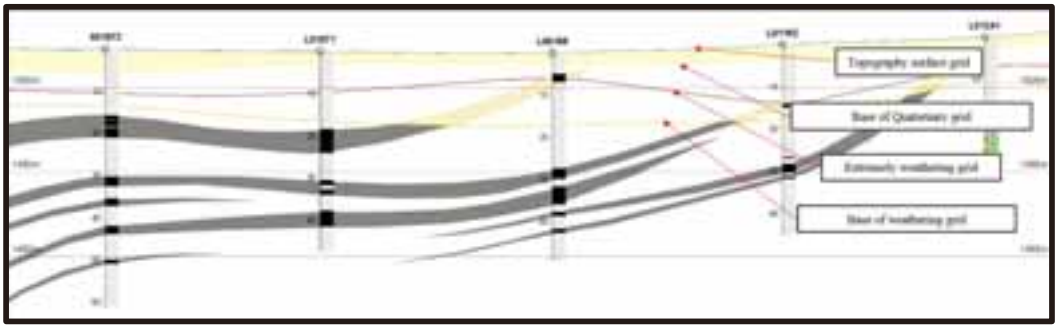


Figure 9-4: Five Example of all surface grids (section) with boreholes

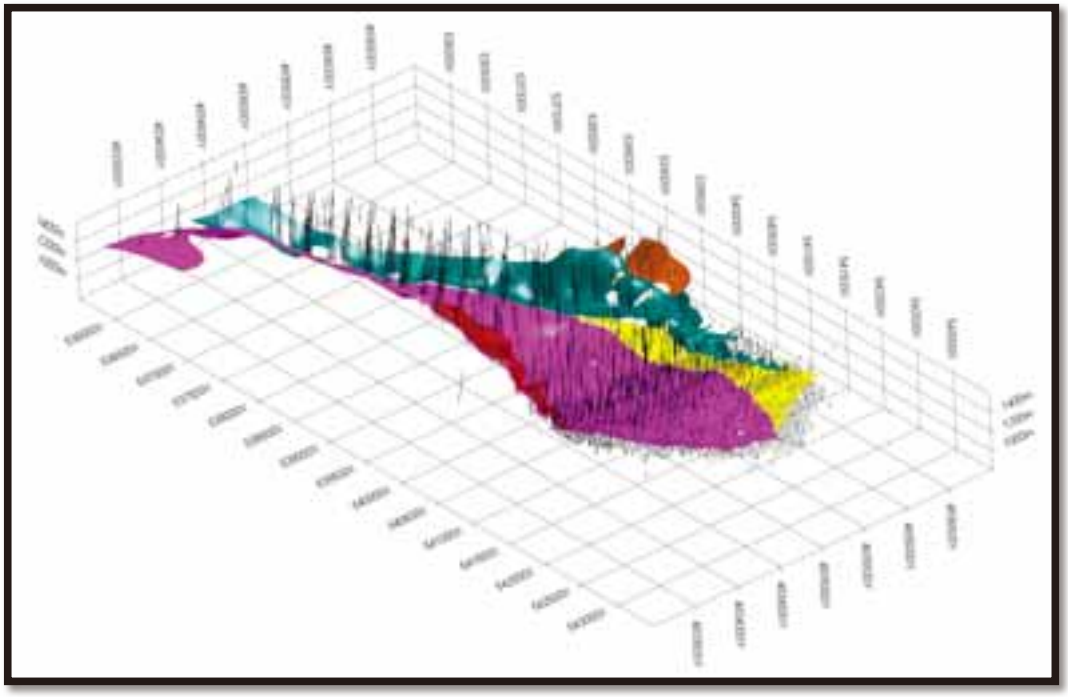


Figure 9-5: Five Structure zone elevation grid for 0AL ply (looking northwest) with boreholes

(Source: Energy Resources LLC)

9.8 Block Modelling

The 3D gridded seam block model was generated by stacking thickness grids on top or below of the major ply (0AL) elevation grid. The centroid of the block East and North was the X and Y values from the grid file which was 10x10m (grid cell size), the centroid of the block RL was the Z value from the elevation grid and block size by RL was the Z value from thickness grids.

Once the block model was created any blocks above the modelled base of extremely weathering surface were removed.

The block model was limited by the extremely weathering where they were determined, the northern and southern fault boundaries, the license boundary and the current mine plan as at the 31st December 2021. Figure 9-6 shows the limits of all seam.

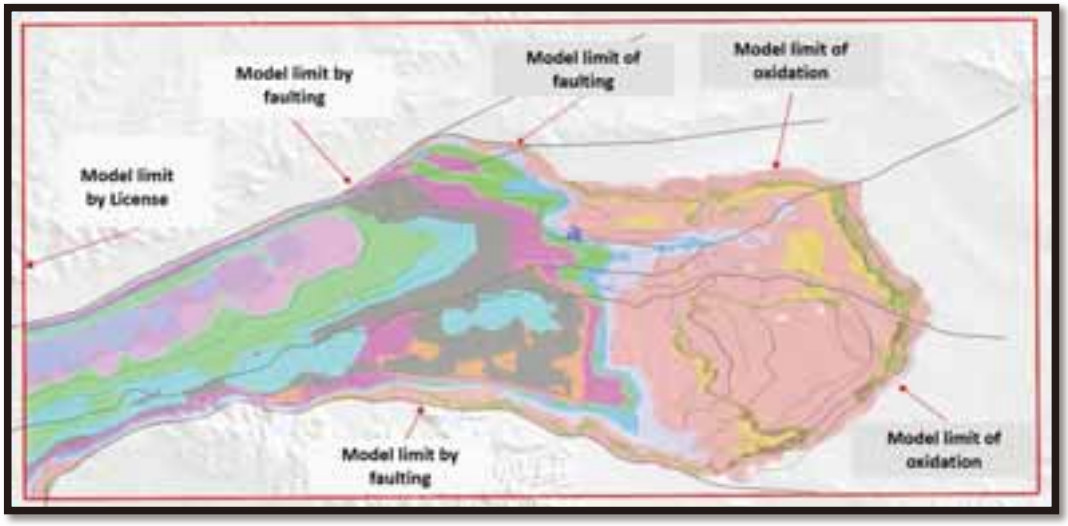


Figure 9-6: Model limits for all seam

(Source: Energy Resources LLC)

The northern and southern boundaries are fault boundaries. Norwest in the 2008 Resource Estimate initially used the geology maps compiled by Dashkhorol et.al., from the 1989 work and simply applied the fault contact with a vertical limit. For the 2012 Resource Estimate the seismic profiles were immensely useful in determining a more accurate surface limit and shape, however, from this work there was no real evidence of the angle of the contact. The Competent Person responsible for the 2012 resource estimate used a more conservative limit of 80 degrees inward dipping into the project area.

During the period 2018, 2020 covering this report, mining had opened up the pit sufficiently that detailed face-wall mapping was able to clearly observe and measure this contact. In addition, four boreholes (G02603, G02611, G02638 and G02619A) were planned for a structure and geotechnical review for the resource estimate, which provided further information on the contact and continuity to the west of the pit. Figure 9-7 graphically displays a borehole section through the contact and the corresponding face-wall mapping of the same contact. The contact is found to be overturned syncline the coal measures at an average angle of approximately 50-54 degrees.

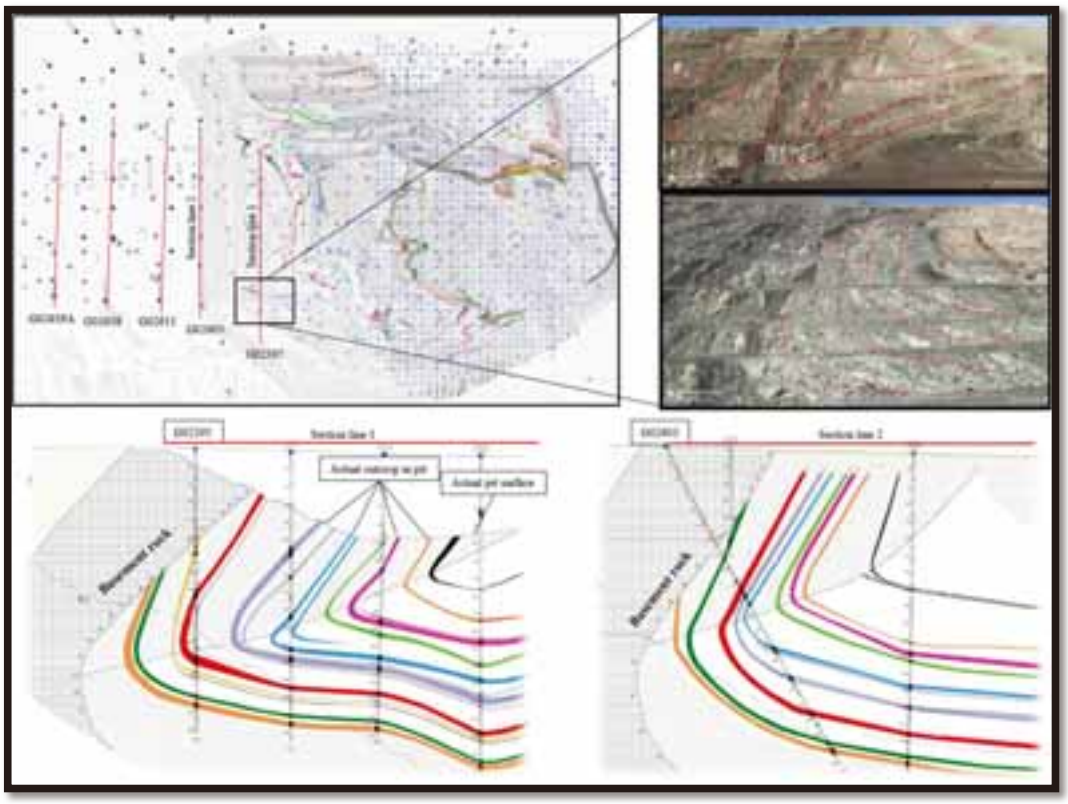


Figure 9-7: Basement contact with coal measure

The final boundary which limited the block model was constructed by digitising the surface boundary of the fault contact between the basement and the coal measure on the 2D seismic profiles and then using the face-wall mapping and borehole information on the contact angle of basement and coal measure to create a wireframe to form a 3D shape. Once the block model was created it was cut by this wireframe to provide the final shape for the block model (Figure 9-8).

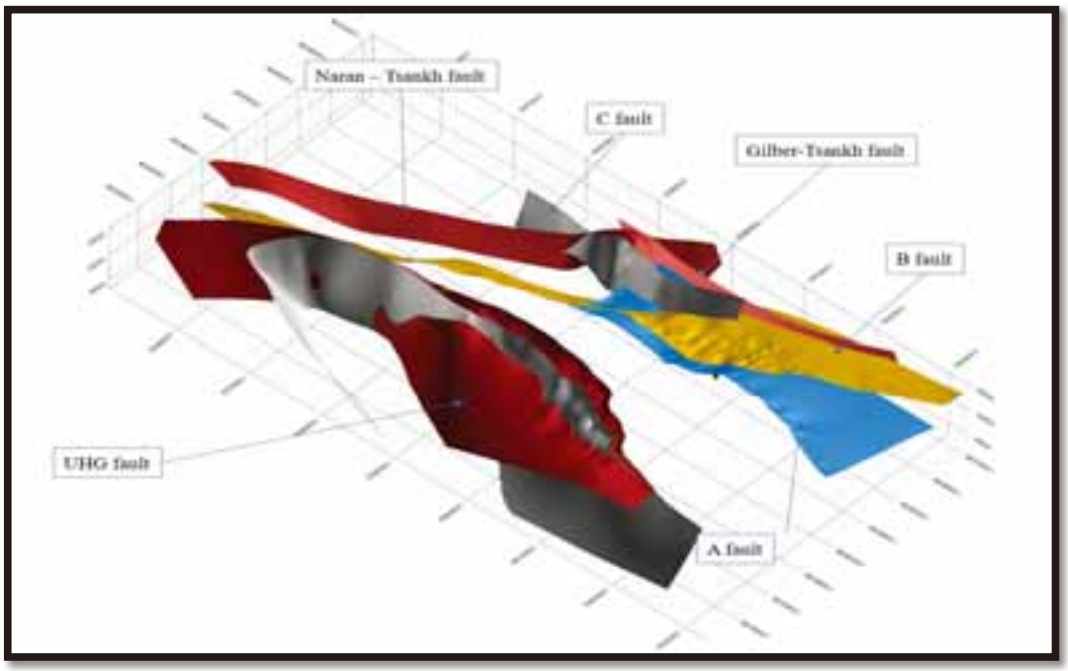


Figure 9-8: Wireframe constructed from 2D Seismic profiles, face-wall mapping and boreholes to limit the northern and southern boundary faults.

(Source: Energy Resources LLC)

The resulting block model which was used for structure zones is shown in Figure 9-9.

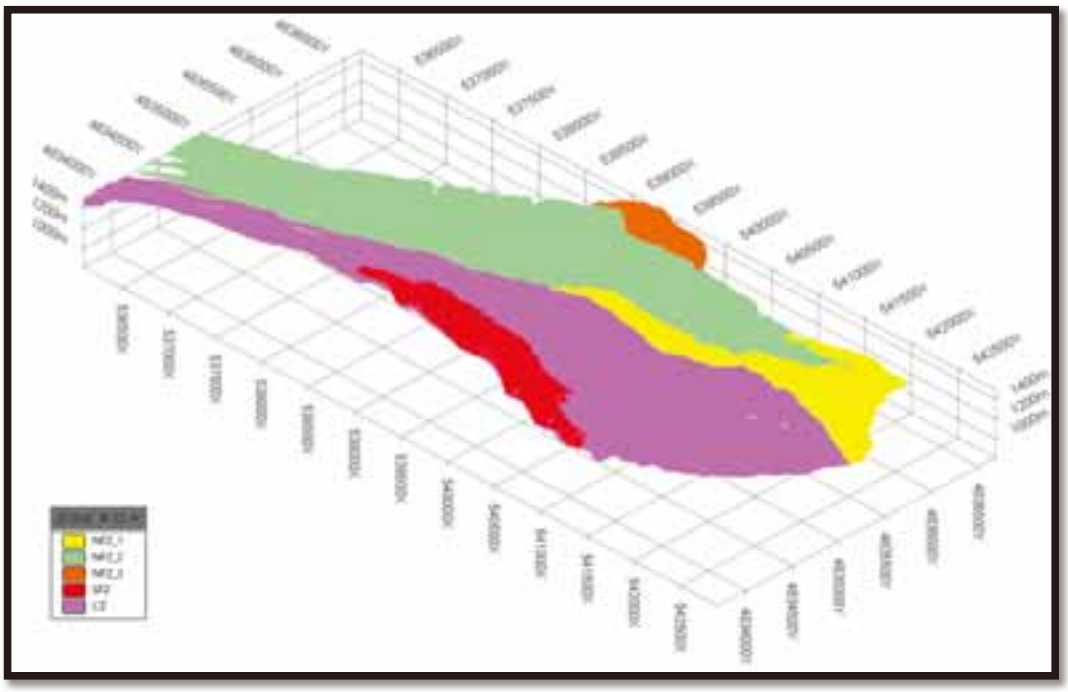


Figure 9-9: Block Model (looking northwest) for each structure zones

(Source: Energy Resources LLC)

The resulting final block model (depleted by pit of 31st December 2021) which was used for the resource estimation and seam coding is shown in Figure 9-10.

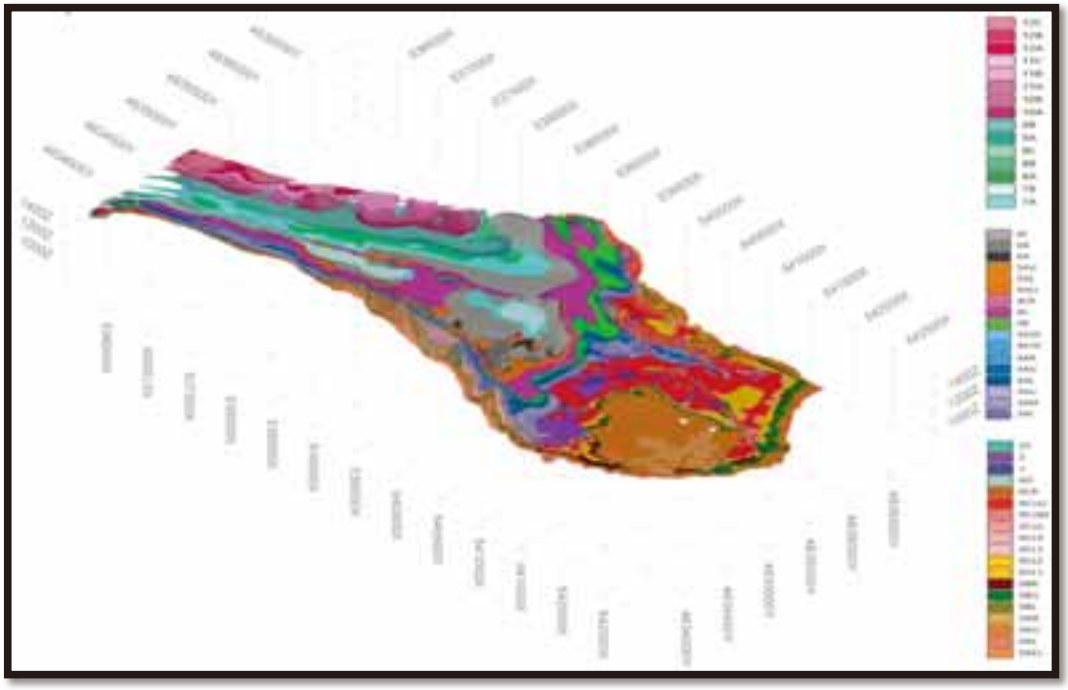


Figure 9-10: Final Block Model (looking northwest) for each ply
(Source: Energy Resources LLC)

9.9 Resource Classification, Seam Coding and Grade Interpolation

The JORC Code and the Guidelines make no recommendations for Resource classifications and place the responsibility with the Competent Person to determine the criteria for classification.

The Competent Person for this estimate used the expected error in the estimate to support distances for Measured and Indicated categories. For Inferred category the narrow dimensions of the deposit may cause a misleading result using the expected error technique so the experience of the Competent Person and detailed knowledge of the deposit were sufficient for determining this category spacing.

In determining extrapolation beyond last data points, half the category distance was applied. Due to the data spacing and deposit dimensions this did not have a major affect.

The shapes for the categories was mostly automated with the Micromine software, however where this case was not true the edge of the data was manually edited by the Competent Person. In addition, due to major structure some areas were hard-wired for specific categories like Inferred and data spacing had no influence. The general approach adopted for the calculation of resources for UHG follows:

1. **Measured** resources were estimated with points of observation at 350m and where appropriate were extrapolated half the distance from the last point.
2. **Indicated** resources were estimated with points of observation at 700m and where appropriate were extrapolated half the distance from the last point.
3. **Inferred** resources were estimated with points of observation at 1500m and where appropriate were extrapolated half the distance from the last point.

The resulting resource category areas are contained in Appendix 19.

Seam coding was applied to composite plies into seams based upon a specified minimum coal thickness and a maximum parting thickness. The seams were also coded on the basis of resource classification so that only plies of the same resource classification were combined together with their partings. The following modifying factors were used for seam coding:

- No maximum seam thickness;
- Minimum seam thickness to be included in the Resource of 0.5m to 400m depth and then 1.5m below 400m;
- Maximum parting thickness to be included in the Resource of 0.5m; and
- Coal Quality limit with Ash content greater than 50 percent (DRY basis) being excluded from the resource estimate.

Following seam coding, coal quality interpolation was carried out. Only intervals that were marked as a point of observation were used for coal quality interpolation. An IDW algorithm with a power of three was used to interpolate the coal quality into the empty block model.

Coal quality interpolation was conducted for each ply separately. One search run at 7,000m radius was used to interpolate all the blocks in each model. Filters were applied to make sure that only points of observation for the selected ply were used for the interpolation of the blocks for that ply.

Partings within the model limits but without coal quality were given default coal quality parameters based on rock quality analyses. The default values used on an air-dry and as-received basis are shown in Table 9-5.

Table 9-5: Default coal quality values for partings

Air Dry		As Received	
RD	2.55	RD	2.46
IM	1.13	TM	2.46
ASH	93.28	ASH	92.03
VM	5.59	VM	5.51
FC	0	FC	0
CV	0	CV	0
S	2.44	S	2.41

(Source: Adiya)

9.10 Block Model Validation

The block model was firstly checked to ensure that all blocks were populated and that block values were within the same range as the input values. Following this a visual validation was conducted by loading the block model into the Micromine 3D viewer together with borehole traces, plies from the original points of observation file, base of weathering, base of Quaternary and topographic surfaces. Each cross-section was then reviewed to check that the plies from the original points of observation file agreed with the plies in the block model.

Figure 9-11 shows validation of the block model through a section containing holes G00604, S01033, G00611, S01034, G00430A and S01035. This image shows that the plies from the original points of observation coincide with the plies in the block model.

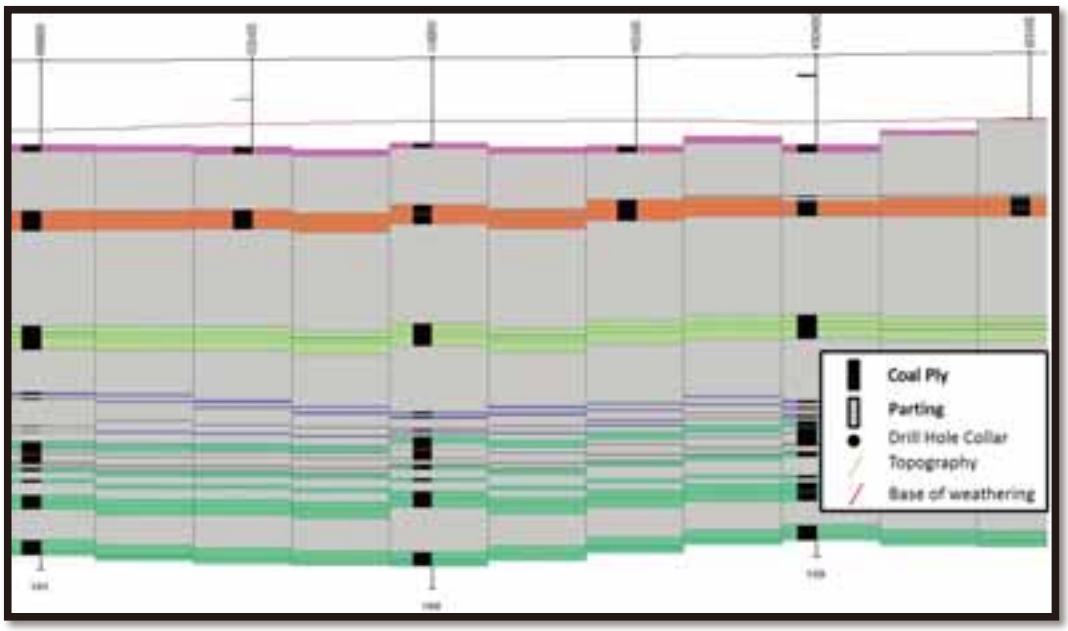


Figure 9-11: Block Model Validation

(Source: Energy Resources LLC)

A further manual check was completed by the Competent Person where an area including boreholes G02057, G202193, G2212 and G02056 for the ply 3AU was compared with the block model. The manual result was within 3 percent in tonnage of the block model result. This comparison is within acceptable limits.

10 Resource Statement

The total Resource estimated for the UHG deposit is shown on an as-received basis in Table 10-1, and on an air-dry basis in Table 10-2. It should be noted that these figures have been rounded to reflect the fact that they are estimates and as a result this may cause figures not to sum correctly.

Table 10-1: Total Resources on an As-Received (AR) Basis

Volume (x1,000,000 m^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Total Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA-BHWE									
4.7	7.2	1.53	28.44	6.66	21.01	5518	0.96	46.82	MEASURED
0.4	0.7	1.50	26.54	4.87	22.68	5747	0.93	47.73	INDICATED
1.9	2.9	1.52	27.55	7.26	22.83	5381	0.85	45.44	INFERRED
7.0	**10.8**	**1.52**	**28.08**	**6.70**	**21.61**	**5496**	**0.93**	**46.51**	**SUBTOTAL**
BHWE - 100m									
41.6	63.9	1.54	28.53	4.18	20.79	5659	1.05	47.62	MEASURED
2.8	4.2	1.51	27.25	5.00	21.48	5742	0.92	48.29	INDICATED
8.8	13.4	1.52	28.50	5.22	21.57	5499	0.94	46.55	INFERRED
53.2	**81.5**	**1.53**	**28.46**	**4.39**	**20.95**	**5637**	**1.03**	**47.48**	**SUBTOTAL**
100 - 200m									
63.7	96.3	1.51	26.67	3.63	21.39	5854	1.02	48.96	MEASURED
5.9	9.0	1.53	28.04	4.61	20.43	5713	0.86	48.65	INDICATED
13.0	20.0	1.54	28.42	3.92	19.77	5664	0.92	48.82	INFERRED
82.6	**125.3**	**1.52**	**27.05**	**3.74**	**21.07**	**5814**	**0.99**	**48.92**	**SUBTOTAL**
200 - 300m									
88.6	133.7	1.51	26.17	3.38	20.28	5939	0.89	50.66	MEASURED
3.9	6.0	1.53	27.33	3.94	20.65	5754	0.71	49.11	INDICATED
8.9	13.6	1.53	28.24	3.61	21.43	5697	0.99	47.29	INFERRED
101.4	**153.3**	**1.51**	**26.40**	**3.42**	**20.40**	**5910**	**0.89**	**50.30**	**SUBTOTAL**
300 - 400m									
57.6	88.1	1.53	27.58	3.19	19.39	5795	0.70	50.16	MEASURED
1.6	2.5	1.55	26.64	3.63	19.29	5776	0.74	51.03	INDICATED
2.7	4.0	1.52	27.26	3.57	21.93	5797	0.73	47.76	INFERRED
61.9	**94.6**	**1.53**	**27.54**	**3.22**	**19.49**	**5795**	**0.70**	**50.08**	**SUBTOTAL**
Below 400m									
56.7	85.2	1.50	25.80	3.82	20.45	5942	0.51	50.78	MEASURED
4.4	6.9	1.55	27.59	3.48	18.24	5729	0.38	51.21	INDICATED
9.2	13.7	1.49	24.20	4.29	20.88	6069	0.52	51.93	INFERRED
70.3	**105.8**	**1.50**	**25.71**	**3.86**	**20.36**	**5945**	**0.51**	**50.95**	**SUBTOTAL**
376.4	**571.3**	**1.52**	**26.93**	**3.74**	**20.49**	**5829**	**0.83**	**49.61**	**GRAND TOTAL**
379	**572**	**1.5**	**27**	**3.7**	**20**	**5829**	**0.83**	**50**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

(Source: Energy Resources LLC)

Table 10-2: Total Resources on an Air-Dry (AD) Basis

Volume (x1,000,000 M^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Inherrent Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA-BHWE									
4.7	7.4	1.57	29.16	1.56	21.49	5643	1.00	47.77	MEASURED
0.4	0.7	1.54	27.16	0.87	23.18	5876	0.98	48.79	INDICATED
1.9	3.0	1.57	28.18	2.05	23.38	5502	0.89	46.39	INFERRED
7.0	**11.1**	**1.57**	**28.77**	**1.65**	**22.11**	**5619**	**0.97**	**47.46**	**SUBTOTAL**
BHWE - 100m									
41.6	65.1	1.56	29.19	0.88	21.28	5787	1.09	48.65	MEASURED
2.8	4.3	1.55	27.93	0.80	21.93	5871	0.97	49.34	INDICATED
8.8	13.8	1.56	29.19	1.22	22.05	5623	0.98	47.54	INFERRED
53.2	**83.2**	**1.56**	**29.13**	**0.93**	**21.44**	**5764**	**1.07**	**48.50**	**SUBTOTAL**
100 - 200m									
63.7	97.7	1.54	27.29	0.79	21.88	5986	1.05	50.04	MEASURED
5.9	9.2	1.56	28.71	0.69	20.87	5841	0.90	49.73	INDICATED
13.0	20.4	1.56	29.10	0.80	20.20	5792	0.95	49.89	INFERRED
82.6	**127.3**	**1.54**	**27.68**	**0.78**	**21.54**	**5945**	**1.02**	**50.00**	**SUBTOTAL**
200 - 300m									
88.6	135.7	1.53	26.79	0.70	20.74	6073	0.92	51.77	MEASURED
3.9	6.1	1.56	27.97	0.73	21.11	5883	0.74	50.19	INDICATED
8.9	13.9	1.56	28.89	0.86	21.92	5825	1.02	48.33	INFERRED
101.4	**155.7**	**1.53**	**27.02**	**0.71**	**20.86**	**6043**	**0.92**	**51.40**	**SUBTOTAL**
300 - 400m									
57.6	89.3	1.55	28.24	0.68	19.83	5926	0.72	51.25	MEASURED
1.6	2.6	1.57	27.29	0.87	19.72	5906	0.75	52.14	INDICATED
2.7	4.1	1.54	27.88	0.86	22.43	5928	0.74	48.83	INFERRED
61.9	**96.0**	**1.55**	**28.20**	**0.70**	**19.93**	**5926**	**0.72**	**51.17**	**SUBTOTAL**
Below 400m									
56.7	86.6	1.53	26.42	0.77	20.91	6076	0.53	51.89	MEASURED
4.4	7.0	1.58	28.26	0.75	18.66	5858	0.39	52.32	INDICATED
9.2	14.0	1.51	24.79	0.78	21.36	6206	0.54	53.06	INFERRED
70.3	**107.6**	**1.53**	**26.33**	**0.77**	**20.83**	**6079**	**0.53**	**52.07**	**SUBTOTAL**
376.4	**580.9**	**1.54**	**27.57**	**0.78**	**20.96**	**5961**	**0.86**	**50.69**	**GRAND TOTAL**
379	**581**	**1.5**	**28**	**0.8**	**21**	**5961**	**0.86**	**51**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

(Source: Energy Resources LLC)

The Resource estimation by seam can be found in Appendix 11a and 11b.

10.1 Comparison between New JORC (2012) - 31 December 2021 and Previous JORC (2004) – 31 December 2014 Resource Estimates to 400m

For the purposes of comparison, the two Resource estimates were un-adjusted for mining so only the models were compared and were not affected by outside influences such as mining dilution etc. This is not to be confused with the final Resource estimate in Table 10-1 and 10-2, which are final JORC (2012) Resource estimates and are adjusted to the mine survey pit shell.

The following table (Table 10-3) shows the Resources quoted on an as-received basis for the unadjusted previous JORC (2004) – 31st December 2014 and compared with the current Resource from this report. This table is non JORC and should be used for indicative comparative purposes only.

Table 10-3: Comparison of unadjusted New with Previous JORC Resource estimates – Non JORC

MMC 31st December 2014 - non JORC (2012)					
Total Coal Resources	**Resources Category (as-received)**				
Depth Limits	**Measured**	**Indicated**	**Inferred**	**Total (M+I)**	**Total (M+I+I)**
Sub-Total above -400m	355	176	87	531	618
Sub-Total below -400m	40	44	30	84	114
Totals	**395**	**220**	**117**	**615**	**732**
MMC 31st December 2021 - non JORC (2012)					
Total Coal Resources	**Resources Category (as received)**				
Depth Limits	**Measured**	**Indicated**	**Inferred**	**Total (M+I)**	**Total (M+I+I)**
Sub-Total above -400m	480	23	62	503	565
Sub-Total below -400m	85	7	14	92	106
Totals	**565**	**30**	**76**	**595**	**671**
Differences:- MMC 31st December 2014 - JORC (2012) vs MMC 31st December 2021 - JORC (2012)					
Total Coal Resources	**Resources Category (as received) Tonnes**				
Depth Limits	**Measured**	**Indicated**	**Inferred**	**Total (M+I)**	**Total (M+I+I)**
Sub-Total above -400m	125	-153	-25	-28	-53
Sub-Total below -400m	46	-37	-16	8	-8
Totals	**171**	**-190**	**-41**	**-19**	**-61**
Total Coal Resources	**Resources Category (as received) percent**				
Depth Limits	**Measured**	**Indicated**	**Inferred**	**Total (M+I)**	**Total (M+I+I)**
Sub-Total above -400m	35%	-87%	-29%	-5%	-9%
Sub-Total below -400m	115%	-84%	-54%	10%	-7%
Totals	**43%**	**-86%**	**-35%**	**-3%**	**-8%**

(Source: Energy Resources LLC)

There is good agreement with the two estimates with the current estimate having a decrease of eight percent. However, there were a number of materially positive and negative aspects that occurred between the two estimates.

One of the main aspects is the current Resource estimate was completed under the new JORC (2012) Code which references to the new Coal Guidelines (2014). It should be noted that the two documents are far more stringent and thorough than previous versions. The following is a list of changes that were applied with apparent affect to the current estimate.

- Updated base of weathering and base of Quaternary with new drilling, (coal lost).
- Basement rocks found in boreholes G02603, G02611, G02638 and G02619 and the Ukhaakhudag fault boundary have shrunk inside the deposit. The thickness of the coal seams in the Ukhaakhudag fault zone has also decreased, (coal lost)
- Seam correlation changed (boreholes G01882, U72R, G02601, G02649) around reverse fault A and B (coal lost)
- Decreased coal thickness near (boreholes G02601, G02649, G02611) reverse faults B and C (coal lost)
- Decreased coal thickness (borehole G02635) in the west and south-west area of the deposit (coal lost)
- The boundaries of the deposit have been extended to the north, (coal gained).

11 Conclusions and Recommendations

The UHG deposit, forms part of the northern extension of the greater Tavan Tolgoi (TT) coalfield and is contained within Mining License [MV-011952]. It is owned by ER, a 100% wholly owned subsidiary of MMC, and a BVI incorporated company, listed on the HK Stock Exchange. This license was granted effective 23rd January 2007 and is for a period of 30 years.

Coal within the UHG deposit is composed of the Tsankhi and Tavan Tolgoi formations, of upper Permian age. The deposit demonstrates 18 first order seam groups, including 0A, 0B, 0CL, 0CU, 25-0D, 3A, 4A, 4A10-20, 4B, 4C, 5 and 6, which outcrop in the east and south of the area dipping west and north-west, and seam groups 7, 8, 9, 10, 11 and 12 which outcrop in the central-west of the deposit and dip north-north-west.

Seams split and merge throughout the deposit with 49 discrete plies being identified with 48 partings that form 97 seams. In accordance with the ASTM classification of coal by rank, with the wide range in volatile matter, the coal was classified as ranging from high-volatile 'A' bituminous coal to low-volatile bituminous coal with most samples in the medium-volatile bituminous group.

The drilling programs conducted from 2009-2020 were observed that boreholes alone were insufficient information to determine seam continuity and structure, so a 2D seismic program was completed. The results showed the deposit to be highly faulted with complex low angle structures where previous work only indicated simple single faults. The seismic program proved invaluable in locating and understanding these fault systems but, just as importantly, showed areas of little to no structure and this is one of the great positives with using seismic. This work has continued to be a valuable guide with the 2011-2020 drilling campaign and continues to provide additional confidence in the final Resource model for mine planning and scheduling.

It was found in the 2009-2020 exploration campaign that coal in the eastern part of the deposit was devolatilised more than the western part of the deposit. The cause of this was due to a major thrust structure, which can be traced with the seismic sections from the south-western to the north-eastern extent of the coal deposit. The effective result is coal being upgraded from a high-volatile (daf) coal to a mid-volatile (daf) coal and hence is the reason why these coal seams are potentially hard coking and not of a lower coking quality. The results of the 2018, 2020 campaign continue to support this finding and this volatile (daf) relationship has been a guiding tool in the mining process to select blocks based on coal rank for product selection.

A review from the RAW coal analyses on the seam group coking potential was completed. The seam groups were defined in three groups representing seams of low, medium and high potential for coking coal. Seams including 0A, 0B and 0BR were defined as having low to no coking potential, seams 0CU, 0CL, 25-0D, 4A10-20, 5, 8, 10, 11 and 12 were defined as having medium coking potential and seams 3A, 4A, 4B, 4C, 6, 7 and 9 were defined as having high coking potential.

LOX work was completed for the immediate mining area for seam groups 0A and 0B. This work is on-going as mining and exploration progresses.

All QAQC methods for drilling, borehole survey, geophysics, logging and sampling were reviewed against current procedures and met JORC (2012) standards. The analytical methods were also investigated. All laboratories were accredited to the

standards of the day with the ERCCL holding a current accreditation to ISO/IEC 17025:2017(MNS ISO/IEC 17025:2018) standard since November 2020 and expires in July 2023. The ERCCL has undergone two audits since being established, with both delivering favourable responses. In addition, duplicate samples were sent to SGS laboratory, based in Ulaanbaatar. The ERCCL generally reported the coal quality parameters generally higher than the SGS laboratory with varying degrees of reproducibility between laboratories.

JORC Resource estimates require a level of independence and hence Mr Todd Sercombe, senior consultant for GasCoal Pty Ltd and a coal geologist since 1996, provided an independent peer review of the exploration program. His full report can be viewed in Appendix 14.

Internal peer review of exploration work 2018, 2020 was conducted by Mr. Lkhagva-Ochir Said, the then Executive General Manager of Mining and Processing. These peer reviews confirmed compliance of the Group's work to update the Coal Resource estimations in compliance with requirements of the JORC Code (2012).

The UHG Resource estimate was carried out using Micromine Version 2021.5 and LogCheck Version 7.277 using the COALLOG geology data format as the database. The Resource estimate was carried out using the points of observation data supplied by the Competent Person.

Conditional simulation geostatistics was used to determine the expected error for Seam 4C and formed the basis for revision of the category spatial limits for points of observation. The revised spatial limits resulting were, for Measured Resource 350m, Indicated Resource 700m and Inferred Resource 1500m. Areas shown from the seismic survey to have no continuity, but still had coal from borehole intercepts were classified as Inferred Resource.

For seam coding there was no maximum seam thickness, a minimum seam thickness of 0.5m to 400m and 1.5m for Resource below 400m depth, a maximum parting thickness of 0.5m, and an ash content cut-off greater than 50 percent (DRY basis). In addition, core recovery was applied where it was greater than or equal to 95 percent for moderate or high potential coking coal seams and greater than or equal to 90 percent for low potential or no coking potential coal seams.

The total Resource for the Ukhaa Khudag deposit is shown on an as-received basis in Table 11-1, and on an air-dry basis in Table 11-2. It should be noted that these figures have been rounded to reflect the fact that they are estimates and as a result this may cause figures not to sum correctly.

Table 11-1: Total Resources on an As Received (AR) Basis

Volume (x1,000,000 M^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Total Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA-BHWE									
4.7	7.2	1.53	28.44	6.66	21.01	5518	0.96	46.82	MEASURED
0.4	0.7	1.50	26.54	4.87	22.68	5747	0.93	47.73	INDICATED
1.9	2.9	1.52	27.55	7.26	22.83	5381	0.85	45.44	INFERRED
7.0	**10.8**	**1.52**	**28.08**	**6.70**	**21.61**	**5496**	**0.93**	**46.51**	**SUBTOTAL**
BHWE - 100m									
41.6	63.9	1.54	28.53	4.18	20.79	5659	1.05	47.62	MEASURED
2.8	4.2	1.51	27.25	5.00	21.48	5742	0.92	48.29	INDICATED
8.8	13.4	1.52	28.50	5.22	21.57	5499	0.94	46.55	INFERRED
53.2	**81.5**	**1.53**	**28.46**	**4.39**	**20.95**	**5637**	**1.03**	**47.48**	**SUBTOTAL**
100 - 200m									
63.7	96.3	1.51	26.67	3.63	21.39	5854	1.02	48.96	MEASURED
5.9	9.0	1.53	28.04	4.61	20.43	5713	0.86	48.65	INDICATED
13.0	20.0	1.54	28.42	3.92	19.77	5664	0.92	48.82	INFERRED
82.6	**125.3**	**1.52**	**27.05**	**3.74**	**21.07**	**5814**	**0.99**	**48.92**	**SUBTOTAL**
200 - 300m									
88.6	133.7	1.51	26.17	3.38	20.28	5939	0.89	50.66	MEASURED
3.9	6.0	1.53	27.33	3.94	20.65	5754	0.71	49.11	INDICATED
8.9	13.6	1.53	28.24	3.61	21.43	5697	0.99	47.29	INFERRED
101.4	**153.3**	**1.51**	**26.40**	**3.42**	**20.40**	**5910**	**0.89**	**50.30**	**SUBTOTAL**
300 - 400m									
57.6	88.1	1.53	27.58	3.19	19.39	5795	0.70	50.16	MEASURED
1.6	2.5	1.55	26.64	3.63	19.29	5776	0.74	51.03	INDICATED
2.7	4.0	1.52	27.26	3.57	21.93	5797	0.73	47.76	INFERRED
61.9	**94.6**	**1.53**	**27.54**	**3.22**	**19.49**	**5795**	**0.70**	**50.08**	**SUBTOTAL**
Below 400m									
56.7	85.2	1.50	25.80	3.82	20.45	5942	0.51	50.78	MEASURED
4.4	6.9	1.55	27.59	3.48	18.24	5729	0.38	51.21	INDICATED
9.2	13.7	1.49	24.20	4.29	20.88	6069	0.52	51.93	INFERRED
70.3	**105.8**	**1.50**	**25.71**	**3.86**	**20.36**	**5945**	**0.51**	**50.95**	**SUBTOTAL**
376.4	**571.3**	**1.52**	**26.93**	**3.74**	**20.49**	**5829**	**0.83**	**49.61**	**GRAND TOTAL**
379	**572**	**1.5**	**27**	**3.7**	**20**	**5829**	**0.83**	**50**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

(Source: Energy Resources LLC)

Table 11-2: Total Resources on an Air Dry (AD) Basis

Volume (x1,000,000 M^3)	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Inherrent Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA-BHWE									
4.7	7.4	1.57	29.16	1.56	21.49	5643	1.00	47.77	MEASURED
0.4	0.7	1.54	27.16	0.87	23.18	5876	0.98	48.79	INDICATED
1.9	3.0	1.57	28.18	2.05	23.38	5502	0.89	46.39	INFERRED
7.0	**11.1**	**1.57**	**28.77**	**1.65**	**22.11**	**5619**	**0.97**	**47.46**	**SUBTOTAL**
BHWE - 100m									
41.6	65.1	1.56	29.19	0.88	21.28	5787	1.09	48.65	MEASURED
2.8	4.3	1.55	27.93	0.80	21.93	5871	0.97	49.34	INDICATED
8.8	13.8	1.56	29.19	1.22	22.05	5623	0.98	47.54	INFERRED
53.2	**83.2**	**1.56**	**29.13**	**0.93**	**21.44**	**5764**	**1.07**	**48.50**	**SUBTOTAL**
100 - 200m									
63.7	97.7	1.54	27.29	0.79	21.88	5986	1.05	50.04	MEASURED
5.9	9.2	1.56	28.71	0.69	20.87	5841	0.90	49.73	INDICATED
13.0	20.4	1.56	29.10	0.80	20.20	5792	0.95	49.89	INFERRED
82.6	**127.3**	**1.54**	**27.68**	**0.78**	**21.54**	**5945**	**1.02**	**50.00**	**SUBTOTAL**
200 - 300m									
88.6	135.7	1.53	26.79	0.70	20.74	6073	0.92	51.77	MEASURED
3.9	6.1	1.56	27.97	0.73	21.11	5883	0.74	50.19	INDICATED
8.9	13.9	1.56	28.89	0.86	21.92	5825	1.02	48.33	INFERRED
101.4	**155.7**	**1.53**	**27.02**	**0.71**	**20.86**	**6043**	**0.92**	**51.40**	**SUBTOTAL**
300 - 400m									
57.6	89.3	1.55	28.24	0.68	19.83	5926	0.72	51.25	MEASURED
1.6	2.6	1.57	27.29	0.87	19.72	5906	0.75	52.14	INDICATED
2.7	4.1	1.54	27.88	0.86	22.43	5928	0.74	48.83	INFERRED
61.9	**96.0**	**1.55**	**28.20**	**0.70**	**19.93**	**5926**	**0.72**	**51.17**	**SUBTOTAL**
Below 400m									
56.7	86.6	1.53	26.42	0.77	20.91	6076	0.53	51.89	MEASURED
4.4	7.0	1.58	28.26	0.75	18.66	5858	0.39	52.32	INDICATED
9.2	14.0	1.51	24.79	0.78	21.36	6206	0.54	53.06	INFERRED
70.3	**107.6**	**1.53**	**26.33**	**0.77**	**20.83**	**6079**	**0.53**	**52.07**	**SUBTOTAL**
376.4	**580.9**	**1.54**	**27.57**	**0.78**	**20.96**	**5961**	**0.86**	**50.69**	**GRAND TOTAL**
379	**581**	**1.5**	**28**	**0.8**	**21**	**5961**	**0.86**	**51**	***Total (Rounded)**

* JORC Code, clause 25, Rounding.

(Source: Energy Resources LLC)

In comparing the previous Resource estimate and the current Resource estimate, un-adjusted for mining so only the models were compared and were not affected by outside influences such as mining dilution, there is good agreement with the two estimates with the current estimate having an decrease of 8 percent.

In view that this Resource estimate forms the basis of a future Reserve update, the following recommendations for the project area include, but are not limited to:

1. Continue to map LOX lines within the mine area and also drill closely spaced boreholes to determine remaining seam LOX lines in the western area of the deposit.
2. Plan and execute drilling 120x120m borehole spacing triangular grid in the middle area in front of mining for better seam delineation and coal quality to keep the mining pit advancing on reliable information.
3. Further bulk sample work for the western area for washability and coke testing so a full understanding of how these seams behave so the current CHPP performance can be ascertained and viable saleable products can be determined and scheduled for the mining operation.
4. Expand the calculation for expected error to all the other major seam groups.
5. Continue the understanding of the spatial distribution of the coking characteristics of the coal and the geological parameters that affect the coking characteristics will

be beneficial for mine planning and production scheduling in order to produce a consistent product and maximising the value of the deposit.

6. A review should be completed where there was some variation in the elevations of the topography survey and the collar survey.
7. The seismic data is high level data that has been important in locating and defining structural style, but it is highly recommended that mine geologists continue to map and monitor faults within the pit.
8. It is recommended that for future programs that some gas testing is completed on deeper boreholes to develop an understanding of the potential for coal bed methane at UHG.

12 Disclaimer

MMC has compiled this document based on the assumptions therein identified and upon reports, drawings, designs, data and other information provided by others. MMC was unable to check the veracity of the supplied data. MMC has relied upon information that has been prepared by non-qualified persons during the preparation of this report. MMC are not in a position to, and do not, verify the accuracy of, or adopt as their own, the information and data supplied by others. Parts of the document have been prepared by others or extracted from documents prepared by others, as identified in the document; the documents have not been audited by MMC.

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13 Date and Signature

Byambaa Barkhas

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Energy Resource LLC (HKE 975 Mongolian Mining Corporation LLC)

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Energy Resource LLC (HKE 975 Mongolian Mining Corporation LLC)

14 Statement of qualifications

I, Byambaa Barkhas do hereby certify that:

- I reside at Door 4, Building 9, Tsetsii Khoroolol, Uguumur bag, TsogtTsetsii soum, Umnugobi province, MONGOLIA.
- I graduated in 2008 with a "Bachelor of geology" from the "School of Geology and Petroleum Engineering, Mongolian University of Science and Technology", I am Master student of "School of Geology and Mining, Mongolian University of Science and Technology".
- I have been a Member of the Australasian Institute of Mining and Metallurgy (#318198) since 2014.
- I have practiced my coal geological profession for a total of 12 years.
- I certify by reason of my education, affiliation with a professional association, and past relevant work experience in the type and style of deposit that I fulfil the requirements to be a 'Competent Person' for Coal resources.
- I am a fulltime employee of Mongolian Mining Corporation in the position of Chief Geologist for Geology and Geotechnical.

I am not aware of any material fact or material change with respect to the subject matter of the technical report that is not reflected in the technical report

15 Statement of independence

I am a fulltime employee of MMC in the position of Chief Geologist for Geology and Geotechnical.

16 References

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17 Glossary of technical terms

3D	Three-dimensional.
%	Percent.
º C	degrees Celsius
Aimag	Provincial centre
Anisotropy	Quality of a variably to having different physical properties when measured in different directions.
Assay	A measured quantity of material within a sample.
ASTM	American Society for Testing and Materials
Azimuth	Azimuth angle on which an exploration hole was drilled (deviation to North).
Coal Seam	Portion of the strata that contains solid fossil fuels
Coal resource	is a concentration or occurrence of material of intrinsic economic interest in or on the earth's crust in such a form and quantity that there are reasonable prospects for eventual economic extraction.
Coefficient of variation	In statistics, a normalised measure of the variation present in a sample population.
Collar	Geographical co-ordinates of a borehole or shaft starting point.
Compositing	In sampling and resource estimation, process designed to carry all samples to certain equal length.
Correlation coefficient	A statistical measure of the degree of similarity between two parameters.
CP	'Competent Person' as defined by JORC
Cumulative frequency graph	Graphical representation of data ranked in ascending or descending order, which are shown in a non-decreasing function between 0% and 100%. The percent frequency and cumulative percent frequency forms are interchangeable, since one can be obtained from the other.
CV	Calorific Value
Dip	Angle which strata makes with horizontal
FC	Fixed Carbon
g/cc	grams per cubic centimetre
Geostatistics	Science studying and describing the spatial continuity of any kind of natural phenomena.
Histogram	A graphical presentation of the distribution of data by frequency of occurrence.
IDW	Inverse Distance Weighting
IM	Inherent Moisture
Indicator	Transformed value.
Inverse Distance Weighting	Geostatistical method to calculate mineral resource. Since this method makes the weight for each sample inversely proportional to its distance from the point being estimated it gives more weight to the closest samples and less to those that are farthest away. Method works very efficiently with regularly gridded data. Extreme versions of inverse distance weighting are the global declustering methods like the polygonal method and the local sample mean method.

JORC Code	Australasian Code for Reporting of Mineral Resources and Ore Reserves
Lognormal	Refers to the distribution of a variable where the distribution of the logarithm of that variable is normal.
m	Metre
M	Million or mega (106).
Mean	Average.
Median	Value of the middle sample in a data set arranged in rank order.
Micromine	Mining and exploration software.
Mt	Million tonnes.
Omni	In all directions.
OK	Ordinary Kriging interpolation method.
Percentile	One hundredths of the total data. 50th percentile corresponds to the median.
Ply	A collection of coal lithotypes that make up the basic component of a coal seam. A ply can also be a seam by itself. A collection of plies make up a seam.
Population	In Geostatistics, population encompasses grades which show the same or close geostatistical characteristics. Ideally, one population is characterised by linear distribution
Probability plot	Plot showing cumulative frequencies over different intervals on a log scale probability plot
QAQC	Quality Assurance and Quality Control
Range	Distance at which variogram reaches its plateau.
RD	Relative density (unit grams per cubic centimetre).
Resource	Geological mineral resource (mineable and unmineable).
RL	Reduced level i.e. elevation relative to a local datum
Seam	A collection of plies (see ply).
Sill	Distance at which variogram reaches its sill. Physically, there is no correlation between paired samples at that distance.
Spatial continuity	The description or function how continuous are the data values over a certain distance in three dimensions.
Standard deviation	A statistical measure of the dispersion of sample data around the mean value.
Soum	Small township
S	Sulphur
t	Tonne.
t/m^3	Tonne per cubic metre.
TM	Total Moisture
Variance	In statistics, a measure of dispersion about the mean value of a data set.
VM	Volatile Matter

Appendix 1: Mineral Tenure License

(Please see CD or Hard copies that accompany this report)

Appendix 2: Procedures

(Please see CD or Hard copies that accompany this report)

Appendix 3: Table of Base of Weathering and Quaternary for all boreholes that it was logged.

(Please see CD or Hard copies that accompany this report)

Appendix 4a: Points of Observation – (as-received basis)

(Please see CD or Hard copies that accompany this report)

Appendix 4b: Points of Observation – (air-dry basis)

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Appendix 5: Laboratory Certificates

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Appendix 6a: Complete analytical database showing (as-received) coal quality

(Please see CD or Hard copies that accompany this report)

Appendix 6b: Complete analytical database showing (air-dry) coal quality

(Please see CD or Hard copies that accompany this report)

Appendix 7: Graphs on a seam by seam basis and for each coal quality parameter

(Please see CD or Hard copies that accompany this report)

Appendix 8: Borehole profiles with LAS and coal quality

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Appendix 9: East-West & North-South borehole sections

(Please see CD or Hard copies that accompany this report)

Appendix 10: Seismic sections & map

(Please see CD or Hard copies that accompany this report)

Appendix 11a: Resources by seam (air-dry)

(Please see CD or Hard copies that accompany this report)

Appendix 11b: Resources by seam (as-received)

(Please see CD or Hard copies that accompany this report)

Appendix 12: Laboratory audit reports

(Please see CD or Hard copies that accompany this report)

Appendix 13: Seismic reports

(Please see CD or Hard copies that accompany this report)

Appendix 14: PEER review

(Please see CD or Hard copies that accompany this report)

Appendix 15: Geotechnical report

(Please see CD or Hard copies that accompany this report)

Appendix 16: List of Downhole geophysical equipment

(Please see CD or Hard copies that accompany this report)

Appendix 17: Faulted boreholes and plies

(Please see CD or Hard copies that accompany this report)

Appendix 18: Inserted and extrapolated data points

(Please see CD or Hard copies that accompany this report)

Appendix 19: Resource category areas per ply

(Please see CD or Hard copies that accompany this report)

Appendix 20: Capability Statement

(Please see CD or Hard copies that accompany this report)

Appendix 21: UHG Geochemistry

(Please see CD or Hard copies that accompany this report)

Appendix 22: Reserves - RPM

(Please see CD or Hard copies that accompany this report)

Appendix 23: Hydrogeology

(Please see CD or Hard copies that accompany this report)

Appendix 24: Variograms

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Appendix 25: JORC (2012) Table 1

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Section 1: Sampling Techniques and Data

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling*	• Coal quality samples were collected from HQ and some PQ sized diamond core. Coal samples once collected were stored in refrigerated containers until required for analysis. • Each coal ply was brightness logged and sampled separately in intervals no greater than 2.0m. Stone bands up to 2cm were sampled with the coal but stone bands larger than this were sampled separately. Stone bands larger than 50cm were not sampled. • Chip samples from open holes and trench samples were used for continuity purposes and were not used for resource calculations. • Full coal seam samples were taken for the resource calculation and 30cm ply roof or floor samples were taken for inclusion in future work on Reserves, which did not impact the resource calculation methods. • All boreholes were geophysically logged with down-hole wire-line tools with sample spacing's of 1, 2 or 5 centimetres used. Coal/rock boundaries were well identified from the geophysics. Core boreholes were corrected and checked for core recovery for coal and rock thickness using down-hole geophysics with loss inserted within the lithology record. Open-hole coal ply thickness was corrected to down-hole geophysics.
	• *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used*	• For cored boreholes, coal plies were fully cored and sampled. • In 2011-2014, Two calibration boreholes (G02251 and R00020) were setup to regularly test all logging tools as they came onto the site and at regular periods whilst onsite. • In 2020, One calibration borehole

Criteria	JORC Code explanation	Commentary
		(G02637) were setup to regularly test all logging tools as they came onto the site and at regular periods whilst onsite. • A central logging facility was designed where all borehole cores were stored, logged photographed and sampled. A standard set of rock types and coal lithotypes were collected and displayed for purposes of calibration in logging. The logging geologists were supervised and regularly tested on performance for procedural compliance.
	• *Aspects of the determination of mineralisation that are Material to the Public Report*	• Coal was determined in the core by colour, weight, strength and texture (assisted with using a field knife to scratch the core and hand lens to observe texture). Once the coal/rock boundary was observed, the coal ply was logged for coal maceral and thickness, for changes in coal brightness (maceral – Vitrinite) using a coal brightness chart (C1 = >90% bright, C2= 60-90% bright, C3=40-60% bright, C4=10-40% bright, C5=1-10% bright and C6=<1% bright). Based on the brightness of coal macerals, similar brightness sections within a ply were sampled together. These samples would indicate changes in quality i.e. higher ash/higher density. Rock partings ≤50cm within or between plies were sampled separately. • The core coal interval observations were confirmed with down-hole geophysics.
Drilling techniques	• *Drill type and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc.).*	• Diamond core and open-hole drilling was completed. All coring was completed with Boart Longyear triple tube split systems to ensure maximum core recovery. Open-hole drilling was 4.5-6' hammer until the water table then water circulated blade drilling. • Core was mostly HQ3 size with some PQ3

Criteria	JORC Code explanation	Commentary
		size. • Core bits were diamond impregnated and surface set to maximise recovery and minimise shattering of core. • Generally boreholes were drilled vertically with most having a down-hole verticality Log run. • A small number of angle boreholes were drilled in the fault zone to determine the structure
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.*	• Linear core recovery was calculated initially by the driller's measurement and then confirmed by the rig geologist who calculated the recovered linear length of core for each drill run and expressing it as a percentage of the full core run. • Downhole geophysics was used to further assess the amount and location of linear core loss. • Core photography in boxes also assisted later evaluation of loss. • Linear core loss was recorded in the drill record and inserted into the lithology log at the point of loss. The point of linear loss was determined with photographs and wire-line geophysics by determining the thickness between stone partings within the geophysical log and solid core. • Samples were measured for weight but this mainly served as a cross check with the laboratory. • Linear core loss was mainly attributed to drilling through structural zones. Where poor drilling was deemed as the cause of poor recovery the borehole was redrilled.
	• *Measures taken to maximise sample recovery and ensure representative nature of the samples.*	• Modern drilling equipment and trained coal drillers was utilised. • High quality drilling pipe, coring and drilling bits used. • Expected high core recovery particularly in coal plies enforced with drilling

Criteria	JORC Code explanation	Commentary
		contractor where ply sections with less than ≥95% were redrilled. • Chip samples collected on a 1m basis and displayed clearly for rig geologist observation.
	• *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• High linear core recover was maintained ≥95% therefore, minimising sample bias due to sample mass loss. Core photography and good wire-line geophysics confirmed high linear core recovery and assisted with documentation of actual loss depth recorded within the lithology log.
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.*	• All core was logged geologically and geotechnically and recorded in hard copy and electronic format to COALLOG standard.
	• *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.*	• Geological and geotechnical logging was qualitative with codes used to describe the different geological and geotechnical aspects of the core as per COALLOG standard. • Borehole core was photographed in 4 or 5 metre boxes (depending PQ or HQ) on a wet and dry basis which included the entire core.
	• *The total length and percentage of the relevant intersections logged.*	• All coal plies were fully cored and logged to COALLOG standard. All logged coal cores were fully sampled including rock parting 50 cm or less.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.*	• The whole core was sampled for coal analysis.
	• *If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.*	• Not applicable for coal.
	• *For all sample types, the nature,*	• Coal cores at the rig site, were measured

Criteria	JORC Code explanation	Commentary
	quality and appropriateness of the sample preparation technique.	in the splits then gently washed to remove drilling grime. The coal was carefully placed into core boxes with no coal remaining. The boxes were wrapped securely in plastic for transport to the central logging facility. The core boxes were delivered (average distance 5km) to central logging facility at the end of each 10hr shift. The coal core boxes are stored in refrigerated containers until logging. After logging and sampling, the samples were returned to refrigeration until sent to the ERCCL. This laboratory is less than 500m from the central logging facility. • At the central logging facility core boxes were placed in the dedicated photography area and photos taken. The core was laid out on specifically designed and built logging tables. The atmospheric environment inside the central logging facility was kept to a constant temperature. The cores were re-measured and confirmed with field measurements. Geophysical logs were used to correct for seam thickness, loss and expansion were noted. Based on the brightness of coal macerals, similar brightness sections within a ply were sampled together. Rock partings ≥0.02cm and ≤50cm within or between plies were sampled separately. Roof and floor material of 30cm in thickness was also sampled. Maximum coal sample thickness was 2m. Identified samples were placed in double plastic bags with sample tags placed inside the coal containing sample bag and then in between the sample bags with finally the sample information written on the outside plastic bag. The sample bag was weighed with weight corrected for the sample bag mass.

Criteria	JORC Code explanation	Commentary
		• Geotechnical rock samples were collected on each change of major lithotype. The samples were wrapped in aluminium foil, then plastic and then water proof tape. The sample number and depth was scribe on the sample. The sample number was digitally recorded in the logging software 'LogCheck'.
	• *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.*	• All samples were analysed at the ERCCL, which is located onsite. With respect to sample preparation, the top size of the sample was reduced and split into two quarters and one half portions. The sample preparation took into account the top size of the sample material required for each of the analytical determinations. One of the quarter portions was used for analysis and the remaining portions were retained. • The ERCCL was accredited to ISO/IEC 17025:2017(MNS ISO/IEC 17025:2018) standard in November 2020 and expires in July 2023.
	• *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.*	• In 2011-2014, ERML prepared and analysed a number of samples, and submitted duplicates of these samples for analysis at the ALS (100 samples) and UUH and the UUH (615 samples) laboratories in Ulaanbaatar. The ERML analytical results were compared to the other laboratories by means of cross plots and basic statistical parameters. • The ERML generally reported the coal quality parameters lower than the SM Laboratory and generally higher than the UUH Laboratory with varying degrees of reproducibility between laboratories. • For work previously completed before 2009, it is unknown if a similar comparison exercise was done. • In 2020, ER Central Chemical Laboratory

Criteria	JORC Code explanation	Commentary
		prepared and analysed a number of samples and submitted duplicates of these samples for analysis at the SGS Laboratory (712 samples) Mongolia branch in Ulaanbaatar. The ER Central Chemical Laboratory analytical results were compared to the SGS Laboratory by means of cross plots and basic statistical parameters. • The ER Central Chemical Laboratory generally reported the coal quality parameters higher than the SGS Laboratory with varying degrees of reproducibility between laboratories.
	• *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• Bulk samples were taken for dry and wet tumbler sizing analysis in 2008 and 2012. • The 2008 work was completed for seams (0C, 3A, 4A, 4C, 8 and 9) and the work was analysed at the SGS – Tianjin, China laboratory. • The 2012 work was completed for seams (0C, 3A, 4A and 4C) and the work was analysed at the ALS – Ulaanbaatar, Mongolia laboratory. • The same procedure was applied to both programs. The average seam sample weight was 800kg. Dropshatter, sample dropped five times from height of 2m, three times. The sizes weighed 2, 6, 8, 11.2 and 16mm. Wet Tumble with steel cubes for five minutes (18 cubes/50kg/150l pro-rata). Wet size at 16, 11.2, 8, 4, 2, 1, 0.5, 0.25, 0.125. The top size for this work was 19mm. • The results of this work were for the design of the CHPP and Reserves. It did not have an impact on the Resource estimate. • For work previously completed before 2008, it is unknown if a similar exercise was done.

Criteria	JORC Code explanation	Commentary
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.*	• In 2011-2014, Coal samples were analysed for, True relative density (GB/T 217:2008), Total moisture (MNS ISO 589:2003), Analytical moisture (MNS ISO 331:2003), Ash (MNS SO 1171:2009), Volatile matter (MNS ISO 562:2001), Calorific value (MNS ISO 1928:2009), Total sulphur (ASTM D4239:05), Crucible swelling number (MNS ISO 501:2003) and Caking index (MNS ISO 335:2005). • In addition, bulk samples were taken in 2008 and 2012 for coke testing. • In 2020, Coal samples were analysed for, True relative density (GB/T 217:2015), Total moisture (MNS ISO 589:2008), Analytical moisture (MNS GB/T 212:2015), Ash (MNS GB/T 212:2015), Volatile matter (MNS GB/T 212:2015), Calorific value (MNS ISO 1928:2009), Total sulphur (ASTM D4239:2005), Crucible swelling number (MNS ISO 501:2003) and Caking index (MNS ISO 15585:2014). • The coal analyses are sufficient to determine a Resource estimate and determine the potential coal products and support the marketability of the coal products. • The laboratory under its certification did regular reproducibility and repeatability samples. Main protocol was every 10 sample duplicate tests were done (coal and non-coal samples). For every 30 sample, 1 standard and 1 blank sample was tested for equipment calibration. After each full borehole analyses were completed, regression graphs were constructed for internal checks. When samples deviated from the procedure tolerance the samples were re-analysed from new.
	• *For geophysical tools,*	• In 2011-2014, Two calibration boreholes

Criteria	JORC Code explanation	Commentary
	spectrometers, handheld XRF instruments, etc., the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.	(G02251 and R00020) were setup to regularly test all wire-line logging tools as they came onto the site and at regular periods whilst onsite. • In 2020, One calibration borehole (G02637) were setup to regularly test all wire-line logging tools as they came onto the site and at regular periods whilst onsite.
	• *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.*	• The ERCCL was accredited to I ISO/IEC 17025:2017(MNS ISO/IEC 17025:2018) standard in November 2020 and expires in July 2023. Internal testing protocols are mandatory with accreditation with duplicate testing and round robin testing done. • Laboratory certificates were supplied by ERCCL, ALS the Russian lab and SGS lab. • In 2011-2014, ERML prepared and analysed a number of samples and submitted duplicates of these samples for analysis at the SM Laboratory (ALS) (100 samples) and the UUH (Mining Institute) Laboratory (615 samples). The ERML analytical results were compared to the other laboratories by means of cross plots and basic statistical parameters. The ERML generally reported the coal quality parameters lower than the SM Laboratory and generally higher than the UUH Laboratory with varying degrees of reproducibility between laboratories. • In 2020, ER Central Chemical Laboratory prepared and analysed a number of samples and submitted duplicates of these samples for analysis at the SGS Laboratory (712 samples) Mongolia branch in Ulaanbaatar. The ER Central Chemical Laboratory analytical results were compared to the SGS Laboratory by means of cross plots and basic statistical

Criteria	JORC Code explanation	Commentary
		parameters. • The ER Central Chemical Laboratory generally reported the coal quality parameters higher than the SGS Laboratory with varying degrees of reproducibility between laboratories.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.*	• A number of pre-2008 boreholes were twinned by the Norwest and ER drilling programs. • Coal thickness intervals were check with a high level of agreement. • Due to poor core recovery many of the pre-2008 boreholes were not accepted for points of observation but due to the good agreement of coal interval thickness the boreholes were generally used for seam correlation and continuity. • Most of the pre-2008 boreholes were redrilled with only a few boreholes, which were accepted for points of observation used in Inferred areas. In these boreholes where coal quality comparisons were possible, there was up to a 20% error upside on relative density and ash. No adjustments were made to the coal quality data. • A few numbers of boreholes from the 2008 program were twinned. In these cases the coal thickness intervals and coal quality had good agreement. All boreholes in this program where they meet point of observation guidelines were used for the Resource estimate. • Hard copy data from the pre-2008 programs were translated and coded and uploaded into the LogCheck data management software. The hard copy geophysical logs were scanned and then digitised and LAS files created and uploaded into the LogCheck data management software. All hard copy coal quality results were entered into Excel

Criteria	JORC Code explanation	Commentary
		spreadsheet and once validated was loaded into the LogCheck data management software. Unless for obvious typographical errors no adjustments were made to the coal quality data. • The 2008 program coded digital data was translated and re-coded and uploaded into the LogCheck data management software. The LAS geophysical logs were validated and uploaded into the LogCheck data management software. The coal quality results were received as Excel spreadsheets and were built into the existing ER Excel spreadsheets for validation and uploaded into the LogCheck data management software. Unless for obvious typographical errors no adjustments were made to the coal quality data.
	• *The use of twinned holes.*	• A number of pre 2008 boreholes were twinned by the Norwest and ER drilling programs. • Coal thickness intervals were check with a high level of agreement. • Due to poor core recovery many of the pre 2008 boreholes were not accepted for points of observation but due to the good agreement of coal interval thickness the boreholes were generally used for seam correlation and continuity. • Most of the pre 2008 boreholes were redrilled with only a few boreholes, which were accepted for points of observation used in Inferred areas. In these boreholes where coal quality comparisons were possible, there was up to a 20% error upside on relative density and ash. • A few numbers of boreholes from the 2008 program were twinned. In these cases the coal thickness intervals and coal

Criteria	JORC Code explanation	Commentary
		quality had good agreement. All boreholes in this program where they meet point of observation guidelines were used for the Resource estimate. • A few numbers of boreholes from the 2008 program were twinned. In these cases the coal thickness intervals and coal quality had good agreement. All boreholes in this program where they meet point of observation guidelines were used for the Resource estimate.
	• *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.*	• The pre-2008 primary data (excluding coal quality) was in the form of hardcopy volumes of longhand drafted graphic profiles with all survey, drilling, recovery, geological, downhole geophysics, raw information, interpreted information and final information. These volumes are securely stored in the company's long term storage archives. The volumes were scanned, translated, coded and uploaded in the LogCheck data management software. Coal quality records were provided on hard copy laboratory certificates. These hardcopies are securely stored in the company's long term storage archives. This data was entered into Excel spreadsheet and once validated was loaded into the LogCheck data management software. • The 2008 primary data was in the form of scanned hard copy survey, drilling and geological logs, wire-line geophysics as LAS digital files and coal quality as Excel spreadsheets. The hardcopy logs were already in digital form as Excel spreadsheets. These were re-coded as necessary and with LAS files uploaded the LogCheck data management software. The coal quality results were built into the existing ER Excel spreadsheets for validation and uploaded into the

Criteria	JORC Code explanation	Commentary
		LogCheck data management software. • The primary data for 2009 – 2014 and 2018-2020 was original hard copy records for survey, drilling, geology, wire-line geophysics, geotechnical and coal quality. This data is securely stored in filing cabinets in the central logging facility at the mine site. All data stored is digital and has been entered and validated by the LogCheck data management software. This data is stored on company servers where the company IT department control the security. Furthermore, all data has been uploaded into the company master database stored on the Micromine GeoBANK system. All data systems are aligned with the COALLOG coding and form system. • All data from all exploration either historical or current has been coded and converted into the COALLOG coding and form system and resides as one database.
	• *Discuss any adjustment to assay data.*	• No adjustments have been made to any coal quality data unless for obvious typographical errors. Regressions using all determined coal quality data on a seam group basis were constructed and missing data calculated and added to the digital database. • Coal interval thicknesses were matched with wire-line geophysics according to normal industry standards. Expanded coal interval intersections and corresponding sample thickness were reduced in thickness to match the geophysics. Where coal interval intersections were less, loss was added in the lithology log at the determined location using comparison thicknesses between observed partings and wire-line rock responses. If the loss occurred within a sample the sample thickness was

Criteria	JORC Code explanation	Commentary
		adjusted to reflect the loss. • All samples once collected at the central logging facility were weighed for mass and this mass was matched with laboratory sample mass. • All compositing for the Resource estimate was done mathematically based on sample thickness and relative density. The only composites made by the laboratory were for coke and caking tests. • All sample data and composite data are recorded in the LogCheck data management software and GeoBANK database.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.*	• The topographic and borehole collar survey was carried out by ER's own survey team using Trimble equipment. • Drill hole collars were surveyed using a Trimble R8 GPS which has a static horizontal and vertical accuracy of ±3mm +0.1ppm RMS, an RTK horizontal measurement of ±3mm +0.1ppm RMS and an RTK vertical measurement ±3.5mm +0.4ppm RMS • Following a review of the LAS variance for the deviation data, the Competent Person decided to assume that boreholes were vertical for modelling purposes. This was due to the low variance of deviation of the boreholes from the vertical plane.
	• *Specification of the grid system used.*	• The grid system coordinates are UTM Zone 48 North. The same system was used for all survey data.
	• *Quality and adequacy of topographic control.*	• The topographic survey was carried out by ER's own survey team using Trimble R8 GPS which has a static horizontal and vertical accuracy of ±3mm +0.1ppm RMS, an RTK horizontal measurement of ±3mm

Criteria	JORC Code explanation	Commentary
		+0.1ppm RMS and a RTK vertical measurement ±3.5mm +0.4ppm RMS in 2008. • A difference map comparing the grid based on borehole collars and the grid based on topography was compiled with most differences being less than 1.5m, which is acceptable with a few areas greater than this around the boundaries where there is no borehole control.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.*	• Pre-2008, distance between explorations lines on the east limb was 125-500 m, while it increases up to 625-750 m for other areas of the deposit. Distance between boreholes on the exploration lines is 250-300m. Exploration depth was to 300-320 m from the surface. • The 2008 program was an infill drilling program that appeared to have an irregular design and spacing. • The drilling program that covered 2009–2011 was a 50x50m square grid on the eastern deposit area covering the mining areas first ten years. This 50x50 grid consisted of 100x100 core boreholes and 100x100 openholes for the first 400m down dip of each seam. The western area was a 120x120 triangular grid of all core boreholes. • The drilling program that covered the period 2012-2014 was an extension of the eastern deposit area in front of the mining face. This program was aligned to the western grid and was drilled on a 120x120 triangular grid of all core boreholes. • The drilling program that covered the period 2018, 2020 was an extension of the central deposit area in front of the mining face. This program was aligned to the central grid and was drilled on a 300x300 grid of all core boreholes.

Criteria	JORC Code explanation	Commentary
		• The openhole boreholes were mainly for structure and LOX work so only intercepted the first two seams in any location. The average depth was 150m. • The cored boreholes were where possible to intercept all seams. A limit of approximately 700m was placed on the boreholes in the western area. All other areas the coal measures were fully penetrated.
	• *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.*	• The data spacing is sufficient to establish a high degree of geological and grade continuity appropriate for the Mineral Resource and classifications applied. • An exercise in geostatistics to calculate estimated error on the estimate was completed which confirms high degree of geological and grade continuity.
	• *Whether sample compositing has been applied.*	• Samples within plies were composited for points of observation for the Resource estimate by mathematical method, based on sample thickness and relative density. The only analytical composites made by the laboratory were for coke and caking tests.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.*	• Pre 2008 and 2009-2014 boreholes included in the Resource estimate were drilled with a vertical orientation. Most boreholes after 2009 had verticality deviation LAS data completed. • Following a review of the LAS variance for the deviation data, the Competent Person decided to assume that boreholes were vertical for modelling purposes. This was due to the low variance of deviation of the boreholes from the vertical plane. • No evidence of bias due to borehole orientation has been observed.

Criteria	JORC Code explanation	Commentary
	• *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• No evidence of bias due to borehole orientation has been observed. • As part of the geostatistical review on estimated error a check for anisotropy was made with no evidence that there was one.
Sample security	• *The measures taken to ensure sample security.*	• For pre-2008 bore cores the following is quoted from (Dashkhorol et.al. 1989): *All coal seams and rocks of the different lithological contents were subjected to sampling. To select cored, coal samples the following method was used: Core was installed in the drill core box in such sequence, for which it will be derived from core barrel. Washing of core with clean water was used only for whole cylinders or large size fragments by hand, but fine-grained and crushed coals are not recommended for washing in the field conditions to avoid distorting of samples because of loss of any lithotypes. Interval length included in the sample has been estimated depending on thickness of a split or coal seam of any lithotype. Usually in average it equals to 1.0-1.5 m, but sometimes was more when really homogeneous components were sampled separately. If drill core contains some intersections of original lithological component, they were selected together in one sample. Then these intersections were verified through logging. Sometimes, if separation of rock intersections from coal splits was not possible they were selected together with coal, which were recorded in appropriate documents. For the calculation of medium-weighed quality indicators of coal for seam intersections, the results of analyses made for such samples were related to appropriate complicated structure interval of a seam without any*

Criteria	JORC Code explanation	Commentary
		amendment. In such cases, a complicated structure interval as a rule was defined and accepted through logging. Core recovery for coal was determined with utilization of volumetric and linear methods into sample divisions, which were organized by crew. Coal core documents were also examined there and completed preparation of samples, labelling and packing into the synthetic bags was made. Selected samples were sent monthly to laboratory. • The 2008 bore cores, little was mentioned in the Norwest report on sample security. The following is summarised (Norwest 2008): *only borehole core samples were assayed. Field samples, usually no more than 0.5m of core length. Incremental samples consisting of combined groups of field samples based on consistent lithological units interpreted from core and geophysical logs. Physical composite samples, consisting of combined incremental sample intervals representing logical mining or integral coal seam units. Large diameter (150mm) core samples of key seams for washability analyses, processing plant simulation and metallurgical characterization. Geotechnical rock strength samples taken of waste (non-coal) and coal core.* • Coal cores at the rig site, were measured in the splits then gently washed to remove drilling grime. The coal was carefully placed into core boxes with no coal remaining. The boxes were wrapped securely in plastic for transport to the central logging facility. The core boxes were delivered (average distance 5 km) to central logging facility at the end of each 10 hour shift. The central logging facility is location within the mine site.

Criteria	JORC Code explanation	Commentary
		The mine site has 24 hour high level security. The coal core boxes are stored in secure refrigerated containers attached to the central logging facility until logging. After logging and sampling, the samples were returned to refrigeration until sent to the laboratory. The laboratory is less than 500m from the central logging facility. The core was laid out on specifically designed and built logging tables. The atmospheric environment inside the central logging facility was kept to a constant temperature. The cores were re-measured and confirmed with field measurements. Geophysical logs were used to correct for seam thickness, loss and expansion were noted. The identified samples were placed in double plastic bags with sample tags placed inside the coal containing sample bag and then in between the sample bags with finally the sample information written on the outside plastic bag. The sample bag was weighed with weight corrected for the sample bag mass. A sample dispatch form is completed by the geologist, which contains all information on the sample. The form is sent to the laboratory. The laboratory accesses the secure refrigerated container to retrieve the sample as listed on the dispatch form. Confirmation of the correct sample being analysed is through the triplicate sample tag/bag information and double check with the sample weight. • Analytical data was entered into the GeoBANK database by the laboratory. The GeoBANK database was first populated with borehole number and sample number from the logged data in the LogCheck software. This data was seamlessly uploaded into the GeoBANK

Criteria	JORC Code explanation	Commentary
		database for laboratory access. Once the data was entered by the laboratory and validated it could be passed back to Geology for importing into the master Excel spreadsheets for further processing and validation. Final data was seamlessly passed to the LogCheck software for final validation and repository for points of observation.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• An initial site visit was completed by Mr Ballantine as a consultant for Micromine Pty Ltd in late January 2009. The visit was commissioned by Mr Andrew Little, Technical Director (at the time) for ER. The purpose of this visit was to audit the topographical and geological data and to assess the quality of the information recorded into the digital geological database and to comment on the implications that this would have on the confidence in the geological model of the UHG coal deposit. The audit used the reference 'Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996)' to compare with the data collected and is referred to as the standard. Numerous issues were identified and Mr Ballantine was asked provided a full time service whereby providing budgeting, planning, procedures and training for required ongoing exploration following the initial visit (January 2009) recommendations overall oversight of exploration at UHG. • Mr Ballantine (Competent Person, Resource estimate- June 2012), thought it prudent to have an independent experienced Competent Person qualified geologist provide a site visit and peer review. This was done by Mr Todd Sercombe, senior consultant for GasCoal Pty Ltd, a coal geologist with 18 years

Criteria	JORC Code explanation	Commentary
		coal experience. Mr Sercombe's findings from the site visit were; *The UHG exploration procedures and practices are of extremely high calibre, exceeding both the Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996) and the benchmark coal industry best practices (as observed by Mr Sercombe in the Bowen Basin, Australia). The accurate and unbiased assignment of coal core loss to coal samples, achieved in the UHG practices, is commendable. The coding, for modelling, of all significant stone band partings in the seams and of inter-burden units between the seams is also praiseworthy. The Exploration and Geology Department are a group of young enthusiastic geologists who have been well trained and led by Gary Ballantine. I would have high confidence in the reportable results obtained from the UHG exploration procedures.* • The exploration group has changed little from the previous JORC (2004) Resources report- June 2012 so the independent peer review by Mr Sercombe is still relevant. • Mr Ballantine currently holds the position of Executive General Manager, Exploration and Geology and has responsibility for budgeting, planning, training and overall oversight of exploration at UHG. As part of the ongoing evolution of the ER geology group and knowledge transfer, supervised and structured succession of capable individuals, is planned. Mr Ballantine understands that complacency can creep into a well establish team. To prevent this he does frequent site visits with Mr Said (Competent Person) every few months and they review different

Criteria	JORC Code explanation	Commentary
		member's capabilities against the exploration procedures. As part of Mr Ballantine's role as mentor and internal auditor, all final data, (i.e. seam thickness, seam correlation, sampling intervals, coal quality analysis, collar survey and LAS quality) are reviewed once the team (supervised by the Competent Person) has done the work. With the above process it is Mr Ballantine's professional opinion that there is a very high compliance with the teams results and JORC standards. • Internal peer review of exploration work 2018, 2020 was conducted by Mr. Lkhagva-Ochir Said, the then Executive General Manager of Mining and Processing. These peer reviews confirmed compliance of the Group's work to update the Coal Resource estimations in compliance with requirements of the JORC Code (2012).

Section 2: Reporting Exploration Results

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.*	• The license is wholly owned by ER and was granted by the Mineral Resources and Oil Authority on 23rd January 2007 for a period of 30 years. In accordance with this consensus the License Transfer Agreement was signed on 21st March 2008 and the coordinates of license [MV-011952] was increased from 1011 hectares up to 2962 Ha. On the 1st April 2010, a further minor change to the license was made, which reduced the area to its now present 2960 Ha.
	• *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• The license is 100% secure and owned by ER.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• The TT deposits of fossilized coal was discovered and exploited by the local people since early 19th century. • The first official information on the deposit appears in reports by geologist K.D.Pomazkov, who studied the coal in a small open-cut pit in 1940. The coal of the deposit was surveyed and tested by the geologist N.A.Marinov in 1943-1953. • In 1975, from shafts sunk in the deposit, five semi-industrial (pilot-plant rank) samples were taken from seams 4A, 4B, 8A, 8B, 8C, 9A, 9B, 9C by Bulgarian geologists. • In 1977 at the request of the Government, MPR (Mongolian People's Republic), 'LENGIPROSHAHT' conducted technical and economic

Criteria	JORC Code explanation	Commentary
		assessment for detailed exploration, upon the condition that the coal of all seams is coking, relying on the results of incomplete exploration works. • In 1985-1987 exploration and evaluation works were conducted in areas directly connected to the Eastern, Bor Tolgoi and Ukhaa Khudag. More perspective and potential among these was the area of UHG, which underwent a preliminary survey in 1987. As results of exploration-evaluation work it was established that the most valuable coal seams by quality and thickness are located within the UHG deposit. • In 1984-1989 continual testing of coal by the USSR's VUHIN Institute of Minchermet; the Institute completed studies of the chemical characteristics of the coking coal for Tsankhi & preliminary reports of the coal from Ukhaa Khudag and Tavan Tolgoi South. • ER conducted an infill drilling and bulk sampling program at UHG in 2008, which was planned and managed by Norwest. The purpose of this program was to address the issues identified above and bring the bulk of the UHG resource to a level of geologic assurance sufficient for mine planning and feasibility level study. • A total of 111 Russian drilled holes were used in the Norwest model, the majority being cored holes. The Norwest program included a total of 121 holes,

Criteria	JORC Code explanation	Commentary
		comprised of 17 slim gauge core holes (PQ/HQ), 99 slim rotary holes (± 100mm) and 5 large diameter core/bulk sample locations. A grand total of 232 holes were used in the creation of the current (2008) geologic model with an average drilled depth of approximately 200m. • The 2008 program sufficiently increased the prior borehole density and validated the historic Russian data to an extent sufficient for categorizing the UHG mine area as a measured plus indicated resource according to the JORC Code and thereby permitting advanced mine planning and economic evaluations to be conducted at current international standards. The drilling plan will also penetrate to a depth of 600m, thus bringing potentially underground mineable resources into a higher level of confidence.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• The late Paleozoic was marked by the continental collision of a number of small micro-continents that came together as convergent margins. As the Siberian Craton and the North China block converged, ancient continental crust was thrust onto the continental margin and small island arcs, subduction wedges, and ophiolitic belts were accreted as pre-existing basement rock was deformed and faulted, and uplift initiated. • Island arc geometry, similar to how the Bowen Basin was

Criteria	JORC Code explanation	Commentary
		formed, coincides with the formation of the late Permian systems that formed the belt of Late Permian coal measures that are found in the south and south-west of Mongolia of which the Tavan Tolgoi deposit forms one of. These types of deposits form large basins that have vast lateral continuity. Unfortunately, due to the collision of India in the Tertiary, these basins in the southern regions of Mongolia have undergone later stage deformation, which appears to be more severe in the west and moderates eastward. This also explains the close proximity of large younger rift type basins that contain thick lignite deposits close to these Permian basins.
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* ○ *easting and northing of the drill hole collar* ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* ○ *dip and azimuth of the hole* ○ *down hole length and interception depth* ○ *hole length.*	• No exploration results are reported. • A total of 1,792 valid boreholes are loaded in the LogCheck data management software and GeoBANK database. Each borehole contains easting, northing, reduced level, dip, azimuth, lithology, coal intersections, sample number, geotechnical, wire-line geophysics and coal quality. • Points of observation derived from this data are in Appendix 4A and 4B of this report.
	• *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly*	• No information was excluded from above criteria.

Criteria	JORC Code explanation	Commentary
	explain why this is the case.	
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.*	• No exploration results are reported.
	• *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.*	• No exploration results are reported.
	• *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• No exploration results are reported.
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.*	• No exploration results are reported.
	• *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.*	• No exploration results are reported.
	• *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	• No exploration results are reported.
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• No exploration results are reported.
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid*	• No exploration results are reported.

Criteria	JORC Code explanation	Commentary
	misleading reporting of Exploration Results.	
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• No exploration results are reported. • A ground Magnetic and Gravity program was undertaken by Monkarotaj LLC in November 2010. The results were high level and provided some guidance with understanding the magnetic hydrothermal fluids and broad coal basin limits. • Polaris Seismic International was awarded the contract to conduct 2D Land High Resolution Seismic Survey at UHG in 2010 and 2011. The 2D UHG 2010 Seismic program recorded 22 lines totalling 46,000m and the 2011 Seismic program recorded 15 lines totalling 25,270m using Roll On and Roll Off methodology with 240 maximum active channels and using dynamite as the source
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).*	• No exploration results are reported.
	• *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• No exploration results are reported.

Section 3: Estimation and Reporting of Mineral Resources

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.*	• For programs pre-2009, hard copy and scanned data was part of the data set supplied to ER. All care has been taken in the translation, recoding and digitising of this data into the COALLOG format. This data has been loaded into the LogCheck data management software and validated for codes, depth errors and consistency. Where photographs exited then these were checked against the coded data. Final checks were data making with wire-line geophysics and through sections with neighbouring boreholes for consistency. • For 2009-2014 programs the raw data was captured in forms using codes in the COALLOG format in hard copy format. This data was then entered into the LogCheck data management software which has very strict validation rules. These rules assist in data being correctly entered. The logging is done in a controlled environment in a central logging facility located on the mine site. Analytical data was entered into the GeoBANK database by the laboratory. The GeoBANK database was first populated with borehole number and sample number from the logged data in the LogCheck software. This data was seamlessly uploaded into the GeoBANK database for laboratory access. Once the data was entered by the laboratory and validated it could be passed back to Geology for importing into the master Excel spreadsheets for further processing and validation. Final data was seamlessly passed to the LogCheck software for final validation and repository for points of observation. All systems are designed to only enter data once. Once all validation, correlation and points of observation checks are completed, points of observation are produced by the LogCheck data management software by way of csv files and these files are uploaded

Criteria	JORC Code explanation	Commentary
		to the Micromine modelling software. • Within the modelling software once final validation and correlation checks are completed. Anomalous seam thickness is validated and if due to faulting is taken out of the database. This data is recorded in Appendix 17 in the report.
	• *Data validation procedures used.*	• The COALLOG codes and forms were used for logging which controlled the format and codes to be used. This data was entered once into the LogCheck data management software which has very strict validation rules on entered data.
		• Once the coded and depth entered data was validated, borehole profiles were produced with wire-line geophysics. Coal intersections were validated with wire-line geophysics coal intersections and core loss or expansion was noted. Where coal loss occurred it was entered into the lithology log as a loss. These final boreholes are recorded in Appendix 8 in the report. Borehole sections in southing and northing directions were produced for seam correction. These records are stored in Appendix 9 of the report. Final validation was completed on the block model through boreholes sections and anomalies investigated. • Data was entered once into the LogCheck data management software for geology/header/drilling/LAS/Geotech data and once into the GeoBANK database for analytical data. Data transfer for analytical data into LogCheck data management software and LogCheck into the Micromine modelling software was done by passing csv files seamlessly.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	• An initial site visit was completed by Mr Ballantine as a consultant for Micromine Pty Ltd in late January 2009. The visit was commissioned by Mr Andrew Little,

Criteria	JORC Code explanation	Commentary
		Technical Director (at the time) for ER. The purpose of this visit was to audit the topographical and geological data and to assess the quality of the information recorded into the digital geological database and to comment on the implications that this would have on the confidence in the geological model of the UHG coal deposit. The audit used the reference 'Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996)' to compare with the data collected and is referred to as the standard. Numerous issues were identified and Mr Ballantine was asked provided a full time service whereby providing budgeting, planning, procedures and training for required ongoing exploration following the initial visit (January 2009) recommendations overall oversight of exploration at UHG.
		• Mr Ballantine (Competent Person, Resource estimate- June 2012), thought it prudent to have an independent experienced Competent Person qualified geologist provide a site visit and peer review. This was done by Mr Todd Sercombe, senior consultant for GasCoal Pty Ltd, a coal geologist with 18 years coal experience. Mr Sercombe's findings from the site visit were; *The UHG exploration procedures and practices are of extremely high calibre, exceeding both the Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996) and the benchmark coal industry best practices (as observed by Mr Sercombe in the Bowen Basin, Australia). The accurate and unbiased assignment of coal core loss to coal samples, achieved in the UHG practices, is commendable. The coding, for modelling, of all significant stone band partings in the seams and of inter-burden units between the seams is also praiseworthy. The Exploration and Geology*

Criteria	JORC Code explanation	Commentary
		Department are a group of young enthusiastic geologists who have been well trained and led by Gary Ballantine. I would have high confidence in the reportable results obtained from the UHG exploration procedures. • The exploration group has changed little from the previous JORC (2004) Resources report- June 2012 so the independent peer review by Mr Sercombe is still relevant. • Mr Ballantine was employed by Executive General Manager, Exploration and Geology and was responsibility for budgeting, planning, training and overall oversight of exploration at UHG. As part of the ongoing evolution of the ER geology group and knowledge transfer, supervised and structured succession of capable individuals, is planned. Mr Ballantine understands that complacency can creep into a well establish team. To prevent this he does frequent site visits with Mr Said (Competent Person) every few months and they review different member's capabilities against the exploration procedures. As part of Mr Ballantine's role as mentor and internal auditor, all final data, (i.e. seam thickness, seam correlation, sampling intervals, coal quality analysis, collar survey and LAS quality) are reviewed once the team (supervised by the Competent Person) has done the work. With the above process it is Mr Ballantine's professional opinion that there is a very high compliance with the team's results and JORC standards. Collar survey is one task that requires a manual audit. Mr Ballantine on his most recent visit to UHG in mid-November 2014 audited the collar survey for boreholes drilled in the period 2012-2014 with a hand held GPS device. • All GPS coordinates of boreholes and boundary pegs checked were within the

Criteria	JORC Code explanation	Commentary
		tolerance of the GPS device. • Internal peer review of exploration work 2018, 2020 was conducted by Mr. Lkhagva-Ochir Said, the then Executive General Manager of Mining and Processing. These peer reviews confirmed compliance of the Group's work to update the Coal Resource estimations in compliance with requirements of the JORC Code (2012).
	• *If no site visits have been undertaken indicate why this is the case.*	• Not applicable, see above section.
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.*	• Detailed mapping from the various campaigns from the 1940's. • A ground Magnetic and Gravity program was undertaken by Monkarotaj LLC in November 2010. The results were high level and provided guidance with understanding the magnetic anomaly and confirmation of broad coal basin limits. • The 2D High Resolution Seismic Survey recorded 37 lines totalling 71,270m using Roll On and Roll Off methodology with 240 maximum active channels and using dynamite as the source proved invaluable in locating and understanding fault systems but, just as importantly, showed areas of little to no structure and this is one of the great positives with using Seismic. In addition, the seismic results gave detailed knowledge of the coal basin shallow surface limits. • Seismic results on structure have been confirmed and updated by mine geology team detailed in-pit and face-wall mapping. • The northern and southern fault boundaries coal/basement contact has been confirmed by face-wall mapping by the geology mine team and angled geotechnical drilling along strike to confirm continuity. • The 'limit of oxidation' was determined by close spaced drilling and confirmed by mapping and sampling from mine geology

Criteria	JORC Code explanation	Commentary
		team. • Seam correlation, continuity and coal quality was confidently predicted by use of close spaced drilling in the eastern and western areas and these results confirmed and supported by detailed 2D seismic. The confirmation of the seismic by drilling results gives confidence where drill spacing is less that correlation and continuity in the seismic provides solid evidence that continuity exists. • Where seismic displayed major structural zones and within these zones boreholes intercepting coal had low confidence of continuity, the seismic was used to map polygons about these areas and deem them as Inferred which was not dependent on points of observation distance. • The continuity of the final computer model provides a high level of confidence. By interrogating the model with all data visible by sections and carefully inspecting allows the Competent Person the confidence to procedure to the final estimate. • As a high level overarching check on the estimate and the confidence of the estimate, expected error on the estimate was used as an aid in understanding the spatial measurements used for the classification categories. As an extension of this the 'loss' function was also estimated determining overall error which, can be used to determine maximum error for Measure and Indicated categories which was 6% and 12% respectfully.
	• *Nature of the data used and of any assumptions made.*	• The essence of the data used is borehole observations with support from detailed mapping and 2D High Resolution Seismic Survey. • No assumption with a material effect to the estimate was made. Notwithstanding, missing or non-analysed coal quality data

Criteria	JORC Code explanation	Commentary
		due to limited sample mass was calculated by regressions and this has been assumed to be adequate for inclusion of the estimate.
	• *The effect, if any, of alternative interpretations on Mineral Resource estimation.*	• There are no alternative interpretations known to the Competent Person at this time.
	• *The use of geology in guiding and controlling Mineral Resource estimation.*	• The geology was used in understanding deposit limits and structure. The geology was also used to determine deposit type.
	• *The factors affecting continuity both of grade and geology.*	• The coal measure was limited by surface outcrop of the seams in the eastern boundary. • The northern and southern limits were fault bounded with generally a steep sharp overthrusting contact. Coal seams close to this contact were highly deformed and coal quality was highly variable. • The western boundary was limited by the license boundary but the seams are continuous beyond this point. • Within the deposit, major structural zones effected coal seam continuity and coal quality. Rank increases due to the major structures effected coal quality.
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	• The coal resource area is oriented generally in an east-west direction and is some 7.5m long and 3 km wide. • The area of the license is 2960.23 hectare • The seams mostly outcrop in the eastern area of the deposit with an average of 10m of unconsolidated Quaternary sediments overlaying the Permian coal measures. The base of weathering is on average between 15 to 25m. • Drilling in the western area went to 700m depth and it is estimated the coal measures still extend another 300m past the drilling. • The model extension is less than 100m deeper than the deepest borehole.

Criteria	JORC Code explanation	Commentary
		Categories were extended half the distance past the last borehole but this had little effect on the estimate due to the dimensions of the deposit. • No resource has been estimates outside of the Lease boundaries.
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.*	• The UHG resource estimate was carried out using Micromine's Version 2021.5 and LogCheck Version 7.277 using the COALLOG geology data format as the database. • The method used for estimating Resources at UHG involved modelling an elevation grid for the major ply, 0AL, and modelling thickness grids for the other plies and partings. These thickness grids for the plies and partings were then stacked on top or below of the elevation grid to form a 3D block model. • To create an accurate and reliable 3D model of the coal seams a kriging algorithm with semivariogram modelling for the seam elevation was used. Kriging is a very flexible gridding method that can be custom-fitted to any data set by specifying the appropriate semivariogram model. Kriging incorporates anisotropy and underlying trends. The purpose of geostatistical analysis was to generate a series of semivariograms that could be used as the input weighting mechanism for the Kriging algorithm. To be able to conduct reliable geostatistical analysis there is a requirement to have sufficient number of points. As such, ply 0AL was used for geostatistical analysis as it was intersected by the largest number of boreholes and is the most consistent ply across the area. • To create the block model an elevation grid was created for the major lower ply 0AL and then the thickness grids for the other plies and partings were stacked above or below this as required. In order to use this method

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		each borehole needed to contain an interval for each ply and parting even if the ply or parting was 'pinched out' and was not intersected by that borehole. Some plies were not intersected by the boreholes and so 'virtual' plies with a thickness of zero were inserted in order to model the seam morphology. The location of these virtual plies was determined by using the MICROMINE extrapolation tool, which uses Inverse Distance Weighting with a power of 2. Where boreholes intercepted plies, but these plies were not present due to deterioration as a result of changing sedimentary environments then these plies were inserted as zero thickness plies at the roof or floor of a logged ply. Stone parting intervals were logged in the raw database, but where they were missing they were added to all ply groups for each borehole even in cases where the parting thickness was zero. • In order to create a reliable model of the seam morphology a cell size of 10m by 10m was selected for gridding. Gridding with exact interpolation using ordinary kriging was used to generate grids for the elevation of the mid-point of the plies and Kriging with a omnidirectional semivarigram was used to generate grids for the thicknesses of the plies. To allow the grids to cover the necessary areas, a circular search radius of 10,000m with maximum of 12 points was used to create the elevation grids. The thickness grids were created using a circular search radius of 10,000m with maximum of 12 points per sector. • The base of Quaternary grid was produced using IDW with a power of two search radius of 500m with maximum of 4 points per sector. • The Extremely weathering grid was produced using IDW with a power of two

Criteria	JORC Code explanation	Commentary
		search radius of 500m with maximum of 4 points per sector. • The base of weathering grid was produced using IDW with search radius of 500m with maximum of 4 points per sector. • The base of weathering grid was used in conjunction with mapped LOX lines as the upper most cut-off for coal. • Weathered coal can be calculated between the base of weathering and Extremely weathering grid. This coal has been successfully mined and has been commercial sold as Thermal coal. For the purpose of this resource estimate it has been included in the estimate. A Topography surface grid was produced using Implicit model. This was then created into a DTM. • The 3D gridded seam block model was generated by stacking thickness grids on top or below of the major ply (0AL) elevation grid. The centroid of the block East and North was the X and Y values from the grid file which was 25x25m (grid cell size), the centroid of the block RL was the Z value from the elevation grid and block size by RL was the Z value from thickness grids. • The Competent Person for this estimate used the expected error in the estimate to support distances for Measured and Indicated categories. For Inferred category the narrow dimensions of the deposit may cause a misleading result using the expected error technique so the experience of the Competent Person and detailed knowledge of the deposit were sufficient for determining this category spacing. In determining extrapolation beyond last data points, half the category distance was applied. Due to the data spacing and deposit dimensions this did not have a major affect. The shapes for the categories was mostly automated with the Micromine software, however where this case was not true the

Criteria	JORC Code explanation	Commentary
		edge of the data was manually edited by the Competent Person. In addition, due to major structure some areas were hard-wired for specific categories like Inferred and data spacing had no influence. • Measured resources were estimated with points of observation at 350m, Indicated resources were estimated with points of observation at 700m, and Inferred resources were estimated with points of observation at 1500m. • Seam coding was applied to composite plies into seams based upon a specified minimum coal thickness and a maximum parting thickness. The seams were also coded on the basis of resource classification so that only plies of the same resource classification were combined together with their partings. The following modifying factors were used for seam coding; No maximum seam thickness. Minimum seam thickness to be included in the Resource of 0.5m to 400m depth and then 1.5m below 400m. Maximum parting thickness to be included in the Resource of 0.5m. Coal Quality limit with Ash content greater than 50% (DRY basis) being excluded from the Resource Estimate. • Following seam coding, coal quality interpolation was carried out. Only intervals that were marked as a point of observation were used for coal quality interpolation. IDW algorithm with a power of three was used to interpolate the coal quality into the empty block model. Coal quality interpolation was conducted for each ply separately. One search run at 7,000m radius was used to interpolate all the blocks in each model. Filters were applied to make sure that only points of observation for the selected ply were used for the interpolation of the blocks for that ply. • Partings within the model limits but without coal quality were given default coal quality

Criteria	JORC Code explanation	Commentary
		parameters based on rock quality analyses.
	• *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.*	• Norwest completed a JORC (2004) estimate in 2010. There was a 23 per cent increase in total air-dried Resource with the JORC (2004) estimate completed by ER in 2012 (excluding mine depletion). The JORC (2012) estimate (excluding mine depletion) based on this report compares well with an increase in 3 per cent in total as-received Resource. • ER completed a JORC (2012) estimate (excluding mine depletion) estimate in 2014. There was a -8 per cent decrease in total as-received Resource with the JORC (2012) estimate completed by ER in 2021 (excluding mine depletion). • The mine has produced 78.8 Mt since April 2009 and the mine geology team completes regular (monthly) reconciliation of model/mined ROM tonnage. Where the model has good borehole control the mine recovery is well aligned, however, once borehole control is less there is a notable variance. The drilling campaigns that this estimate is based on plus the review of category limits under JORC (2012) means this notable variance will be minimised and demonstrates the estimate is valid.
	• *The assumptions made regarding recovery of by-products.*	• The report in section 4.7.2.6 shows typical production figures from the CHPP. Depending on which seam is being washed and what blends are being appointed three main products are produced. A mid-vol hard coking product, high-vol semi soft coking product and high-ash middling by-product for the thermal coal market.
	• *Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).*	• Norwest in their JORC (2004) estimate in 2010 mentions that samples were collected for Acid Generating Potential in 2008. • Further rock and in seam parting samples were collected by the ER geology team for

Criteria	JORC Code explanation	Commentary
		further work by EGI on Acid Generating Potential. • A total of 631 samples were tested from these holes, including coal and parting samples. All holes were sampled continuously except where there were missing intervals. Sample intervals were selected by site geologists in conjunction with EGI to match geological boundaries, with intervals ranging from less than 0.5m to over 5m. Standard ARD testing was carried out on these samples by the Stewart Mongolia LLC Ulaanbaatar laboratory, with EGI providing advice on testing methods and carrying out quality control and specialised testing on a sub set of 42 samples. • Results indicate that the vast majority of overburden/interburden and pit floor materials represented by the samples tested are unlikely to be acid producing or release significant salinity. The NAF overburden and interburden has excess ANC, providing a high factor of safety and offering a potential source of materials to mitigate ARD from PAF washery waste materials. PAF-LC samples made up only 2 per cent of samples tested, and PAF samples accounted for 0.3 per cent. PAF/PAF-LC materials occur in the immediate 0.5m of a number of coal seams, and could potentially produce localised ARD if not mixed effectively with the NAF overburden and interburden. Near surface (within 5 to 10m of surface) materials have higher salinity due to salt accumulation. • This work lead to the design and disposal of high sulphur reject material from the CHPP in the waste dumps.
	• *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.*	• In order to create a reliable model of the seam morphology a cell size of 10x10m was selected for gridding. Gridding with exact interpolation using ordinary kriging was used to generate grids for the elevation of the

Criteria	JORC Code explanation	Commentary
		mid-point of the plies and Kriging with a omnidirectional semivarigram was used to generate grids for the thicknesses of the plies. To allow the grids to cover the necessary areas, a circular search radius of 10,000m with maximum of 12 points was used to create the elevation grids. The thickness grids were created using a circular search radius of 10,000m with maximum of 12 points per sector. The 3D gridded seam block model was generated by stacking thickness grids on top or below of the major ply (0AL) elevation grid. The centroid of the block East and North was the X and Y values from the grid file which was 25x25m (grid cell size), the centroid of the block RL was the Z value from the elevation grid and block size by RL was the Z value from thickness grids.
	• *Any assumptions behind modelling of selective mining units.*	• All seams were modelled, therefore there were no 'specific' horizons that were separately modelled. However, there is a change in minimum seam thickness for below 400m Resources from 0.5m to 1.5m to reflect the possibility of only underground Resources past this depth.
	• *Any assumptions about correlation between variables.*	• Missing or non-analysed coal quality data due to limited sample mass was calculated by regressions of determined coal quality data on a seam group basis and this has been assumed to be adequate for inclusion of the estimate.
	• *Description of how the geological interpretation was used to control the resource estimates.*	• Geological interpretation using the seismic results was critical in identifying major structure and confirming seam correlation and continuity. Much of these results have been confirmed and updated by mine geology team detailed in-pit and face-wall mapping. • The northern and southern fault boundaries

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		coal/basement contact has been confirmed by face-wall mapping by the geology mine team and angled geotechnical drilling along strike to confirm continuity. • The 'limit of oxidation' was determined by close spaced drilling and confirmed by mapping and sampling from mine geology team. • Where seismic displayed major structural zones and within these zones boreholes intercepting coal had low confidence of continuity, the seismic was used to map polygons about these areas and deem them as Inferred which was not dependent on points of observation distance.
	• *Discussion of basis for using or not using grade cutting or capping.*	• A greater than 50% ash (DRY basis) cut-off was used to determine what coal was and what rock was.
	• *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	• The block model was firstly checked to ensure that all blocks were populated and that block values were within the same range as the input values. Following this a visual validation was conducted by loading the block model into the Micromine 3D viewer together with borehole traces, plies from the original points of observation file, base of weathering, base of Quaternary and topographic surfaces. Each cross-section was then reviewed to check that the plies from the original points of observation file agreed with the plies in the block model. • A further manual check was completed by the Competent Person where an area including boreholes G02057, G202193, G2212 and G02056 for the ply 3AU was compared with the block model. The manual result was within 3 per cent in tonnage of the block model result. This comparison is within acceptable limits.
Moisture	• *Whether the tonnages are*	• Moisture was analysed as TM (MNS ISO

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	estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	589:2008) and Analytical moisture (MNS GB/T 212:2015). TM was assumed to equal in-situ moisture and the Preston Sanders formula was used to convert air-dry relative density to as-received (in-situ) relative density. • The estimated Resource is reported on 'as received' basis and 'air dried' basis
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• No maximum seam thickness. • Minimum seam thickness to be included in the Resource of 0.5m to 400m depth and then 1.5m below 400m. • Maximum parting thickness to be included in the Resource of 0.5m. • Coal Quality limit with Ash content greater than 50% (DRY basis) being excluded from the Resource Estimate.
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.*	• The UHG mine has produced 78.8 Mt since April 2009 as a large scale 'truck and shovel' operation and has an 15Mt/year capacity CHPP. No mining assumptions have been applied to the Resource estimate other than minimum coal thickness and maximum in-seam parting thickness which has been taken from engineering operational advice. In the exploration process sufficient roof and floor sampling and analysis has been completed for Reserve estimates of dilution.
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of*	• The report in section 4.7.2.6 shows typical production figures from the CHPP. Depending on which seam is being washed and what blends are being appointed three

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	determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.	main products are produced. A mid-vol hard, low ash, coking product, high-vol, low ash, semi soft coking product and high-ash middling by-product for the thermal coal market. • The Resource estimate for this report has had no assumptions made on the estimate for beneficiation.
Environmental factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	• All environmental issues are managed by the company's environmental department which has operated since the start of mining. • In addition, under the Mining Licence there are strict environmental conditions. While these were not reviewed in detail they are relevant to the operation to ensure that waste material is well managed and that what soil profiles are available in the area are used for the rehabilitation process. • During all site visits there have been no obvious environmental issues of leachates emanating from spoil piles or from coal stockpiles.
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the*	• True Relative Density was analysed for 40,126 samples, or 91.8 per cent of all samples (MNS GB/T 217:2015). The missing Relative density data was calculated using the regression on a seam group basis of RD v

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	measurements, the nature, size and representativeness of the samples.	ASH for air dried and as-received samples. • An industry standard method for estimating in situ RD was applied using the Preston Sanders formula was used to convert air-dry relative density to as-received (in-situ) relative density.
	• *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.*	• An industry standard method for estimating in situ RD was applied using the Preston Sanders formula was used to convert air-dry relative density to as-received (in-situ) relative density.
	• *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	• Partings within the model limits but without coal quality were given default coal quality parameters based on rock quality analyses. These are defined in the report in Table 9-5.
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.*	• The basis for the classification for the Resource estimate is taken from guidance from the Australian Coal Guidelines (2014). • The basis of the classification confidence categories is from the results of an investigation of expected error for the 95th percentile through the use of Conditional Simulation Geostatistics.
	• *Whether appropriate account has been taken of all relevant factors (i.e. relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).*	• Exploration prior to 2009 had been done to good geological standards however, not always to JORC standards. The geological teams of this era were well trained in the collection of geological information and this information has been used affectively for the current Resource estimates and have assisted greatly in the preliminary understands of seam correlation, continuity, coal quality and boundary limits. • Since 2009 having a highly trained team to international and Australian standards, modern drilling methods and equipment, good downhole geophysics, high quality 2D

Criteria	JORC Code explanation	Commentary
		seismic, good survey control for borehole locations and topography, a modern onsite accredited coal laboratory and having an active modern mine, there is great confidence that the resulting Resource estimate for this report is highly reliable. • As a further measure to understand the confidence in the estimate the high level overarching check on the estimate, expected error on the estimate was used as an aid in understanding the spatial measurements used for the classification categories. As an extension of this the 'loss' function was also estimated determining overall error which, can be used to determine a range that the estimate applies too.
	• *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• The Competent Person has confidence in the resource figures reflecting well the contained coal resource.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• Mr Ballantine (Competent Person, Resource estimate- June 2012), thought it prudent to have an independent experienced Competent Person qualified geologist provide a site visit and peer review. This was done by Mr Todd Sercombe, senior consultant for GasCoal Pty Ltd, a coal geologist with 18 years coal experience. Mr Sercombe's findings from the site visit were; The UHG exploration procedures and practices are of extremely high calibre, exceeding both the Australian Standards for coal evaluation and sampling (AS 2519—1993 & AS 2617—1996) and the benchmark coal industry best practices (as observed by Mr Sercombe in the Bowen Basin, Australia). The accurate and unbiased assignment of coal core loss to coal samples, achieved in the UHG practices, is commendable. The coding, for modelling, of all significant stone band partings in the seams and of inter-burden units between the seams is also

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		praiseworthy. The Exploration and Geology Department are a group of young enthusiastic geologists who have been well trained and led by Gary Ballantine. I would have high confidence in the reportable results obtained from the UHG exploration procedures.
		• The exploration group has changed little from the previous JORC (2004) Resources report- June 2012 so the independent peer review by Mr Sercombe is still relevant. • Mr Ballantine was employed by Executive General Manager, Exploration and Geology and was responsibility for budgeting, planning, training and overall oversight of exploration at UHG. As part of the ongoing evolution of the ER geology group and knowledge transfer, supervised and structured succession of capable individuals, is planned. Mr Ballantine understands that complacency can creep into a well establish team. To prevent this he does frequent site visits with Mr Said (Competent Person) every few months and they review different member's capabilities against the exploration procedures. As part of Mr Ballantine's role as mentor and internal auditor, all final data, (i.e. seam thickness, seam correlation, sampling intervals, coal quality analysis, collar survey and LAS quality) are reviewed once the team (supervised by the Competent Person) has done the work. With the above process it is Mr Ballantine's professional opinion that there is a very high compliance with the team's results and JORC standards. In addition, Mr Ballantine has completed an oral review and internal audit with the Competent Person for every step of the data preparation of the points of observation and the modelling stages to the final estimate. • Internal peer review of exploration work 2018, 2020 was conducted by Mr. Lkhagva-

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		Ochir Said, the then Executive General Manager of Mining and Processing. These peer reviews confirmed compliance of the Group's work to update the Coal Resource estimations in compliance with requirements of the JORC Code (2012).
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.*	• As a measure relative accuracy and to understand the confidence in the estimate the high level overarching check on the estimate, expected error on the estimate was used as an aid in understanding the spatial measurements used for the classification categories. As an extension of this the 'loss' function was also estimated determining overall error which, can be used to determine a range that the estimate applies too. • In addition, the 3D model for the estimate was accurate and reliable due to a kriging algorithm with semivariogram modelling for the seam elevation and thickness was used. Kriging is a very flexible gridding method that can be custom-fitted to any data set by specifying the appropriate semivariogram model. Kriging incorporates anisotropy and underlying trends. The purpose of geostatistical analysis was to generate a series of semivariograms that could be used as the input weighting mechanism for the Kriging algorithm. To be able to conduct reliable geostatistical analysis there is a requirement to have sufficient number of points. • The use of high level 2D seismic, downhole geophysical data, modern drilling with high core recovery, a modern onsite accredited coal laboratory and highly trained geologists gives high confidence and confirms the existence of location of the coal seams in 3D space. A detailed understanding of the coal seam geometry from trenches and existing operating mine pits, also gives a high level of

Criteria	JORC Code explanation	Commentary
		confidence in the estimate.
	• *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.*	• The Resource estimate for this report is a global estimate to international standards and meets all JORC 2012 requirements. • All assumptions and procedures for the Resource estimate are documented within the report sections or as Appendices.
	• *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• The mine has produced 35.3 Mt since April 2009 and the mine geology team completes regular (monthly) reconciliation of modelled versus mined ROM tonnage. Where the model has good borehole control the mine recovery is well aligned, however, once borehole control is less there is a notable variance. The drilling campaigns that this estimate is based on plus the review of category limits under JORC (2012) means this notable variance will be minimised and demonstrates the estimate is valid.

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