## **IMPORTANT NOTICE**

# THIS OFFERING IS AVAILABLE ONLY TO INVESTORS WHO ARE EITHER (1) A QUALIFIED INSTITUTIONAL BUYER (a "QIB") WITHIN THE MEANING OF RULE 144A UNDER THE UNITED STATES SECURITIES ACT OF 1933 (THE "SECURITIES ACT") OR (2) PERSONS OUTSIDE THE UNITED STATES IN COMPLIANCE WITH REGULATION S UNDER THE SECURITIES ACT.

**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 Morgan Stanley & Co. International Plc and The Hongkong and Shanghai Banking Corporation Limited (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) either (A) you are a QIB (within the meaning of Rule 144A under the Securities Act) or (B) (i) 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 (ii) 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.

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.

#### STRICTLY CONFIDENTIAL



# MONGOLIAN MINING CORPORATION

(Incorporated in the Cayman Islands with limited liability)

and

# **ENERGY RESOURCES LLC**

(Incorporated in Mongolia with limited liability)

#### US\$350,000,000

#### 8.44% Guaranteed Senior Notes due 2030

#### **Issue Price: 98.766%**

Our US\$350,000,000 8.44% Guaranteed Senior Notes due 2030 (the "Notes") will bear interest from April 3, 2025 at 8.44% per annum payable semiannually in arrears on April 3 and October 3 of each year, beginning on October 3, 2025. The Notes will mature on April 3, 2030.

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 April 3, 2027, at the redemption prices set forth in this Offering Memorandum plus accrued and unpaid interest, if any, to (but not including) the redemption date.

At any time and from time to time prior to April 3, 2027, 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 April 3, 2027, the Issuers may redeem up to 35% of the Notes, at a redemption price equal to interest, if any, to (but not including) the redemption date. At any time and from time to time prior to April 3, 2027, the Issuers may redeem up to 35% of the Notes, at a redemption price of 108.44% 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 (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. 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 188.

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 on the SGX-ST subsidiary Guarantees. The Notes will be traded on the SGX-ST in a minimum board lot size of \$\$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 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).

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 by the Initial Purchasers only (1) to "qualified institutional buyers" ("QIBs") in reliance on the exemption from the registration requirements of the Securities Act. Accordingly, the Notes are being offered and sold by the Initial Purchasers only (1) to "qualified institutional buyers" ("QIBs") in reliance on the exemption from the registration requirements of the Securities Act provided by Rule 144A ("Rule 144A") under the Securities Act, and (2) 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 252.

It is expected that the delivery of the Notes will be made on or about April 3, 2025 (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\$200,000 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 the 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.

Sole Global Coordinator

Morgan Stanley

Joint Lead Managers

**Morgan Stanley** 

HSBC

Offering Memorandum dated March 26, 2025

# **TABLE OF CONTENTS**

Definitions
Glossary.     Summary       Summary Of The Offering.     Summary       Summary Historical Consolidated Financial Information And Other Data     Summary       Risk Factors.     Summary       Use Of Proceeds.     Selected Historical Consolidated Financial Information And Other Data.       Selected Historical Consolidated Financial Information And Other Data.     Selected Historical Consolidated Financial Information And Other Data.       Management's Discussion And Analysis Of Financial Condition And Results Of Operations     Selected Historical Consolidated Financial Condition And Results Of Operations       Mongolia     Selected Verview
Summary
Summary Of The Offering.
Summary Historical Consolidated Financial Information And Other Data
Risk Factors
Use Of Proceeds
Capitalization And Indebtedness
Selected Historical Consolidated Financial Information And Other Data
Management's Discussion And Analysis Of Financial Condition And Results Of Operations Mongolia
Mongolia
Industry Overview
industry overview
Corporate Structure And History
Business.
Regulations
Directors And Management
Principal Shareholders
Related Party Transactions
Description Of Other Material Indebtedness
Description Of The Notes
Taxation
Transfer Restrictions
Plan Of Distribution
Ratings
Legal Matters
Independent Accountants
Independent Mining And Geological Expert
Listing And General Information
Index To Consolidated Financial Statements
Exhibit A – BN and THG Glogex Reserve Statement as at January 1, 2025 Ex
Exhibit B – BN and THG Glogex Reserve Report as at January 1, 2022 Ex
Exhibit C – BN Resource Statement from Company as at December 31, 2024 Ex
Exhibit D – THG Resource Statement from Company as at December 31, 2024 Ex
Exhibit E – BN and THG Resource Report as at December 31, 2021 Ex
Exhibit F – UHG Glogex Reserve Statement as at January 1, 2025 Ex
Exhibit G – UHG Glogex Reserve Report as at January 1, 2022 Ex
Exhibit H – UHG Resource Statement from Company as at December 31, 2024 Ex
Exhibit I – UHG Resource Report as at December 31, 2021

## **IMPORTANT INFORMATION**

You should rely only on the information contained in this Offering Memorandum. The Issuers have not, and Morgan Stanley & Co. International Plc and The Hongkong and Shanghai Banking Corporation Limited (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.

You are hereby notified that sellers of the securities, including the Notes and the Subsidiary Guarantees, may be relying on the exemption from the provisions of Section 5 of the Securities Act provided by Rule 144A under the Securities Act.

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 is for distribution only to persons who (i) are outside the UK, (ii) have professional experience in matters relating to investments falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005, as amended (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 or (iv) are persons to whom an invitation or inducement to engage in investment activity (within the meaning of Section 21 of the Financial Services and Markets Act 2000 (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 document relates is available only to relevant persons and will be engaged in only with relevant persons.

**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 WK 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).

Notice to capital market intermediaries and prospective investors pursuant to paragraph 21 of the Hong Kong SFC Code of Conduct – Important Notice to Prospective Investors: Prospective investors should be aware that certain intermediaries in the context of this offering of the Notes, including certain Initial Purchasers, are "capital market intermediaries" (together, the "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" (together, the "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 Issuer, the Company or any of its subsidiaries, a CMI or its group companies would be considered under the SFC Code as having an association (an "Association") with the Issuer, the Company and its subsidiaries, the CMI or the relevant group company. Prospective investors associated with the Issuer, the Company or any of its subsidiaries, 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 Initial Purchaser, such prospective investor should indicate when placing an order if it is for a fund or portfolio where the Initial Purchaser or its group company has a 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 Initial Purchaser, 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 Initial Purchaser 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 Initial Purchasers and/or any other third parties as may be required by the SFC Code, including to the Issuer, the Company and its subsidiaries, 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 the offering of the Notes. Failure to provide such information may result in that order being rejected.

## 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 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 Lead Manager, such prospective investor should indicate when placing an order if it is for a fund or portfolio where the 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 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 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 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 MNT3,420.46 to US\$1.00, which translation represents the basic exchange rate published by the Bank of Mongolia on December 31, 2024. On March 20, 2025 the translation of Togrogs into U.S. dollars published by the Bank of Mongolia was MNT3,475.37 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 IFRS Accounting Standards, 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 Accounting Standards 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 Accounting Standards. Adjusted EBITDA is not a measurement of financial performance or liquidity under IFRS Accounting Standards and should not be considered as an alternative to net income, operating income or any other performance measures derived in accordance with IFRS Accounting Standards 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 Accounting Standards. 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 Accounting Standards.

#### INDUSTRY AND MARKET DATA

We have commissioned Shanxi Fensheng Information Technology Co., Ltd, or Fensheng, as our industry consultant, to prepare an independent expert report (the "Fensheng 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. Fensheng prepared its report based on Fensheng's in-house database, independent third-party reports and publicly available data from reputable industry organizations. Fensheng has assumed that the information and data which it relied on are complete and accurate. The definition of the terms used in the Fensheng 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 Fensheng 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 Fensheng 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.

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.

Certain of the Subsidiary Guarantors are incorporated and exist under the laws of the Grand Duchy of Luxembourg ("Luxembourg") (each a "Luxembourg Company").

A substantial portion of the assets and the officers, directors or managers of the Luxembourg Companies, at any one time, are or may be located in jurisdictions outside the United States. As a result, an investor may not be able to effect service of process outside the United States upon a Luxembourg Company, or their directors, managers and officers, or enforce court judgments obtained against them or their directors, managers and officers outside of the United States.

As there is no treaty in force governing the reciprocal recognition and enforcement of judgments in civil and commercial matters between the United States and Luxembourg, courts in Luxembourg will not automatically recognize and enforce a final judgment rendered by a United States court. A valid, final, non-appealable and conclusive judgment against a Luxembourg Company with respect to the Notes, obtained from a court of competent jurisdiction in the United States, which remains in full force and effect after all appeals that may be taken in the relevant state or federal jurisdiction with respect thereto have been taken, may be entered and enforced through a court of competent jurisdiction of Luxembourg, subject to compliance with the enforcement procedures (exequatur) set out in the relevant provisions of the Luxembourg New Code of Civil Procedure (Nouveau Code de Procédure Civile) and Luxembourg case law, being:

- the judgment of the U.S. court is enforceable (*exécutoire*) in the United States;
- the U.S. court must not infringe the exclusive jurisdiction of the Luxembourg courts and there must be a real link (*lien caractérisé*) between the case and the U.S. courts;
- the judgment of the U.S. court must not contain contradictions with an existing Luxembourg court order or contravene overriding mandatory provisions of Luxembourg law;
- the judgment must not have been obtained by fraud but in compliance with the principles of natural justice and with the rights of the defendant to appear and the right to a fair trial, and if the defendant appeared, to present its defense; and
- the considerations of the foreign order, as well as the judgment, do not contravene international public policy as understood under the laws of Luxembourg or have been given 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 or jurisdiction (*fraude à la loi*). Ordinarily an award of monetary damages would not be considered as a penalty, but if the monetary damages include punitive damages such punitive damages may be considered as a penalty.

If an original action is brought in Luxembourg, without prejudice to specific conflict of law rules, Luxembourg courts may refuse to apply the designated law (i) if the choice of such foreign law was not made bona fide, (ii) if the foreign law was not pleaded and proved or (iii) if pleaded and proved, such foreign law was contrary to mandatory Luxembourg laws or incompatible with Luxembourg public policy rules. 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 exequatur may be refused in respect of punitive damages. In practice, Luxembourg courts now tend not to review the merits of a foreign judgment, although there is no clear statutory prohibition of such review.

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, holders of 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:

- 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;
- disruptions in transportation, export transportation inefficiency and delays in road, railway and cross-border infrastructure development programs;
- our ability to maintain our necessary licenses and permits;
- fluctuation in coking coal prices and competition from other coal producers;
- availability of fuel, blasting materials 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;
- difficult conditions in the global economy, financial markets and geopolitical relations;
- risks inherent to our mining and production;
- health and safety laws and regulations;
- the success of the efforts of our executive officers and our ability to attract and retain qualified technical personnel;
- 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 production capabilities;
- our plans and objectives for future operations;
- our dependency on our major customers;
- public health crises and pandemics or epidemics;
- future legislation, including regulations and rules as well as changes in enforcement policies;
- environmental laws and regulations;
- the effects of foreign currency fluctuations;
- regulatory and court decisions; 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.

## CAUTIONARY NOTE TO U.S. INVESTORS CONCERNING ESTIMATES OF RESERVES

On October 31, 2018, the SEC adopted amendments to its disclosure rules to modernize the mineral property disclosure requirements for issuers whose securities are registered with the SEC under the Exchange Act. These amendments became effective February 25, 2019, with compliance required for the first fiscal year beginning on or after January 1, 2021. Under the new SEC amendments, the historical property disclosure requirements for mining registrants included in Industry Guide 7 under the Securities Act have been rescinded and replaced with disclosure requirements in subpart 1300 of Regulation S-K under the Securities Act. As a result of the adoption of subpart 1300 of Regulation S-K, the SEC's standards for mining property disclosures are now more closely aligned to the JORC Code's requirements. For example, the SEC now recognizes estimates of "measured mineral resources", "indicated mineral resources" and "inferred mineral resources". In addition, the SEC has amended its definitions of "proven mineral reserves" and "probable mineral reserves" to be "substantially similar" to the corresponding standards under the JORC Code. However, despite these similarities, SEC standards are still not identical to the JORC Code, and there are significant differences between the reporting regimes for reserve estimates in the United States and under the JORC Code. Accordingly, investors are cautioned that there can be no assurance that the reserves and resources reported by us under the JORC Code would be the same had it prepared its reserve or resource estimates under the standards adopted under subpart 1300 of Regulation S-K and that the technical information contained within this document does not constitute a Technical Report Summary in accordance with the requirements of subpart 1300 of Regulation S-K.

UNITED STATES INVESTORS ARE ADVISED THAT THE REPORTING OF MINERAL RESOURCES IN THIS OFFERING MEMORANDUM IS ACCORDINGLY NOT COMPLIANT WITH SUBPART 1300 OF REGULATION S-K.

## 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, 2024, was prepared by Mr. Avirmed Khishigbuyan (Competent Person as defined by JORC code 2012 edition, ID #3127840, 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, 2025 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, 2024. Estimates of coal reserves of our UHG and BN deposits disclosed herein have not been adjusted to reflect production after January 1, 2025.

#### AVAILABLE INFORMATION

During any period in which the Issuers are not subject to Section 13 or 15(d) of the United States Securities Exchange Act of 1934, as amended (the "Exchange Act"), or exempt from reporting pursuant to Rule 12g3-2(b) under the Exchange Act, the Issuers will furnish, upon request, to each noteholder, or any prospective purchaser designated by any such noteholder, information satisfying the requirements of Rule 144A(d)(4) under the Securities Act to permit compliance with Rule 144A in connection with resales of the Notes for so long as any such Notes are "restricted securities" within the meaning of Rule 144(a)(3) under the Securities Act.

## **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, London Branch as trustee on April 15, 2019, pursuant to which the 2024 Notes were issued
"2026 Notes"	the U.S. dollar 12.50% guaranteed senior notes due 2026
"2026 Notes Indenture"	an indenture entered into by the Company, ER LLC, the subsidiary guarantors named therein and The Bank of New York Mellon, London Branch as trustee on September 13, 2023, pursuant to which the 2026 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 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
"СНРР"	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 a strain of coronavirus (severe acute respiratory syndrome coronavirus 2) first reported in or around 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, and its 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"	Gashuunsukhait, 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" or "IFRS Accounting Standards"	IFRS Accounting Standards, as issued by the International Accounting Standards Board
"IMF"	International Monetary Fund
"Initial Purchasers"	Morgan Stanley & Co. International Plc and The Hongkong and Shanghai Banking Corporation Limited
"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
"MIMR"	the Ministry of Industry and Mineral Resources, a cabinet-level ministry of the Government of Mongolia

"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
"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 MIMR, 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\$350,000,000 8.44% Guaranteed Senior Notes due 2030
"Parliament" or "State Great Hural"	the legislature in Mongolia
"Proved Coal Reserve"	the economically mineable part of a mineral measured resource
"QIB"	"qualified institutional buyer" within the meaning contained in Rule 144A under the Securities Act
"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
"Rule 144A"	Rule 144A under the Securities Act
"S&P"	S&P Global Ratings, a division of S&P Global Inc.
"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 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
"ТКН"	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
"Universal Copper LLC"	Universal Copper LLC, a limited liability company incorporated in Mongolia
"Universal Group"	Universal Copper LLC and its successors and subsidiaries
"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 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, 2024, 539 Mt of JORC-compliant coal resources, and as of January 1, 2025, 340 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 493 Mt of JORC-compliant coal reserves as of January 1, 2025. 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. Our UHG mine produced 12.7 Mt ROM coal for 2024. Our BN mine produced 3.6 Mt ROM coal for 2024. For the years ended December 31, 2022, 2023 and 2024, we produced an aggregate of 5.7 Mt, 14.6 Mt and 16.3 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. The total volume of coal export from Mongolia to China reached 31.8 Mt in 2022, 69.6 Mt in 2023 and 83.8 Mt in 2024. During each such period, our market share accounted for 13%, 13% and 10%, respectively, of the total volume of coal exported from Mongolia. For the years ended December 31, 2022, 2023 and 2024, we sold our hard coking coal at an average selling price of US\$147.1 per tonne, US\$160.2 per tonne and US\$168.4 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 2023, 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 11th consecutive year.

Our revenue was US\$546.2 million, US\$1,034.8 million and US\$1,039.9 million for the years ended December 31, 2022, 2023 and 2024, respectively. We recorded profit of US\$58.9 million, US\$240.1 million and US\$243.6 million for the years ended December 31, 2022, 2023 and 2024, 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:

- Reduce 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**

On February 26, 2025, the Minister of Justice and Home Affairs of Mongolia announced, among others, the establishment of the Working Group) to (i) analyze and evaluate the decision to grant mineral exploration licenses for the strategically important Tavan Tolgoi coal deposit to private entities and (ii) review previous resolutions issued by the Parliament and the Government of Mongolia in relation to this matter.

On March 6, 2025, the Minister of Justice and Home Affairs of Mongolia stated that the Government of Mongolia had decided to submit to the Parliament a draft resolution instructing the Government of Mongolia and Prime Minister Oyun-Erdene to take measures to bring the relevant part of the MLT Agreement into compliance with the law.

As of the date of this Offering Memorandum, we have not been approached by, nor have we engaged in any communication with, the Working Group. We intend to engage in official communication and correspondence with the Government of Mongolia and provide all inputs required to protect our interests and rights over the UHG Mine pursuant to what we believe is a valid and binding MLT Agreement with the Government of Mongolia. However, while we believe that the MLT Agreement remains valid and binding on both parties, we are unable to determine the outcome of any discussions we may have with the Government of Mongolia at this time. For a further discussion on this matter, see "Risk Factors – Risks Relating to our Business and Industry – The Parliament could determine that any one or more of our project sites in Mongolia is a Mineral Deposit of Strategic Importance and the Government of Mongolia could take an equity, production, profit sharing or other interest in any of our projects and any changes in the Mongolian legal frameworks or government policies may materially and adversely affect our business, prospects, financial condition and results of operations".

## CORPORATE STRUCTURE

As of the date of this Offering Memorandum, 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 Room 1910, 19/F, Lee Garden One, 33 Hysan Avenue, Causeway Bay, 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.

# 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\$350,000,000 aggregate principal amount of 8.44% Guaranteed Senior Notes due 2030 (the "Notes").
Maturity Date	April 3, 2030
Interest	The Notes will bear interest from and including April 3, 2025 at the rate of 8.44% per annum, payable semi-annually in arrears.
Interest Payment Dates	April 3 and October 3 of each year, commencing October 3, 2025.
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 <i>pari passu</i> 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 HoldCo, EM LLC, Leader Exploration LLC and Universal Copper LLC, will be Restricted Subsidiaries. Each of Singapore Holdco, EM LLC, Leader Exploration LLC and Universal Copper LLC will be an Unrestricted Subsidiary on the Original Issue Date.

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. All of the other Restricted Subsidiaries, including Tianjin Zhengcheng Import and Export Trade Co., Ltd., Inner Mongolia Fangcheng Trade Co., Ltd. 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 (1) Singapore HoldCo to guarantee the Notes unless it becomes a Wholly Owned Restricted Subsidiary or (2) any member of the EM Group or the Universal Group to guarantee the Notes, unless in each case, such member of the EM Group or such member of the Universal Group, respectively, becomes a Wholly Owned Restricted Subsidiary.

Ranking of the Subsidiary	The Subsidiary Guarantee of each Subsidiary Guarantor:
Guarantees	• 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 <i>pari passu</i> 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 April 3, 2027, the Issuers may at their option redeem the Notes, in whole or in part, at the redemption prices set forth under Description of the Notes – Optional Redemption," plus accrued and unpaid interest, if any, to (but not including) the redemption date. At any time and from time to time prior to April 3, 2027, 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. In addition, at any time and from time to time prior to April 3, 2027, 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 108.44% 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; <i>provided</i> 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.
	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, <i>plus</i> accrued and unpaid interest, if any, to (but not including) the redemption date.

	In connection with any redemption of Notes referred to in the preceding paragraphs, any such redemption or notice may, at the Issuers' discretion, be subject to one or more conditions precedent, including, but not limited to, completion of an equity or debt offering, a financing, or other corporate transactions.
Mandatory Redemption	Not later than 30 days following the date on which the mining license for the Ukhaa Khudag mine ceases to be valid and effective, the Issuers will give notice (the "Mandatory Redemption Notice") to the Holders and the Trustee that the Issuers will redeem all outstanding Notes (the "Mandatory Redemption"), in whole and not in part, on the date that is a Business Day no earlier than 30 days nor later than 60 days from the date of the Mandatory Redemption Notice (the "Mandatory Redemption Date") at a redemption price equal to 102% of the principal amount thereof plus accrued and unpaid interest on the Notes redeemed, if any, to (but not including), the Mandatory 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\$200,000 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 the common depositary for Euroclear and/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 April 3, 2025 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 Official List of 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	Rule 144A Notes: XS3038560721
	Regulation S Notes: XS3038559129
Common Code	Rule 144A Notes: 303856072
	Regulation S Notes: 303855912
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, 2022, 2023 and 2024 and the summary consolidated statement of financial position as of December 31, 2022, 2023 and 2024 set forth below have been derived from our consolidated financial statements which have been prepared in accordance with IFRS Accounting Standards (the "Audited Financial Statements"). Our Audited Financial Statements have been audited by KPMG.

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,		
	2022	2023	2024
	(in US\$'000, except earnings per share		
Revenue	546,248 (451,131)	1,034,821 (593,180)	1,039,852 (628,177)
Gross profit	95,117	441,641	411,675
Other net income	4,181 (2,434) (24,775)	7,414 (4,779) (57,272)	13,049 (9,767) (46,633)
Profit from operations.	72,089 6,286 (47,081) (40,795)	387,004 1,855 (41,958) (40,103)	368,324 4,272 (37,349) (33,077)
redemption of 2024 Notes	23,144 286	(12,975) 996	957
Share of losses of joint ventures	(16)		(1)
Profit before taxation	54,708	334,922	336,203
Income tax	4,183	(94,820)	(92,651)
<b>Profit for the year</b>	58,891	240,102	243,552
Equity shareholders of the Company Non-controlling interests Other comprehensive income for the year (after tax and reclassification adjustments)	59,177 (286)	239,686 416	242,012 1,540
Exchange differences on re-translation	(21,726)	525	(2,614)
Total comprehensive income for the year	37,165	240,627	240,938

	Year ended December 31,		
	2022	2023	2024
	(in US\$'000, except earnings per share)		
Profit attributable to the equity shareholders of the Company	59,177	239,686	242,012
Total comprehensive income attributable to the equity shareholders of the Company	38,306	240,119	239,539
Basic earnings per share	5.68 cents	21.95 cents	22.12 cents
Diluted earnings per share	5.68 cents	21.95 cents	21.77 cents

SUMMARY CONSOLIDATED STATEMENT OF FINANCIAL POSITION

	As of December 31,		
	2022	2023	2024
		(in US\$'000)	
Total non-current assets	1,560,862	1,588,538	1,748,456
Total current assets	259,646	419,903	386,757
Total assets	1,820,508	2,008,441	2,135,213
Total current liabilities	328,288	433,432	325,619
Total non-current liabilities	565,143	405,143	428,675
Total liabilities	893,431	838,575	754,294
Total equity attributable to equity shareholders of the Company	872,556	1,114,837	1,245,510
Perpetual Notes	55,476	55,476	
Non-controlling interests	(955)	(447)	135,409
Total liabilities and shareholders' equity	1,765,987	1,953,412	1,999,804

#### SUMMARY CONSOLIDATED CASH FLOW DATA

	Year ended December 31,		
	2022	2023	2024
	(in US\$'000)		
Net cash generated from operating activities	233,779	481,879	223,491
Net cash used in investing activities	(87,916) (103,874)	(172,300) (197,583)	(177,910) (80,426)

#### **OTHER FINANCIAL DATA**

	Year ended December 31,			
	2022	2023	2024	
	(in US\$'000, e	except otherwise	wise indicated)	
Adjusted EBITDA <sup>(1)</sup> Adjusted EBITDA margin <sup>(2)</sup>	133,791 24%	508,977 49%	495,870 48%	

#### Notes:

We calculate Adjusted EBITDA by adding income tax, share of losses of associates and joint venture, net finance costs, (1)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 as calculated under IFRS. We have included Adjusted EBITDA data because such data is commonly used by investors to measure a company's ability to service debt. Adjusted EBITDA 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 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 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 under IFRS to the definition of Adjusted EBITDA for the periods indicated:

	Year ended December 31,		
—	2022	2023	2024
—	(		
Profit for the year	58,891	240,102	243,552
Adjustments			
Income tax	(4,183)	94,820	92,651
Share of profits of associates and joint ventures	(270)	(996)	(956
Net finance costs.	40,795	40,103	33,077
Depreciation and amortization	61,708	94,119	124,798
Loss/(gain) on disposals of property, plant and equipment.	(6)	1,635	862
Equity-settled share-based payment expenses	_	2,162	1,886
Loss on mining equipment transferred from mining			
contractor	_	24.057	_
Loss/(gain) from repurchase, refinancing and redemption		*	
of 2024 Notes	(23.144)	12,975	_
Adjusted EBITDA	133,791	508,977	495,870

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

### **OPERATION DATA**

	Year ended December 31,		
	2022	2023	2024
	(in US\$'000, except otherwise indicated		
ROM coal production (Mt)	5.7	14.6	16.3
Average accounting stripping ratio (actual) (bcm/t)	4.7	4.4	4.2
Total coal sales (Mt)	4.7	9.8	8.6
Average sales price per tonne of HCC (US\$ per tonne) <sup>(1)(2)</sup>	147.1	160.2	168.4

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**

### 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 remained stable year-on-year at 928.0 Mt in 2024 compared to 928.3 Mt in 2023, which had decreased by 2.1% year-on-year compared to 948.2 Mt in 2022 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 negatively impacted China's construction industry and hence its steel demand. These actions, as well as any 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 started to loosen its "zero COVID" policy since December 2022, and formally ended the policy on January 8, 2023. 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 Chinese 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 Chinese 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. Heightened trade tensions between, for example, the United States and China, including the use or threatened use of tariffs by the Trump administration on U.S. imports from China, may disrupt global trade, cause economic uncertainty or negatively impact economic conditions in China. 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. These tariffs, however, were temporarily suspended from May 1, 2022, until December 31, 2023. Since January 1, 2024, a 3% import tax on coking coal and a 6% import tax on thermal coal were reinstated. 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 Government of Mongolia. 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.

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 Road LLC that is renewed on a yearly basis. The latest renewal of the agreement was made on January 29, 2025, 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. ER LLC was identified as a civil respondent by the Independent Authority Against Corruption of Mongolia (the "IAAC") in two cases under investigation by the IAAC. In 2022, ER LLC was identified as a civil respondent in an investigation of Erdenes MGL, a state-owned company, regarding the purchase of 240 km paved road from ER LLC (the amount in dispute being MNT36,423,614,978.34 (approximately US\$10.6 million) relating to project financing costs incurred by ER LLC). In 2023, the court of first instance hearings (the "First Instance Court") had dismissed the civil claim against ER LLC, among other rulings, but the prosecutors subsequently appealed and the matter eventually went to the Supreme Court, which transferred the case back to the First Instance Court for rehearing along with other cases. On February 27, 2025, the written Supreme Court order was handed over to participants, including ER LLC. As of the date of this Offering Memorandum, ER LLC has not been notified of any further actions by the First Instance Court or the prosecutors. On January 24, 2025, ER LLC was identified as a civil respondent in an investigation that was opened in 2020 involving members of the working group established by the Minister of Economic Development, the Minister of Finance, and the Minister of Road and Transportation in 2013 to review the implementation of the concession project for the railway construction between Ukhaa Khudag and Gashuunsukhait (the amount in dispute being MNT22,525,487,163 (approximately US\$6.6 million)). On February 26, 2025, ER LLC submitted copies of all relevant financial documents for the costs incurred in connection with the railway project. ER LLC will continue to protect its legal interest and rights. 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 during the 2020-2022 period. Our unit transportation costs decreased from US\$26.9 per tonne in 2022 to US\$13.8 per tonne in 2023 and then increased to US\$18.2 per tonne in 2024. 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, was officially commissioned on May 30, 2023. The Zuunbayan-Khangi railway commenced operations on November 25, 2022, and was officially commissioned on December 25, 2024. The Tavan Tolgoi-Gashuunsukhait railway and the Zuunbayan-Khangi railway will add two more cross-border railways connecting Mongolia and China, once their respective cross-border railway sections are completed. 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.

The Government of Mongolia is working with the Chinese government to establish cross-border railway infrastructure between Gashuunsukhait-Gantsmod border ports to increase the current coal export volume of 85 million tonnes to 165 million tonnes per annum. As the Government of Mongolia submitted its draft agreement to the Parliament for consensus on December 27, 2024, the basic guidelines for the conclusion of an agreement between the Government of Mongolia and the Chinese government on the construction of the cross-border railway between GS and GM ports were approved. On February 5, 2025, the Government of Mongolia announced that it had finalized the agreement and resolved to execute it with the Chinese government and such agreement was signed on February 14, 2025. This bilateral agreement is expected to be ratified by the Parliament, and project construction is expected to commence during 2025. There is no assurance that we will be able to freely transport our coal products under such cross-border railway.

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, 2022, 2023 and 2024, we incurred US\$100.9 million, US\$92.3 million and US\$143.6 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. See also "- The Parliament could determine that any one or more of our project sites in Mongolia is a Mineral Deposit of Strategic Importance and the Government of Mongolia could take an equity, production, profit sharing or other interest in any of our projects, and any changes in the Mongolian legal frameworks or government policies may materially and adversely affect our business, prospects, financial condition and results of operations".

#### 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\$147.1 per tonne, US\$160.2 per tonne and US\$168.4 per tonne for the years ended December 31, 2022, 2023 and 2024, 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.

#### 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. 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, 2022, 2023 and 2024, NIC provided 31.5%, 42.8% and 40.8%, respectively, of our diesel needs and Shunkhlai provided 52.1%, 41.2% and 43.1%, 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 initially affected supply of goods and raw materials from Russia to Mongolia, and there was a significant decrease in overall supplies in the markets in 2022. Since 2022, Russia has remained Mongolia's primary supplier of diesel fuel and Mongolia's fuel imports from Russia have steadily increased. While the Government of Mongolia was able to secure supply agreements and stabilize prices 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. For example, 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 impacted 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, 2024, three fatal traffic accidents involving the Group's staff occurred outside of the Group's premises and one accident occurred at a contractor company's workshop involving the contractor's employee who was working to provide maintenance to an autograder. We have cooperated with the local authorities on these accidents and have completed the standard procedures. See "Business – Safety and Environmental Matters". As of December 31, 2024, 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, 2022, 2023 and 2024, we suspended our mining operations at UHG mine for about 9.5 days due to inclement weather whereas operations at the BN mine were suspended for about nine 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 ability 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 and Ms. Uurtsaikh Dorjgotov. 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, 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, 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. Additionally, Mongolia's limited pool of highly skilled technical professionals, particularly in the mining and heavy industry sectors, poses a challenge in recruiting and retaining talent. The competition for experienced specialists is intense, and shortages in engineering, geology, and equipment maintenance expertise could materially and adversely impact our ability to maintain or scale operations efficiently.

### 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.

We plan to increase our mineral resources through acquisitions of companies with existing exploration rights and additional mining assets. For example, in January 2024, we completed the acquisition of a 50% equity interest in EM LLC for total consideration of US\$40 million pursuant to an investment agreement that we entered into with EM LLC and Erdene Resource Development Corporation. 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. For more information, see also "Business – EM Transaction". In December 2024, we also announced that the Company, our wholly-owned subsidiary Singapore HoldCo and Talst Investment LLC, an independent third party entered into a securities purchase agreement pursuant to which Singapore HoldCo has agreed to purchase 50.5% of the issued and outstanding share capital of Universal Copper LLC, a Mongolian

company, for an aggregate cash consideration of US\$20.5 million. Universal Copper LLC is principally engaged in the exploration for copper and other non-ferrous metals and holds three minerals exploitation special permits for areas all located in Bayankhongor aimag (province), Mongolia. The closing of the Universal Transaction occurred on March 11, 2025. For more information, see also "Business – Universal Transaction".

These 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 of gold, we may not be able to realize expected benefits from the EM Transaction or benefit from EM LLC, which may adversely affect our financial condition and results of operation. Similarly, our ability to ensure commercial viability of the mining assets held by Universal Copper LLC would depend on the market price of copper. If there is material decline in the price of copper. LLC would depend on the market affect our financial condition or benefit from Universal Copper LLC, which may adversely affect our financial transaction or benefit from Universal Copper 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 to develop new reserves or businesses. 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 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. For the years ended December 31, 2022, 2023 and 2024, site administration costs were US\$26.4 million, US\$27.2 million and US\$30.4 million, respectively. 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. See also "- The Parliament could determine that any one or more of our project sites in Mongolia is a Mineral Deposit of Strategic Importance and the Government of Mongolia could take an equity, production, profit sharing or other interest in any of our projects, and any changes in the Mongolian legal frameworks or government policies may 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, 2022, 2023 and 2024, our sales to our five largest customers accounted for 48.1%, 43.6% and 30.6%, respectively, of our total sales. For the years ended December 31, 2022, 2023 and 2024, our sales to our single largest customer accounted for 14.9%, 18.8% and 8.1%, 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 Parliament could determine that any one or more of our project sites in Mongolia is a Mineral Deposit of Strategic Importance and the Government of Mongolia could take an equity, production, profit sharing or other interest in any of our projects, and any changes in the Mongolian legal frameworks or government policies may materially and adversely affect our business, prospects, financial condition and results of operations.

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 if the mineral deposits are considered as a deposit that could impact national security, economic and social development, or contribute more than 5% of Mongolia's annual GDP. In addition to deposits currently on the Strategic Deposits List and the additional Tier 2 Deposits List, the Parliament may, at any time, designate any 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 coal deposit 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 coal deposit were defined and whereby the Government of Mongolia expanded the boundaries for the Tavan Tolgoi coal deposit by including the areas under the BN and THG mining licenses. However, the license holder of BN and THG has neither been named in the list approved by Parliament Resolution No. 27 of 2007 nor has the Company received any notification or letter from the Government of Mongolia with regard to the consequences or follow-up actions of the above-mentioned resolution. However, there can be no assurance that our BN and THG deposits will not be designated by the Parliament as a Mineral Deposit of Strategic Importance or that the Government of Mongolia will not take equity or other interest in these deposits.

Following a series of discussions with the working group of the Government of Mongolia, on March 21, 2008, the then Minister of Industry and Trade (representing the Government of Mongolia) and ER LLC entered into the Minerals License Transfer Agreement (the "MLT 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 for such transfer. Our license area in the Ukhaa Khudag mine located in Tsogttsetsii soum, Umnugobi province (aimag) (the "UHG Mine") was considered to be part of the Tavan Tolgoi coal deposit which is listed in the list of Mineral Deposits of Strategic Importance, but having entered into the MLT Agreement with the Government of Mongolia, the Government of Mongolia guaranteed that such mining license would not be terminated or amended by requiring state participation with regard to our license over the UHG Mine.

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.

On April 19, 2024, the Parliament adopted the Law on National Wealth Fund ("National Wealth Fund Law") along with amendments to certain laws of Mongolia, including the Minerals Law, which became effective from May 11, 2024. One of the key amendments made to the Minerals Law is a revision to Article 5.4 and 5.5, which replaces the term "state participation" with "shares of the legal entity" holding license of a Mineral Deposit of Strategic Importance and its residual deposit (ore and mineral stockpiles with a certain mineral content formed during extraction, processing, and concentration, which may be economically profitable when reprocessed), if such deposit is to be exploited jointly by state and a private entity.

We believe that the requirement to have state participation of up to 50% in a Mineral Deposit of Strategic Importance under Article 5.4 of the Minerals Law was already fulfilled in 2008 under the MLT Agreement whereby the Government of Mongolia received more than 50% of the Tavan Tolgoi coal deposit, rather than exploiting the Tavan Tolgoi coal deposit in partnership with ER LLC.

Additionally, on April 19, 2024, the Minerals Law was amended to introduce new limits on privately owned equity ownership in legal entities holding licenses for Mineral Deposits of Strategic Importance. Under the revised Article 5.7, no person – whether solely or together with its affiliates with common interests – may own more than 34% of the total issued shares of a legal entity holding a license for such deposit. We believe that ER LLC shall not be considered as a legal entity holding license over the entire Mineral Deposit of Strategic Importance because it holds license over the UHG Mine only. As of the date of this Offering Memorandum, ER LLC has not been invited or approached by anyone for any commencement or negotiation related to the change of the Minerals Law. If we are required to comply with new ownership limits under the amended Minerals Law, we may need to restructure our shareholding arrangements, which may impact investor confidence and our market value. The uncertainty surrounding enforcement of these provisions adds complexity to strategic planning and investment decisions.

During a press conference held on February 26, 2025, the Minister of Justice and Home Affairs of Mongolia mentioned, among other things, that pursuant to the Prime Minister's Order No. 32, a working group (the "Working Group") was established to (i) analyze and evaluate the decision to grant mineral exploration licenses for the strategically important Tavan Tolgoi coal deposit to private entities and (ii) review previous resolutions issued by the Parliament and the Government of Mongolia in relation to this matter. The Minister stated that certain government officials may have violated and not complied with the procedures set out under the laws and regulations in entering into the MLT Agreement and will investigate the relevant conduct. The Minister further alleged abuse of official power in relation to initial issuances of mineral exploration licenses. While abuse of power ordinarily refers to government officials in the context of exceeding their authority, the Company has no further information on the specific details of these allegations, nor do we know of any facts that may implicate any of our personnel or entities.

Furthermore, the Minister noted that only the Parliament has the legal authority to make decisions regarding the state's ownership of mining assets designated as a strategically important deposit according to the Minerals Law. Accordingly, the Government of Mongolia intends to submit a resolution for consideration by the Parliament. The Minister specifically pointed out that the Working Group had not made any conclusions with respect to private property and investments made by ER LLC over the UHG Mine. Moreover, the Minister expressed his strong view that the Government of Mongolia must be considerate by taking into account the fact that ER LLC had made investments and is engaged in ongoing business operations. The Minister emphasized that, as a matter of principle, any decisions shall result from dialogue involving ER LLC. On February 27, 2025, ER LLC sent a letter to the Working Group with detailed information regarding the historical negotiation process with regards to the MLT Agreement and our willingness to share information with the Working Group.

A further press briefing was held by the Minister of Justice and Home Affairs of Mongolia on March 6, 2025, whereby the Minister stated that the Government of Mongolia had decided to submit to the Parliament a draft resolution instructing the Government of Mongolia and Prime Minister Oyun-Erdene to take measures to bring the relevant part of the MLT Agreement into compliance with the law. The draft resolution will also instruct the Government and Prime Minister Oyun-Erdene to negotiate with ER LLC pursuant to Article 8.1.7 of the Minerals Law and submit the outcome for consideration by the Parliament. Pursuant to Article 8.1.7 of the Minerals Law, the Parliament has full authority to determine the size of the state ownership in a legal entity holding a mining license for Mineral Deposits of Strategic Importance or to replace such ownership with a special royalty, either based on a proposal submitted by the Government of Mongolia or on its own initiative. The Minister further stated that the legal basis for issuing the resolution is to rectify the previous failure to follow due process. Therefore, it is necessary to ensure that the transfer of ownership of the UHG Mine – designated by the State Great Khural as a Mineral Deposit of Strategic Importance - to ER LLC complies with the law. Since the authority to make this decision lies solely with the Parliament, the Government has deemed it appropriate for the Parliament to approve a resolution granting the Government the authority to negotiate with ER LLC and determine the state's ownership percentage. We have not yet seen a copy of this draft resolution.

As of the date of this Offering Memorandum, we have not been approached by, nor have we engaged in any communication with, the Working Group. We intend to engage in official communication and correspondence with the Government of Mongolia and provide all inputs required to protect our interests and rights over the UHG Mine pursuant to what we believe is a valid and binding MLT Agreement with the Government of Mongolia. However, while we believe that the MLT Agreement remains valid and binding on both parties, we are unable to determine the outcome of any discussions we may have with the Government of Mongolia at this time. Regarding the potential criminal consequences referenced in the Minister of Justice's press conference, we are not aware of the nature of the said potential consequences, nor do we know any facts that may implicate any of our personnel or entities.

Any unforeseen government intervention or changes in the Mongolian legal frameworks or government policies may result in unforeseen liabilities or obligations, which may materially and adversely affect our business, prospects, financial condition and results of operations. Further, the outcomes of any negotiations with governmental authorities may not align with our interests or expectations and there is no certainty or assurance on when or how any such negotiations will be concluded. There can be no assurance that we will not face governmental intervention regarding the UHG Mine (including the Mongolian Parliament potentially designating our UHG Mine license as a Mineral Deposit of Strategic Importance) or that the Government of Mongolia or the Parliament will not change or introduce laws or policies, which may, among other things, affect the ownership of the entity owning the mining license over the UHG Mine (including the Government of Mongolia assuming certain ownership or taking an equity stake), impose special royalty or profit sharing arrangements with the Government, or invalidate the MLT Agreement or our right to operate or our mining license for the UHG Mine, which may dilute our control over the UHG Mine and materially and adversely impact our profitability, results of operations and financial condition. See also "Description of the Notes – Mandatory Redemption" and "Description of the Notes – Events of Default."

#### 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 of Mongolia 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 (US\$2.8) per cubic meter while in Galba-Uush Doloodin Gobi river basin is MNT3,996 (US\$1.2) 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 December 31, 2024, MCS Mongolia LLC indirectly owned approximately 30.84% 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. 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 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 of Mongolia and/or the 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. ER LLC was identified as a civil respondent by the IAAC in two cases under investigation by the IAAC. In 2022, ER LLC was identified as a civil respondent in an investigation of Erdenes MGL, a state-owned company, regarding the purchase of 240 km paved road from ER LLC (the amount in dispute being MNT36,423,614,978.34 (approximately US\$10.6 million) relating to project financing costs incurred by ER LLC). In 2023, the First Instance Court had dismissed the civil claim against ER LLC, among other rulings, but the prosecutors subsequently appealed and the matter eventually went to the Supreme Court, which transferred the case back to the First Instance Court for rehearing along with other cases. On February 27, 2025, the written Supreme Court order was handed over to participants, including ER LLC. As of the date of this Offering Memorandum, ER LLC has not been notified any further actions by the First Instance Court or the prosecutors. On January 24, 2025, ER LLC was identified as a civil respondent in an investigation that was opened in 2020 involving members of the working group established by the Minister of Economic Development, the Minister of Finance, and the Minister of Road and Transportation in 2013 to review the implementation of the concession project for the railway construction between Ukhaa Khudag and Gashuunsukhait (the amount in dispute being

MNT22,525,487,163 (approximately US\$6.6 million)). On February 26, 2025, ER LLC has submitted copies of all relevant financial documents for the costs incurred in connection with the railway project. ER LLC will continue to protect its legal interest and rights. 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\$13.5 million as of December 31, 2022 and December 31, 2023, respectively. The net current liabilities were primarily attributable to the economic downturn as a result of the COVID-19 pandemic. We had net current assets of US\$61.1 million as of December 31, 2024. 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.

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

The COVID-19 pandemic had led to significant global economic and financial disruptions, including an adverse impact on international trade and business activities. Mongolia declared a state of emergency in response to the pandemic in February 2020 and measures taken by the Government of Mongolia to combat the spread of COVID-19 adversely affected various sectors of the economy. In early 2022, many countries including Mongolia had cancelled a number of containment measures.

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. Since then, local governments across China gradually lifted the restrictive measures and the border crossings between Mongolia and China have been more normalized. In December 2022, the Chinese government cancelled a number of containment measures and started to open up the economy leading to a recovery in China's domestic economic growth and trades between Mongolia and China.

Our business could be adversely affected by 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.

### 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.

The ongoing Russia-Ukraine war 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 of Mongolia 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 2024, and Mongolia's inflation rate was 9.0% in 2024. To alleviate the supply shortage of imported goods from Russia, the Government of Mongolia has held regular discussions with Russia, secured supply agreements and stabilized prices with Russia.

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 recent years, the Mongolian economy has started to show signs of recovery with its GDP growth at 4.9% in 2024. Historically, certain policies implemented by the Government of Mongolia from time to time and other factors have caused fiscal imbalances or current account deficits. While the Government of Mongolia 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. On September 18, 2024, Fitch Ratings announced that it upgraded Mongolia's credit rating from "B" to "B+". Fitch Ratings had downgraded Mongolia's rating from "B+" to "B" in 2015, and this marks the first time it has increased the rating back to "B+" since then. On October 4, 2024, S&P upgraded Mongolia's long-term foreign-currency rating to "B+" from "B" with a positive outlook. On November 18, 2024, Moody's upgraded the Government of Mongolia's long-term issuer and senior unsecured ratings to "B2" from "B3".

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\$3,399.6 million, US\$4,921 million and US\$5,510 million as of December 31, 2022, 2023 and 2024, respectively.

Mongolia has significant amounts of outstanding foreign currency denominated bonds and Governmentguaranteed 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. 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 RMBare 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 August 2023, the Bank of Mongolia and the People's Bank of China successfully renewed bilateral currency swap agreement of RMB15 billion. The effective period is for three years until 2026, which period can be extended by mutual agreement.

### 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 2022, 2023 and 2024, Mongolia's inflation rate was 13.2%, 7.9% and 9.0%, 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. In March, June, September and December 2023 the MPC kept the policy rates at 13.0% taking into account the state of economic, bank and financial markets, as well as the external environment and risks. In March 2024, taking into account the state of the economy, the bank and financial markets, and the risks in the external environment, MPC decided to reduce the policy rate by 1% to 12.0%. In May 2024, the MPC decided to reduce the policy rate by a further 1% to 11.0%. The policy rate was kept at 11.0% during the MPC meeting in July 2024, and further reduced by 1% to 10.0% in September 2024. In December 2024 and January 2025, the policy rate was left unchanged at 10.0%. In March 2025, the MPC decided to raise the policy rate by 2.0% to 12.0%. However, there can be no assurance that measures taken by the Bank of Mongolia and the Government of Mongolia 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 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, the 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 December 31, 2024, 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.

A parliamentary working group established by the Order of the Parliament Speaker is expected to introduce draft amendments to tax laws during the spring session of the Parliament of 2025. According to the information from media platforms and the statement of the head of the working group, the expected changes are anticipated to reduce tax rates and ease the tax burdens on taxpayers.

Although the stabilization certificate granted by the Head of the Investment Agency in Mongolia on August 13, 2015, stabilizes the four core taxes, i.e., corporate income tax, custom duty, value added tax and royalty until April 17, 2033, there may be uncertainties involved in the application and implementation of any new tax regulations if the working group proposes and the Parliament approves the anticipated tax amendments.

Pursuant to the 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 the Personal Income Tax Law, the Parliament 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 of Mongolia 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 of Mongolia has elected to not impose any tax on diesel fuel until January 1, 2026. There can be no assurance that the rates applicable for diesel fuel will not be increased in the future.

Pursuant to the General 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 set at 8.5% of the salary income. 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 of Mongolia 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 of Mongolia 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.

For example, the Parliament adopted an amendment to the Minerals Law on January 10, 2025, and eliminated the 5% threshold for the special royalty rate. The special royalty may be determined by the Parliament to be applicable for each legal entities holding the license of mineral deposits of strategic importance in lieu of state shareholding in such legal entity.

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 "– Risks Relating to our Business and Industry – The Parliament could determine that any one or more of our project sites in Mongolia is a Mineral Deposit of Strategic Importance and the Government of Mongolia could take an equity, production, profit sharing or other interest in any of our projects, and any changes in the Mongolian legal frameworks or government policies may materially and adversely affect our business, prospects, financial condition and results of operations".

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 Government of Mongolia 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 of Mongolia has a significant role in major mining projects such as Oyu Tolgoi, legislative changes in 2015 permitting the Government of Mongolia 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 88.2%, 91.8% and 91.4% of Mongolia's total exports in 2022, 2023 and 2024, 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. In 2023, China imported approximately 103 million tonnes of coking coal, with Mongolia supplying approximately 54 million tonnes, which represented 53% of China's total coking coal imports. In 2024, China imported approximately 122 million tonnes of coking coal, with Mongolia supplying approximately 57 million tonnes, which represented 46% of China's total coking coal imports. 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;

- bankruptcy procedures that are not well developed and are subject to abuse; and
- frequent amendments of its laws, particularly those related to taxation, foreign investment, mining, and environmental regulations.

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 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 of Mongolia, 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 of Mongolia will not pursue or implement policies that differ significantly from those of previous governments.

Future changes in the Government of Mongolia, 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.

Any actual or alleged acts of corruption and bribery by Government officials could materially and adversely affect the Government of Mongolia, 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.

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".

### 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. The characteristics of these products were updated by the Government Resolution No. 168 dated November 13, 2024. 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, 2022, 2023 and 2024, our VAT and other tax receivables were US\$33.2 million, US\$62.7 million and US\$47.1 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.

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.

ER LLC initiated a litigation against the General Tax Authority stating that Government Resolutions No. 342 of 2019 and No. 174 of 2021 increased the amount of royalty payable by ER LLC and claimed MNT208,688,214,552 (approximately US\$61.0 million) as royalty payments unreasonably collected from ER LLC. The administrative case was finalized in the Supreme Court's on October 7, 2024, and the claim was partially satisfied by the Court.

The Supreme Court concluded that ER LLC's argument that Government Resolutions No. 342 of 2019 and No. 174 of 2021 will be considered as a part of the tax laws is reasonable and required the defendant to make calculations on the royalties paid by the claimant under the methods stated in Government Resolution No. 220 of 2014 that was valid on the date of the stabilization certificate and to payback any royalty payments that were excessively collected from the taxpayer. Although the court resolved in favor of ER LLC in this matter, there is no guarantee the Government of Mongolia will not increase the royalty fees by changing the taxing methods.

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\$84.0 million, US\$113.9 million and US\$75.0 million as royalty to the Government of Mongolia for the years ended December 31, 2022, 2023 and 2024, 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 December 31, 2024, we had US\$240.0 million outstanding principal amount indebtedness. See "Description of Other Material Indebtedness".

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 HoldCo, EM LLC, Leader Exploration LLC and Universal Copper LLC, will be Restricted Subsidiaries. Each of Singapore Holdco, EM LLC, Leader Exploration LLC and Universal Copper LLC will be an Unrestricted Subsidiary on the Original Issue Date. 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 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. Our total indebtedness as of December 31, 2024 were US\$240.0 million. See "Description of Other Material Indebtedness". 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". 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 Accounting Standards 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 guarantees 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 or a mandatory redemption 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. The Issuers must also redeem the Notes following the occurrence of the mandatory redemption event at a redemption price equal to 102% of the principal amount plus accrued and unpaid interest. See "Description of the Notes". The source of funds for any such purchase or redemption 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 or mandatory redemption event to make purchases or redemptions of outstanding Notes. The Issuers' failure to make the offer to purchase or purchase or redeem 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 stable outlook by Fitch and "B3" with a positive outlook 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 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 Accounting Standards, 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 Accounting Standards 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 guaranter'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.

Certain of the Subsidiary Guarantors are incorporated and exist under the laws of Luxembourg (each a "Luxembourg Company") and, under Luxembourg law, the following types of proceedings (altogether referred to hereafter as "Luxembourg Insolvency Proceedings") may be opened against an entity having its center of main interest in Luxembourg or an establishment within the meaning of the EU Insolvency Regulation:

#### Bankruptcy proceedings (faillite)

The opening of bankruptcy proceedings may be requested by the Luxembourg Company or by any of its creditors. Following such a request, the courts having jurisdiction may open bankruptcy proceedings if the Luxembourg Company: (i) is in a state of cessation of payments (*cessation des paiements*) and (ii) has lost its commercial creditworthiness (*ébranlement de crédit*). If a court finds that these conditions are satisfied, it may also open bankruptcy proceedings, ex officio (absent a request made by the Luxembourg Company or a creditor). The main effect of such proceedings is that the suspension of all measures of enforcement against the Luxembourg Company, except, subject to certain limited exceptions, for the enforcement by secured creditors and the payment of the secured creditors in accordance with their rank upon realization of the assets. It is worth noting that any financial collateral security or similar arrangement under the Luxembourg law of August 5, 2005 on financial collateral arrangements, as amended (the "Luxembourg Collateral Law") would remain outside the scope of the Luxembourg bankruptcy laws.

### Judicial decisions concerning judicial reorganisation proceedings (procédures de réorganisation judiciaire)

As of the time of filing of a petition for the opening of such judicial reorganisation proceedings (*procédure de réorganisation judiciaire*):

- (i) the rights of creditors (including certain secured creditors, other than creditors benefiting from security interests governed by the Luxembourg Collateral Law, which remain outside the scope of such laws) may be frozen;
- (ii) notwithstanding contrary contractual provisions, the filing of the petition for or the opening of a judicial reorganisation proceedings may not be ground for the termination of existing contracts;
- (iii) a breach of contract by a debtor before a moratorium is granted pursuant to the Luxembourg law of August 7, 2023 on business continuation (the "Reorganization Law") shall not entitle a creditor to terminate an agreement where the debtor remedies such breach within a period of fifteen days after it has been given formal notice to do so by the creditor; and
- (iv) a debtor subject to judicial reorganisation proceedings may unilaterally decide to suspend performance of contractual obligations for the duration of a moratorium granted as part of such proceedings.

In addition, a noteholders' ability to receive payment on the Notes may be affected by a decision of a court to grant a stay on payments (*sursis de paiement*) or to put the Luxembourg Company into judicial liquidation (*liquidation judiciaire*). Judicial 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 commercial code or of the laws governing commercial companies. The management of such liquidation proceedings will generally follow the rules of bankruptcy proceedings.

#### General limitations on enforcement resulting from Luxembourg Insolvency Proceedings

During such Luxembourg Insolvency Proceedings, all enforcement measures by unsecured creditors are suspended. The ability of certain secured creditors to enforce their security interest may also be limited (though the Reorganization Law being very recent and in the absence of legislative clarification or relevant case law, there are substantial uncertainties around the interpretations of certain key provisions therein), in particular in the event of judicial decisions concerning judicial reorganization proceedings (*procédures de réorganisation judiciaire*).

Luxembourg insolvency laws may also affect transactions entered into or payments made by the Luxembourg Company during the period before bankruptcy, the so-called "suspect period" (*periode suspecte*), which is a maximum of six months, as from the date on which the Commercial Court formally adjudicates a person bankrupt, and, as for specific payments and transactions, during an additional period of ten days before the commencement of such period preceding the judgment declaring bankruptcy, except that in certain specific situations the court may set the start of the suspect period at an earlier date, if the bankruptcy judgment was preceded by another Luxembourg Insolvency Proceeding (e.g. a suspension of payments) under Luxembourg law. In particular:

- (i) pursuant to article 445 of the Luxembourg Code of Commerce (*code de commerce*), specified transactions (such as, 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 (or the 10 days preceding it) must be set aside or declared null and void, if so requested by the insolvency receiver;
- (ii) pursuant to article 21 (2) of the Luxembourg Collateral Law, notwithstanding the suspect period as referred to in articles 445 and 446 of the Luxembourg Code of Commerce, where a financial collateral arrangement has been entered into on the day of the commencement of domestic or foreign winding-up proceedings or reorganization measures or similar proceedings, but after the Court decision ruling regarding the opening of such proceedings or after such measure becomes effective, such arrangement is valid and binding against third parties, administrators, insolvency receivers, liquidators and other similar organs if the collateral taker proves that it was unaware of the fact that such proceedings had been opened or that such measures had been taken or that it could not reasonably be aware of it;
- (iii) pursuant to article 446 of the Luxembourg Code of Commerce, 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 party's cessation of payments; and
- (iv) in the case of bankruptcy, article 448 of the Luxembourg Code of Commerce (*Code de commerce*) and article 1167 of the Luxembourg Civil Code (Code civil) (*action paulienne*) gives the insolvency receiver (acting on behalf of the creditors) 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.

In principle, a bankruptcy order rendered by a Luxembourg court does not result in automatic termination of contracts except for *intuitu personae* contracts, that is, contracts for which the identity of the company or its solvency were crucial. The contracts, therefore, subsist after the bankruptcy order. However, the insolvency receiver may choose to terminate certain contracts. As of the date of adjudication of bankruptcy, no interest on any unsecured claim will accrue vis-à-vis the bankruptcy estate.

Luxembourg Insolvency Proceedings may hence have a material adverse effect on a Luxembourg Company's business and assets and the Luxembourg Company's obligations under the Notes.

Finally, international aspects of Luxembourg bankruptcy or judicial reorganization proceedings may be subject to the EU Insolvency Regulation.

#### Limitations on Enforcement of Guarantees in Luxembourg

In respect of the guarantees granted by a Luxembourg company, it should be noted that there is no published Luxembourg case law and only limited Luxembourg legal literature in connection with enforcement of guarantees granted by a Luxembourg Company for a company of the group (whether downstream, cross-stream or upstream guarantees).

It is generally admitted that the grant of a guarantee by a Luxembourg Company for the obligations of another group company shall be subject to the following conditions: (i) it must be within the corporate purpose of the guarantor as set out in its articles of association; (ii) it shall correspond to a demonstrable and commensurate corporate benefit received by the guarantor; and (iii) the financial obligations assumed by the guarantor must not be disproportionate to the financial capacity of the guarantor.

The question of corporate benefit is determined on a case-by-case basis.

For the purpose of condition (iii) above, it is standard market practice that cross-stream and upstream guarantees granted by Luxembourg Companies must be limited in their amount, as opposed to downstream guarantees.

According to the limited Luxembourg doctrine on this matter, in the event the above conditions are not met, the directors of a Luxembourg Company may be held liable and it is only in exceptional cases in which it is demonstrated that (i) the beneficiary was aware of the ultra vires nature of the guarantee or (ii) that the guarantee was given with the intent to defraud creditors of the guarantor or (iii) the guarantee qualifies as a misuse of corporate asset (*abus de bien social*) that a court may void the guarantee itself.

In accordance with the principle *fraus omnia corrumpit*, a first demand guarantee would not be enforceable under Luxembourg law if it is called upon in a manifestly abusive way by the beneficiary of the guarantee.

Under Luxembourg law, certain creditors of an insolvent party have rights to preferred payments arising by operation of law, some of which may, under certain circumstances, supersede the rights to payment of secured or unsecured creditors, and most of which are undisclosed preferences (*privilèges occultes*). This includes in particular the rights relating to fees and costs of the insolvency official as well as any legal costs, the rights of employees to certain amounts of salary, and the rights of the Treasury and certain assimilated parties (namely social security bodies), which preferences may extend to all or part of the assets of the insolvent party. This general privilege takes in principle precedence over the privilege of a pledgee in respect of pledged assets.

The Luxembourg courts, or the official Luxembourg authority, may require that the Notes, the applicable indenture (and any other document in connection therewith), and any judgment obtained in a foreign court, be translated into French or German.

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 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\$345.7 million, before deducting fees and expenses payable by us in respect of this offering. We intend to use the net proceeds from this offering to repurchase and/or redeem outstanding 2026 Notes as permitted under the indenture governing the 2026 Notes (at a redemption price based on a "make-whole premium"). Any remaining funds are expected to be used by us for working capital and general corporate purposes.

### **CAPITALIZATION AND INDEBTEDNESS**

The following table sets forth our borrowings, equity and capitalization as of December 31, 2024:

- on an actual basis under IFRS Accounting Standards; and
- as adjusted to give effect to the issuance of the Notes in connection with the offering and the application of the proceeds from this offering to repurchase and/or redeem the outstanding 2026 Notes.

The as adjusted information below is illustrative only and does not take into account any changes in our borrowings and capitalization after December 31, 2024, other than as noted above.

	At December 31, 2024		
	Actual	As adjusted	
	US\$ <sup>'</sup> 000	US\$ <sup>°</sup> 000	
Non-current borrowings:			
2026 Notes	$216,122^{(1)}$	_(2)	
Borrowing	20,000	20,000	
Notes to be issued	_	345,681 <sup>(3)</sup>	
Total borrowings	236,122	365,681	
Total equity	1,380,919	1,380,919	
Total capitalization <sup>(4)</sup>	1,617,041	1,746,600	
=			

Notes:

(1) Represents the carrying amount of the 2026 Notes as shown on our consolidated financial statements.

(2) All of the outstanding principal amount of the 2026 Notes will be repurchased and/or redeemed in full.

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

Except as disclosed above, there has been no material change in our capitalization since December 31, 2024.

<sup>(3)</sup> Represents the estimated initial recognition amount of US\$345,681,000 of the Notes, taking into account the issue price of the Notes but before deducting the fees and commissions and other estimated expenses payable in connection with this offering.

### 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, 2022, 2023 and 2024 and the summary consolidated statement of financial position as of December 31, 2022, 2023 and 2024 set forth below have been derived from our consolidated financial statements which have been prepared in accordance with IFRS Accounting Standards (the "Audited Financial Statements"). Our Audited Financial Statements have been audited by KPMG.

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,		
	2022	2023	2024
	(in US\$'000,	except earnings	per share)
Revenue	546,248	1,034,821	1,039,852
Cost of revenue	(451,131)	(593,180)	(628,177)
Gross profit	95,117	441,641	411,675
Other net income	4,181	7,414	13,049
Selling and distribution costs	(2,434)	(4,779)	(9,767)
General and administrative expenses	(24,775)	(57,272)	(46,633)
Profit from operations	72,089	387,004	368,324
Finance income	6,286	1,855	4,272
Finance costs	(47,081)	(41,958)	(37,349)
Net finance costs	(40,795)	(40,103)	(33,077)
redemption of 2024 Notes	23,144	(12,975)	_
Share of profits of associates	286	996	957
Share of losses of joint ventures	(16)		(1)
Profit before taxation	54,708	334,922	336,203
Income tax	4,183	(94,820)	(92,651)
Profit for the year.	58,891	240,102	243,552
Fauity shareholders of the Company	59 177	239 686	242 012
Non-controlling interests	(286)	416	1 540
Other comprehensive income for the year (after tax and reclassification adjustments)	(200)	710	1,540
Exchange differences on re-translation	(21,726)	525	(2,614)
Total comprehensive income for the year	37,165	240,627	240,938

	Year ended December 31,			
	2022	2023	2024	
	(in US\$'000,	except earnings	per share)	
Profit attributable to the equity shareholders of the Company	59,177	239,686	242,012	
Total comprehensive income attributable to the equity shareholders of the Company	38,306	240,119	239,539	
Basic earnings per share	5.68 cents	21.95 cents	22.12 cents	
Diluted earnings per share	5.68 cents	21.95 cents	21.77 cents	

### SUMMARY CONSOLIDATED STATEMENT OF FINANCIAL POSITION

	As of December 31,			
	2022	2023	2024	
		(in US\$'000)		
Total non-current assets	1,560,862	1,588,538	1,748,456	
Total current assets	259,646	419,903	386,757	
Total assets	1,820,508	2,008,441	2,135,213	
Total current liabilities	328,288	433,432	325,619	
Total non-current liabilities	565,143	405,143	428,675	
Total liabilities	893,431	838,575	754,294	
Total equity attributable to equity shareholders of the Company	872,556	1,114,837	1,245,510	
Perpetual Notes	55,476	55,476		
Non-controlling interests	(955)	(447)	135,409	
Total liabilities and shareholders' equity	1,765,987	1,953,412	1,999,804	

#### SUMMARY CONSOLIDATED CASH FLOW DATA

Year ended December 31,			
2022	2023	2024	
(in US\$'000)			
233,779	481,879	223,491	
(87,916) (103,874)	(172,300) (197,583)	(177,910) (80.426)	
	Year en   2022 (   233,779 (   (87,916) (   (103,874) (	Year ended December 3   2022 2023   (in US\$'000)   233,779 481,879   (87,916) (172,300)   (103,874) (197,583)	

#### **OTHER FINANCIAL DATA**

	Year ended December 31,			
	2022	2023	2024	
	(in US\$'000, e	ccept otherwise	therwise indicated)	
Adjusted EBITDA <sup>(1)</sup> Adjusted EBITDA margin <sup>(2)</sup>	133,791 24%	508,977 49%	495,870 48%	

#### Notes:

We calculate Adjusted EBITDA by adding income tax, share of losses of associates and joint venture, net finance costs, (1)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 as calculated under IFRS. We have included Adjusted EBITDA data because such data is commonly used by investors to measure a company's ability to service debt. Adjusted EBITDA 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 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 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 under IFRS to the definition of Adjusted EBITDA for the periods indicated:

	Year ended December 31,		
	2022	2023	2024
	(	in US\$'000)	
Profit for the year	58,891	240,102	243,552
Adjustments			
Income tax	(4,183)	94,820	92,651
Share of profits of associates and joint ventures	(270)	(996)	(956)
Net finance costs.	40,795	40,103	33,077
Depreciation and amortization	61,708	94,119	124,798
Loss/(gain) on disposals of property, plant and equipment.	(6)	1,635	862
Equity-settled share-based payment expenses	-	2,162	1,886
Loss on mining equipment transferred from mining			
contractor	_	24,057	-
Loss/(gain) from repurchase, refinancing and redemption			
of 2024 Notes	(23, 144)	12,975	-
Adjusted EBITDA	133,791	508,977	495,870

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

#### **OPERATION DATA**

	Year ended December 31,			
	2022	2023	2024	
	(in US\$'000,	except otherwise	e indicated)	
ROM coal production (Mt)	5.7	14.6	16.3	
Average accounting stripping ratio (actual) (bcm/t)	4.7	4.4	4.2	
Total coal sales (Mt)	4.7	9.8	8.6	
Average sales price per tonne of HCC (US\$ per tonne) <sup>(1)(2)</sup>	147.1	160.2	168.4	

Notes:

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

<sup>(1)</sup> 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.

### 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 Accounting Standards, 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 2022, 2023 and 2024 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, 2024, 539 Mt of JORC-compliant coal resources, and as of January 1, 2025, 340 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 493 Mt of JORC-compliant coal reserves as of January 1, 2025. 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. Our UHG mine produced 12.7 Mt ROM coal for 2024. Our BN mine produced 3.6 Mt ROM coal for 2024. For the years ended December 31, 2022, 2023 and 2024, we produced an aggregate of 5.7 Mt, 14.6 Mt and 16.3 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. The total volume of coal export from Mongolia to China reached 31.8 Mt in 2022, 69.6 Mt in 2023 and 83.8 Mt in 2024. During each such period, our market share accounted for 13%, 13% and 10%, respectively, of the total volume of coal exported from Mongolia. For the years ended December 31, 2022, 2023 and 2024, we sold our hard coking coal at an average selling price of US\$147.1 per tonne, US\$160.2 per tonne and US\$168.4 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 2023, 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 11th consecutive year.

Our revenue was US\$546.2 million, US\$1,034.8 million and US\$1,039.9 million for the years ended December 31, 2022, 2023 and 2024, respectively. We recorded profit of US\$58.9 million, US\$240.1 million and US\$243.6 million for the years ended December 31, 2022, 2023 and 2024, 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, 2022, 2023 and 2024, a total of 5.7 Mt, 14.6 Mt and 16.3 Mt of ROM coal, respectively, was mined by us from both UHG and BN mines. At UHG mine, approximately 27.9 million bcm, 54.8 million bcm and 59.6 million bcm of prime overburden was removed, resulting in an actual stripping ratio of 5.3 bcm, 4.5 bcm and 4.7 bcm of overburden per ROM tonne, for the years ended December 31, 2022, 2023 and 2024, respectively. At BN mine, approximately 3.6 million bcm, 20.2 million bcm, and 26.5 million bcm of prime overburden was removed, resulting in an actual stripping ratio of 8.1 bcm, 8.2 bcm and 7.3 bcm of overburden per ROM coal tonne for the years ended December 31, 2022, 2023 and 2024, 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 four types of washed coal products: (i) hard coking coal ("HCC"); (ii) semi-soft coking coal ("SSCC"); (iii) mid-ash semi-hard coking coal ("MASHCC"); and (iv) 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 6.6 Mt, 14.1 Mt and 15.4 Mt of ROM coal was processed by us in 2022, 2023 and 2024, respectively. Resulting from this plant feed, we were able to produce 3.0 Mt of washed coking coal and 1.2 Mt of middlings for 2022, 6.7 Mt of washed coking coal and 2.0 Mt of middlings for 2023, and 8.4 Mt of washed coking coal and 0.7 Mt of middlings for 2024.

#### **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 sold into the Chinese market. The large 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 as well as 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".

For the years ended December 31, 2022, 2023 and 2024, we sold our HCC at an average selling price of US\$147.1 per tonne, US\$160.2 per tonne and US\$168.4 per tonne, respectively.

#### **Mining Costs**

We have two components of mining costs: (i) costs directly incurred by us and (ii) costs related to our mining contractors. Costs directly incurred by us primarily include fuel costs, labor costs, employee-related expenses (onsite accommodations), depreciation and blasting expenses. Costs related to our mining contractors include plant rates for mining equipment operation, expatriate staff wages, corporate overhead and contractor fee.

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\$147.8 million, US\$250.5 million and US\$269.3 million for the years ended December 31, 2022, 2023 and 2024, respectively. For the years ended December 31, 2022, 2023 and 2024, 30.6%, 34.4% and 33.1% of our mining costs, respectively, were primarily fuel, labor and other employee-related costs, as well as drilling and blasting expenses directly incurred by us. The remainder was associated with our mining contractor costs, the majority of which was related to plant rates for mining equipment operation.

#### **Transportation Costs**

Transportation costs are costs related to (i) the transportation of ROM coal from the BN mine to the UHG mine; (ii) the transportation of coal products from UHG to Tsagaan Khad ("TKH"); and (iii) transportation of coal from TKH to GM. Transportation between our BN and UHG mines is performed by our own trucking fleet as well as third-party contractors. Transportation from UHG to TKH is primarily performed by our own trucking fleet. Transportation from TKH to GM is mainly performed by third-party contractors' trucking fleet and supplemented by our own trucking fleet.

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 volatile depending on the cross-border throughput condition. 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\$26.9 per tonne, US\$13.8 per tonne and US\$18.2 per tonne for the years ended December 31, 2022, 2023 and 2024, respectively.

#### **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 Accounting Standards 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 in 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 overseas holding entities and main operating subsidiaries located in Mongolia is the U.S. dollar and the functional currency of remaining subsidiaries located in Mongolia is 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,		
	2022	2023	2024
	(in US\$'000,	except otherwise	indicated)
Revenue	546,248	1,034,821	1,039,852
Cost of revenue	(451,131)	(593,180)	(628,177)
Gross profit.	95,117	441,641	411,675
Other net income	4,181	7,414	13,049
Selling and distribution costs.	(2, 434)	(4,779)	(9,767)
General and administrative expenses	(24,775)	(57,272)	(46,633)
Profit from operations.	72,089	387,004	368,324
Finance income	6,286	1,855	4,272
Finance costs	(47,081)	(41,958)	(37,349)
Net finance costs	(40,795)	(40, 103)	(33,077)
Gain/(loss) from repurchase, refinancing and			,
redemption of 2024 Notes	23,144	(12,975)	_
Share of profits of associates	286	996	957
Share of losses of joint ventures	(16)	_	(1)
Profit before taxation	54,708	334,922	336,203
Income tax	4,183	(94,820)	(92,651)
Profit for the year	58,891	240.102	243,552
Attributable to	)	-, -	- )
Equity shareholders of the Company	59,177	239,686	242,012
Non-controlling interests	(286)	416	1.540
Profit for the year.	58,891	240.102	243.552
Basic earnings per share	5.68 cents	21.95 cents	22.12 cents
Diluted earnings per share	5.68 cents	21.95 cents	21.77 cents
Profit for the year	58,891	240.102	243.552
Other comprehensive income for the year (after	00,001	2.0,102	2.0,002
tax and reclassification adjustments)			
Items that may be reclassified subsequently to profit or loss:			
Exchange differences on re-translation	(21,726)	525	(2,614)
Other comprehensive income for the year	(21,726)	525	(2,614)
Total comprehensive income for the year	37,165	240,627	240,938
Attributable to:			
Equity shareholders of the Company	38,306	240,119	239,539
Non-controlling interests	(1,141)	508	1,399
Total comprehensive income for the year	37,165	240,627	240,938

#### 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\$546.2 million, US\$1,034.8 million and US\$1,039.9 million, respectively, for the years ended December 31, 2022, 2023 and 2024. Our total sales volume for the years ended December 31, 2022, 2023 and 2024 were approximately 4.7 Mt, 9.8 Mt and 8.6 Mt of coal products, respectively. We sold approximately 3.5 Mt, 5.5 Mt and 4.7 Mt of HCC at an average selling price of US\$147.1 per tonne, US\$160.2 per tonne and US\$168.4 per tonne, respectively, for the years ended December 31, 2022, 2023, and 2024, respectively.

Since January 2023, we have been selling coal products through the MSE commodities exchange platform. In 2024, we sold a total of 4.7 Mt of coal products through the MSE commodities exchange platform, of which 2.6 Mt was HCC at an average selling price of US\$178.3 per tonne.

#### **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. For the years ended December 31, 2022, 2023 and 2024, our cost of revenue was US\$451.1 million, US\$593.2 million and US\$628.2 million, respectively.

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,					
	2022	2	2023	3	2024	
	US\$'000	%	US\$'000	%	US\$'000	%
Cost of revenue	451,131	100.0	593,180	100.0	628,177	100.0
Idling cost	24,445	5.4	_	_	_	-
Cost of revenue excluding idling cost.	426,686	94.6	593,180	100.0	628,177	100.0
Mining cost	147,846	32.8	250,465	42.2	269,334	42.9
Variable cost	74,045	16.4	156,598	26.4	156,912	25.0
Fixed cost	46,707	10.4	38,544	6.5	36,844	5.9
Depreciation and amortization	27,094	6.0	55,323	9.3	75,578	12.0
Processing cost	43,734	9.7	63,456	10.7	67,989	10.8
Variable cost	16,182	3.6	26,202	4.4	28,211	4.5
Fixed cost	7,172	1.6	13,962	2.4	17,031	2.7
Depreciation and amortization	20,380	4.5	23,292	3.9	22,747	3.6
Handling cost.	9,960	2.2	17,095	2.9	18,839	3.0
Transportation costs	100,942	22.4	92,291	15.6	143,589	22.9
Logistics cost	9,589	2.1	12,626	2.1	15,691	2.5
Variable cost	5,633	1.2	6,319	1.0	7,533	1.2
Fixed cost	2,326	0.5	4,752	0.8	6,529	1.0
Depreciation and amortization	1,630	0.4	1,555	0.3	1,629	0.3
Site administration cost	26,373	5.8	27,203	4.6	30,398	4.8
Transportation and stockpile loss	479	0.1	11,109	1.9	2,929	0.5
Royalties and fees	87,763	19.5	118,935	20.0	79,408	12.6
Royalty	84,047	18.6	113,902	19.2	75,042	11.9
Air pollution fee	1,833	0.4	871	0.1	863	0.1
Customs fee	1,883	0.5	4,162	0.7	3,503	0.6

#### **Idling** Cost

In response to the COVID-19 pandemic's impact on the border throughput, we temporarily suspended operations at certain times during 2022 for cash conservation and efficiency purposes. Idling cost primarily consist of fixed charges paid to the mining contractor and depreciation expenses relating to idled plants and equipment during the suspension of operations. We did not have any idling cost in 2023 and 2024.

#### 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.

Unit mining cost, excluding idling cost, was 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\$18.1 per ROM tonne (comprising cash cost of US\$14.1 per ROM tonne and non-cash cost of US\$4.0 per ROM tonne) and US\$18.8 per ROM tonne (comprising cash cost of US\$13.6 per ROM tonne and non-cash cost of US\$5.2 per ROM tonne) for the years ended December 31, 2022, 2023 and 2024, 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\$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\$2.9 and non-cash cost of US\$1.7) and US\$4.8 (comprising cash cost of US\$3.2 and non-cash cost of US\$1.6) for the years ended December 31, 2022, 2023 and 2024, 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 cost per tonne was US\$26.9, US\$13.8 and US\$18.2 for the years ended December 31, 2022, 2023 and 2024, respectively. Total transportation costs, including fees paid for the usage of the UHG-GS paved road, were US\$100.9 million, US\$92.3 million and US\$143.6 million for the years ended December 31, 2022, 2023 and 2024, respectively. In 2023, the majority of coal products were sold on the Mongolian side of the border, whereas in 2024, the majority were sold on the Chinese side of the border, resulting in higher transportation costs.

#### 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\$9.6 million in 2022, US\$12.6 million in 2023 and US\$15.7 million in 2024.

#### 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 increased from US\$26.4 million in 2022 to US\$27.2 million in 2023 and to US\$30.4 million in 2024.

#### 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. 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. With the improvement in border throughput from the second half of 2022, the gap between reference prices and contract prices started to narrow. In addition, effective from October 1, 2023, the royalty calculation of coal products traded through the MSE's platform are being based on the corresponding monthly average open trade price as published by the MSE. As a result, our effective royalty average rate decreased from 15.4% for the year ended December 31, 2022 to 11.1% for the year ended December 31, 2023, and to 7.2% for the year ended December 31, 2024, 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 term.

#### **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\$24.8 million, US\$57.3 million and US\$46.6 million for the years ended December 31, 2022, 2023 and 2024, respectively.

#### **Net Finance Costs**

Net finance costs primarily consist of (i) accrued interest expense on 2022 Notes, 2024 Notes and 2026 Notes (ii) amortization of the difference between the fair value and the principal amounts due on the 2022 Notes, 2024 Notes and 2026 Notes using the effective interest rate method, (iii) change in fair value of the derivative component of the 2022 Notes, (iv) foreign exchange net gain/loss and (v) interest income accrued on cash and cash equivalents.

#### (Loss)/Gain from Repurchase, Refinancing and Redemption of 2024 Notes

In 2022 and 2023, we purchased US\$63.6 million and US\$41.2 million principal amount of the 2024 Notes, respectively, through open market purchases. The excess of derecognized carrying amount of the 2024 Notes over the consideration to settle these liabilities, which was approximately US\$23.1 million in 2022 and US\$4.7 million in 2023, have been recognized as a gain from repurchase of the 2024 Notes and credited to profit or loss during the respective periods.

In September 2023, we completed an exchange offer of US\$251.0 million principal amount of the 2024 Notes for US\$175.7 million principal amount of 2026 Notes, together with new money issuance of US\$4.3 million principal amount of 2026 Notes.

In November 2023, we redeemed the remaining US\$84.2 million principal amount of the 2024 Notes in full.

In December 2023, we issued an additional US\$40 million principal amount of the 2026 Notes.

As a result of the above, a loss of US\$17.7 million was recognized in profit or loss during the year ended December 31, 2023.

#### 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 year ended December 31, 2024, the consolidated revenue and net profit for Tianjin Zhengcheng Import and Export Trade Co., Ltd (China) was US\$77.8 million and US\$0.03 million, respectively. As of December 31, 2024, consolidated net assets for Tianjin Zhengcheng Import and Export Trade Co., Ltd (China) was US\$3.0 million.

For the year ended December 31, 2023, the consolidated revenue and net profit for Tianjin Zhengcheng Import and Export Trade Co., Ltd (China) was US\$75.8 million and US\$1.0 million, respectively. As of December 31, 2023, consolidated net assets for Tianjin Zhengcheng Import and Export Trade Co., Ltd (China) was US\$1.8 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**

#### 2024 compared to 2023

*Revenue*. Our revenue remained stable at US\$1,039.9 million in 2024, compared to US\$1,034.8 million in 2023. Our HCC sales volume was 4.7 Mt in 2024, compared to 5.5 Mt in 2023. Our average selling price of HCC increased from US\$160.2 per tonne in 2023 to US\$168.4 per tonne in 2024.

*Cost of Revenue*. Our cost of revenue increased by 5.9% from US\$593.2 million in 2023 to US\$628.2 million in 2024, primarily due to increases in transportation costs and depreciation and amortization of mining equipment, partly offset by a decrease in governmental royalties and fees.

*Gross Profit*. As a result of the foregoing, our gross profit decreased by 6.8% from US\$441.6 million in 2023 to US\$411.7 million in 2024.

*Selling and Distribution Costs.* Our selling and distribution costs increased by 104.2% from US\$4.8 million in 2023 to US\$9.8 million in 2024, primarily due to the reinstatement of China's customs fee on coal imported from Mongolia.

*General and Administrative Expenses.* Our general and administrative expenses decreased by 18.7% from US\$57.3 million in 2023 to US\$46.6 million in 2024.

*Net Finance Costs.* Our net finance cost decreased by 17.5% from US\$40.1 million in 2023 to US\$33.1 million in 2024, primarily due to decreases in interest expense on senior notes and foreign exchange net loss, partly offset by an increase in interest income.

*Income Tax Expenses.* Our income tax expense decreased by 2.2% from US\$94.8 million in 2023 to US\$92.7 million in 2024.

*Profit for the Year*. As a result, our profit attributable to equity shareholders of the Company remained relatively stable at US\$242.0 million in 2024, compared to US\$239.7 million in 2023.

#### **2023** Compared to 2022

*Revenue*. Our revenue increased by 89.5% from US\$546.2 million in 2022 to US\$1,034.8 million in 2023. The increase in revenue was primarily attributable to increased sales volume. Our HCC sales volume increased significantly from 3.5 Mt in 2022 to 5.5 Mt in 2023. Our average selling price of HCC increased from US\$147.1 per tonne in 2022 to US\$160.2 per tonne in 2023.

*Cost of Revenue*. Our cost of revenue increased by 31.5% from US\$451.1 million in 2022 to US\$593.2 million in 2023 as a result of the higher sales volume described above.

Our mining costs increased by 69.5% from US\$147.8 million in 2022 to US\$250.5 million in 2023, primarily due to the increase in our sales volume described above. Our processing costs increased by 45.3% from US\$43.7 million in 2022 to US\$63.5 million in 2023, primarily due to the increase in our sales volume described above. Our transportation costs decreased by 8.5% from US\$100.9 million in 2022 to US\$92.3 million in 2023, primarily because a majority of the coal products were sold on the Mongolian side of the border. In 2022, we also incurred US\$24.4 million in cost of revenue during idle mine period for the first half of 2022, mainly comprising depreciation expense for idle plant and equipment, staff costs and mining contractor costs.

*Gross Profit.* As a result of the foregoing, our gross profit increased by 364.4% from US\$95.1 million in 2022 to US\$441.6 million in 2023.

*Selling and Distribution Costs.* Our selling and distribution costs increased by 100% from US\$2.4 million in 2022 to US\$4.8 million in 2023, primarily due to higher sales volume realized under FOT GM term in 2023 compared to 2022.

*General and Administrative Expenses.* Our general and administrative expenses increased by 131.0% from US\$24.8 million in 2022 to US\$57.3 million in 2023, primarily due to the transfer of mining equipment from our mining contractor. Based on the components of the transferred assets' net book value, we capitalized the portion that met the asset recognition criteria and the remaining portion was recognized as general and administrative expenses in the statement of profit or loss.

*Net Finance Costs.* Our net finance cost decreased by 1.7% from US\$40.8 million in 2022 to US\$40.1 million in 2023. Our total interest on liability component of senior notes decreased to US\$34.7 million in 2023 from US\$45.4 million in 2022. Conversely, we incurred foreign exchange net loss of US\$6.0 million in 2023, compared to foreign exchange net gain of US\$3.0 million in 2022.

(Loss)/gain from repurchase, refinancing and redemption of 2024 Notes. We recognized a net loss of US\$13.0 million from repurchase, refinancing and redemption of the 2024 Notes in 2023 compared to a gain of US\$23.1 million from the repurchase of the 2024 Notes in 2022.

*Income Tax Expenses.* We did not have income tax expense in 2022 but had income tax credit of US\$4.2 million as a result of recognized deferred tax asset. We had income tax expense of US\$94.8 million in 2023, as a result of an increase in taxable income due to an increase in sales revenue.

*Profit for the Year*. As a result, our profit attributable to equity shareholders of the Company increased by 304.9% from US\$59.2 million in 2022 to US\$239.7 million in 2023.

### LIQUIDITY AND CAPITAL RESOURCES

For the years ended December 31, 2022, 2023 and 2024, 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, 2024, our net current assets were US\$61.1 million.

As at December 31, 2022 and 2023, our net current liabilities were US\$68.6 million and US\$13.5 million, respectively. 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 (i) completed a tender offer for our 2024 Notes in December 2022, (ii) completed an exchange offer for a portion of the outstanding 2024 Notes for new 2026 Notes and issued additional new 2026 in September 2023, (iii) completed the redemption of the outstanding 2024 Notes in full in November 2023, and (iv) further issued additional 2026 Notes in December 2023. 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,			
	2022	2023	2024	
	(US\$'000)	(US\$'000)	(US\$'000)	
Net cash generated from operating activities	233,779	481,879	223,491	
Net cash used in investing activities	(87,916)	(172,300)	(177,910)	
Net cash used in financing activities	(103,874)	(197,583)	(80,426)	
Net increase/(decrease) in cash and cash equivalents	41,989	111,996	(34,845)	
Cash and cash equivalents at beginning of the year	25,937	64,695	175,799	
Effect of foreign exchange rate changes	(3,231)	(892)	(433)	
Cash and cash equivalents at end of the year	64,695	175,799	140,521	

#### **Cash Flows from Operating Activities**

We generated net cash from operating activities of US\$233.8 million in 2022. We generated net cash from operating activities of US\$481.9 million in 2023, primarily due to an increase in sales volume. We generated net cash from operating activities of US\$223.5 million in 2024.

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

	Year ended December 31,		
_	2022	2023	2024
_		(US\$'000)	
Profit before taxation	54,708	334,922	336,203
Adjustments for:	61 709	04 110	124 709
	01,708	94,119	124,798
Share of profits of associates and joint venture	(270)	(996)	(956)
(Gain)/Loss on disposal of property, plant and		1.625	0.60
equipment	(6)	1,635	862
Loss on mining equipment transferred from			
mining contractor	-	24,057	-
Net finance costs	40,795	40,103	33,077
(Gain)/Loss from repurchase, refinancing and			
redemption of 2024 Notes	(23, 144)	12,975	_
Equity-settled share-based payment expenses	_	2,162	1,886
Changes in working capital:			
Decrease/(increase) in inventories	56,869	3,842	(49,387)
Decrease/(increase) in trade and other receivables	7.363	(52,995)	47.255
Increase/(decrease) in trade and other payables and	,		,
contract liabilities	40,353	15,862	(180,596)
(Increase)/decrease in other non-current assets	(3,903)	28,936	(24.095)
Cash generated from operations	234.473	504,622	289.047
Income tax paid	(694)	(22,743)	(65,556)
Net cash generated from operating activities	233,779	481,879	223,491

#### **Cash Flows from Investing Activities**

Net cash used in investing activities was US\$87.9 million in 2022, which consisted primarily of (i) US\$80.4 million in payments for acquisition of property, plant and equipment and construction in progress, of which US\$76.7 million was attributable to payments of deferred stripping activity, (ii) US\$7.0 million in payments for acquisition of an associate and (iii) US\$0.7 million payments for acquisition of intangible asset, partly offset by US\$0.1 million of interest received.

Net cash used in investing activities was US\$172.3 million in 2023, which consisted primarily of (i) US\$133.8 million in payments for acquisition of property, plant and equipment and construction in progress, of which US\$92.5 million was attributable to payments of deferred stripping activity, and (ii) US\$40.0 million in prepayments for acquisition of a subsidiary, partly offset by US\$1.3 million of interest received.

Net cash used in investing activities was US\$177.9 million in 2024, which consisted primarily of US\$189.0 million in payments for acquisition of property, plant and equipment and construction in progress, of which US\$101.6 million was attributable to payments of deferred stripping activity, partly offset by US\$6.0 million from the acquisition of Erdene Mongol LLC at the date of acquisition, net of cash acquired, US\$4.8 million of interest received and US\$0.2 million dividend received.

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

### **INVESTING CASH FLOW**

	Year ended December 31,		
	2022	2023	2024
	(US\$'000)		
Payments for acquisition of property, plant and			
equipment and construction in progress	(80,379)	(133,798)	(188,955)
Proceeds from disposals of property, plant and			
equipment	6	8	_
Payments for acquisition of intangible asset	(715)	(6)	_
Prepayments for acquisition of subsidiary	_	(40,000)	_
Acquisition of a subsidiary, net of cash acquired	_	_	6,028
Payments for acquisition of an associate	(6,951)	_	_
Interest received	123	1,328	4,777
Dividends received from an associate	_	168	240
Net cash used in investing activities	(87,916)	(172,300)	(177,910)

#### **Cash Flows from Financing Activities**

In 2022, net cash used in financing activities was US\$103.9 million, consisting of interest paid under the 2022 Notes and the 2024 Notes, repurchase of a portion of the 2024 Notes and repayment of the outstanding 2022 Notes.

In 2023, net cash used in financing activities was US\$197.6 million, consisting of payments for refinancing and redemption of the 2024 Notes, repurchase a portion of the 2024 Notes and interest paid on the 2024 Notes, partly offset by proceeds from the issuance of the 2026 Notes.

In 2024, net cash used in financing activities was US\$80.4 million, consisting of payments for redemption of the Perpetual Securities, interest paid under the 2026 Notes, partly offset by the proceeds from partial disposal of a subsidiary and proceeds from a bank loan, obtained by Erdene Mongol LLC.

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

#### FINANCING CASH FLOW

	Year ended December 31,		
_	2022	2023	2024
	(US\$'000)		
Financing activities			
Capital injection by a non-controlling interest	_	_	542
Proceeds from partial disposal of interests in a			
subsidiary	_	_	88,810
Proceeds from borrowing	-	_	20,000
Capital element of lease rentals paid	(130)	(220)	(1,099)
Repayment of the 2022 Notes	(14,912)	_	_
Repurchase of the 2024 Notes	(39,671)	(36,227)	_
Payment for refinancing of the 2024 Notes	-	(174,035)	_
Proceeds from new issue of the 2026 Notes	_	44,222	_
Repurchase of Perpetual Securities	(9,991)	-	(142,528)

	Year ended December 31,		
-	2022	2023	2024
	(US\$'000)		
Distribution made to holders of Perpetual Securities	_	_	(21,348)
Interest element of lease rentals paid Proceeds from shares issued under share option	(6)	(7)	(56)
scheme	3,325	_	2,753
Interest paid	(42,489)	(31,316)	(27,500)
Net cash used in financing activities	(103,874)	(197,583)	(80,426)

### TAXATION

Income tax expenses for the years ended December 31, 2022, 2023 and 2024 can be reconciled to profit before income tax as follows:

	Year ended December 31,		
_	2022	2023	2024
_	(US\$'000)		
Profit before taxation	54,708	334,922	336,203
Notional tax on profit before taxation <sup><math>(1)(2)</math></sup>	14,335	85,142	86,500
Tax effect of non-deductible items <sup>(3)</sup>	1,743	11,441	7,260
Tax effect of non-taxable items <sup>(3)</sup>	(20,678)	(1,908)	(1,502)
Prior year tax loss utilized	(163)	_	(10)
Tax loss not recognized.	695	259	403
Over-provision in respect of prior years	(115)	(114)	_
Actual tax (credit)/expenses	(4,183)	94,820	92,651

Notes:

(2) Pursuant to the rules and regulations of the Cayman Islands, 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, 2022, 2023 and 2024.

(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, 2022, 2023 and 2024.

<sup>(1)</sup> Pursuant to income tax rules and regulations of Mongolia, our subsidiaries located in Mongolia are subject 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 years ended December 31, 2022, 2023 and 2024. According to the Corporate Income Tax Law of China, our subsidiaries in China are subject to statutory income tax rate of 25%.

#### **INDEBTEDNESS**

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

As at December 31,		
2022	2023	2024
	(US\$'000)	
373,756	-	_
_	213,993	216,122
		20,000
373,756	213,993	236,122
	As 2022 373,756 - 373,756	As at December 31,   2022 2023   (US\$'000) -   373,756 -   213,993 -   373,756 -   373,756 213,993

(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 of December 31, 2024 are stated below.

The 2024 Notes bore interest at the rate of 9.25% per annum. The 2024 Notes were due in April 2024, unless earlier redeemed. In 2022, we repurchased an aggregate principal amount of US\$63,591,000 of 2024 Notes. In 2023, we repurchased an aggregate principal amount of US\$41,160,000 of 2024 Notes in the open market and an aggregate principal of US\$251,029,000 of 2024 Notes through an exchange offer. We redeemed the outstanding US\$84,220,000 principal amount of the 2024 Notes in full. See note 7 to our audited consolidated financial information as of and for the year ended December 31, 2024 and 2023, respectively, included elsewhere in this Offering Memorandum.

In September 2023, we issued an aggregate of US\$180 million principal amount of the 2026 Notes in connection with the exchange offer of the 2024 Notes combined with a new money issuance, and in December 2023, we issued an additional US\$40 million principal amount of the 2026 Notes. As of December 31, 2024, the outstanding principal amount of the 2026 Notes was US\$220 million.

On October 2, 2024, we completed the redemption of the entire outstanding principal amount of the Perpetual Securities, being US\$122,527,920, at the redemption price of 100% of the principal amount of the Perpetual Securities and paid all accrued distributions thereon, being US\$6,739,035.6. Following the completion of such redemption, all of the Perpetual Securities have been cancelled and delisted from the SGX.

In December 2024, Erdene Mongol LLC entered into a loan agreement with Trade and Development Bank of Mongolia for an amount of up to US\$50.0 million. As of December 31, 2024, US\$20.0 million of loan was drawn down. The loan bears interest at the rate of 13.3% per annum and will mature in December 2026.

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

#### 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,		
	2022	2023	2024
		(US\$'000)	
Contracted for	_	21,142	31,269
Authorized but not contracted for			50,833
Total	_	21,334	82,102
—			

As at December 31, 2024, our capital commitment of US\$82.1 million includes US\$45.1 million commitment related to the project development of the BKH gold mine.

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

	Year ended December 31,		
	2022	2023	2024
		(Actual)	
		(US\$'000)	
Capital Expenditures:			
СНРР	155	313	158
Project development of BKH gold mine	_	_	55,275
Trucks and equipment	_	31,144	9,559
Investment in associate company	6,951	_	_
Others <sup>(1)</sup>	4,189	9,539	22,396
Total	11,295	41,296	87,388

(1) Others mainly include equipment, appliances and light vehicles.

Our maintenance capital expenditure is expected to be approximately US\$10 to US\$20 million per year. In 2023, we spent US\$41.3 million in capital expenditure, of which US\$31.4 million was used for trucks and equipment. In 2024, we spent US\$87.4 million in capital expenditure, of which US\$55.3 million was used for the project development of the BKH gold mine. 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 makes 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 7 customers accounted for 100% of our total trade receivables as of December 31, 2024, three customers accounted for 100% as of December 31, 2023 and two customers accounted for 100% as of December 31, 2023 and two 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 of December 31, 2024, we had US\$40.7 million in trade receivables and US\$57.2 million in other receivables. The other receivables of US\$57.2 million in 2024 mainly related to US\$47.0 million VAT receivables and 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 of December 31, 2023, we had US\$33.7 million in trade receivables and US\$111.5 million in other receivables. As of December 31, 2022, we had US\$4.4 million in trade receivables and US\$87.7 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 of December 31, 2022, 2023 and 2024 amounted to US\$21.5 million, US\$73.3 million and US\$50.3 million, respectively. Total borrowings denominated in the currency other than the functional currency of the entity to which they relate as at December 31, 2022, 2023 and 2024 amounted to nil, nil and US\$20.0 million, respectively.

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 2026 Notes and bank borrowing, which totaled US\$240.0 million. 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 13.2% in 2022, 7.9% in 2023 and 9.0% in 2024. 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 37 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<sup>2</sup> 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, 2023, Mongolia had a population of approximately 3.50 million people, of which approximately 1.36 million people were of working age. The average life expectancy at birth was 72.7 years in 2022. 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 126-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 6 times with the latest amendment in 2023, 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. The latest amendment to the Constitution made a change to the number of the Parliament to be 126. Out of the 126 seats, 78 will be elected under majoritarian electoral system and the remaining 48 will be elected in proportional to the votes obtained by the political parties. Accordingly, the 2019 Law on Parliamentary Election was amended on June 16, 2023, and the first election under such amendment to the Constitution has been held on June 28, 2024.

The amended 2019 Law on Parliamentary Election requires the parties to have equal gender balance at their party list.

#### **Political Elections**

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

The last parliamentary elections were held in June 2024, in which the MPP won 68 seats in the newly formed 126-seat Parliament. The Democratic Party ("DP"), the HUN Party ("HUN party"), the Civil Will-Green Party and the National Coalition took 42, 8, 4 and 4 seats, respectively. Mr. Amarbayasgalan Dashzegve was elected as the Speaker of the Parliament during the first session of the newly elected Parliament held in July 2024. Additionally, Mr. Oyun-Erdene Luvsannamsrai from the MPP was re-appointed as the Prime Minister, and a coalition government was formed with 23 ministers. The cabinet consists of 13 representatives from the MPP, including the Prime Minister, 8 representatives from the DP and 2 representatives from HUN Party.

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.

On April 19, 2024, the Parliament of Mongolia ("Parliament") adopted the Law on the National Wealth Fund along with amendments to respective laws of Mongolia, including the Minerals Law, which became effective on May 11, 2024. The Law on National Wealth Fund introduces a new three-tier structured national sovereign wealth fund by enhancing the fund previously established by the Law on Future Inheritance Fund of 2016. Pursuant with the Law on National Wealth Fund, a former Future Inheritance Fund will be revised to be the saving fund dedicated for the future generation and newly defined two funds, that are, Savings Fund will be dedicated for the health and wellness, education, and housing needs of the citizens of Mongolia and the Development Fund will be used for enhancing development projects with nationwide economic significance. The Law on National Wealth Fund provides detailed framework on fund management and control scheme and each fund's sources, distribution, and investment operation distinctions. It aims to ensure implementation of the Constitutional Amendment of 2019, for fair and equal distribution of mineral resources benefits to the current and future generation of citizens through the national sovereign wealth fund.

Together with the National Wealth Fund Law, some amendments were made to the Minerals Law, and the amendments took effect on May 11, 2024.

#### **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 2024 by 4.9% as compared to 2023, and the total volume of coal export reached 31.8 Mt in 2022, 69.6 Mt in 2023 and amounted to 83.8 Mt in 2024. Going forward, international organizations, including the World Bank, ADB and IMF, project that Mongolia's economic growth would remain robust in the coming years with projected GDP growth between 6.0-7.0% over 2025-2026.

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.

On September 18, 2024, Fitch upgraded Mongolia's long-term foreign-currency issuer rating from "B" to "B+" with a stable outlook. On October 4, 2024, S&P upgraded Mongolia's long-term foreign-currency rating to "B+" from "B" with a positive outlook. On November 18, 2024, Moody's upgraded Mongolia's long-term foreign-currency issuer rating to "B2" from "B3" and the outlook remains stable. Mongolia's sizeable market debt obligations in 2026 are expected to be met with continued market access at non-prohibitive costs, mitigating the probable risk of a credit event consistent with a B2 rating.

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,										
	<b>2017</b> <sup>(1)</sup>	2018 <sup>(1)</sup>	2019 <sup>(1)</sup>	2020 <sup>(1)</sup>	<b>2021</b> <sup>(1)</sup>	<b>2022</b> <sup>(1)</sup>	2023(1)	2024 <sup>(1)</sup>				
Nominal GDP <sup>(2)</sup> (MNT billions)	28,010.7	32,582.6	37,839.2	37,453.2	43,555.4	53,851.5	70,441.5	79,956.3				
Nominal $GDP^{(2)}$ (US\$ millions <sup>(3)</sup> )	11,476.8	13,177.1	14,204.2	13,311.8	15,286.4	17,123.8	20,324.9	23,584.9				
Real GDP (MNT billions) <sup>(4)</sup>	24,545.6	26,446.7	27,928.3	26,655.4	27,091.7	28,455.1	30,567.1	32,053.9				
Real GDP (US\$ millions <sup>(3)</sup> ) <sup>(4)</sup> $\ldots$ .	10,081.8	10,659.0	10,498.1	9,468.5	9,508.0	9,048.2	8,819.7	9,455.0				
Real GDP growth <sup><math>(8)</math></sup>	5.6	7.7	5.6	-4.6	1.6	5.0	7.4	4.9				
Nominal GDP per capita (MNT												
thousands) <sup>(5)</sup>	9,042.5	10,314.1	11,855.6	11,612.9	13,267.87	16,121.0	20,824.0	23,356.5				
Nominal GDP per capita $(US^{(3)})^{(5)}$ .	3,705.0	4,171.0	4,450.0	4,128.0	4,657.0	5,126.0	6,008.0	6,890.0				
Year-on-year inflation	4.3	6.8	7.3	3.7	7.3	15.2	10.3	6.5				
Export (US\$ millions <sup>(3)</sup> )	6,200.6	7,011.7	7,619.8	7,576.3	9,241.1	12,538.6	15,186.9	15,783.4				
Imports (US\$ millions <sup>(3)</sup> )	4,337.3	5,874.8	6,127.4	5,298.9	6,845.5	8,704.4	9,250.2	11,612.5				
Unemployment rate	8.8	7.8	9.9	6.7	8.3	6.4	5.3	n/a				
External debt (US\$ millions <sup>(3)(7)</sup> )	27,492.66	28,714.89	30,702.29	32,361.83	33,805.5	33,344.8	34,569.8	37,117.3				
Balance of payments (US\$												
$millions^{(3)})^{(6)}$	616.8	-24.0	290.7	777.6	214.8	469.7	493.5	n/a				
Current account (US\$ millions) <sup>(6)</sup> .	-319.7	-441.6	-418.4	-84.9	-784.9	-321.5	-245.1	n/a				
Financial account (US\$ millions)	766.8	349.6	814.5	801	878.1	389.3	920.6	n/a				
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	4,921.5	5,509.8				
Population	3,177,899	3,238,479	3,296,866	3,357,542	3,409,939	3,457.5	3,504,741	3,544,835				

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

- (1) National Statistical Office of Mongolia, except otherwise indicated.
- (2) GDP by production approach.
- (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 MNT2,849.29 = US\$1.00, 2022 MNT3,144.83, 2023 MNT3,465.78 and 2024 MNT3,390.15.
- (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 2021, 2022, 2023 and 2024, the mining and quarrying sector accounted for 24.7%, 23.0%, 28.1% and 27.3% of nominal GDP, respectively. For 2024, total foreign trade turnover was US\$27.4 billion, representing a 12.1% increase compared to 2023. This growth was driven by a 3.9% increase in exports, amounting to US\$15.8 billion, and a 25.5% rise in imports, totaling US\$11.6 billion. The contribution of coal to Mongolia's exports has significantly increased in the last couple of years. Total coal exports were 31.8 Mt in 2022, 69.6 Mt in 2023 and 83.8 Mt in 2024.

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 and 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 Shanxi Fensheng Information Technology Co., Ltd ("Fensheng"), a leading Chinese consultancy and service provider in the coal and coke industry, to prepare an independent report for use, in whole or in part, in this section. Fensheng 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, Fensheng visits companies operating in the industry to gather and synthesize information about the market, prices and other relevant information. Fensheng has assumed that the information and data on which it relied are complete and accurate.

Forecasts and assumptions included in the Fensheng 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.

Fensheng has provided part of the statistical and graphical information contained in this section from many third-party sources, 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. The information contained herein has been obtained from sources believed by Fensheng 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 Fensheng 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 Fensheng 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 following diagram 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: FutureCoal

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 Fensheng, China will remain a major export market for Mongolian coal from 2025 to 2029. In this context, Fensheng 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 a few regions of China. Based on the 2024 China Mineral Resources Report, China had 218.6 Bt of coal reserves at the end of 2023, of which proven coking coal reserves accounted for 50.9 Bt.

According to Fensheng, the top ten provinces with largest proven coking coal reserves were Shanxi, Guizhou, Xinjiang, Heilongjiang, Yunnan, Shaanxi, Ningxia, Liaoning, Jiangsu and Jilin, accounting for 91.9% of the coking coal reserves in China, as of the end of 2022. Shanxi province had the highest quantity of coking coal reserves, accounting for approximately 55.4% of the total coking coal reserves in China, as of the end of 2022.

The following charts illustrate China's coal reserves by province and China's coking coal reserves by province, each as of 2022:

#### China's coal reserves by province as of 2022 Unit: Bt



Source: The Ministry of Natural Resources (MNR), Sxcoal





Source: The Ministry of Natural Resources (MNR), Sxcoal

#### 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 a period of intensive capacity reduction between 2016 and 2020, coking coal capacity surplus was significantly decreased in China. Between 2020 and 2024, China's coking coal capacity structure was optimized, with the proportion of backward capacity shrinking and coal de-capacity tasks diminishing. In particular, after 2021, the emphasis of the capacity reduction campaign shifted to phasing out capacity from coal mines with exhausted resources, low safety levels and substandard environmental protection measures. The capacity reduction in 2021 was mainly concentrated in non-major production areas with a large number of small coal mines with production of less than 0.3 Mtpa. Through the supply-side reform in the period from 2016 to 2022, the coal capacity was greatly optimized, and the proportion of backward capacity was continuously lowered over the period from 2013 to 2024. In April 2024, the National Development and Reform Commission issued the Implementation Opinions on Establishing Coal Capacity Reserve System, proposing that by 2030, the capacity reserve system will be improved, the capacity management system will be established, and 300 Mtpa of capacity reserves will be formed, raising national coal supply guarantee capacity and the supply resilience.

During the period from 2025 to 2029, due to the limited successive coking coal resources and the ongoing adjustments in the coal, coke and steel industry chain, the coking coal capacity is not expected to see significant increment, according to Fensheng. Meanwhile, existing mines will face resource reduction, and long-term idled mines and small-sized mines will be gradually closed, according to Fensheng. As a result, the operating coking coal capacity is likely to diminish from the current levels. In 2025, due to relieved safety supervision disturbance in Shanxi compared to early 2024, coking coal production will increase year-on-year, while the increment in total washed coking coal supply in China is expected to be limited under slowed capacity release and normalized safety inspections. Fensheng estimates that the raw coking coal output will slightly rebound to 1,295.2 Mt in 2025, and the output of washed coking coal will slightly rise to 480 Mt. Subsequently, as downstream demand declines, coking coal production will decrease accordingly. Moreover, due to the depletion of high-quality resources, the yield rate of washed coking coal will show a downward trend, leading the decline rate of washed coking coal output faster than raw coking coal output. By 2029, the output of raw coking coal is projected to decrease to 1,251.1 Mt, and the output of washed coking coal is forecast to decrease to 455.9 Mt.

The following charts illustrate coal supply forecast from 2025 to 2029:





Raw coking coal output forecast, 2025-2029 Unit: Mt



Source: Sxcoal

#### **China Structural Demand Side Reform**

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. In China, between 2020 and 2024, coking coal demand increased at a CAGR of 1.3% from 557.7 Mt in 2020 to 587.8 Mt in 2024.

The following table summarizes demand for different types of coking coal for the periods indicated:

China	coking	coal	demand	by	subtype,	2020-2024
Unit: I	Mt					

-	2020	2021	2022	2023	2024	CAGR 20-24
Total demand	557.7	545.4	556.2	591.5	587.8	1.3%
Primary coking coal	191.1	187.2	191.2	204.5	203.3	1.6%
Fat coal	82.5	80.8	82.5	89.7	89.2	2.0%
1/3 coking coal	51.1	49.9	50.8	53.9	55.2	2.0%

Source: Sxcoal

China's urbanization rate entered a "plateau" phase in or around 2020. However, under the countercyclical regulation measures following the COVID-19 pandemic, real estate and infrastructure investments increased in spite of otherwise adverse macroeconomic conditions. Along with the rapid economic recovery, China's crude steel and pig iron production reached a peak of 1,065 Mt and 888 Mt, respectively in 2020. In 2021-2022, under various policies relating to "cutting crude steel production", "dual control of energy consumption", and "houses are for living in, not for speculation", crude steel and pig iron production declined. In 2023, after the COVID-19 pandemic restrictive measures were lifted, steel demand was released temporarily, but weakened again due to a national real estate downturn. In 2024, the real estate industry continued to perform poorly, and infrastructure investment growth slowed due to high debt burdens, applying downward pressure on crude steel and pig iron production to 1,005 Mt and 852 Mt, respectively, resulting in a CAGR of -1.4% and -1.0% in 2020-2024, respectively.

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





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





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

Against the backdrop of policies aimed at achieving peak carbon emissions by 2030 and carbon neutrality by 2060, and the gradual decline in steel demand, the steel production and the coke industry chain is expected to trend downwards, according to Fensheng. Supportive policy and falling electricity and scrap prices will result in EAF steel output to rise, leading to a decline of pig iron production greater than the decline of crude steel production. As both production and demand have entered a downward trend in coal, coke and steel industry chain, Fensheng estimates that China's crude steel, pig iron and coke production will fall at a CAGR of -1.2%, -1.4% and -1.5% respectively during the period from 2025 to 2029. Due to a decline in metallurgical coke production, demand for coking coal is expected to decrease accordingly, at an estimated CAGR of -1.7% over the period from 2025 to 2029, according to Fensheng.

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

	2025E	2026E	2027E	2028E	2029E	CAGR 25-29
-						
Crude steel	990	976	965	956	948	-1.2%
Pig iron	836	822	812	802	794	-1.4%
Coke	483	474	466	460	455	-1.5%
Met coke	435	426	418	412	406	-1.7%
Washed coking coal						
demand	577	565	555	547	540	-1.7%
Demand for strongly-caking						
coal	343	337	332	328	325	-1.3%
Washed primary coking coal.	201	197	195	193	191	-1.2%
Washed fat coal	88	86	85	84	83	-1.5%
Washed 1/3 coking coal	54	53	52	52	51	-1.5%

# Washed coking coal demand forecast, 2025-2029 Unit: Mt

Source: Sxcoal

# China Coking Coal Import Analysis

China's coal import levels in 2022 were primarily impacted by Indonesia's ban on coal exports, higher international prices in the wake of the Russia-Ukraine conflict and the ongoing disruption caused by the COVID-19 pandemic, showing a decrease of 9.4% year-over-year. In 2023 and 2024, China's coal import levels increased in light of reduced overseas demand and the cost-effectiveness of imported coal.

China's coking coal imports increase by 16.7% year-over-year 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. In 2023, the import volume further increased to 102.5 Mt due to increasing clearance of Mongolian coal in the post-pandemic period and the zero-import tariff policy. In 2024, the coking coal import volume reached a record high of 122 Mt.

The following charts illustrate total coal imports and coking coal imports by China for the periods indicated:



China's total coal imports, 2020-2024 Unit: Mt China's coking coal imports, 2020-2024 Unit: Mt

The following table summarizes China's coking coal import forecast for the periods indicated:



### China's coking coal import forecast, 2025-2029 Unit: Mt

#### Source: Sxcoal

Between 2025 and 2029, loosening supply, high port inventories, and weakening demand is expected to result in a downward trend in China's coking coal imports, which are expected to fall to 94.6 Mt by 2029, according to Fensheng. Fensheng expects that Mongolian coal will continue to replace some market share of seaborne imported coal, benefitting from its locational advantage, reduced freight rates, improved border infrastructure and higher clearance efficiency. China's imports of Russian coal via land transport may also increase along with the construction and improvement of the Far East ports. Overall, in line with the reduction in China's total coking coal imports, the overland import volume will also show a downward trend, but at a slower pace, projected to decrease to 52.8 Mt by 2029.

#### China Coking Coal Supply-Demand Dynamics

In 2023, as the COVID-19 pandemic control measures were lifted, and the domestic economy gradually recovered. China continued to increase coal production and implement supply guarantee policies. Meanwhile, import volumes increased substantially due to the smooth clearance of Mongolian coal and the implementation of zero import tariff until the end of the year. The total washed coking coal supply (domestic supply plus net imports) rose 6.5% to 594 Mt, and demand increased 6.3% to 591 Mt in 2023, leading to a build-up in coking coal inventory.

In 2024, the domestic coking coal supply was tightened in first half of the year due to strict safety guidance by the Central Inspection Team in the Shanxi province, and gradually loosened in the second half of 2024 alongside the production stabilization policy in Shanxi and the increase in imports. In 2024, the domestic washed coking coal supply dropped 3.8% to 473 Mt while net imports increased by 19.3% to 122 Mt; and demand ticked down 0.6% to 588 Mt, leading to further inventory accumulation.

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

#### China coking coal supply-demand balance, 2020-2029 Unit: Mt, %

											CAGR	CAGR
	2020	2021	2022	2023	2024	2025E	2026E	2027E	2028E	2029E	20-24	24-29
Raw coal output	1,215.7	1,254.1	1,319.0	1,333.6	1,276.1	1,295.2	1,291.3	1,282.7	1,270.0	1,251.1	1.2%	-0.4%
Washed coal output	485.1	489.9	493.5	491.4	473.0	480.1	477.7	472.1	465.1	455.9	-0.6%	-0.7%
Coking coal imports	72.6	54.7	63.8	102.5	122.3	115.6	110.3	104.8	99.6	94.6	13.9%	-5.0%
Coking coal exports	0.9	0.1	0.3	0.4	0.7	0.8	0.8	0.8	0.9	0.9	-4.5%	5.0%
Total washed coal												
supply	556.8	544.5	557.1	593.6	594.6	595.0	587.2	576.1	563.8	549.6	1.7%	-1.6%
Total Demand	557.7	545.4	556.2	591.5	587.8	577.2	564.9	555.2	547.1	539.5	1.3%	-1.7%
Supply Gap/Surplus	-0.9	-0.9	0.9	2.0	6.8	15.2	18.0	16.6	12.4	4.4		

Source: Sxcoal

As China's finished steel production is expected to decline during the period 2025 to 2029 under the dual carbon policy, demand for coking coal is also expected to decline. In terms of supply, along with the normalized production in Shanxi in 2025, China's coking coal supply will increase slightly year-on-year, according to Fensheng. During the period 2026 to 2029, affected by several factors, such as weakening downstream demand, high inventory levels, and diversified import channels, domestic supply may passively decrease. Coking coal inventory is expected to continue to accumulate amid ample domestic supply and high imports.

#### 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, releasing a sign of improving relations between the two countries. In January 2023, the restrictions on Australian coal imports showed signs of relaxation, allowing some Chinese companies to import Australian coal for self-use and, in February 2023, the first shipment of Australian coal arrived in China, marking the official lifting of the restrictions on Australian coal imports. In 2024, coal import tariffs were reinstated after being cut to zero between May 1, 2022, and December 31, 2023. Due to price advantage, premium quality, and favorable import policy, Australian coal import volume recovered to the 80 Mt level while the import landscape had changed. In 2024, China imported 83 Mt of Australian coal, accounting for 15.4% of the total imports, significantly lower than 27% in the period 2018 to 2019, according to Fensheng.

In 2025, import tariff policies are expected to remain unchanged and imports are expected to remain high. Australian coal, as an important import source, will continue to be purchased based on market demand and price differentials. By type, China's imports of Australian thermal coal may shrink, while imports of Australian coking coal may continue to increase moderately.

# 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 33.3 Bt of coal reserves as of 2021, with lignite ranking top, followed by bituminous and subbituminous coal.

The following map 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 Heavy Industry of Mongolia, Sxcoal

Note: A Kharkhiraa, B Mongol Altay, C South Khangay, D Bogdn, C Ongiyngol, South Govi, C Choir-Nyalga, H Middle Govi, I Choybalsan, J Sukhe-Bator, & East Govi, I Tamsag, M Orkhon-Selenge, N Altay-Chandmani, O Bayan-Ulgii

# **Mongolian Coal Production**

During the period from 2022 to 2024, Mongolia's coal production displayed an upward trend following the volatility experienced during the COVID-19 pandemic. In 2023, new coal projects commenced operations and some large local enterprises achieved mining efficiencies through technological advancements and equipment upgrades. Export volumes increased due to strong demand from China, which led to an increase in coal production to 77.6 Mt in 2023. According to the National Statistics Office of Mongolia, Mongolia's coal production reached 96.8 Mt in 2024, an increase of 25.0% compared to 2023, of which coking coal production was 59.1 Mt, accounting for 61.0% of total production for 2024 and thermal coal production was 37.7 Mt, accounting for approximately 39.0% of total production.

The following chart illustrates Mongolian coal production for the periods indicated:



### Mongolian coal production, 2020-2024 Unit: Mt

Source: National Statistics Office of Mongolia, Sxcoal

For the period from 2025 to 2029, Mongolian coal production is projected to decline due to weakening coal demand in its target markets and increased competition from seaborne coal imports. Mongolian thermal coal production is expected to face greater challenges than coking coal due to growing production from existing operating mines and newly commissioned coal mines in China's Xinjiang, Inner Mongolia and Ningxia.

Mongolia's coal output is projected to decrease to 74.2 Mt by 2029, representing a CAGR of -5.2% during the period from 2025 to 2029, of which the output of coking coal is estimated to decrease at a CAGR of -3.3% to 53.6 Mt and the output of thermal coal is expected to decrease at a CAGR of -11.4% to 20.6 Mt by 2029.

The following chart illustrates Mongolian forecasted coal production by coal type for the periods indicated.



#### Mongolian coal output forecast, 2025-2029 Unit: Mt

Source: National Statistics Office of Mongolia, Sxcoal

#### **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 used either the GS-GM route or the Shivee Khuren (Mongolia)-Ceke (China) route in 2024. 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 into 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 Wuhai in Inner Mongolia, Gansu and Xinjiang, and eastward to Baotou in Inner Mongolia, Tangshan in Hebei, and farther east to Shandong and Jiangsu. It can reach Jining first on Jingbao Railway Line and then through Jitong line to the northeastern parts of China in Heilongjiang, Jilin and Liaoning.

GS (ten kilometers from the GM border checkpoint in China) is currently the largest border checkpoint in Mongolia for coal exports, with a designed cargo clearance capacity of 45-50 Mt per year. 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 and passed the acceptance test in June 2024. In 2024, the trucking freight rate from UHG to Ganqimaodu border decreased by 39% year-on-year to US\$22.9/t, of which the freight from UHG mine to Tsagaan Khad fell 4% year-on-year to US\$9/t, and the freight from Tsagaan Khad to Ganqimaodu dropped 51% year-on-year to US\$13.9/t.



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. In April 2024, China and Mongolia signed an agreement to build the Gashuunsukhait-Ganqimaodu cross-border railway designed to have a total length of 8,081 m, UIC 60 steel rails, one broad-gauge line (1,520 mm) and one standard-gauge line (1,435 mm), and a 5,441 m bridge. Upon operation, the railway will be able to transport 30 Mt of goods annually and undertake 55%-60% of Mongolia's coal exports.

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

Mongolia's coking coal exports to China increased to 54 Mt in 2024, driven by several favorable factors, including minimal impact arising from the COVID-19 pandemic, improved customs clearance procedures, zero import tariff, rising purchases of Chinese buyers, and the low-cost effectiveness of alternatives such as Australian coal. Despite the restoration of import tariffs in 2024, Mongolian coal exports to China increased to 56.8 Mt, due to Mongolia's coal quality advantage, its proximity to Chinese consumption market regions, and the weak competitiveness of Australian coal. For the period from 2020 to 2024, Mongolia's coking coal exports achieved a CAGR of 24.3%, according to Fensheng.

The following table sets out a breakdown of Mongolia's historical coal exports to China for the periods indicated:

#### Mongolia coal exports by type, 2020-2024 Unit: Mt

_	2020	2021	2022	2023	2024	CAGR 20-24
Total Thermal coal	28.6 4.8 23.8	16.4 2.4 14.0	31.1 5.5 25.6	$70.0 \\ 16.0 \\ 54.0$	82.9 26.1 56.8	30.7% 52.8% 24.3%

Source: GAC, Sxcoal

#### **MMC Coal Quality Evaluation**

MMC is currently operating two coal mines in the South Gobi 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 following table 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)	<u> </u>	Y	CSN	CSR
JM	9.0	11 9.5	28 35	0.85	75 65	14	-	-

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 <sub>daf</sub>	G <sub>R.I</sub>	Y	b	P <sub>M</sub>	H <sub>daf</sub>	Q <sub>gr,maf</sub>
Anthracite	No. 1	WY <sub>1</sub>	01	≤3.5					≤2	
	No. 2	$WY_2$	02	>3.5~6.5					>2~3	
	No. 3	WY <sub>3</sub>	03	>6.5~10					>3	
Bituminous coal	Meagre coal	PM	11	>10~20	$\leq 5$					
	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)			

							Indices			
Category		Symbol	No.	V <sub>daf</sub>	G <sub>R.I</sub>	Y	b	P <sub>M</sub>	H <sub>daf</sub>	Q <sub>gr,maf</sub>
	Gas coal	QM	34	>28~37	>50~65					
			43	>37	>35~50					
			44		>50~65					
			45		>65	≤25	(≤220)			
	<sup>1</sup> / <sub>2</sub> 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	$\leq 5$					
			31	>28~37						
	Long flame coal	CY	41	>37	$\leq 5$			>50		
			42		>5~35					
Lignite	No. 1	$HM_1$	51	>37				≤30		≤24
-	No. 2	HM <sub>2</sub>	52					>30~50		

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

MMC's HCC has medium ash, medium sulfur, mid-to-low volatile matter and strong caking properties. 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 medium ash, low sulfur, mid-to-high volatile matter and medium caking quality. MMC's SSCC is a highly preferred blending coal, because it can improve coke quality with a flexible blending ratio.

# A Quality Comparison with Rival Coals

MMC's HCC contains medium ash, medium sulfur and high caking property. Compared to China's primary coking coal, MMC's HCC contains similar ash content and slightly lower or advantaged sulfur content, while having medium-to-low G Index and slightly higher volatile matter content (or "Vdaf"), which is the content of volatile substances in the combustion component. Compared to Australian HCC, the ash content of MMC's HCC is similar, sulfur content is slightly higher, while other indicators of MMC's HCC are inferior to Australian coals. MMC's SSCC has lower ash and sulfur content and medium coking property compared with Chinese 1/3 coking coal. Compared to Australian SSCC, the ash content and volatile matter content of MMC's SSCC is similar with slightly lower sulfur and lower G index.

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

Qualit	y 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	_
	Mongolia	10.5	25	0.8	83	17
	Gujiao of Shanxi	10.5	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 (G6)	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

Source: Sxcoal

#### Production Cost Comparison with Rival Coals

MMC's washed coal production cost is competitive because of shallow coal seams, low labor costs and moderate washed coal yield. In addition, the significant reduction in freight rates from Tsagaan Khad to Ganqimaodu have helped consolidate MMC coal's cost competitiveness in its target market regions.

#### **Commercial coal ex-plant cost**

Fuel costs declined in 2023 as both mining and transportation costs dropped. Coal prices fell and associated taxes and fees were both reduced to varying degrees. As a result, the production costs of both Chinese and overseas mines shifted downward in 2023. In 2024, as the prices of raw materials such as fuel and steel continued to decline and taxes and fees also fell, production costs moved further down. The ex-plant cost of Australian coking coal was US\$97/t in 2024, placing it between the costs of coking coal from China's Inner Mongolia and Shandong provinces.

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

The following graph shows a comparison of coal ex-plant cost for 2023 and 2024:



Commercial coal ex-plant cost comparison Unit: USD/t

Source: Sxcoal

#### **Transportation Cost Comparison**

The primary target market regions of Mongolian coking coal are the western parts of Inner Mongolia and Tangshan in Hebei. Coking plants in Inner Mongolia are mostly located in Wuhai, in the western parts of Inner Mongolia, where fat coal resources are rich while primary coking coal resources are scarce. Consequently, in the western parts of Inner Mongolia, MMC coal products have a significant advantage over alternative sources. Tangshan, Hebei, is also a principal target market region for Australian coking coal and Shanxi coking coal.

In addition to the significant reduction in short-distance freight rates from Tsagaan Khad to Ganqimaodu, the transportation costs of MMC coking coal to the target market regions in China declined and its sales radius expanded.

The following table sets out the transportation costs of Shanxi, Mongolia and Australia for periods indicated:

Coal	Departure	Destination	Transport mode	Distance	Freigh	t
					2023	2023
Shanxi Liulin coking coal	Liulin, Shanxi	Jingtang port	Road	820	225	236
MMC coal	GMD	Jingtang port	Rail	1,340	42	38
Australian coal	Hay point port	Jingtang port	Sea	8,000	13	14

#### Transportation costs of Shanxi, Mongolia and Australia coal to Jingtang port Unit: km, yuan/t, USD/t

Note: The freight cost from Liulin to Jingtang port is shown in Chinese yuan

Source: Sxcoal

#### **CFR** Cost Comparison

Heilongjiang province has the highest coking coal CFR cost among major China domestic producing provinces due to the higher transportation and mining costs. By comparison, Shandong's CFR cost is the lowest, followed by Hebei, largely due to the lower transportation cost applicable. According to Fensheng, UHG coal's CFR cost was US\$112/t in 2024, comparable to that of the main coking coal production provinces in China. The transportation costs, taxes and other fees associated with UHG operations undermined UHG coking coal's advantage of low mining cost.

The following graph shows a comparison of coking coal CFR cost for various sources for 2023 and 2024:



Source: Sxcoal

Note: The 13% VAT is not included

#### Target Market Regions for MMC Coal Products

Currently, MMC's coal is transported to GS by road, and subsequently transported to Wanshuiquan in Baotou via the Shenhua Ganquan Railway. Then it is transported either westward to Gansu, Inner Mongolia's Wuhai and/or to Xinjiang, or eastward to Baotou, Tangshan, Shandong and/or Jiangsu. The following map illustrates such transportation options.



The primary target markets of Mongolian coking coal are the western parts of Inner Mongolia Autonomous Region and Tangshan in Hebei province. In the western parts of 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.

Inner Mongolia is rich in coking coal resources. However, the coke produced locally has high ash and sulfur content and does not meet the requirements of steel mills. In 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 2025 and 2029, Tangshan is expected to have a primary coking coal gap of between 10.2 Mt and 11.3 Mt and a 1/3 coking coal gap or between 4.1 Mt and 4.6 Mt annually.

The following table sets out the forecasted demand and supply gap within the geographic locations and periods indicated.

Supply gap	Region	2025E	2026E	2027E	2028E	2029E
Washed JM	Total	23.2	24.1	25.2	25.3	25.0
	Inner Mongolia	9.2	9.6	10.3	10.2	9.8
	Hebei's Tangshan	10.2	10.4	10.7	11.0	11.3
	Gansu	3.8	4.0	4.2	4.1	4.0
Washed 1/3 JM	Total	11.5	11.7	21.1	11.7	11.2
	Inner Mongolia	5.9	5.9	6.1	5.6	5.0
	Hebei's Tangshan	4.1	4.2	4.3	4.5	4.6
	Gansu	1.5	1.6	1.7	1.6	1.6

### Washed coking coal supply gap forecast, 2025E-2029E Unit: Mt

#### **China Coking Coal Price**

UHG's HCC and BN's SSCC are of similar quality as washed Shanxi primary coking coal and Shanxi 1/3 coking coal, respectively. The historical prices for these are shown in the following graph.



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

Source: Sxcoal

According to Fensheng, during the forecast period, global coking coal supply is expected to remain high relative to soft demand stemming from slow global economic growth and changing international trading patterns. In China, Fensheng expects demand for coking coal to enter a downward trend due to slowing GDP growth and China's "dual carbon" policy. Coupled with high imports, the supply of coking coal in China will further loosen, resulting in an oversupply, according to Fensheng. In the forecast period, coking coal prices are estimated to decline to 1,525 yuan/t for Shanxi washed primary coking coal and 1,315 yuan/t for washed Shanxi 1/3 coking coal in Jingtang port by 2029.

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

#### China domestic coking coal price forecast, 2024-2029E Unit: yuan/t

	2024	2025E	2026E	2027E	2028E	2029E
Shanxi washed primary coking coal at Jingtang						
port/HCC	1,884	1,585	1,560	1,542	1,532	1,525
coal/SSCC	1,670	1,400	1,375	1,352	1,332	1,315

The saleable prices of MMC products at GM Border are expected to fall from 2024 to 2029 as competition in the Chinese market intensifies. The price of MMC JM is expected to decline from 1,438 yuan/t in 2024 to 1,133 yuan/t in 2029 while the price of 1/3 JM is expected to decline from 1,356 yuan/t in 2024 to 1,032 yuan/t in 2029. The following table sets forth the price forecasts for MMC washed coal at FOT GM for the periods indicated.

# MMC coal price forecast at GM border with VAT, 2024-2029E Unit: yuan/t

_	2024	2025E	2026E	2027E	2028E	2029E
ММС-ЈМ	1,438	1,172	1,153	1,141	1,135	1,133
MMC-1/3JM(G65)	1,356	1,099	1,078	1,060	1,044	1,032
MMC-6000Kcal/kg	657	572	546	522	519	516

# **CORPORATE STRUCTURE AND HISTORY**

# **CORPORATE STRUCTURE**

As of the date of this Offering Memorandum, 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 Energoresources 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, 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 LLC and CECC holds 10% and 90% of equity interest, respectively. 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".

In September 2023, we completed an exchange offer for the 2024 Notes and issued the 2026 Notes. In December 2023, we issued additional 2026 Notes. For more information, see "Management's Discussion and Analysis of Financial Condition and Results of Operations – Liquidity and Capital Resources".

In November 2023, we redeemed the outstanding principal amount of the 2024 Notes in full.

In April 2024, we partially redeemed our Perpetual Securities and in October 2024, we redeemed the outstanding principal amount of Perpetual Securities in full.

In June 2024, we sold 20% equity interest in Khangad Exploration to Jiayou International Logistics Co., Ltd.

In August 2024, Energy Resources Rail LLC, one of our indirect subsidiaries, was liquidated.

In December 2024, we entered into a securities purchase agreement with Talst Investment LLC to purchase 50.5% of the issued and outstanding share capital of Universal Copper LLC, a Mongolian company principally engaged in the exploration for copper and other non-ferrous metals. This transaction closed on March 11, 2025. For more information, see "Business – Universal 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.
- 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 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 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, 2024, 539 Mt of JORC-compliant coal resources, and as of January 1, 2025, 340 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 493 Mt of JORC-compliant coal reserves as of January 1, 2025. 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. Our UHG mine produced 12.7 Mt ROM coal for 2024. Our BN mine produced 3.6 Mt ROM coal for 2024. For the years ended December 31, 2022, 2023 and 2024, we produced an aggregate of 5.7 Mt, 14.6 Mt and 16.3 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. The total volume of coal export from Mongolia to China reached 31.8 Mt in 2022, 69.6 Mt in 2023 and 83.8 Mt in 2024. During each such period, our market share accounted for 13%, 13% and 10%, respectively, of the total volume of coal exported from Mongolia. For the years ended December 31, 2022, 2023 and 2024, we sold our hard coking coal at an average selling price of US\$147.1 per tonne, US\$160.2 per tonne and US\$168.4 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 2023, 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 11th consecutive year.

Our revenue was US\$546.2 million, US\$1,034.8 million and US\$1,039.9 million for the years ended December 31, 2022, 2023 and 2024, respectively. We recorded profit of US\$58.9 million, US\$240.1 million and US\$243.6 million for the years ended December 31, 2022, 2023 and 2024, 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. Our UHG and BN mines are located within approximately 30 km of each other, and 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 539 Mt of JORC-compliant measured, indicated and inferred coal resources as of December 31, 2024, and a total of 340 Mt of JORC-compliant proved and probable coal reserves as of January 1, 2025, according to the technical study completed by Glogex. Our BN mine had a total of 404 Mt of JORC-compliant measured, indicated and inferred coal resources as of December 31, 2024, and a total of 272 Mt of JORC-compliant proved and probable coal reserves as of January 1, 2025, 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 <sup>(1)</sup>	612	
South Gobi <sup>(2)</sup>	114	
China		
Hidili <sup>(3)</sup>	294	
Shougang Fushan <sup>(4)</sup>	59	
Australia		
BHP (Goonyella Riverside) <sup>(5)</sup>	322	
Glencore (Hail Creek) <sup>(5)</sup>	80	
Anglo American (Moranbah North) <sup>(5)</sup>	152	

Notes:

<sup>(1)</sup> Reserve as of January 1, 2025, from Glogex reserve statement as of January 1, 2025.

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

<sup>(3)</sup> Reserve as of December 31, 2023, from Hidili's 2023 annual report.

<sup>(4)</sup> Reserve as of December 31, 2023 from Shougang Fushan's 2023 annual report.

<sup>(5)</sup> Reserve as of December 31, 2022 from Wood Mackenzie.

<sup>(6)</sup> Reserve as of December 31, 2023 from Glencore Resources and Reserves report 2023.

<sup>(7)</sup> Reserve as of December 31, 2023 from Anglo American Ore Reserves and Mineral Resources Report 2023.

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 Naimdai 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 has 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. The border crossing facilities were further expanded between 2021-2023 to approximately 40.0-45.0 Mtpa capacity.

During 2023, we transported 370,000 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. In 2022, we built a designated stockyard at UHG, and 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 railway line. We also developed a bonded terminal for the GS Terminal in 2021 for containerized shipments.

#### 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 December 31, 2024, we had 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 "– 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, achieving a growth rate of around 5% in 2024. 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 1,019 Mt of crude steel in 2023, 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, Fensheng estimates there to be a shortage of coking coal supply for the period. In 2024, China imported 122.3 Mt of coking coal, of which 46% was sourced from Mongolia, making Mongolia China's largest supplier, according to Fensheng. Chinese demand for metallurgical coal is expected to remain stable.

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. From the second half of 2022, China began to relax various pandemic related border restrictions, which further boosted export volume. In 2022, 2023 and 2024, the total number of trucks passing through the GS-GM border reached 136,534, 271,563 and 282,001, 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. Coke production in Inner Mongolia has remained relatively stable. According to Fenwei, Inner Mongolia ranks as the second-largest producer, with an output of 50.2 Mt, trailing behind Shanxi, which leads with 92.1 Mt produced in 2024. We believe this demonstrates that Mongolia has geographical location advantage to supply coal to high-demand markets. 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 by actively trading through auctions via the MSE platform and sold 1.8 Mt of coal products in 2023 and 4.7 Mt of coal products in 2024. 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 was 5.3 bcm/t in 2022, 4.5 bcm/t in 2023 and 4.7 bcm/t in 2024. Our mine gate cash cost was US\$50.6, US\$48.0 and US\$50.0 per tonne for the years ended December 31, 2022, 2023 and 2024, 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 from 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 further 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 also prioritize cost control initiatives intended to enhance operational efficiency and productivity. Our power plant is connected to the central grid, allowing for bidirectional power exchange. When we generate excess power, it is sent to the grid and when needed, we draw power from the grid to ensure stable operations and efficient energy use. 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. In 2024, we spent US\$87.4 million in capital expenditure, of which US\$55.3 million was used for the BKH mine development. Our maintenance capital expenditure is expected to be approximately US\$10 million to US\$20 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 has helped increase export volume to China. Tavantolgoi Railway LLC has completed the construction of the loop connecting the Tavantolgoi-Gashuunsukhait railway to the UHG stockyard. We built and completed a designated stockyard at our UHG mine in 2022, which can connect to the Tavan Tolgoi station. 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. On February 5, 2025, the Government of Mongolia announced that it had finalized the agreement and resolved to execute it with the Chinese government and such agreement was signed on February 14, 2025. This bilateral agreement is expected to be ratified by the Parliament, and project construction is expected to commence during 2025, as announced by Government of Mongolia.

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. We also developed a bonded terminal for the GS Terminal in 2021 for containerized shipments. 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 25, 2025, we completed the acquisition of a 50% equity interest in EM LLC for a total consideration of US\$40 million. 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. Through EM LLC, our 50%-owned subsidiary, we are developing Bayan Khundii ("BKH") gold mine located in Bayankhongor aimag (province), Mongolia, and commercial production is expected to commence from the second half of 2025. For more information, see also "Business – EM Transaction". In addition, on December 11, 2024, we announced that the Company, our wholly-owned subsidiary Singapore HoldCo and Talst Investment LLC (the "Seller"), an independent third party entered into a securities purchase agreement pursuant to which Singapore HoldCo agreed to purchase 50.5% of the issued and outstanding share capital of Universal Copper LLC, a Mongolian company, for an aggregate cash consideration of US\$20.5 million. Universal Copper LLC is principally engaged in the exploration for copper and other non-ferrous metals and holds three minerals exploitation special permits for areas all located in Bayankhongor aimag (province), Mongolia. The closing of the Universal Transaction occurred on March 11, 2025. For more information, see also "Business - Universal Transaction". We believe that the EM Transaction and the Universal Transaction will help us diversify our revenue sources, reduce our full dependency on coal or single commodity, and achieve our long-term development objectives, enabling further expansion of our business operations.

We believe that high corporate governance standards are essential in providing a framework for us 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 we strictly adhere 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 15 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.

# Reduce operating cost and improve operating efficiency

We have implemented various measures aimed 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 to 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 based on 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.

We will continue to optimize our operations and seek opportunities to improve our operating efficiency and reduce operating costs.

#### 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 2024, we completed the acquisition of a 50% equity interest in EM LLC, a Mongolian company principally engaged in the exploration of gold and other precious metals. In March 2025, we completed the acquisition of a 50.5% interest in Universal Copper LLC, a Mongolian company principally engaged in the exploration for copper and other non-ferrous metals. For more details, see "– EM Transaction" and "– Universal 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.

#### 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.

# 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 a guarantee from the Government of Mongolia that the license would not be terminated. See "Risk Factors – Risks Relating to our Business and Industry – The Parliament could determine that any one or more of our project sites in Mongolia is a Mineral Deposit of Strategic Importance and the Government of Mongolia could take an equity, production, profit sharing or other interest in any of our projects, and any changes in the Mongolian legal frameworks or government policies may materially and adversely affect our business, prospects, financial condition and results of operations".

#### **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.

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 Parliament could determine that any one or more of our project sites in Mongolia is a Mineral Deposit of Strategic Importance and the Government of Mongolia could take an equity, production, profit sharing or other interest in any of our projects, and any changes in the Mongolian legal frameworks or government policies may materially and adversely affect our business, prospects, financial condition and results of operations".

#### **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, 2024 was made only on the basis of revised surface topography, to account for depletion as a result of mining activity between January 1, 2024 to December 31, 2024 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.

Internal peer audit of these latest structural and coal quality models was conducted by Mr. Lkhagva-Ochir Said, employed by the Group as Chief Operating Officer-Coal & Energy. This peer review confirmed that the Group's work to update the UHG geological model, and thus the Coal Resource estimate for the UHG mining license area, was in compliance with requirements of the JORC Code (2012). The following table sets forth the UHG mining license area JORC Code coal resource by depth and category as of December 31, 2024. Based upon mine survey calculation, since January 1, 2024 to December 31, 2024, mine production has depleted the stated coal resource by approximately 10 Mt.

Total Coal Resource for UHG mining license	<b>Resource Category</b> (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	53	4	12	57	69
From 100m to 200m	87	9	19	96	115
From 200m to 300m	125	6	14	131	145
From 300m to 400m	88	3	4	91	95
Below 400m	85	7	14	92	106
Sub-Total above 300m	272	20	48	292	340
Sub-Total below 300m	173	10	18	183	201
Total	445	30	66	475	541
Total (Rounded)	450	30	60	470	540

Notes:

- (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 17 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.

<sup>(1)</sup> 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 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. 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, 2024, and have been carried out in accordance with the principles and guidelines of the Australasian Code for Reporting of Exploration Reserves, 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, 2024 was made only the basis of revised surface topography, to account for depletion as a result of mining activity from January 1, 2024 to December 31, 2024, 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-Coal & Energy. 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 December 31, 2024, respectively. The figures in this table represents a calculation based upon in-situ density at an assumed 5% moisture basis.

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# Total Coal Resource for BN mining license

	Total	<b>m</b> ( )
Inferred	(M+I)	Total (M+I+I)
1	6	7
5	64	69
8	99	107
8	102	110
9	103	112
22	271	293
9	103	112
31	374	405
30	370	400
	Inferred   1   5   8   9   22   9   31	Inferred (M+I)   1 6   5 64   8 99   8 102   9 103   22 271   9 103   31 374   30 370

# Total Coal Resource for THC mining license

THG mining license	<b>Resource Category</b> (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:

- Mr. Lkhagva-Ochir Said is employed by the Group as Chief Operating Officer. Mr. Said is a member of the AusIMM (Member (2)#116005) and has over 17 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.

<sup>(1)</sup> 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 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. 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, 2024, 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.

#### **COAL RESERVES**

#### Ukhaa Khudag (UHG) deposit

We engaged Glogex to prepare an updated JORC Code coal reserve statement as at January 1, 2025 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, 2024 to January 1, 2025. As of January 1, 2025, the total marketable reserves for the UHG deposit was approximately 210 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 Fensheng, 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, 2025 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	<b>Reserve Category</b> (Mt)		
Coal Type	Proved	Probable	Total
Coking	311 19	10	321 19
Total	330	10	340

Notes:

<sup>(1)</sup> 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 23 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.

<sup>(2)</sup> 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, 2025. 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 January 1, 2024 to January 1, 2025.

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 Fensheng.

The JORC Code coal reserve estimate for the BN deposit as of January 1, 2025 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	<b>Reserve Category (Mt)</b>		
Coal Type	Proved	Probable	Total
Coking	239	23	262
Thermal	9	1	10
Total	248	24	272

Notes:

(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, 2024 to January 1, 2025. As measured by mine survey, the stated BN ROM coal reserve has been depleted by 4.0 Mt.

<sup>(1)</sup> 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 23 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.

# **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.

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"). In December 2023, the mining equipment previously owned by Thiess was transferred to the Group and a new contract was entered into with Thiess. Under the new contract, Thiess will deliver asset management services, including supply chain management and maintenance services. As a result, the plant rate and the base fee previously charged by Thiess have been reduced. Our agreement with Vertex expired on June 30, 2024 and was 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 us. 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. 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 spare parts covering cost of maintaining assets and supply chain management on an actual cost basis. 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.

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 was completed and commissioned in 2023.

Our CHPP is capable of operating in the harsh climate of Mongolia's South Gobi desert with extreme fluctuations in temperature. As of December 31, 2024, the CHPP processed a total of 15.4 Mt of ROM coal to produce a total of 8.4 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 the 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, the Company 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. 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.

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, respectively.

On January 25, 2024, the Company announced that all conditions precedent to closing under the investment agreement have been fulfilled and that closing had taken place. Following the closing, the Company through its wholly-owned subsidiary, holds 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 effective for 30 years and extendable twice for 20-year periods. EM LLC's wholly owned subsidiary, Leader Exploration LLC is a limited liability company established 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, 2027. 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".

#### UNIVERSAL TRANSACTION

In December 2024, the Company announced that it has entered into a securities purchase agreement with its wholly-owned subsidiary Singapore HoldCo and Talst Investment LLC (the "Seller"), an independent third party pursuant to which Singapore HoldCo has agreed to purchase 50.5% of the issued and outstanding share capital of Universal Copper LLC (the "Target Company"), a Mongolian company, for an aggregate cash consideration of US\$20.5 million. The consideration is payable in two tranches, subject to the conditions of the securities purchase agreement: (i) an initial payment of US\$8.5 million, which was paid on January 10, 2025 and (ii) a deferred payment of US\$12 million to be settled in two equal installments of US\$6 million each – the first installment payable within 12 months following the closing and the second installment payable within 24 months following the closing. Closing occurred on March 11, 2025 with the registration of the 50.5% equity interest of the Target Company to the Singapore HoldCo and as a result, the Target Company is a subsidiary of Singapore HoldCo.

The Target Company is principally engaged in the exploration for copper and other non-ferrous metals and holds three minerals exploitation special permits as follows: MV-017089 of 2,931.07 hectare area named Khar Tolgoi (White Hill), MV-017579 of 5,300.54 hectare area named Urkhut and MV-021014 of 6,557.08 hectare area named Khukh Tolgoi, all located in Bayankhongor aimag (province), Mongolia. These permits were issued by the MRPAM on July 30, 2012, July 17, 2014 and January 30, 2018, respectively. According to the Minerals Law of Mongolia, a minerals exploitation special permit issued is effective for 30 years and extendable twice, each by a 20-year period. As closing is conditional upon satisfaction of various conditions under the securities purchase agreement, the proposed acquisition may or may not proceed. 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".

# TRANSPORTATION AND LOGISTICS

The throughput remained strong throughout 2023 and 2024. In 2022, 2023 and 2024, the total number of trucks passing through the GS-GM border reached 136,534, 271,563 and 282,001, respectively.

In 2023 and 2024, 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 primarily 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 transported by third party contractors. In addition, the Group has been utilizing the UHG rail terminal stockyard to supply coal to domestic users as well as the middlings supplied to Tavan Tolgoi Tulsh, free of charge.

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 primarily 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 2024, 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 overall transportation cost was US\$26.9 per tonne for the year ended December 31, 2022, US\$13.8 per tonne for the year ended December 31, 2024.

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 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.

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 facilitating 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.

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 customers. Pursuant to the joint venture agreement, ER LLC 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 and commissioned by the relevant state authorities, and is currently operational with additional capacity expansion plans currently in the development stage. ER LLC and CECC, respectively, holds 10% and 90% of equity interest in "Guoneng Inner Mongolia Ganqimaodu International Energy Co., Ltd". We believe that this investment has supported 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 strategic cooperations, 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. This railway is also connected to the Ulaanbaatar Tomor Zam railway network. This 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 with capacity to transport 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, together with the TT-GS railway, significantly increase Mongolia's rail freight traffic capacity, and the commissioning of these railways is helping to 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 2023, we have arranged for approximately 370 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, 2022, 2023 and 2024, our five largest suppliers accounted for 53.4%, 54.7% and 42.4%, respectively, of our total purchases, while, Thiess, our largest supplier for the years ended December 31, 2022, 2023 and 2024, accounted for 26.9%, 25.1% and 13.2%, respectively, of our total purchases for the same periods.

Our five largest suppliers for the year ended December 31, 2024 were:

- *Thiess Mongolia LLC*. Thiess is our mining contractor at our UHG mine and assists in asset management services, training of mining personnel and maintenance services, and was 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.
- *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.
- *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.

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,		
_	2022	2023	2024
_		(in US\$'000)	
Capital Expenditures:			
CHPP	155	313	158
Project development of BKH mine	_	_	55,275
Trucks and equipment.	_	31,444	9.559
Investment in associate company	6,951	_	_
Others <sup>(1)</sup>	4,189	9,539	22,396
Total	11,295	41,296	87,388

(1) 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 delivery terms such as (i) EXW UHG; (ii) free carrier ("FCA") TKH; and (iii) DAP GM. In 2022, due to continued disruptions in export logistics via GS-GM, we continued to sell coal products under flexible approach by applying such alternative delivery terms, which remaining committed to maintaining our relations with key end-use customers.

In 2023 and 2024, we sold coal products under the following terms: (i) EXW UHG; (ii) FCA TKH, GST and KHA; (iii) DAP GM; and (iv) FOT GM.

Under EXW UHG terms, we sold our coal products at the UHG coal stockyard and which were mostly applicable for coal products sold to local customers in Mongolia. FCA TKH, GST and KHA terms refer to exported coal products sold from designated customs bonded yards located in Mongolia. DAP GM terms refer to exported coal products delivered to designated customs bonded yards located at GM. FOT GM terms apply to coal products sold from designated customs bonded yards located at GM after completing import customs clearance and quality inspections by relevant authorities in China.

For the years ended December 31, 2022, 2023 and 2024, approximately 28.7 %, 21.8% and 13.2% of our coal sales were made to coke plants, respectively, 5.4%, 12.3% and 8.4% to steel mills, respectively, and 64.7%, 65.1% and 76.7% to coal traders, respectively. For the years ended December 31, 2022, 2023 and 2024, our total revenues were derived from 89, 130 and 124 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 by actively trading through auctions via the MSE platform and sold 1.8 Mt of coal products in 2023 and 4.7 Mt of coal products in 2024. For 2023 and 2024, the amount of coking coal sold through the MSE platform accounted for approximately 18.4% and 54.7%, respectively, 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-user customers under our own brand. We believe this approach increases our average selling price and profitability compared to selling raw coal and enhances our market recognition and competitiveness.

#### **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 December 31, 2024	
Customer	Customer Type	Revenue	Percentage of Total Revenue
		(in US\$'000)	%
JASN International PTE. Ltd	Trader	83,867	8.1
Sumec International Technology Co., Ltd	Trader	71,990	6.9
Xianghui Energy (Singapore) Pte. Ltd	Trader	63,844	6.1
Global Coking Coal Pte. Ltd	Trader	56,041	5.4
Hubei Laker International Supply Chain Management Co., Ltd	Coke plant	42,184	4.1
Total		317,926	30.6

		Year ended December 31, 2023	
Customer	Customer Type	Revenue	Percentage of Total Revenue
		(in US\$'000)	%
Global Coking Coal Pte. Ltd	Trader	194,602	18.8
Inner Mongolia Xingyongsheng Energy Co., Ltd .	Trader	73,852	7.1
Urat Middle Banner Agreeable to Commerce and Trade Co., Ltd	Coke plant	54,514	5.2
Bayannur Kerry Resources Company Limited	Trader	41,899	4.0
Inner Mongolia Baiyi International Trading Co., Ltd	Trader	40,772	3.9
Total		405,639	39.1

		Year ended December 31, 2022	
Customer	Customer Type	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

For the years ended December 31, 2022, 2023 and 2024, revenue from our single largest customer represented 14.9%, 18.8% and 8.1%, respectively, of our total revenues. For the years ended December 31, 2022, 2023 and 2024, our five largest customers accounted for 48.1%, 39.1% and 30.6%, respectively, of our total revenues.

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. After two years of effort, we successfully completed the verification of the Company's 2023 GHG emissions in two stages: i) 1Q24, verification in accordance with the GHG Protocol, the most globally recognized emissions accounting standard, and ii) 4Q24, verification in accordance with ISO 14061, the most advanced emissions accounting standard.

For 2024, the intensity of our green-house gas emissions was 2.64, and the scope 1 emission was 1,195,809.45 tonnes, the scope 2 emission was 22,255.37 tonnes and the scope 3 emission was 41,973,027.59 tonnes. The 2024 emissions are currently under verification. 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 company in Mongolia measuring, reporting and verifying all three scopes of our carbon emissions on a periodic basis, covering all of our operations. 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 "BBB" and "C", respectively, from MSCI ESG Ratings and CDP Climate Change in 2024. We are also the first international company to publicly submit the TSM self-assessments through a subscription service independent of a national mining association. In 2024, we conducted our first TSM external verification, with the objective of progressively implementing TSM best practices throughout its operational mines while anticipating year after year improvement in overall performance. The verification was completed to the level required for a limited assurance engagement, following the guidance in Mining Association of Canada's ("MAC") Terms of Reference and related ISO 19011 and ISAE 3000 standards and documents. The TSM Verification Process included an independent review performed by Envirochem Services Inc., in accordance with the Terms of Reference for Verifiers. The Company's reported 2024 TSM performance indicator results for the period ending 31 December 2024, were assessed by the verifier with respect to the mandatory TSM Performance Protocols standards by MAC.

The external verification confirmed Mongolian Mining Corporation's commitment to environmental sustainability and safety performance, along with the stated results which respectfully indicated our results, as shown below table.

Protocols	Indicators	2024 Verified score
	Commitment, accountability	AAA
	Planning and implementation	AAA
Safety and Health	Training, Behavior & Culture	AAA
	Monitoring & reporting	AAA
	Performance	В
	Commitments & accountability	AAA
Biodiversity	Planning & Implementation	AAA
	Reporting	AAA
	Governance	Α
Watan Stawandahin	Management	Α
water Stewardship	Watershed-scale planning	AA
	Reporting & performance	Α
	Corporate Management	Α
Climate Change	Facility Management	AA
	Facility performance targets & reporting	С
Preventing Child &	Preventing forced labor	Y
Forced Labor	Preventing child labor	Y
	COI Identification	В
Indianaua P	Effective COI engagement & dialogue	AA
Community	Indigenous	-
Community	Impact & benefit management	В
	COI response mechanism	AA
	Management & preparedness/Corporate/	Y
Crisis Managamant &	Review	Y
Communication	Training	Y
nlanning	Management & preparedness/Facility/	Y
pranning	Review	Y
	Training	N
	Policy & Commitment	С
	Accountability & Responsibility	С
Tailings Management	System & Emergency Preparedness	С
	OMS Manual	С
	Management review	C

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 2024, 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, 52.7% market share in 2023, and 46.4% market share in 2024. 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 December 31, 2024, our principal properties consisted of (i) land use and possession rights of 81 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 and Bayankhongor Province and relevant soums, we are permitted to use our 81 parcels of land to conduct our mining activities and to build and operate our CHPP, airport, camp, apartments, offices, workshops, customscontrol 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.

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, 2024, three fatal traffic accidents involving the Group's staff occurred outside of the Group's premises. 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. During operations conducted by our mining contractor at the UHG mine, an incident occurred, resulting in one fatality. This incident prompted an immediate and thorough investigation to determine the precise circumstances that led to this outcome and to identify any breaches of safety protocols or operational procedures.

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 2023, we registered two class 1 risks (traffic accidents that resulted in two fatalities). In 2024, we registered one class 1 risk (a traffic accident that resulted in one fatality) in all workplaces. 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.

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) 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 the three years ended December 31, 2022, 2023 and 2024. 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 December 31, 2024, approximately 37% 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 basketball national teams for both 3x3 and 5-on-5 in Mongolia with a long-term vision to build a resilient and young urban sports community. Through our Energy 3x3 Club, we support one professional team, 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, 2023 and 2024, we supplied free-of-charge 0.5 Mt, 0.4 Mt and 0.4 Mt, respectively, of middlings under EXW UHG terms through ER LLC 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 December 31, 2024, we had a total of 2,559 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 December 31, 2024 was approximately 5,037 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. During the year ended December 31, 2024, a total number of 6,604,000 Share Options were exercised.

# **Benefit Schemes**

We maintain benefit schemes for our employees as required by relevant laws in Mongolia.

# Injuries

For the year ended December 31, 2024, within all operations under the management of Group, approximately 16.5 million man-hours were worked by employees, contractors and sub-contractors, out of which 14.6 million man-hours were worked at the coal operations and 1.9 million man-hours were worked at the gold operations. During this period, nine incidences of Lost Time Injury was recorded, resulting in an overall Lost Time Injury Frequency Rate of 0.69. 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 December 31, 2024, 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 22 trademarks, including those related to our corporate logo and names, which are registered in Mongolia. We also own trademarks to three of our logos, " $\square$ ", " $\checkmark$ " and " $\blacksquare$ ", 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 common 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 Government of Mongolia assigned Mongolian Stock Exchange ("MSE") to act as an exchange to undertake commodity trade activities and listed fluoride, iron, coal, copper, and molybdenum as mining commodities that can be traded at the MSE. Under the law, it is mandatory for the state-owned entities that undertake mining and export of these commodities to trade their products through the commodity exchange, whereas private entities are allowed to trade their mining commodities through the commodity exchange on a voluntary basis.

Furthermore, the Government has identified the price of the MSE trade (i) as the source of reference price for royalty calculation on coal, iron and fluoride, by its Resolution No 345 of 2023, and (ii) as the source of reference price for royalty calculation on copper and molybdenum by its Resolution No. 73 of 2024 to be applicable for the respective commodities which are traded over MSE trade for the export.

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	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 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	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 MIMR'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 MIMR 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 on August 17, 2023, and February 8, 2024, respectively.

#### **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. In addition to deposits currently on the Strategic Deposits List and the additional Tier 2 Deposits List, the Parliament may at any time designate any 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.

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 February 21, 2025. 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, the 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 eight Mineral Deposits of Strategic Importance in total. The Government of Mongolian issued on April 4, 2017 Resolution No. 109 "On defining the boundaries of Gatsuurt gold deposit" and issued on October 3, 2018, Resolution No. 300 "On defining the boundaries of some mineral deposits of strategic importance" for defining boundary coordinates of the other seven Mineral Deposits of Strategic Importance. Under Resolution No. 300, the Government of Mongolia defined boundary coordinates of Tavan Tolgoi which expanded the boundary coordinates for Tavan Tolgoi by including the areas under the BN and THG mining licenses. However, the license holder of BN and THG has neither been named in the list approved by the Parliament Resolution No. 27 of 2007 "On designation of some mineral deposit as Mineral Deposit of Strategic Importance," nor received any notification or letter from the Government with regards to the consequences or follow-up actions of the abovementioned resolution. Since, only the Parliament has the 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 areas have not been designated as a Mineral Deposit of Strategic Importance by the Parliament and 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

On April 19, 2024, the Parliament of Mongolia adopted the Law on National Wealth Fund ("National Wealth Fund Law") along with amendments to respective laws of Mongolia, including the Minerals Law, which became effective from May 11, 2024. One key amendment to the Minerals Law revised Article 5.4, replacing the term "state participation" with "shares of the legal entity" holding license of a mineral deposit of strategic importance and its residual deposit (ore and mineral stockpiles with a certain mineral content formed during extraction, processing, and concentration, which may be economically profitable when reprocessed) if such deposit is to be developed jointly by state and a private entity.

Under the amended Minerals Law, the Government of Mongolia may acquire up to 50% equity shares of the license holder if the relevant exploration is state financed, such as funded from the State Budget or up to 34% equity shares of the license holder, if the relevant exploration is privately financed. In both cases, the shares may be acquired free of charge or be replaced with additional royalties to be set by the Parliament. 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 of, or procedures for, such negotiations.

We believe that the requirement to have state participation of up to 50% in a Mineral Deposit of Strategic Importance under the Article 5.4 of the Minerals Law was already fulfilled in 2008 under 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, whereby the Government of Mongolia received more than 50% of the Tavan Tolgoi coal deposit, rather than exploiting the Tavan Tolgoi coal deposit in partnership with ER LLC. We further believe that ER LLC shall not be considered as a legal entity holding license over the entire Mineral Deposit of Strategic Importance because it holds license over the UHG mine only. As of the date of this Offering Memorandum, ER LLC has not been invited or approached by anyone for any commencement or negotiation related to the change of the Minerals Law.

Under Clause 2.2.2 of the Mining License Transfer Agreement, the Government made a warranty that the mining license of UHG coal deposit shall not modified or revoked, or not to submit a proposal to determine "state participation" over the Ukhaa Khudag coal deposit.

The amendment to the 2006 Minerals Law, adopted on April 19, 2024, further introduced new limits on share ownership in mineral deposits of strategic importance. Specifically, no individual or entity, whether directly or through affiliates, may own more than 34% of the total issued shares of a legal entity holding a license for such deposits, except in cases in which the license holding legal entity has entered into an Investment Agreement with the Government of Mongolia and/or has state or municipal ownership participation.

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.

See "Risk Factors – Risks Relating to our Business and Industry – The Parliament could determine that any one or more of our project sites in Mongolia is a Mineral Deposit of Strategic Importance and the Government of Mongolia could take an equity, production, profit sharing or other interest in any of our projects, and any changes in the Mongolian legal frameworks or government policies may materially and adversely affect our business, prospects, financial condition and results of operations".

#### 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.

<b>Raw Coal Progressive Royalty Rate</b>		<b>Processed Coal Progressive Royalty Rate</b>	
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, the Government may agree with the license holder of Mineral Deposits with Strategic Importance on imposing special royalty 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).

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	Government
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

#### License

#### Authority for licensing

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
<ul><li>8.29. using commonly distributed minerals</li><li>8.30. exploring commonly distributed minerals</li></ul>	Governor of respective province or capital city 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 adopted on May 11, 2017.
- The Law on Auto Transportation adopted on June 4, 1999.
- The Law on Traffic Safety adopted on July 8, 2015.
- The Law on Civil Aviation adopted July 7, 2023.
- The Law on using Air Space for Aviation adopted on May 30, 2003.
- The Law on Custom adopted on May 20, 2008.
- The Law on Waste adopted on May 12, 2017.
- The Law on Border adopted on December 28, 2016.
- The Law on Communication adopted on October 18, 2001.
- The Law on Radio Wave adopted on June 4, 1999.
- The Law on Urban and Rural Water Supply Sanitation Sewerage Uses 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 died as a result of the accident, the employer must reimburse the employee of the average salary of the employee. If 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 minimum wage is set to increase to MNT792,000 from April 1, 2025. 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 Climate Change of Mongolia and the MIMR 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. Under Government Regulation No. 182 dated November 20, 2024, there is no limitation for foreign workers for the mining sector in 2025. 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, mining license holders shall still be obligated to 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.

The most recent Collective (Tariff) Agreement of the Geology Mining and Heavy Industry Sector has been entered into by and between the Ministry of Mining and Heavy Industry, the Trade Union of the Energy, Geology and Mining and Heavy Industries and the Mongolian National Mining Association as the representative of mining employers in June 2023 and is effective until June 22, 2025. 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 May 1, 2023, the Head of the Agency for Standardization and Metrology issued Order No. C/18 and approved MNS 6457:2023 "Coal Quality Classification", the national standard defining different types of coal based on their quality specifications, replacing its previous version adopted in 2022.

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. Starting from November 13, 2024, the National Center for Auto-Transportation has been entitled again to grant C permits for qualified transporters who meet the requirements for cross-border cargo transportation between the Gashuunsukhait border point of Mongolia and the Ganqimaodu border point of PRC.

The Government of Mongolia is working with the PRC Government to establish cross-border railway infrastructure between Gashuunsukhait-Gantsqimaodu border ports to increase the current coal export volume of 85 million tonnes to 165 million tonnes per annum. As the Government of Mongolia submitted its draft agreement to the Parliament of Mongolia for consensus, on December 27, 2024, the basic guidelines for the conclusion of an agreement between the Government of Mongolia and the Government of the PRC on the construction of the cross-border railway between GS and GM ports were approved. On February 5, 2025, the Government of Mongolia announced that it had finalized the agreement and resolved to execute it with the Government of PRC and such agreement was signed on February 14, 2025, by the two governments. This bilateral agreement will be ratified by the Parliament of Mongolia, and project construction will commence in 2025, as announced by Government of Mongolia.

# 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.

# 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"), land use rights can be granted to legal entities that are not deemed to be BEFI 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 landowners, 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.

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 on 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 5 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 of 33.0% or more in a Mongolian legal entity 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 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 logbook 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, and which is currently set at MNT7,792,000 per month (i.e., income in excess of this amount is not subject to the 11.5% assessment) with effect from April 1, 2025. The employer must pay an additional 12.5-14.5% (14.5% 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 have been restricted to be exported if they are not registered in such electronic system.
- On December 25, 2024, the Government of Mongolia issued Resolution No. 241, which extended the period of zero percent excise tax on imported gasoline and diesel fuel to January 1, 2026, which was previously set until January 1, 2025.

# DIRECTORS AND MANAGEMENT

#### GENERAL

The Board consists of ten Directors, comprising two executive Directors, three non-executive Directors and five 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	59	Executive Director and Chairman of the Board
Battsengel Gotov	53	Executive Director and Group Chief Executive Officer
Od Jambaljamts	60	Non-executive Director
Enkhtuvshin Gombo	53	Non-executive Director
Myagmarjav Ganbyamba	39	Non-executive Director
Khashchuluun Chuluundorj	58	Independent non-executive Director
Unenbat Jigjid	62	Independent non-executive Director
Chan Tze Ching, Ignatius	68	Independent non-executive Director
Delgerjargal Bayanjargal	62	Independent non-executive Director
Tsend-Ayush Tuvshintur	62	Independent non-executive Director
Senior Management		
Oyunbat Lkhagvatsend	48	President and Chief Executive – Gold & Metals
Enkhbat Dorjpalam	43	President and Chief Executive – Coal & Energy
Ulemj Baskhuu	46	Executive Vice President and Group Chief Financial Officer
Uurtsaikh Dorjgotov	61	Executive Vice President and Group Chief Legal Counsel

#### **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 Group 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. He was also appointed as Chief Executive Officer of Khangad Exploration LLC from December 2012 until his resignation as Chief Executive Officer from both ER LLC and Khangad Exploration LLC in December 2023. 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 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. He served as the chief executive officer of MCS Ventures LLC from July 2020 until November 2023. 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, Nomination Committee and ESG 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. Dr. Chuluundorj has been an independent director of MIK Holding JSC since June 2017 and of Invescore NBFI since June 2019, both of which are listed on the Mongolian Stock Exchange ("MSE"). He served as an independent member of the Monetary Policy Council of the Bank of Mongolia from June 2018 to January 2025. 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 to 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 an independent 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 2018. 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.

Delgerjargal Bayanjargal is an independent non-executive Director of the Company. Ms. Bayanjargal was appointed an independent non-executive Director of the Company in January 2025. She is a member of the Audit Committee. Since July 2021, Ms. Bayanjargal has served as chief financial and operating officer of Zes Erdeniin Huvi LLC, a Mongolian company engaged in cathode copper processing business. She has also been serving as an independent director of M Bank Closed JSC since June 2022, an indirect wholly owned subsidiary of MCS Mongolia LLC, a controlling shareholder of the Company. Ms. Bayanjargal was the chief executive officer of LendMN NBFI JSC from 2018 to 2019 and its board member from 2018 to 2022, which is listed on the MSE. She was chief executive officer of And Systems LLC from 2019 to 2021. She was a board member of Tenger Insurance LLC from 2014 to 2016 and its deputy chief executive officer from 2017 to 2018. Ms. Bayanjargal was a member of the finance and audit committee of MIK Holding JSC from 2014 to April 2017, which is listed on the MSE in 2015, and its housing finance subsidiary, Mortgage Corporation HFC LLC ("MIK HFC"). Ms. Bayanjargal also held various management positions at XacBank from 2001 to 2017, which was listed on the MSE in 2023. Ms. Bayanjargal was the chairperson and board member of Development Solution NGO from 2011 to 2016, and a board member of Quality Supplier Development NGO from 2015 to 2018, both projects funded by United States Agency for International Development. From 1998 to 2001, as a loan officer and advanced to financial manager and head of department at Khugjliin Altan San NBFI, which was subsequently transformed into XacBank. Ms. Bayanjargal served as an officer at the listing and research department of MSE from 1992 to 1993, and subsequently from 1997 to 1998. Ms. Bayanjargal was awarded a bachelor's degree in banking economics and finance by the Institute of Finance and Economics (currently known as University of Finance and Economics ("UFE")) in Mongolia in 1997.

Tsend-Ayush Tuvshintur is an independent non-executive Director of the Company. Dr. Tuvshintur was appointed an independent non-executive Director of the Company in January 2025. She is a member of the ESG Committee. Dr. Tuvshintur is the executive director of CGDC in Mongolia since January 2015. She has served as a board member of MIK ASSET SPC LLC, a wholly owned subsidiary of MIK HFC, since 2018. Dr. Tuvshintur was deputy director of the consultancy center at the UFE from 2006 to 2008, secretary of the board of trustees at the UFE from 2014 to 2018, and a lecturer from 1993 to 2005. She was program director of joint MBA program in corporate governance from 2015 to 2019, a collaboration between UFE and CGDC. Dr. Tuvshintur also served as secretary of the board of trustees at CGDC from 2009 to 2013, board member of Information Communications Network LLC from 2016 to 2017, and independent board director of Mongol Basalt JSC, listed on the MSE, from 2018 to 2020. Dr. Tuvshintur led various corporate governance initiatives in Mongolia, including coordinating the first corporate governance training for board members of state-owned enterprises in 2010, conducting research on corporate governance practices among the Top 20 companies listed on the MSE in 2011, and leading a project to evaluate corporate governance and develop the first transparency indices for Mongolian publicly traded companies in 2012, in collaboration with various organizations. She initiated Annual Reporting Award of Mongolia project from 2015 to 2016 to promote international reporting standards among state-owned enterprises and listed companies in Mongolia, with support from Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Dr. Tuvshintur was awarded a bachelor's degree in production management and economics from the National University of Mongolia in 1992, and obtained her master's degree in economics and Ph.D. in business administration from NUM in 2012.

#### SENIOR MANAGEMENT

*Oyunbat Lkhagvatsend* is the President and Chief Executive – Gold & Metals 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. He was appointed as the chairman of the board of Erdene Mongol LLC in January 2024. 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 Chief Executive – Coal & Energy of the Company. Mr. Dorjpalam joined the Group as the Deputy Chief Executive Officer in February 2023. Mr. Dorjpalam was appointed chief executive officer of ER LLC and Khangad Exploration LLC in December 2023. He was appointed as a director of the board of Khangad Exploration LLC in May 2024. 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 Group 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 Group 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.

# **COMPANY SECRETARY**

*Cheung Yuet Fan* was appointed Secretary of the Company in October 2017. Ms. Cheung is a director of the corporate services of Tricor Services Limited, a global professional services provider specializing in integrated business, corporate and investor services, and is a member of Vistra Group. 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 five members, including one independent non-executive Director who possesses the appropriate professional qualifications or accounting or related financial management expertise. There are four independent non-executive Directors, namely Mr. Chan Tze Ching, Ignatius (chairman), Dr. Khashchuluun Chuluundorj, Mr. Unenbat Jigjid and Ms. Delgerjargal Bayanjargal, 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 six members with a majority of independent non-executive Directors. The members are Mr. Unenbat Jigjid (chairman), Dr. Khashchuluun Chuluundorj, Mr. Chan Tze Ching, Ignatius and Dr. Tsend-Ayush Tuvshintur, being independent non-executive Directors, and Mr. Od Jambaljamts and Mr. Myagmarjav Ganbyamba, being non-executive Directors.

# **PRINCIPAL SHAREHOLDERS**

As of December 31, 2024, 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:

Annrovimate

	Capacity/		percentage of shareholdings in
Name of substantial shareholder	Nature of interest	Number of Shares	our Company
MCS Mining Group LLC (Note 1)	Beneficial owner	323.492.188 (L)	30.84%
MCS Mongolia LLC (Note 1)	Interest of controlled corporation	323,492,188 (L)	30.84%
Ms. Batmunkh Dashdeleg (Note 1)	Interest of spouse	369,656,943 (L)	35.24%
Ms. Munkhsuren Surenkhuu (Note 1)	Interest of spouse	350,068,414 (L)	33.37%
Continental General Holdings LLC ("CGH") (Note 2)	Interest of controlled corporation	93,888,000 (L)	8.95%
Continental Insurance Group, Ltd. ("CIG") (Note 2)	Interest of controlled corporation	93,888,000 (L)	8.95%
Continental General Insurance Company ("CGIC") (Note 2)	Beneficial owner	93,888,000 (L)	8.95%
Percy Rockdale LLC ("Percy") (Note 2)	Beneficial owner	1,365,000 (L)	0.13%
Mr. Michael Gorzynski (Note 2)	Interest of controlled corporation	95,253,000	9.08%
Kerry Mining (UHG) Limited ("KMUHG") (Note 3)	Beneficial owner	73,383,000 (L)	6.99%
Kerry Mining (Mongolia) Limited ("KMM") (Note 3)	Interest of controlled corporation	73,383,000 (L)	6.99%
Fexos Limited ("Fexos") (Note 3)	Interest of controlled corporation	73,383,000 (L)	6.99%
Kerry Holdings Limited ("KHL") (Note 3)	Interest of controlled corporation	73,383,000 (L)	6.99%
Kerry Group Limited ("KGL") (Note 3)	Interest of controlled corporation	73,383,000 (L)	6.99%

(L) - Long position

(3) 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 73,383,000 shares of the Company that KMUHG was interested.

Save as disclosed above, as of December 31, 2024, 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.

<sup>(1)</sup> MCS Mining Group LLC is wholly owned by MCS Mongolia LLC. MCS Mongolia LLC is owned as to approximately 58.18% by Mr. Odjargal Jambaljamts, and approximately 30.67% 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.

<sup>(2) (</sup>a) CGIC is a direct wholly owned subsidiary of CIG which in turn is wholly owned by CGH. CGH is 100% owned by Mr. Michael Gorzynski. Accordingly, CIG, CGH and Mr. Michael Gorzynski were deemed to be interested in the 93,888,000 shares of the Company that CGIC was interested. (b) Percy is 100% owned by Mr. Michael Gorzynski. Accordingly, Mr. Michael Gorzynski was deemed to be interested in the 1,365,000 shares of the Company that Percy was interested.

# **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 Note 32 to our financial statements as of and for the years ended December 31, 2022, 2023 and 2024 included elsewhere in this Offering Memorandum.

# **ANCILLARY SERVICES**

For the years ended December 31, 2022, 2023 and 2024, we recorded ancillary services payments to M Armor LLC, Uniservice Solution LLC, MCS International LLC, MCS and its affiliates and Inner Mongolia Wanli Trading Co., Ltd. of US\$14.4 million, US\$19.7 million and US\$28.3 million, respectively. 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, management fees and coal import service fee. 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, 2022, 2023 and 2024, we recorded lease of property, plant and equipment to MCS and its affiliates of US\$0.2 million, US\$0.3 million and US\$0.7 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. Rental charges are based on comparable or prevailing market rates, as applicable.

#### PURCHASE OF PROPERTY AND GOODS

For the years ended December 31, 2022, 2023 and 2024, we recorded purchase of property goods from MCS and its affiliates of US\$0.3 million, US\$0.6 million and US\$1.1 million, respectively.

#### SALES OF PROPERTY

For the years ended December 31, 2022, 2023 and 2024, we recorded sales of property to MCS and its affiliates of US\$6.0 thousand, nil and nil, respectively.

#### SALES OF GOODS

For the years ended December 31, 2022, 2023 and 2024, we recorded sales of coal to Risun Supply Management Co., Ltd and JASN International Pte. Ltd of US\$6.1 million, nil and US\$67.3 million, respectively.

#### ENGINEERING, PROCUREMENT AND CONSTRUCTION SERVICES

For the year ended December 31, 2024, we recorded engineering, procurement and construction services from MCS Property LLC of US\$25.9 million in relation to the construction work of Bayan Khundii mine of EM LLC. For the years ended December 31, 2022 and 2023, we recorded nil and nil, respectively.

# **DESCRIPTION OF OTHER MATERIAL INDEBTEDNESS**

Set forth below is a summary of the material terms and conditions of our 2026 Notes. As of December 31, 2024, we had a principal amount of US\$220.0 million with a carrying amount of US\$216.1 million outstanding under the 2026 Notes and US\$20.0 million in borrowings from a local bank in Mongolia.

#### **2026 NOTES**

On September 13, 2023, Mongolian Mining Corporation and ER LLC, as co-issuers, entered into an indenture (the "2026 Notes Indenture") pursuant to which we issued the 2026 Notes with a principal amount of US\$180.0 million (the "2026 Notes"). On December 14, 2023, we issued an additional US\$40.0 million principal amount of the 2026 Notes. As of December 31, 2024, we had an outstanding principal amount of US\$220.0 million with a carrying amount of US\$216.1 million. As of the date of this Offering Memorandum, a principal amount of US\$220.0 million of the 2026 Notes were outstanding. We intend to use the net proceeds from this offering to repurchase and/or redeem the outstanding 2026 Notes.

#### Guarantee

The obligations pursuant to the 2026 Notes are guaranteed by 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. Each of these 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 2026 Notes.

#### Interest

The 2026 Notes bear an interest rate of 12.50% per annum payable semi-annually in arrears.

#### Covenants

Subject to certain conditions and exceptions, the 2026 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 2026 Notes Indenture contains certain customary events of default, including default in the payment of principal, or of any premium, on the 2026 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 2026 Notes Indenture. If an event of default occurs and is continuing, the trustee under the 2026 Notes Indenture or the holders of at least 25% of the outstanding 2026 Notes may declare the principal of the 2026 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 2026 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 2026 Notes.

#### Maturity and Redemption

The maturity date of the 2026 Notes is September 13, 2026.

At any time and from time to time on or after September 13, 2025, we may at our option redeem the Notes, in whole or in part, at a redemption price equal to 106.25% of the principal amount of the 2026 Notes, plus accrued and unpaid interest, if any, on the 2026 Notes redeemed, to (but not including) the applicable redemption date.

At any time and from time to time prior to September 13, 2025, we may at our option redeem the Notes, in whole or in part, at a redemption price equal to 100% of the principal amount of the 2026 Notes plus the applicable premium as of, and accrued and unpaid interest on the 2026 Notes redeemed, if any, to (but not including), the redemption date. Neither the trustee nor any of its 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, we may at our option redeem up to 35% of the aggregate principal amount of the 2026 Notes with certain 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 2026 Notes, plus accrued and unpaid interest on the 2026 Notes redeemed, if any, to (but not including) the redemption date; provided that at least 65% of the aggregate principal amount of the 2026 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

Additionally, if we or a subsidiary guarantor under the 2026 Notes Indenture would become obligated to pay certain additional amounts as a result of certain changes in specified tax law, we may redeem the 2026 Notes at a redemption price equal to 100% of the principal amount of the 2026 Notes, plus any accrued and unpaid interest, subject to certain exceptions.

#### BORROWINGS

In December 2024, Erdene Mongol LLC entered into a loan agreement with Trade and Development Bank of Mongolia for an amount of up to US\$50.0 million. As of December 31, 2024, US\$20.0 million of loan was drawn down. The loan bears interest at the rate of 13.3% per annum and will mature in December 2026.

Under the loan agreement, Erdene Mongol LLC is obligated to use the loan for its intended purpose of project financing. To secure its obligation under the Loan Agreement, Erdene Mongol LLC pledged its future income through bank account at the value of MNT 193.5 billion (approximately US\$55 Million) through its bank account by signing Movable Property and Tangible Asset Pledge Agreement on December 4, 2024. Further, as agreed in the Loan Agreement, Erdene Mongol LLC pledged Process Plant Construction, which was 62% complete and its equipment, in February 2025. Erdene Mongol LLC has the right to require the bank to restructure the pledge agreements upon the 100% completion of the Process Plant Construction, subject to its, and to release the future income pledge.

The Loan Agreement includes certain covenants, among other things, requiring Erdene Mongol LLC to endeavor to process the majority of its sales incomes through its account at the bank, to sell no less than 50% of extracted gold to the bank, to pay a penalty interest rate if it fails to make timely loan and interest payments, to allow bank to deduct the outstanding amount from the company's account at the bank on a non-disputable basis; to submit periodic reports on loan usage and operations to the bank, and notify the bank in advance of any significant operational changes, including changes in shareholding structure, modifications to legal status, or a change of registered address; to inform the bank before allowing a third party to use, lease, or re-pledge the pledged assets.

# **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 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 and identity) on or after the Original Issue Date during normal office hours (between 9:00 am and 3:00 pm (London 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 April 3, 2030, 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 8.44% 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 April 3 and October 3 of each year (each an "Interest Payment Date"), commencing October 3, 2025.

Interest on the Notes will be paid to Holders of record at the close of business on March 19 and September 18 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 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 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\$200,000 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, 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 HoldCo, EM LLC, Leader Exploration LLC and Universal Copper LLC, will be Restricted Subsidiaries. Each of Singapore HoldCo, EM LLC, Leader Exploration LLC and Universal Copper LLC will be an Unrestricted Subsidiary on the Original Issue Date. 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. All of the other Restricted Subsidiaries, including Tianjin Zhengcheng Import and Export Trade Co., Ltd., Inner Mongolia Fangcheng Trade Co., Ltd. and Tavan Tolgoi Power Plant Water Supply LLC will not guarantee the Notes. 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 December 31, 2024:

- the Company and its consolidated subsidiaries had US\$240 million principal amount of consolidated indebtedness outstanding, of which US\$20 million incurred by EM LLC (an Unrestricted Subsidiary) was secured by certain of its own assets;
- the Non-Guarantor Restricted Subsidiaries did not have any indebtedness outstanding; and
- the Company and its consolidated subsidiaries had US\$82.1 million of capital commitments.

In addition, the Non-Guarantor Restricted Subsidiaries accounted for 7.5% of the Company's consolidated net revenue and none of the Company's consolidated EBITDA, in each case, for the year ended December 31, 2024, and 0.5% of the Company's consolidated total assets as of December 31, 2024.

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 (1) Singapore HoldCo to guarantee the Notes unless it becomes a Wholly Owned Restricted Subsidiary or (2) any member of the EM Group or the Universal Group to guarantee the Notes, unless in each case, such member of the EM Group or such member 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 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 Luxembourg Guaranteed 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 April 3, 2027, the Issuers may at their option redeem the Notes, in whole or in part, at a redemption price (expressed as a percentage of principal amount) set forth below, plus accrued and unpaid interest, if any, on the Notes redeemed, to (but not including) the applicable redemption date, if redeemed during the 12-month period commencing on April 3 of any year set forth below:

Period	Redemption Price
2027	104.22%
2028	102.11% 100.00%

At any time and from time to time prior to April 3, 2027, 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 April 3, 2027, 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 108.44% 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 and unpaid interest, if any, thereon, to (but not including), the redemption date.

In connection with any redemption of Notes referred to in the preceding paragraphs, any such redemption or notice may, at the Issuers' discretion, be subject to one or more conditions precedent, including, but not limited to, completion of an equity or debt offering, a financing, or other corporate transactions. In addition, if such redemption or notice is subject to satisfaction of one or more conditions precedent, such notice may state that, in the Issuers' discretion, the redemption date may be delayed until such time (*provided*, *however*, that any delayed redemption date shall not be more than 60 days after the date the relevant notice of redemption was sent) as any or all such conditions shall be satisfied, or such redemption may not occur and such notice may be rescinded in the event that any or all such conditions shall not have been satisfied by the redemption date, or by the redemption date so delayed.

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\$200,000 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.

# MANDATORY REDEMPTION

Not later than 30 days following the date on which the mining license for the Ukhaa Khudag mine ceases to be valid and effective, the Issuers will give notice (the "Mandatory Redemption Notice") to the Holders and the Trustee that the Issuers will redeem all outstanding Notes (the "Mandatory Redemption"), in whole and not in part, on the date that is a Business Day no earlier than 30 days nor later than 60 days from the date of the Mandatory Redemption Notice (the "Mandatory Redemption Date") at a redemption price equal to 102% of the principal amount thereof plus accrued and unpaid interest on the Notes redeemed, if any, to (but not including), the Mandatory Redemption Date.

Following the Mandatory Redemption, the redeemed Notes will be canceled.

#### **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 SINKING FUND

There will be no 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 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 changing the jurisdiction of organization of the Issuers or such Surviving Person is not a reasonable measure for purposes of this section; *provided further* 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 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; (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; (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; and (D) none of the conditions in (A), (B) and (C) above shall apply to any Permitted Refinancing Indebtedness incurred to fully refinance the Notes:
- (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 (x) the aggregate principal amount of such Indebtedness shall not exceed such purchase price or cost, (y) 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 (z) on the date of the Incurrence of 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 the aggregate principal amount outstanding of all Indebtedness (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 clause to the extent the amount of such guarantee is otherwise reflected in such aggregate principal amount) plus the aggregate principal amount outstanding of all Indebtedness (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 10.0% 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) (i) 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 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 is otherwise reflected in such aggregate principal amount) does not exceed 10.0% 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 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 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 10.0% 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 Singapore HoldCo, any member of EM Group or any member of the Universal Group and, upon designation of Singapore HoldCo, the EM Group members and/or the Universal Group members as Restricted Subsidiaries, any Indebtedness of Singapore HoldCo, the EM Group and/or the Universal 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 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 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 twelve-month 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; or
- (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);

*provided* that, in the case of clause (2), (3), (4) or (8) 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.

## 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\$10.0 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\$20.0 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 Singapore HoldCo, any member of EM Group and/or any member of the Universal 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\$200,000, 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 for any purpose other than for the purposes specified under the caption "Use of Proceeds" in this Offering Memorandum and 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:
  - as soon as they are available, but in any event within 90 calendar days after the end of each (1)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 (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) the entity holding the mining license in relation to the Ukhaa Khudag mine ceases to be, directly or indirectly a Restricted Subsidiary, 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 principal of, premium, if 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 a responsible officer of the Trustee or the Agent, as the case may be, has received actual 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\$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 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 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" 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, and the satisfaction of the provisions described in clause (a)(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 any 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 an Event of 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 a responsible officer of the Trustee or the Paying Agent, as the case may be, has received actual written notice of such event. 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, 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 any 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, or from accepting the 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 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 Notes

Payments of any amounts owing in respect of the Global Notes (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 Notes (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 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, which 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\$200,000 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 a 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 Notes.

# 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.

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 Notes. Upon receipt of such notice from the common depositary or the relevant clearing system, 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 Trustee 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 420 Lexington Avenue, Suite 901, New York, NY 10170, 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 April 3, 2027, 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 April 3, 2027 (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 April 3, 2027 (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 or any other Lien not prohibited by the covenant under the caption "– Limitation on Liens";
- (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";
- (1) 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, Singapore HoldCo, any member of the EM Group or any member of the Universal 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 April 3, 2027 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 April 3, 2027.

"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 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.

"*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 and its successors and subsidiaries.

"*EM LLC*" means Erdene Mongol LLC, a limited liability company incorporated in Mongolia, a Subsidiary of the Company.

"*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.

*"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" 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).

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 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).

"Luxembourg Guaranteed Maximum Amount" means that, notwithstanding any other provisions to the contrary in the Indenture or the Notes, the guarantee granted by any Luxembourg Subsidiary Guarantor for the obligations of any obligor which is not a direct or indirect subsidiary of such Luxembourg Subsidiary Guarantor shall be limited, at any time, to an aggregate amount not exceeding the higher of:

- 90% of such Subsidiary Guarantor's *capitaux propres* (as referred to in article 34 of the Luxembourg law dated 19 December 2002 relating to the Register of Commerce and Companies as well as the accounting and the annual accounts of companies, as amended) reduced by the amount of any Liabilities, in each case, determined as at the date on which the guarantee is called; and
- 90% of such Subsidiary Guarantor's *capitaux propres* (as referred to in article 34 of the Luxembourg law dated 19 December 2002 relating to the Register of Commerce and Companies as well as the accounting and the annual accounts of companies, as amended) reduced by the amount of any Liabilities, in each case, determined as at the date of the Indenture,

and where such amount is calculated so that so as to also encompass (i) any amounts borrowed by a Luxembourg Subsidiary Guarantor or any of its direct or indirect subsidiaries under the Indenture and (ii) any amounts borrowed under the Indenture and on-lent, or otherwise made available, to the Luxembourg Subsidiary Guarantor or any of its direct or indirect subsidiaries (in any form whatsoever).

"Luxembourg Subsidiary Guarantor" means Subsidiary Guarantor that is incorporated in Luxembourg.

"*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.

"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\$200,000 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 accepted for payment by the Issuers. In the case of Certificate specifying the Notes or portions thereof accepted for payment by the Issuers 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\$200,000 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; (c) Singapore HoldCo; (d) any member of EM Group as described in the EM Transaction Announcement; or (e) any member of the Universal Group as described in the Universal 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 Singapore HoldCo, any member of the EM Group or any member of the Universal 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 5.0% 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 set-off, 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 Singapore HoldCo, any member of the EM Group or any member of the Universal 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 HoldCo" means Mongolian Mining Corporation Pte. Ltd., a Wholly Owned Subsidiary of the Company incorporated under the laws of Singapore, and any of its successors.

"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 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).

*"Universal Copper LLC"* means Universal Copper LLC, a limited liability company incorporated in Mongolia, which is expected to become a Subsidiary of the Company upon consummation of the Universal Transaction.

"Universal Group" means Universal Copper LLC and its successors and subsidiaries.

"Universal Transaction" means the investment by the Company in Universal Copper LLC with details of such investment disclosed in the Universal Transaction Announcement.

"Universal Transaction Announcement" means an announcement dated December 11, 2024 filed by the Company with The Stock Exchange of Hong Kong Limited.

"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) Singapore HoldCo, (3) any member of the EM Group that is a Subsidiary of the Company, (4) any member of the Universal Group that is a Subsidiary of the Company and (5) 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 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 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 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, 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 Act (As Revised). In accordance with the provision of section 6 of The Tax Concessions Act (As Revised), 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 Act (As Revised).
- 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 taxpayers 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 taxpayers 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.

#### Certain U.S. Federal Income Tax Considerations

The following is a description of certain U.S. federal income tax consequences to the U.S. Holders described below of owning and disposing of Notes, but it does not purport to be a comprehensive description of all tax considerations that may be relevant to a particular person's decision to acquire the Notes. This discussion applies only to U.S. Holders that (i) purchase Notes in this offering at the "issue price", which will equal the first price to the public (not including bond houses, brokers or similar persons or organizations acting in the capacity of underwriters, placement agents or wholesalers) at which a substantial amount of the Notes is sold for money and (ii) hold the Notes as capital assets for U.S. federal income tax purposes (generally, property held for investment).

This discussion does not describe all of the tax consequences that may be relevant in light of a U.S. Holder's particular circumstances, including the special tax accounting rules set forth in Section 451(b) of the U.S. Internal Revenue Code of 1986, as amended (the "Code"), any alternative minimum tax and Medicare contribution tax consequences and tax consequences applicable to U.S. Holders subject to special rules, such as:

- certain financial institutions;
- dealers or traders in securities that use a mark-to-market method of tax accounting;
- persons holding Notes as part of a straddle, wash sale, conversion transaction or integrated transaction;
- persons whose functional currency for U.S. federal income tax purposes is not the U.S. dollar;

- certain U.S. expatriates;
- entities classified as partnerships for U.S. federal income tax purposes;
- tax-exempt entities, "individual retirement accounts" and "Roth IRAs"; and
- persons holding Notes in connection with a trade or business conducted outside of the United States.

If an entity that is classified as a partnership for U.S. federal income tax purposes holds Notes, the U.S. federal income tax treatment of a partner will generally depend on the status of the partner and the activities of the partnership. Partnerships holding Notes and partners in such partnerships should consult their tax advisers as to the particular U.S. federal income tax consequences of holding and disposing of the Notes.

This discussion is based on the Code, administrative pronouncements, judicial decisions, and Treasury regulations, all as of the date hereof, any of which is subject to change, possibly with retroactive effect.

As used herein, a "U.S. Holder" is a person that for U.S. federal income tax purposes is a beneficial owner of a Note and is:

- an individual who is a citizen or resident of the United States;
- a corporation (or other entity taxable as a corporation for U.S. federal tax purposes) created or organized under the laws of the United States, any state or political subdivision thereof, or the District of Columbia;
- an estate the income of which is subject to U.S. federal income taxation regardless of its source; or
- a trust that (1) is subject to the primary supervision of a court within the United States and one or more U.S. persons (as defined in Section 7701(a)(30) of the Code (a "U.S. person")) have the authority to control all substantial decisions of the trust or (2) has a valid election in effect under applicable Treasury Regulations to be treated as a U.S. person.

THIS DISCUSSION IS NOT INTENDED AS LEGAL ADVICE. PROSPECTIVE INVESTORS SHOULD CONSULT THEIR TAX ADVISERS REGARDING THE APPLICATION OF ANY U.S. FEDERAL INCOME TAX RULES TO THEIR PARTICULAR CIRCUMSTANCES AS WELL AS THE STATE, LOCAL, NON-U.S. OR OTHER TAX CONSEQUENCES TO THEM OF THE PURCHASE, OWNERSHIP AND DISPOSITION OF NOTES.

#### Potential Contingent Payment Debt Instrument Treatment

There are circumstances in which the Company might be required to make payments on a Note that would increase the yield of the Note, for example, as described under "Description of the Notes - Repurchase of Notes upon a Change of Control Triggering Event" and "Description of the Notes - Optional Redemption". Under Treasury Regulations governing contingent payment debt instruments ("CPDIs"), the possibility of a contingent payment on a Note may be disregarded if the likelihood of the contingent payment as of the issue date is "remote or incidental" or under certain other circumstances. We believe that the likelihood that the Notes will be repurchased upon a Change of Control or pursuant to an Optional Redemption is, in each case, remote, and, therefore, we intend to take the position for U.S. federal income tax purposes that the Notes are not contingent payment debt instruments. The Company's position is not binding on the Internal Revenue Service ("IRS"). If the IRS takes a contrary position, U.S. Holders may be required to accrue interest income based upon a "comparable yield" (as defined in the Treasury regulations) determined at the time of issuance of the Notes (which is not expected to differ significantly from the actual yield on the Notes), with adjustments to such accruals when any contingent payments are made that differ from the payments based on the comparable yield. In addition, any income on the sale, exchange, retirement or other taxable disposition of the Notes would be treated as interest income rather than as capital gain. U.S. Holders should consult their tax advisers regarding the tax consequences if the Notes were treated as contingent payment debt instruments. The remainder of this discussion assumes that the Notes are not treated as contingent payment debt instruments.

#### **Payments of Interest**

It is expected, and this discussion assumes, that the Notes will be issued without original issue discount for U.S. federal income tax purposes. Interest on the Notes (including foreign taxes withheld from payments in respect of the Notes and any Additional Amounts with respect thereto) will be taxable to a U.S. Holder as ordinary interest income at the time it accrues or is received, in accordance with the U.S. Holder's method of accounting for U.S. federal income tax purposes.

Interest income generally will constitute foreign-source income for foreign tax credit purposes, which may be relevant in calculating the U.S. Holder's foreign tax credit limitation.

Subject to applicable limitations that may vary depending on the U.S. Holder's particular circumstances, any foreign income taxes withheld from payments in respect of the Notes will be creditable against a U.S. Holder's U.S. federal income tax liability. The rules governing foreign tax credits are complex, and recently issued Treasury regulations that apply to foreign taxes paid or accrued in taxable years beginning on or after December 28, 2021 (the "foreign tax credit regulations") have imposed additional requirements that must be met for a foreign tax to be creditable. U.S. Holders should consult their tax advisers regarding the creditability of any foreign income taxes in their particular circumstances. Instead of claiming a credit, a U.S. Holder may elect to deduct such foreign taxes in computing taxable income. An election to deduct foreign taxes instead of claiming foreign tax credits must apply to all foreign taxes paid or accrued in the taxable year.

#### Sale, Exchange, Retirement or Other Taxable Disposition of the Notes

Upon the sale, exchange, retirement or other taxable disposition of a Note, a U.S. Holder will recognize taxable gain or loss in an amount equal to the difference between the amount realized on the sale, exchange, retirement or other taxable disposition and the U.S. Holder's tax basis in the Note. For these purposes, the amount realized does not include any amount attributable to accrued interest, which will be treated as interest as described under "– Payments of Interest" above. Gain or loss realized on the sale, exchange, retirement or other taxable disposition of a Note will be U.S.-source capital gain or loss and will be long-term capital gain or loss if at the time of the sale, retirement or disposition the U.S. Holder has held the Note for more than one year. Long-term capital gains recognized by non-corporate U.S. Holders are subject to reduced tax rates. The deductibility of capital losses may be subject to limitations.

As described in "Mongolian Taxation", if a U.S. Holder sells Notes to a Mongolian purchaser, the Mongolian purchaser may withhold 20% from the gross proceeds. A U.S. Holder is entitled to use foreign tax credits to offset only the portion of its U.S. federal income tax liability that is attributable to foreign-source income. Because capital gains are generally treated as U.S.-source income, this limitation may preclude a U.S. Holder from claiming a credit for all or a portion of any Mongolian taxes imposed on any such gains. U.S. Holders should consult their tax advisers regarding their ability to claim a refund or foreign tax credit with respect to any Mongolian tax on dispositions in their particular circumstances (including in light of the foreign tax credit regulations).

#### Information Reporting and Backup Withholding

Payments of interest and proceeds from the sale of a Note that are made within the United States or through one of certain U.S.-related financial intermediaries generally are subject to information reporting to the IRS, and may be subject to backup withholding, unless (i) the U.S. Holder is an exempt recipient or (ii) in the case of backup withholding, the U.S. Holder provides a correct taxpayer identification number and certifies that it is not subject to backup withholding. Backup withholding is not an additional tax. The amount of any backup withholding from a payment to a U.S. Holder will be allowed as a credit against the U.S. Holder's U.S. federal income tax liability and a U.S. Holder may obtain a refund of any excess amounts withheld, provided that the required information is timely furnished to the IRS.

Certain U.S. Holders who are individuals (or certain specified entities) may be required to report information relating to their ownership of the Notes, or non-U.S. accounts through which the Notes are held. U.S. Holders should consult their tax advisers regarding their reporting obligations with respect to the Notes.

# 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, 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 Initial Purchasers propose to resell the Notes at the offering price set forth on the cover page of this Offering Memorandum within the United States, to QIBs (as defined in Rule 144A) in reliance on Rule 144A and outside the United States in offshore transactions in reliance on Regulation S.

#### Rule 144A Notes

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 or with any securities regulatory authority of any state or other jurisdiction of the United States and may not be offered, resold, pledged or otherwise transferred except (a) in accordance with Rule 144A to a person that the holder and any person acting on its behalf reasonably believe is a QIB purchasing for its own account or for the account of a QIB, (b) in an "offshore transaction," as defined in, and in accordance with, Rule 903 or Rule 904 of Regulation S, (c) pursuant to an exemption from registration under the Securities Act provided by Rule 144 thereunder (if available) or (d) pursuant to an effective registration statement under the Securities Act, in each case in accordance with all applicable securities laws of any state of the United States; and the purchaser will, and each subsequent holder is required to, notify any subsequent purchaser of the Notes of the resale restrictions referred to in this clause (1);
- (2) You represent that you are purchasing the Notes as a QIBs (as defined in Rule 144A) for your own account or for the account of one or more QIBs in reliance on Rule 144A. You are aware that each beneficial owner of such Notes has been advised that the sale of such Notes to it is being made in reliance of Rule 144A.
- (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 the Notes are offered and sold hereby in the manner set forth in paragraphs (2) and (4) above are "restricted securities" within the meaning of Rule 144(a)(3) under the Securities Act, are being offered and sold in a transaction not involving any public offering in the United States within the meaning of the Securities Act and that no representation is made as to the availability of the exemption provided by Rule 144 for resales of the Notes.
- (6) You understand that any offer, sale, pledge or other transfer of the Notes made other than in compliance with the above-stated restrictions may not be recognized by the Issuer.

- (7) The Issuer, the registrar, the Initial Purchasers and their respective affiliates, and others will rely upon the truth and accuracy of the foregoing acknowledgments, representations and agreements. If it is acquiring any Notes for the account of one or more QIBs, it represents that it has sole investment discretion with respect to each such account and that it has full power to make (and does make) the foregoing acknowledgments, representations and agreements on behalf of each such account.
- (8) You understand that the Notes offered in reliance on Rule 144A will be represented by the Rule 144A Global Note. Before any interest in the Rule 144A Global Note may be offered, sold, pledged or otherwise transferred to a person who takes delivery in the form of an interest in the Regulation S Global Note, it will be required to provide the relevant registrar with a written certification (in the form provided in the indenture governing the Notes) as to compliance with applicable securities laws.
- (9) You acknowledge that each Note will contain a legend substantially in the following form:

"THIS NOTE AND THE GUARANTEES HEREOF HAVE NOT BEEN AND WILL NOT BE REGISTERED UNDER THE U.S. SECURITIES ACT OF 1933 (THE "SECURITIES ACT") OR WITH ANY SECURITIES REGULATORY AUTHORITY OF ANY STATE OR OTHER JURISDICTION OF THE UNITED STATES, AND MAY NOT BE OFFERED, SOLD, PLEDGED OR OTHERWISE TRANSFERRED EXCEPT (1) PURSUANT TO A REGISTRATION STATEMENT THAT HAS BEEN DECLARED EFFECTIVE UNDER THE SECURITIES ACT, (2) IN ACCORDANCE WITH RULE 144A UNDER THE SECURITIES ACT ("RULE 144A") TO A PERSON THAT THE HOLDER AND ANY PERSON ACTING ON ITS BEHALF REASONABLY BELIEVE IS A "OUALIFIED INSTITUTIONAL BUYER" WITHIN THE MEANING OF RULE 144A PURCHASING FOR ITS OWN ACCOUNT OR FOR THE ACCOUNT OF A OUALIFIED INSTITUTIONAL BUYER, (3) IN AN "OFFSHORE TRANSACTION," AS DEFINED IN, AND IN **ACCORDANCE WITH RULE 903 OR RULE 904 OF REGULATION S UNDER THE SECURITIES** ACT, (4) PURSUANT TO AN EXEMPTION FROM REGISTRATION UNDER THE SECURITIES ACT PROVIDED BY RULE 144 THEREUNDER (IF AVAILABLE) OR (5) PURSUANT TO ANY OTHER AVAILABLE EXEMPTION FROM THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT, IN EACH CASE IN ACCORDANCE WITH ANY APPLICABLE SECURITIES LAWS OF ANY STATE OF THE UNITED STATES. NO REPRESENTATION CAN BE MADE AS TO THE AVAILABILITY OF THE EXEMPTION PROVIDED BY RULE 144 UNDER THE SECURITIES ACT FOR RESALES OF THIS NOTE. THE HOLDER OF THIS NOTE WILL, AND EACH SUBSEQUENT HOLDER IS REQUIRED TO, NOTIFY ANY PURCHASER OF THIS NOTE OF THE RESALE RESTRICTIONS REFERRED TO ABOVE."

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.

- (10) 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.
- (11) 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.

- (12) 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.
- (13) 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".

#### **Regulation S Notes**

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 and such Notes are being offered and sold in reliance on Regulation S.
- (2) You are, or at the time the Notes are purchased will be, the beneficial owner of such Notes and (a) you are purchasing the Notes in an offshore transaction (within the meaning of Regulation S), (b) you are not an affiliate of the Issuer or a person acting on behalf of such an affiliate, and (c) you are located outside the United States and will continue to be located outside the United States at the time the buy order is originated.
- (3) You will not offer, sell, pledge or otherwise transfer such Notes except in accordance with the Securities Act and any applicable laws of any State of the United States and any other jurisdiction.
- (4) The Issuer, the registrar, the Initial Purchasers and their respective affiliates, and others will rely upon the truth and accuracy of the foregoing acknowledgments, representations and agreements.
- (5) You understand that the Notes offered in reliance on Regulation S will be represented by the Regulation S Global Note. For the period until and including the 40th day after the commencement of the offering, any interest in the Regulation S Global Note may be offered, sold, pledged or otherwise transferred to a person located in the United States or a person who takes delivery in the form of an interest in the Rule 144A Global Note, provided that it will be required to provide a Transfer Agent with a written certification (in the form provided in the Indenture) to the effect that the transferee is a "**qualified institutional buyer**" (as defined in Rule 144A) and as to compliance with applicable securities laws. It understands that the Notes will, unless otherwise agreed between the Issuer and the Trustee in accordance with applicable law, bear a legend to the following effect:

"THIS NOTE AND THE GUARANTEES HEREOF HAVE NOT BEEN AND WILL NOT BE REGISTERED UNDER THE UNITED STATES SECURITIES ACT OF 1933, AS AMENDED (THE "SECURITIES ACT"), OR WITH ANY SECURITIES REGULATORY AUTHORITY OF ANY STATE OR OTHER JURISDICTION OF THE UNITED STATES AND MAY NOT BE OFFERED, SOLD, PLEDGED OR OTHERWISE TRANSFERRED IN THE UNITED STATES EXCEPT PURSUANT TO AN AVAILABLE EXEMPTION FROM THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT AND ALL APPLICABLE STATE SECURITIES LAWS. TERMS USED ABOVE HAVE THE MEANINGS GIVEN TO THEM IN REGULATION S UNDER THE SECURITIES ACT."

# PLAN OF DISTRIBUTION

Morgan Stanley & Co. International Plc and The Hongkong and Shanghai Banking Corporation Limited 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
Morgan Stanley & Co. International Plc	US\$350,000,000 US\$ 0
Total	US\$350,000,000

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 April 3, 2025.

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 Initial Purchasers propose to resell the Notes at the offering price set forth on the cover page of this Offering Memorandum within the United States, to QIBs (as defined in Rule 144A) in reliance on Rule 144A and outside the United States in offshore transactions in reliance on Regulation S. See "Transfer Restrictions".

The Notes will constitute a new class of securities with no established trading market. Approval-inprinciple has been received from the SGX-ST for the listing and quotation of the Notes on the Official List of the SGX-ST. The Issuers do 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 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.

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 April 3, 2025, 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 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 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). 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 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 categorize 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); and
- 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.

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 it 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 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 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.

#### Hong Kong

Each of the Initial Purchasers has represented and agreed that:

- (a) it has not offered or sold and will not offer or sell in Hong Kong, by means of any document, any Notes other than: (A) to "professional investors" as defined in the Securities and Futures Ordinance (Cap. 571) of the laws of Hong Kong (the "SFO") and any rules made thereunder; or (B) in other circumstances which do not result in the document being a "prospectus" as defined in the Companies (Winding Up and Miscellaneous Provisions) Ordinance (Cap. 32) of Hong Kong (the "C(WUMP)O") or which do not constitute an offer to the public within the meaning of the C(WUMP)O; and
- (b) it has not issued or had in its possession for the purposes of issue, and will not issue or have in its possession for the purposes of issue, whether in Hong Kong or elsewhere, any advertisement, invitation or document relating to the Notes, which is directed at, or the contents of which are likely to be accessed or read by, the public in Hong Kong (except if permitted to do so under the securities laws of Hong Kong) 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" as defined in the SFO and any rules made under the SFO.

#### 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 with the *Commissione Nazionale per le Società e la Borsa* ("CONSOB") 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, in accordance with any Italian securities, tax and other applicable laws and regulations.

Each Initial Purchaser has represented and agreed that it has not 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:

- 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");
- (2) comply with Article 129 of the Banking Act, as amended from time to time, and the implementing guidelines of the Bank of Italy, as amended from time to time; and
- (3) comply with any other applicable laws and regulations, including any limitation or requirement which may be imposed from time to time by CONSOB or the Bank of Italy or other competent 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) an accredited investor (as defined in Section 4(A) of the SFA) pursuant to, and in accordance with the conditions specified in Section 275 of the SFA.

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 and the expression Prospectus Regulation means Regulation (EU) 2017/1129, as amended.

#### 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:

- (a) 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");

- (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; or
- (iii) not a qualified investor as defined in the Prospectus Regulation as it forms part of domestic law by virtue of the EUWA; and
- (b) 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.

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, an 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 (1) in the United States to "qualified institutional buyers" in reliance on Rule 144A and (2) outside of the United States in offshore transactions in reliance on Regulation S. Resales of the Notes are restricted as described under "Transfer Restrictions".

Until 40 days after the commencement of this Offering, an offer or sale of Notes within the United States by a dealer (whether or not participating in this Offering) may violate the registration requirements of the Securities Act if such offer or sale is made otherwise than in accordance with Rule 144A or pursuant to another exemption from registration under the Securities Act.

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. See "Risk Factors – Risks Relating to the Notes and the Subsidiary Guarantees – The ratings provisionally assigned to the Notes may be lowered or withdrawn".

# **LEGAL MATTERS**

Certain legal matters will be passed upon for us by Allen Overy Shearman Sterling as to United States federal and New York State law. Certain legal matters as to Hong Kong law will be passed upon for us by Davis Polk & Wardwell. 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 SARL.

Certain legal matters will be passed upon for the Initial Purchasers by Linklaters Singapore Pte. Ltd, as to matters of United States federal securities and New York State laws and Melville Erdenedalai LLP as to Mongolian law.

# **INDEPENDENT ACCOUNTANTS**

Our consolidated financial statements as of and for the years ended December 31, 2022, 2023 and 2024, included in this Offering Memorandum, have been audited by KPMG, certified public accountants, Hong Kong, as stated in their reports appearing herein.

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 and within the United States to "qualified institutional buyers" in reliance on Rule 144A under the Securities Act, 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 25, 2024 and March 24, 2025 on the consolidated financial statements for the years ended December 31, 2022, 2023 and 2024, 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 March 24, 2025.

#### DOCUMENTS AVAILABLE

For so long as any of the Notes are outstanding, copies of the Indenture will be available to holders of the Notes charge (following prior written request and satisfactory proof of holding and identity) during normal office hours (between 9:00 a.m. and 3:00 p.m. (London 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 of Notes, in each case, provided the Trustee has been supplied with the relevant documents by the Company.

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
Rule 144A Global Note	303856072	XS3038560721
Regulation S Global Note	303855912	XS3038559129

Only Notes evidenced by either a Rule 144A Global Note or 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 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

# Audited consolidated financial information as of and for the year ended December 31, 2024

Independent Auditor's Report	F-3		
Consolidated Statement of Profit or Loss	F-8		
Consolidated Statement of Profit or Loss and Other Comprehensive Income	F-10		
Consolidated Statement of Financial Position	F-11		
Consolidated Statement of Changes in Equity	F-13		
Consolidated Cash Flow Statement	F-15		
Notes to Consolidated Financial Statements	F-17		
Audited consolidated financial information as of and for the year ended December 31, 2023			
Independent Auditor's Report	F-92		
Consolidated Statement of Profit or Loss	F-98		
Consolidated Statement of Profit or Loss and Other Comprehensive Income	F-100		
Consolidated Statement of Financial Position	F-101		
Consolidated Statement of Changes in Equity	F-103		
Consolidated Cash Flow Statement	F-105		
Notes to Consolidated Financial Statements	F-107		

Mongolian Mining Corporation (Stock Code: 00975)

Financial Statements for the year ended 31 December 2024



# 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 6 to 88, which comprise the consolidated statement of financial position as at 31 December 2024, 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, comprising material accounting policy information and other explanatory information.

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 2024 and of its consolidated financial performance and its consolidated cash flows for the year then ended in accordance with IFRS Accounting Standards as 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.

#### Revenue recognition

Refer to notes 2(v) and 4(a) to the consolidated financial statements and the accounting policies.

#### The Key Audit Matter

The Group is principally engaged in the mining, processing, transportation and sale of coat products. The Group has generated relevant revenue from coal products amounted to USD1.039.852,000 for the year ended 31 December 2024

The Group enters into sale agreements with customers and, in accordance with the terms of the agreements, revenue is recognised when the control of the coal has been transferred to the customers. Management evaluates the terms of individual agreements in order to determine the appropriate timing for revenue recognition.

We identified revenue recognition as a key audit matter because revenue is one of the key performance indicators of the Group and therefore there is an inherent risk of manipulation of revenue recognition through recording fictitious revenue by management to meet specific targets or expectations

#### How the matter was addressed in our audit

Our audit procedures to assess the recognition of revenue included the following

- obtaining an understanding of and evaluating the design, implementation and operating effectiveness of key internal controls over revenue recognition;
- inspecting sale agreements, on a sample basis, to understand the terms of delivery and assessing whether management recognised the related revenue in accordance with the Group's accounting policies, with reference to the requirements of the prevailing accounting standards.
- obtaining confirmations from customers, on a sample basis, to confirm the sales transactions during the year, and for unreturned confirmations, performing alternative procedures by comparing details of the transactions with the relevant sale agreements and good delivery notes ("underlying documentation"), and
- selecting on a sample basis, specific revenue transactions recorded before and after the financial year end date and inspecting underlying documentation to determine whether the related revenue had been recognised in the appropriate financial period.



# Independent Auditor's Report to the Shareholders of Mongolian Mining Corporation (continued) (Incorporated in the Cayman Islands with limited liability)

(incorporated in the Cayman Islands with limited liability)

# 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. The other information is expected to be made available to us after the date of this auditor's report.

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.

# 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 IFRS Accounting Standards as 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.



Independent Auditor's Report to the Shareholders of Mongolian Mining Corporation (continued) (Incorporated in the Cayman Islands with limited liability)

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.
- Plan and perform the group audit to obtain sufficient appropriate audit evidence regarding the financial information of the entities or business units within the Group as a basis for forming an opinion on the group financial statements. We are responsible for the direction, supervision and review of the audit work performed for purposes 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.


### Independent Auditor's Report to the Shareholders of Mongolian Mining Corporation (continued) (Incorporated in the Cayman Islands with limited liability)

### 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.

19118

Certified Public Accountants

8th Floor, Prince's Building 10 Chater Road Central, Hong Kong

24 March 2025

### Consolidated statement of profit or loss for the year ended 31 December 2024

(Expressed in United States dollars)

	Note	2024 USD'000	2023 USD'000
Revenue Cost of revenue	4 5	1,039,852 (628,177)	1,034,821 (593,180)
Gross profit		411,675	441,641
Other net income Selling and distribution costs General and administrative expenses	6(c)	13,049 (9,767) (46,633)	7,414 (4,779) (57,272)
Profit from operations		368,324	387,004
Finance income Finance costs	6(a) 6(a)	4,272 (37,349)	1,855 (41,958)
Net finance costs	6(a)	(33,077)	(40,103)
Loss from repurchase, refinancing and redemption of Senior Notes due 2024 Share of profits of associates Share of losses of joint ventures	7	- 957 (1)	(12,975) 996 

The notes on pages 15 to 88 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 2024 (continued)

(Expressed in United States dollars)

	Note	2024 USD'000	2023 USD'000
Profit before taxation	6	336,203	334,922
Income tax	8	(92,651)	(94,820)
Profit for the year		243,552	240,102
Attributable to:			
Equity shareholders of the Company Non-controlling interests		242,012 1,540	239,686 416
Profit for the year		243,552	240,102
Basic earnings per share	9(a)	22.12 cents	21.95 cents
Diluted earnings per share	9(b)	21.77 cents	21.95 cents

The notes on pages 15 to 88 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 2024

(Expressed in United States dollars)

	Note	2024 USD'000	2023 USD'000
Profit for the year		243,552	240,102
Other comprehensive income for the year (after tax and reclassification adjustments)	12		
Item that may be reclassified subsequently to profit or loss:			
Exchange differences on re-translation		(2,614)	525
Other comprehensive income for the year		(2,614)	525
Total comprehensive income for the year		240,938	240,627
Attributable to:			
Equity shareholders of the Company Non-controlling interests		239,539 1,399	240,119 508
Total comprehensive income for the year		240,938	240,627

# Consolidated statement of financial position at 31 December 2024

(Expressed in United States dollars)

	Note	2024 USD'000	2023 USD'000
Non-current assets			
Property, plant and equipment, net	13	1,099,868	1,066,555
Other right_of_use assets	14	00,702 70	7,230
Intangible assets	16	506.741	492,317
Interests in associates	18	8,718	8,258
Interest in joint ventures		5	6
Other non-current assets	19	30,639	6,544
Deferred tax assets	26(b)	15,654	7,574
Total non-current assets		1,748,456	1,588,538
Current assets			
Inventories	20	148,339	98,952
Trade and other receivables	21	97,897	145,152
Cash and cash equivalents	22	140,521	175,799
Total current assets		386,757	419,903
Current liabilities			
Trade and other payables	24	138,970	126,736
Contract liabilities		115,421	237,447
Lease liabilities		567	-
Current taxation	26(a)	70,661	69,249
Total current liabilities		325,619	433,432
Net current assets/(liabilities)		61,138	(13,529)
Total assets less current liabilities		1,809,594	1,575,009

### Consolidated statement of financial position at 31 December 2024 (continued)

(Expressed in United States dollars)

	Note	2024 USD'000	2023 USD'000
Non-current liabilities			
Borrowing Senior Notes Provisions Deferred tax liabilities	25 23 28 26(b)	20,000 216,122 32,030 160,523	213,993 24,959 166,191
Total non-current liabilities		428,675	405,143
NET ASSETS		1,380,919	1,169,866
CAPITAL AND RESERVES			
Share capital Reserves	29(c)	104,908 1,140,602	104,248 1,010,589
Total equity attributable to equity shareholders of the Company		1,245,510	1,114,837
Perpetual notes	29(e)		55,476
Non-controlling interests		135,409	(447)
TOTAL EQUITY		1,380,919	1,169,866

Approved and authorised for issue by the board of directors on 24 March 2025.

Odjargal Jambaljamts Chairman

**Battsengel Gotov** 

Battsengel Gotov Chief Executive Officer

Mongolian Mining Corporation Financial statements for the year ended 31 December 2024

# Consolidated statement of changes in equity for the year ended 31 December 2024 (Expressed in United States dollars)

	Sh Note Sh USD' (Note 29(	January 2023	it for the year r comprehensive income 12	I comprehensive income	urchase of perpetual notes 29(e)	ing-actions 27	destancion of property adlation reserve to tained profits upon sposals of assets ncerned	1 December 2023
	hare pital (000 ((c))	,248				ı		248
Attr	<i>Share</i> <i>premium</i> USD'000 (Note 29(d)(i))	773,014			ı	ı		773,014
ibutable to equi	Other reserve USD'000 (Note 29(d)(ii))	34,874		·	I	2,162		37,036
ty shareholders	<i>Exchange</i> <i>reserve</i> USD'000 (Note 29(d)(iii))	(519,940)	- 433	433	ı	ı		(519,507)
s of the company	Property revaluation reserve USD'000 (Note 29(d)(iv))	370,316			ı		(1,426)	368,890
	Retained profits USD'000	110,044	239,686 -	239,686	ı	I	1,426	351,156
	Total USD'000	872,556	239,686 433	240,119	ı	2,162		1,114,837
	Perpetual notes USD'000 (Note 29(e))	55,476			ı	I		55,476
	Non- controlling interests USD'000	(955)	416 92	508	ı	ı		(447)
	<i>Total equity</i> USD'000	927,077	240,102 525	240,627		2,162		1,169,866

Mongolian Mining Corporation Financial statements for the year ended 31 December 2024

# Consolidated statement of changes in equity for the year ended 31 December 2024 (continued) (Expressed in United States dollars)

			Attr	ributable to equ	uity shareholders	s of the company	/				
						Property				Non-	
	010to	Share	Share	Other	Exchange	revaluation	Retained	Totol	Perpetual	controlling	Total acuity
	2001	USD'000	USD'000	USD'000	USD'000	USD'000	000,DSU	USD'000	USD'000	USD'000	USD'000
		(Note 29(c))	29(d)(i))	29(d)(ii))	29(d)(iii))	29(d)(iv))			29(e))		
At 1 January 2024		104,248	773,014	37,036	(519,507)	368,890	351,156	1,114,837	55,476	(447)	1,169,866
Profit for the year Other comprehensive income	12				- (2,473)		242,012 -	242,012 (2,473)		1,540 (141)	243,552 (2,614)
Total comprehensive income		'	'	'	(2,473)	'	242,012	239,539	'	1,399	240,938
Repurchase of perpetual notes	29(e)	,					(87,052)	(87,052)	(55,476)	,	(142,528)
Distribution made to notaers of perpetual notes	29(e)						(21,348)	(21,348)		,	(21,348)
Equity-settied snare-pased transactions Declassification of property	27	660	3,065	914		·	,	4,639		ı	4,639
reclassification of property revaluation reserve to retained profits upon											
concerned						(801)	801				
controlling interest		ı	ı		I	,	ı	,		542	542
Acquisition of a subsidiary	33	ı	ı	I	'		ı	ı	I	40,000	40,000
in a subsidiary	34		'	'	'	'	(5,105)	(5,105)	'	93,915	88,810
At 31 December 2024		104,908	776,079	37,950	(521,980)	368,089	480,464	1,245,510	'	135,409	1,380,919

## Consolidated cash flow statement for the year ended 31 December 2024 (Expressed in United States dollars)

	Note	2024 USD'000	2023 USD'000
Operating activities			
Profit before taxation		336,203	334,922
Adjustments for: Depreciation and amortisation Share of profits of associate and joint venture Loss on disposals of property, plant and	6(c)	124,798 (956)	94,119 (996)
equipment	6(c)	862	1,635
mining contractor Net finance costs	6(a)	- 33,077	24,057 40,103
redemption of Senior Notes due 2024 Equity-settled share-based payment expenses	7 6(b)	- 1,886	12,975 2,162
Changes in working capital: (Increase)/decrease in inventories Decrease/(increase) in trade and other		(49,387)	3,842
receivables		47,255	(52,995)
(Decrease)/increase in trade and other payables and contract liabilities (Increase)/decrease in other non-current		(180,596)	15,862
assets		(24,095)	28,936
Cash generated from operations		289,047	504,622
Income tax paid	26(a)	(65,556)	(22,743)
Net cash generated from operating activities		223,491	481,879

# Consolidated cash flow statement for the year ended 31 December 2024 (continued) (Expressed in United States dollars)

	Note	2024 USD'000	2023 USD'000
Investing activities			
Payments for acquisition of property, plant and equipment and construction in progress Proceeds from disposals of property, plant and equipment	33	(188,955) - 6 028	(133,798) 8
Payments for acquisition of intangible asset Prepayments for acquisition of a subsidiary Interest received Dividends received from an associate	55	4,777 240	- (6) (40,000) 1,328 168
Net cash used in investing activities		(177,910)	(172,300)
Financing activities			
Proceeds from borrowing Capital injection by a non-controlling interest Proceeds from partial disposal of interests in a	22(b)	20,000 542	-
subsidiary Capital element of lease rentals paid Repurchase of Senior Notes due 2024	34 22(b)	88,810 (1,099) -	- (220) (36,227)
Payment for refinancing of Senior Notes due 2024 Proceeds from new issue of Senior Notes due	22(b)	-	(174,035)
2026 Repurchase of perpetual notes Distribution made to holders of perpetual notes Interest element of lease rentals paid Proceeds from shares issued under share	22(b) 29(e) 29(e)	(142,528) (21,348) (56)	44,222 - - (7)
option scheme Interest paid		2,753 (27,500)	(31,316)
Net cash used in financing activities		(80,426)	(197,583)
Net (decrease)/increase in cash and cash equivalents		(34,845)	111,996
Cash and cash equivalents at beginning of the year		175,799	64,695
Effect of foreign exchange rate changes		(433)	(892)
Cash and cash equivalents at end of the year	22	140,521	175,799

### 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 products and gold products.

### 2 Material accounting policies

### (a) Statement of compliance

These financial statements have been prepared in accordance with all IFRS Accounting Standards as issued by the International Accounting Standards Board ("**IASB**"). 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**"). Material accounting policies adopted by the Group is set out below.

The IASB has issued certain amendments to IFRS Accounting Standards 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 2024 comprise the Group and the Group's interests in associates and joint ventures.

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(g)); and
- Derivative financial instruments (see Note 2(n)).

Non-current assets and disposals groups held for sale are stated at the lower of carrying amount and fair value less costs to sell (see Note 2(y)).

The preparation of financial statements in conformity with IFRS Accounting Standards 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.

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 IFRS Accounting Standards 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 IFRS Accounting Standards that are first effective for the current accounting period of the Group. Of these, the following developments are relevant to the Group's financial statements:

- Amendments to IAS 1, *Presentation of financial statements Classification of liabilities as current or non-current* ("2020 amendments") and amendments to IAS 1, *Presentation of financial statements Non-current liabilities with covenants* ("2022 amendments")
- Amendments to IFRS 16, Leases Lease liability in a sale and leaseback
- Amendments to IAS 7, Statement of cash flows and IFRS 7, Financial instruments: Disclosures – Supplier finance arrangements

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 to, 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. The financial statements of subsidiaries are included in the consolidated financial statements from the date on which control commences until the date on which control ceases.

Intra-group balances and transactions, and any unrealised income and expenses (except for foreign currency transaction gains or losses) arising from intra-group transactions, are eliminated. 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.

For each business combination, the Group can elect to measure any non-controlling interests ("**NCI**") either at fair value or at the NCI's proportionate share of the subsidiary's net identifiable assets. NCI are presented in the consolidated statement of financial position within equity, separately from equity attributable to the equity shareholders of the Company. NCI 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 ("**OCI**") as an allocation of the total profit or loss and total comprehensive income for the year between NCI and the equity shareholders of the Company. Loans from holders of NCI and other contractual obligations towards these holders are presented as financial liabilities in the consolidated statement of financial position in accordance with Notes 2(m) or (o) depending on the nature of the liability.

Changes in the Group's interests in a subsidiary that do not result in a loss of control are accounted for as equity transactions.

When the Group loses control of a subsidiary, it derecognises the assets and liabilities of the subsidiary, and any related NCI and other components of equity. Any resulting gain or loss is recognised in profit or loss. Any interest retained in that former subsidiary is measured at fair value when control is lost.

In the Company's statement of financial position, an investment in a subsidiary is stated at cost less impairment losses (see Note 2(j)), unless it is classified as held for sale (or included in a disposal group classified as held for sale) (see Note 2(y)).

### (e) Associates and joint ventures

An associate is an entity in which the Group or the Company has significant influence, but not control or joint control, over the financial and operating policies. A joint venture is an arrangement in which the Group or the Company has joint control, whereby the Group or the Company has the rights to the net assets of the arrangement, rather than rights to its assets and obligations for its liabilities.

An interest in an associate or a joint venture is accounted for using the equity method, unless it is classified as held for sale (or included in a disposal group classified as held for sale) (see Note 2(y)). They are initially recognised at cost, which includes transaction costs. Subsequently, the consolidated financial statements include the Group's share of the profit or loss and OCI of those investees, until the date on which significant influence or joint control ceases.

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 any other long-term interests that in substance form part of the Group's net investment in the associate or the joint venture, after applying the expected credit loss ("**ECL**") model to such other long-term interests where applicable (see Note 2(j)(i)).

Unrealised gains arising from transactions with equity-accounted investees are eliminated against the investment to the extent of the Group's interest in the investee. Unrealised losses are eliminated in the same way as unrealised gains, but only to the extent there is no evidence of impairment.

In the Company's statement of financial position, an investment in an associate or a joint venture is stated at cost less impairment losses (see Note 2(j)), unless it is classified as held for sale (or included in a disposal group classified as held for sale) (see Note 2(y)).

### (f) Other investments in securities

The Group's policies for investments in securities, other than investments in subsidiaries, associates and joint ventures, are set out below.

Investments in 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 for 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) Non-equity investments

Non-equity investments 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. ECLs, interest income calculated using the effective interest method (see Note 2(v)), foreign exchange gains and losses are recognised in profit or loss. Any gain or loss on derecognition is recognised in profit or loss.
- 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. ECLs, interest income (calculated using the effective interest method) and foreign exchange gains and losses are recognised in profit or loss and computed in the same manner as if the financial asset was measured at amortised cost. The difference between the fair value and the amortised cost is recognised in OCI. When the investment is derecognised, the amount accumulated in OCI is recycled from equity to 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 investment is not held for trading purposes and on initial recognition the Group makes an irrevocable election to designate the investment at FVOCI (non-recycling) such that subsequent changes in fair value are recognised in OCI. 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. If such election is made for a particular investment, at the time of disposal, the amount accumulated in the fair value reserve (non-recycling) is transferred to retained earnings and 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) Property, plant and equipment

The following properties held for own use are stated at their revalued amount, being their fair values at the date of the revaluation less any subsequent accumulated depreciation:

- 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, which includes capitalised borrowing costs, less accumulated depreciation and any accumulated impairment losses (see Note 2(j)):

- 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.

If significant parts of an item of property, plant and equipment have different useful lives, then they are accounted for as separate items (major components).

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.

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(j)). Cost comprises cost of materials, direct labour and an appropriate proportion of production overheads and borrowing costs (see 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.

Any gain or loss on disposal of an item of property, plant and equipment is recognised in profit or loss. Any related revaluation surplus is transferred from the revaluation reserve to retained profits and is not reclassified to profit or loss.

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.

Other items of property, plant and equipment are depreciated using the straight line method over their estimated useful lives, and is recognised in profit or loss.

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	,

Depreciation methods, useful lives and residual values are reviewed annually and adjusted if appropriate.

No depreciation is provided in respect of construction in progress until it is substantially completed and ready for its intended use.

### (h) 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(j)).

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 and adjusted if appropriate.

### (i) Leased assets

At inception of a contract, the Group assesses whether the contract is, or contains, a lease. This is the case 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 component(s) and non-lease component(s), 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 leases that have a short lease term of 12 months or less, and leases of low-value items such as laptops and office furniture. When the Group enters into a lease in respect of a low-value item, the Group decides whether to capitalise the lease on a lease-by-lease basis. If not capitalised, the associated lease payments are recognised in profit or loss 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 recognised 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 are charged to profit or loss as 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 adjusted for any lease payments made at or before the commencement date, plus any initial direct costs incurred and 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, less any lease incentives received. The right-of-use asset is subsequently stated at cost less accumulated depreciation and impairment losses (see Notes 2(g) and 2(j)(ii)).

Refundable rental deposits are accounted for separately from the right-of-use assets in accordance with the accounting policy applicable to investments in non-equity securities carried at amortised cost (see Notes 2(f)(i), 2(v)(ii)(a) and 2(j)(i)). Any excess of the nominal value over the initial fair 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, if there is a change in the Group's estimate of the amount expected to be payable under a residual value guarantee, or if the Group changes its assessment of whether it will 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 lease modification, which means a change in the scope of a lease or the consideration for a lease that is not originally provided for in the lease contract, if such modification 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.

In the consolidated statement of financial position, the current portion of long-term lease liabilities is determined as the present value of contractual payments that are due to be settled within twelve months after the reporting period.

### (j) Credit losses and impairment of assets

(i) Credit losses from financial instruments, contract assets and lease receivables

The Group recognises a loss allowance for ECLs on:

- financial assets measured at amortised cost (including cash and cash equivalents, trade receivables and other receivables, including those loans to associates and joint ventures that are held for the collection of contractual cash flows which represent solely payments of principal and interest);
- contract assets (see Note 2(p));
- non-equity securities measured at FVOCI (recycling) (see Note 2(f)(i)); and
- loan commitments issued, which are not measured at FVPL.

### Measurement of ECLs

ECLs are a probability-weighted estimate of credit losses. Generally, credit losses are measured as the present value of all expected cash shortfalls between the contractual and expected amounts.

For undrawn loan commitments, expected cash shortfalls are measured as the difference between (i) the contractual cash flows that would be due to the Group if the holder of the loan commitment draws down on the loan and (ii) the cash flows that the Group expects to receive if the loan is drawn down.

The expected cash shortfalls are discounted using the following rates if the effect 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;
- lease receivables: discount rate used in the measurement of the lease receivable;
- loan commitments: current risk-free rate adjusted for risks specific to the cash flows.

The maximum period considered when estimating ECLs is the maximum contractual period over which the Group is exposed to credit risk.

ECLs are measured on either of the following bases:

- 12-month ECLs: these are the portion of ECLs that result from default events that are possible within the 12 months after the reporting date (or a shorter period if the expected life of the instrument is less than 12 months); and
- lifetime ECLs: these are the ECLs that result from all possible default events over the expected lives of the items to which the ECL model applies.

Loss allowances are measured at an amount equal to lifetime ECLs, except for the following, which are measured at 12-month ECLs:

- financial instruments that are determined to have low credit risk at the reporting date; and
- other financial instruments (including loan commitments issued) for which credit risk (i.e. the risk of default occurring over the expected life of the financial instrument) has not increased significantly since initial recognition.

Loss allowances for trade receivables and contract assets are always measured at an amount equal to lifetime ECLs.

### Significant increases in credit risk

When determining whether the credit risk of a financial instrument (including a loan commitment) has increased significantly since initial recognition and when measuring ECLs, the Group considers reasonable and supportable information that is relevant and available without undue cost or effort. This includes both quantitative and qualitative information and analysis, based on the Group's historical experience and informed credit assessment, that includes forward-looking information.

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 non-equity securities that are measured at FVOCI (recycling), for which the loss allowance is recognised in OCI and accumulated in the fair value reserve (recycling) does not reduce the carrying amount of the financial asset in the statement of financial position.

### Credit-impaired financial assets

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;
- the restructuring of a loan or advance by the Group on terms that the Group would not consider otherwise;
- it is probable that the debtor will enter bankruptcy or other financial reorganisation; 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 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 non-current assets

At each reporting date, the Group reviews the carrying amounts of its non-financial assets (other than property carried at revalued amounts, investment property, inventories and other contract costs, contract assets and deferred tax assets) to determine whether there is any indication of impairment.

If any such indication exists, then the asset's recoverable amount is estimated. Goodwill is tested annually for impairment.

For impairment testing, assets are grouped together into the smallest group of assets that generates cash inflows from continuing use that are largely independent of the cash inflows of other assets or cash-generating units ("CGUs"). Goodwill arising from a business combination is allocated to CGUs or groups of CGUs that are expected to benefit from the synergies of the combination.

The recoverable amount of an asset or CGU is the greater of its value in use and its fair value less costs of disposal. Value in use is based on the estimated future cash flows, 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 or CGU.

An impairment loss is recognised if the carrying amount of an asset or CGU exceeds its recoverable amount.

Impairment losses are recognised in profit or loss. They are allocated first to reduce the carrying amount of any goodwill allocated to the CGU, and then to reduce the carrying amounts of the other assets in the CGU on a pro rata basis.

An impairment loss in respect of goodwill is not reversed. For other assets, an impairment loss is reversed only to the extent that the resulting carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortisation, if no impairment loss had been 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(j)(i) and (ii)).

### (k) 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.

### (I) Trade and other receivables

A receivable is recognised when the Group has an unconditional right to receive consideration and only the passage of time is required before payment of that consideration is due.

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 (see Note 2(j)(i)).

Insurance reimbursement is recognised and measured in accordance with Note 2(t).

### (m) Interest-bearing borrowings

Interest-bearing borrowings are recognised initially at fair value less transaction costs. Subsequently, these 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.

### (n) Senior notes

At initial recognition the derivative component is measured at fair value and presented as part of derivative financial instruments. Derivatives are initially measured at fair value. Subsequently, they are measured at fair value with changes therein recognised in profit or loss, except where the derivatives qualify for cash flow hedge accounting or hedges of net investment in a foreign operation. Any excess of proceeds over the amount initially recognised as the derivative component is recognised as the host liability component. The host liability component is subsequently carried at amortised cost using effective interest method. Interest related to the host liability component is recognised in profit or loss.

### (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 terms in the contract. Contract assets are assessed for ECLs (see Note 2(j)(i)) and are reclassified to receivables when the right to the consideration becomes unconditional (see Note 2(I)).

A contract liability is recognised when the customer pays non-refundable consideration before the Group recognises the related revenue (see Note 2(v)). A contract liability is also recognised if the Group has an unconditional right to receive non-refundable consideration before the Group recognises the related revenue. In such latter cases, a corresponding receivable is also recognised (see Note 2(I)).

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 on hand, demand deposits with banks and other financial institutions, and other 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 ECL (see Note 2(j)(i)).

### (r) Employee benefits

(i) Short-term employee benefits and contributions to defined contribution retirement plans

Short-term employee benefits are expensed as the related service is provided. A liability is recognised for the amount expected to be paid if the Group has a present legal or constructive obligation to pay this amount as a result of past service provided by the employee and the obligation can be estimated reliably.

Obligations for contributions to defined contribution retirement plans are expensed as the related service is provided.

(ii) Share-based payments

The grant-date fair value of equity-settled share-based payments granted to employees is measured using the binomial lattice model. The amount is generally recognised as an expense, with a corresponding increase in equity, over the vesting period of the awards. The amount recognised as an expense is adjusted to reflect the number of awards for which the related service conditions are expected to be met, such that the amount ultimately recognised is based on the number of awards that meet the related service conditions at the vesting date.

(iii) Termination benefits

Termination benefits are expensed at the earlier of when the Group can no longer withdraw the offer of those benefits and when the Group recognises costs for a restructuring.

### (s) Income tax

Income tax expense comprises current tax and deferred tax. It is recognised in profit or loss except to the extent that it relates to a business combination, or items recognised directly in equity or in OCI.

Current tax comprises the estimated tax payable or receivable on the taxable income or loss for the year and any adjustments to the tax payable or receivable in respect of previous years. The amount of current tax payable or receivable is the best estimate of the tax amount expected to be paid or received that reflects any uncertainty related to income taxes. It is measured using tax rates enacted or substantively enacted at the reporting date. Current tax also includes any tax arising from dividends.

Current tax assets and liabilities are offset only if certain criteria are met.

Deferred tax is recognised in respect of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for taxation purposes. Deferred tax is not recognised for:

- temporary differences on the initial recognition of assets or liabilities in a transaction that is not a business combination and that affects neither accounting nor taxable profit or loss and does not give rise to equal taxable and deductible temporary differences;
- temporary differences related to investment in subsidiaries, associates and joint venture to the extent that the Group is able to control the timing of the reversal of the temporary differences and it is probable that they will not reverse in the foreseeable future;
- taxable temporary differences arising on the initial recognition of goodwill; and
- those related to the income taxes arising from tax laws enacted or substantively enacted to implement the Pillar Two model rules published by the Organisation for Economic Co-operation and Development.

The Group recognised deferred tax assets and deferred tax liabilities separately in relation to its lease liabilities and right-of-use assets.

Deferred tax assets are recognised for unused tax losses, unused tax credits and deductible temporary differences to the extent that it is probable that future taxable profits will be available against which they can be used. Future taxable profits are determined based on the reversal of relevant taxable temporary differences. If the amount of taxable temporary differences is insufficient to recognise a deferred tax asset in full, then future taxable profits, adjusted for reversals of existing temporary differences, are considered, based on the business plans for individual subsidiaries in the Group. Deferred tax assets are reviewed at each reporting date and are reduced to the extent that it is no longer probable that the related tax benefit will be realised; such reductions are reversed when the probability of future taxable profits improves.

Deferred tax assets and liabilities are offset only if certain criteria are met.

### (t) Provisions and contingent liabilities

Generally provisions are determined by discounting the expected future cash flows at a pretax rate that reflects current market assessment of the time value of money and the risks specific to the liability.

A provision for onerous contracts is measured at the present value of the lower of the expected cost of terminating the contract and the expected net cost of continuing with the contract, which is determined based on the incremental costs of fulfilling the obligation under that contract and an allocation of other costs directly related to fulfilling that contract. Before a provision is established, the Group recognises any impairment loss on the assets associated with that contract (see Note 2(j)).

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 and other income

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.

Further details of the Group's revenue and other income recognition policies are as follows:

### (i) Revenue from contracts with customers

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.

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 ("**VAT**") 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 VAT 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 using the effective interest method. The "effective interest rate" is the rate that exactly discounts estimated future cash receipts through the expected life of the financial asset to the gross carrying amount of the financial asset. In calculating interest income, the effective interest rate is applied to the gross carrying amount of the asset (when the asset is not credit-impaired). However, for financial assets that have become credit-impaired subsequent to initial recognition, interest income is calculated by applying the effective interest rate to the amortised cost of the financial asset. If the asset is no longer credit-impaired, then the calculation of interest income reverts to the gross basis.

### (w) Translation of foreign currencies

Transactions in foreign currencies are translated into the respective functional currencies of group companies at the exchange rates at the dates of the transactions.

Monetary assets and liabilities denominated in foreign currencies are translated into the functional currency at the exchange rate at the reporting date. Non-monetary assets and liabilities that are measured at fair value in a foreign currency are translated into the functional currency at the exchange rate when the fair value was determined. Non-monetary assets and liabilities that are measured based on historical cost in a foreign currency are translated at the exchange rate at the date of the transaction. Foreign currency differences are generally recognised in profit or loss.

However, foreign currency differences arising from the translation of the following items are recognised in OCI:

- an investment in equity securities designated as at FVOCI (except on impairment, in which case foreign currency differences that have been recognised in OCI are reclassified to profit or loss);
- a financial liability designated as a hedge of the net investment in a foreign operation to the extent that the hedge is effective; and
- qualifying cash flow hedges to the extent that the hedges are effective.

The assets and liabilities of foreign operations using the functional currency other than USD, including goodwill and fair value adjustments arising on acquisition, are translated into USD at the exchange rates at the reporting date. The income and expenses of foreign operations are translated into USD at the exchange rates at the dates of the transactions.

Foreign currency differences are recognised in OCI and accumulated in the exchange reserve, except to the extent that the translation difference is allocated to NCI.

When a foreign operation is disposed of in its entirety or partially such that control, significant influence or joint control is lost, the cumulative amount in the exchange reserve related to that foreign operation is reclassified to profit or loss as part of the gain or loss on disposal. On disposal of a subsidiary that includes a foreign operation, the cumulative amount of the exchange differences relating to that foreign operation that have been attributed to the NCI shall be derecognised, but shall not be reclassified to profit or loss. If the Group disposes of part of its interest in a subsidiary but retains control, then the relevant proportion of the cumulative amount is reattributed to NCI. When the Group disposes of only part of an associate or joint venture while retaining significant influence or joint control, the relevant proportion of the cumulative amount is reclassified to profit or loss.

### (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.

### (y) Non-current assets held for sale

Non-current assets, or disposal group comprising assets and liabilities, are classified as held for sale if it is highly probable that they will be recovered primarily through sale rather than through continuing use.

Such assets, or disposal groups, are generally measured at the lower of their carrying amount and fair value less costs to sell. Any impairment loss on a disposal group is allocated first to goodwill, and then to the remaining assets and liabilities on a pro-rata basis, except that no loss is allocated to deferred tax assets, employee benefits assets, financial assets (other than investments in subsidiaries, associates and joint ventures) and investment properties, which continue to be measured in accordance with the Group's other accounting policies. Impairment losses on initial classification as held for sale or held for distribution and subsequent gains and losses on remeasurement are recognised in profit or loss.

Once classified as held for sale, intangible assets and property, plant and equipment are no longer amortised or depreciated, and any equity-accounted investee is no longer equity accounted.

### (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).
  - (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.

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 Coal Resource, 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.

(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 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.

### (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 and segment reporting

### (a) Revenue

The Group is principally engaged in the mining, processing, transportation and sale of coal products and gold 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 during the year is as follows:

	2024	2023 1000 (תפון
	000 000	000 000
Revenue from contracts with customers within the scope of IFRS 15		
Coal mining segment		
Washed hard coking coal	796,476	883,140
Washed mid-ash semi-hard coking coal	158,594	28,387
Washed semi-soft coking coal	57,860	85,047
Middlings	25,822	36,471
Raw thermal coal	1,100	1,776
Gold mining segment		
Gold products		
	1,039,852	1,034,821

Revenue generated from the coal mining segment is from sale of goods, which is recognised when the goods are transferred at point in time. No revenue was generated from the gold mining segment during the year ended 31 December 2024.

During the year ended 31 December 2024, the Group had no customer that individually exceeded 10% of the Group's revenue from sales of goods and rendering of services. During the year ended 31 December 2023, the Group had one customer that individually exceeded 10% of the Group's revenue from sales of goods and rendering of services, being USD194,602,000.

Revenue during the year ended 31 December 2024 includes approximately USD116,308,000 (2023: USD120,811,000) 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).

### 4 Revenue and segment reporting (continued)

### (b) Segment reporting

The Group manages its businesses by business lines, which are divided into mining, processing, transportation and sale of coal products and gold products. In a manner consistent with the way in which information is reported internally to the Group's most senior executive management for the purposes of resources allocation and performance assessment, the Group has identified and presented the following two reportable segments. No operating segments have been aggregated to form the following reportable segments:

- Coal mining segment: the mining, processing, transportation and sale of coal products;
- Gold mining segment (Note): the mining, processing, transportation and sale of gold products.
- Note: As at 31 December 2024, the gold mine is at construction stage and gold production is expected to start in 2025.
- (i) Information about segment results, assets and liabilities

For the purposes of assessing segment performance and allocating resources between segments, the Group's senior executive management monitors the results, assets and liabilities attributable to each reportable segment on the following basis:

Segment assets include all tangible, intangible assets and current assets with the exception of head office assets. Segment liabilities include provisions, trade and other payables, lease liabilities, deferred tax liabilities, current taxation, other taxes payables, contract liabilities attributable to the production and sales activities of the individual segments and senior notes and borrowing managed directly by the segments.

Revenue and expenses are allocated to the reportable segments with reference to the revenue generated by those segments and the expenses incurred by those segments or which otherwise arise from the depreciation of assets attributable to those segments. Head office expenses are not allocated to individual segments.

Segment profit or loss represent the profit or loss earned by each segment.
# 4 Revenue and segment reporting (continued)

The information of the segment results is as follows:

	Year ended 31 December 2024		
	Coal mining segment USD'000	Gold mining segment USD'000	<i>Total</i> USD'000
Revenue from external customers Inter-segment revenue	1,039,852	- -	1,039,852
Segment revenue	1,039,852		1,039,852
Profit/(loss) from operations Finance income Finance costs Share of profit of associates Share of loss of joint ventures Income tax expense Segment profit/(loss)	376,609 1,284 (30,171) 957 (1) (92,776) 255,902	(2,084) 135 (1,763) - 125 (3,587)	374,525 1,419 (31,934) 957 (1) (92,651) 252,315
Unallocated head office and corporate expenses		_	(8,763)
Profit for the year		=	243,552
Other segment information:			
Depreciation and amortisation	124,473	325	124,798

# 4 Revenue and segment reporting (continued)

(ii)

	Year ended 31 December 2023		
	Coal mining segment USD'000	Gold mining segment USD'000	<i>Total</i> USD'000
Revenue from external customers Inter-segment revenue	1,034,821	-	1,034,821
Segment revenue	1,034,821		1,034,821
<b>Profit from operations</b> Finance income Finance costs	391,752 1,668 (41,595)	- - -	391,752 1,668 (41,595)
Share of profit of associates Loss from repurchase of Senior Notes	996	-	996
Income tax expense	(94,820)	-	(12,230) (94,820)
Segment profit	245,765		245,765
Unallocated head office and corporate expenses			(5,663)
Profit for the year			240,102
Other segment information:			
Depreciation and amortisation	94,119	-	94,119
Reconciliations of segment assets and I	iabilities:		
Assets		2024 USD'000	2023 USD'000
Segment assets - Coal mining segment - Gold mining segment Elimination of inter-segment		1,973,702 148,266	1,892,691 - -
		2,121,968	1,892,691
Unallocated head office assets		13,245	115,750
Consolidated total assets		2,135,213	2,008,441

# 4 Revenue and segment reporting (continued)

	2024 USD'000	2023 USD'000
Liabilities		
Segment liabilities - Coal mining segment - Gold mining segment Elimination of inter-segment	688,807 23,857 	797,350 - - -
Unallocated based office lisbilities	41.620	41 225
Unanocated head once habilities	41,030	41,225
Consolidated total liabilities	754,294	838,575

#### (iii) Geographical information

The majority of the Group's assets and liabilities are located in Mongolia. The majority of its coal mining segment's customers are located in China. No revenue was generated from the gold mining segment, therefore no geographical segment reporting is presented.

# 5 Cost of revenue

	2024 USD'000	2023 USD'000
Mining costs	269,334	250,465
Processing costs	67,989	63,456
Transportation costs	143,589	92,291
Others (Note)	147,265	186,968
Cost of revenue	628,177	593,180

Note:

Others mainly include royalty tax on the coal sold.

# 6 **Profit before taxation**

Profit before taxation is arrived at after (crediting)/charging:

#### (a) Net finance costs:

	2024 USD'000	2023 USD'000
Interest income	(4,272)	(1,855)
Finance income	(4,272)	(1,855)
Interest on liability component of senior notes (Note 23) Interest on borrowing (Note 25) Interest on lease liabilities Transaction cost Unwinding interest on accrued reclamation obligations (Note 28)	31,322 109 60 - 3,334	34,675 - 6 11 1,313
Net interest expense Foreign exchange loss, net Others	34,825 1,473 1,051	36,005 5,953 -
Finance costs	37,349	41,958
Net finance costs	33,077	40,103

No borrowing costs have been capitalised for the years ended 31 December 2024 and 2023.

#### (b) Staff costs

	2024 USD'000	2023 USD'000
Salaries, wages, bonuses and benefits Retirement scheme contributions	52,208 6,887	38,903 4,889
(Note 27)	1,886	2,162
	60,981	45,954

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.

# 6 **Profit before taxation (continued)**

# (c) Other items:

	2024 USD'000	2023 USD'000
Selling and distribution costs (Note (i))	9,767	4,779
Depreciation and amortisation	124,798	94,119
Net loss on disposals of property, plant and equipment	862	1,635
Auditors' remuneration - audit and review services - tax and other services	679 7 686	641 353 994
Cost of inventories (Note (ii))	628,177	593,180

Notes:

- (i) Selling and distribution costs represent fees and charges incurred for importing coal into China, logistics costs, governmental fees and charges and fixed agent fees associated with sales activities in inland China.
- (ii) Cost of inventories includes USD167,579,000 (2023: USD136,876,000) 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 USD2,929,000 (2023: USD11,109,000).

# 7 Loss from repurchase, refinancing and redemption of Senior Notes due 2024

	2024 USD'000	2023 USD'000
Gain on repurchase of Senior Notes due 2024		4 601
Loss on refinancing and redemption of	-	4,091
Senior Notes due 2024 (Note (ii))		(17,666)
	<u> </u>	(12,975)

Notes:

- (i) The Group repurchased a total of USD41,160,000 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 during the year ended 31 December 2023. The excess of derecognised carrying amount of the Senior Notes due 2024 over the consideration to settle the financial liabilities, amounting to approximately USD4,691,000, 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 2023.
- (ii) On 28 August 2023, the Company announced an invitation to exchange any and all of the outstanding Senior Notes due 2024 and potential issuance of new senior notes. As at the offer expiration date on 5 September 2023, an aggregate principal amount of USD251,029,000 of the Senior Notes due 2024 has been validly tendered for exchange and accepted in the exchange offer and USD175,713,000 principal amount of new senior notes due 2026 was issued pursuant to the exchange offer (the "Exchange Offer"). Pursuant to the Company's announcement dated 7 September 2023, the Company and Energy Resources LLC ("ER"), an indirect wholly-owned subsidiary of the Company, issued additional USD4,287,000 principal amount of senior notes due 2026 ("New Money Issuance"). As a result of the Exchange Offer and New Money Issuance, the outstanding principal amount of the Senior Notes due 2024 and senior notes due 2026, issued on 13 September 2023, is listed on the Singapore Exchange Securities Trading Limited ("SGX-ST") and bears interest at 12.50% per annum fixed rate, payable semi-annually, and due on 13 September 2026 ("Senior Notes due 2026").

On 8 November 2023, the Company and ER redeemed the outstanding USD84,220,000 principal amount of Senior Notes due 2024 in full at redemption price of 102.313% ("**Optional Redemption**").

On 14 December 2023, the Company and ER issued additional USD40,000,000 of senior notes, which is consolidated and formed single series with the Senior Notes due 2026 ("Additional Issuance").

As a result of the Exchange Offer, New Money Issuance, Optional Redemption and Additional Issuance, a loss amounting to approximately USD17,666,000 has been recognised in profit or loss during the year ended 31 December 2023.

# 8 Income tax

### (a) Income tax in the consolidated statement of profit or loss represents:

	2024 USD'000	2023
Current tax	030 000	030 000
Provision for the year (Note 26(a)) Over-provision in respect of prior years	105,542 -	81,493 (114)
Deferred tax		
Origination and reversal of temporary difference (Note 26(b))	(12,891)	13,441
	92,651	94,820

### (b) Reconciliation between tax expense and accounting profit/(loss) at applicable tax rates:

	2024 USD'000	2023 USD'000
Profit before taxation	336,203	334,922
Notional tax on profit before taxation	86,500	85,142
Tax effect of non-deductible items (Note (iii))	7,260	11,441
Tax effect of non-taxable items (Note (iii))	(1,502)	(1,908)
Prior year tax loss utilised	(10)	-
Tax losses not recognised	403	259
Over-provision in respect of prior years		(114)
Actual tax expenses	92,651	94,820

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 2024 and 2023. According to the Corporate Income Tax Law of China, the Company's subsidiaries in China 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 2024 and 2023.

# 8 Income tax (continued)

(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 2024 and 2023.

#### 9 Earnings per share

#### (a) Basic earnings per share

The calculation of basic earnings per share is based on the adjusted profit attributable to ordinary equity shareholders of the Company of USD231,532,000 (2023: USD228,818,000) and the weighted average of 1,046,534,536 ordinary shares (2023: 1,042,476,786 ordinary shares) in issue during the year, calculated as follows:

The adjusted profit attributable to ordinary equity shareholders of the Company is calculated as follows:

	2024 USD'000	2023 USD'000
Profits attributable to ordinary equity shareholders Allocation of profit of the year attributable to holders of perpetual notes (Note 29(e))	242,012	239,686
	(10,480)	(10,868)
Adjusted profits attributable to ordinary equity shareholders	231,532	228,818

#### (b) Diluted earnings per share

For the year ended 31 December 2024, the effect of the outstanding share options was dilutive and therefore included in the calculation of diluted earnings per share. The calculation of diluted earnings per share is based on the adjusted profit attributable to ordinary equity shareholders of the Company and the weighted average of 1,063,424,260 ordinary shares after adjusting the effects of outstanding share options (see Note 27).

No potential dilutive shares existed as at 31 December 2023. The equity-settled share-based payment transactions (see Note 27) were anti-dilutive and therefore not included in calculating diluted earnings per share for the year ended 31 December 2023.

Weighted average number of ordinary shares (diluted) is calculated as follows:

	2024	2023
Weighted average number of ordinary shares at 31 December Dilution effect of the Company's share option scheme	1,046,534,536	1,042,476,786
(Note 27)	16,889,724	-
Weighted average number of ordinary shares (diluted) at 31 December	1,063,424,260	1,042,476,786

# 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 2024	4	
Executive directors	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(v)) USD'000	Total USD'000
Odjargal Jambaljamts (Chairman) Battsengel Gotov	19 19	1,173 1,113	75 75	102 97	- 598	1,369 1,902
Non-executive directors						
Enkhtuvshin Gombo Od Jambaljamts Mvagmariav Ganbyamba	29 29 29	-	-	-	-	29 29 29
Independent non-executive directors						
Khashchuluun Chuluundorj Unenbat Jigjid Chan Tze Ching, Japatius	29 29 87	-	-	-	-	29 29 87
Chan i ze Ching, ignatius	07					07
Total	270	2,286	150	199	598	3,503

			Year ended 31	December 2023	}	
Functionalization	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(v)) USD'000	<i>Total</i> USD'000
Executive directors						
Odjargal Jambaljamts (Chairman) Battsengel Gotov	19 19	1,139 919	75 75	99 81	- 641	1,332 1,735
Non-executive directors						
Enkhtuvshin Gombo Od Jambaljamts	19 19	-	-	-	-	19 19
Independent non-executive directors	19	-	-	-	-	19
Khashchuluun Chuluundorj	19	-	-	-	-	19
Chan Tze Ching, Ignatius	58	-		-	-	58
Total	191	2,058	150	180	641	3,220

# **10** Directors' remuneration and interest of Directors (continued)

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 2024 and 2023.
- (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 2024 and 2023.
- (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 2024 and 2023.
- (iv) No consideration was provided to or receivable by third parties for making available Directors' services during the years ended 31 December 2024 and 2023.
- (v) These represent the estimated value of share options granted to the directors under the Company's share option schemes. 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).

The details of these benefits in kind, including the principal terms and number of options granted, are disclosed in Note 27.

#### 11 Individuals with highest emoluments

The number of directors and non-directors included in the five highest paid individuals is set forth below:

	2024 Number of individuals	2023 Number of individuals
Directors	2	2
Non-directors	3	3
	5	5

# 11 Individuals with highest emoluments (continued)

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:

	2024 USD'000	2023 USD'000
Basic salaries, allowances and benefits in kind	873	765
Discretionary bonuses	450	226
Retirement scheme contributions	108	81
Equity-settled share-based payment expenses	370	401
	1,801	1,473

The emoluments of the remaining individuals with the highest emoluments are within the following band:

Number of individuals	Number of individuals
-	3
1	-
2	-
	Number of individuals - 1 2

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 2024 and 2023.

### 12 Other comprehensive income

	2024 USD'000	2023 USD'000
Exchange differences on re-translation of the financial statements of certain subsidiaries	(2,614)	525

#### 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 Property, plant and equipment, net

		Machinery	• • •	o 11		
	Buildings	and	Motor	Office	Mining	
	and plants	equipment	vehicles	equipment	properties	Total
	USD-000	USD-000	USD-000	USD 000	USD-000	USD'000
Cost or valuation:						
At 1 January 2023	485,171	319,832	44,877	5,187	612,092	1,467,159
Additions	1,947	2,750	101,594	713	83,411	190,415
Disposals	(2,706)	(1,761)	(1,731)	(543)	-	(6,741)
progress	23 791	15 159	_	-	-	38 950
Adjustment on mining rehabilitation	-	-	-	-	6,909	6,909
Exchange adjustments	1,246	562	(2)	6	-	1,812
At 31 December 2023	509,449	336,542	144,738	5,363	702,412	1,698,504
Representing:						
Cost	760	-	144,738	5,363	702,412	853,273
Valuation	508,689	336,542	-	-	-	845,231
	509 449	336 542	144 738	5 363	702 412	1 698 504
At 1 January 2024	509,449	336,542	144,738	5,363	702,412	1,698,504
Acquisition of a subsidiary (Note						
33) A deliti e e e	29	241	329	178	19,484	20,261
Disposala	2,805	0,344	(524)	(251)	99,997	(2 5 1 9)
Adjustment on mining rehabilitation	(1,779)	(954)	(554)	(201)	3 737	(3,516)
Exchange adjustments	(354)	(166)	(2)	(4)	(4)	(530)
At 31 December 2024	510,150	342,007	161,780	6,683	825,626	1,846,246
Representing:						
	4 9 - 9					
Cost	1,858	-	161,780	6,683	825,626	995,947
Valuation	508,292	342,007	-			850,299
	510,150	342,007	161,780	6,683	825,626	1,846,246
Accumulated amortisation and						
depreciation:						
At 1 January 2023	147,477	212,101	41,415	4,135	142,343	547,471
Charge for the year	14,537	17,286	8,078	306	48,193	88,400
Written back on disposals	(877)	(1,730)	(1,727)	(519)	-	(4,853)
Exchange adjustments	550	378	(1)	4	-	931
At 31 December 2023	161,687	228,035	47,765	3,926	190,536	631,949
At 1 January 2024	161,687	228,035	47,765	3,926	190,536	631,949
Charge for the year	15,805	18,676	31,701	567	50,349	117,098
Written back on disposals	(718)	(925)	(520)	(186)	-	(2,349)
Exchange adjustments	(191)	(125)	(2)	(2)		(320)
At 31 December 2024	176,583	245,661	78,944	4,305	240,885	746,378
Carrying amount:						
At 31 December 2024	333,567	96,346	82,836	2,378	584,741	1,099,868
At 31 December 2023	347 762	108 507	96 973	1 437	511 876	1 066 555
	5.1,1 OL	,		1,101	0.1,010	.,

Notes:

- (a) Majority part of the Group's property, plant and equipment are located in Mongolia.
- (b) Mining properties as at 31 December 2024 include stripping activity assets with the carrying amount of USD531,464,000 (2023: USD483,446,000).
- (c) As at 31 December 2024, 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 2024 is approximately USD5,556,000 (2023: USD6,618,000). The Directors are of the opinion that the Group is entitled to lawfully occupy or use of these properties.
- (d) 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

463,505

# 13 Property, plant and equipment, net (continued)

Total

	⊢air vaiue			
	as at 31	Fair value measurements as at		
	December	31 December 2024 categorised int		
	2024	Level 1	Level 2	Level 3
	USD'000	USD'000	USD'000	USD'000
Recurring fair value measurement				
Buildings and plants	332,629	-	-	332,629
Machinery and equipment Buildings and plants, machinery and	96,346	-	-	96,346
equipment under construction (Note 14)	86,782			86,782
Total	515,757			515,757
	Fair value			
	as at 31	Fair valu	le measuremer	nts as at
	December	31 Decem	ber 2023 catea	orised into
	2023	Level 1	Level 2	Level 3
	USD'000	USD'000	USD'000	USD'000
Recurring fair value measurement				
Buildings and plants	347,762	-	-	347,762
Machinery and equipment Buildings and plants, machinery and	108,507	-	-	108,507
equipment under construction (Note 14)	7,236			7,236

During the year ended 31 December 2024, 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.

463.505

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.

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; and
  - 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.

(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 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:

	2024 USD'000	2023 USD'000
Buildings and plants Machinery and equipment	111,526 22,695	116,481 25,952
Buildings and plants, machinery and equipment under construction	3,704	3,715
	137,925	146,148

(e) 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 2024, 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.

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 types of coal.

Preparation basis used for the coal price assumptions for the next five years estimated at the year end of 2024 is consistent with that at the year end of 2023, 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 profiles, the costs 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.

#### - 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 16% and pre-tax discount rate of 20% were applied to the future cash flows projection at the year end of 2024 (2023: post-tax discount rate of 17% and pre-tax discount rate of 23%). 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 2024, and has not resulted in the identification of an impairment loss for the year ended 31 December 2024. The Directors are of the opinion that the impairment provision is adequate as at 31 December 2024 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

2024	2023
USD'000	USD'000
7,236	47,387
35,465	-
44,668	163
-	(38,950)
-	(1,433)
(587)	69
86,782	7,236
	2024 USD'000 7,236 35,465 44,668 - (587) 86,782

Note: The construction in progress is mainly related to buildings and plants. The additions in construction in progress are mainly related to the construction of Bayan Khundii ("**BKH**") mine of Erdene Mongol LLC ("**EM**") (see Note 33).

# 15 Other right-of-use assets

	2024	2023
Cost:	050 000	050 000
At 1 January Additions	65 2	65 -
At 31 December	67	65
Accumulated depreciation:		
At 1 January Charge for the year	17 1	16 1
At 31 December	18	17
Net carrying amount:	49	48

Note: Right-of-use assets comprise interests in leasehold land held for own use located in Mongolia, with original lease period from 5 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 2023 Addition	701,557	3,676	3,174	708,407
At 31 December 2023 Acquisition of a subsidiary (Note 33) Addition	701,557 21,900 -	3,676 - 223	3,174 - -	708,407 21,900 223
At 31 December 2024	723,457	3,899	3,174	730,530
Accumulated amortisation and impairment loss:				
At 1 January 2023 Amortisation charge for the year	206,305 4,292	2,942 367	1,125 1,059	210,372 5,718
At 31 December 2023 Amortisation charge for the year	210,597 6,340	3,309 369	2,184 990	216,090 7,699
At 31 December 2024	216,937	3,678	3,174	223,789
Carrying amount:				
At 31 December 2024	506,520	221		506,741
At 31 December 2023	490,960	367	990	492,317

#### Notes:

- (i) Acquired mining right represents the mining right acquired during the acquisition of BN mine and BKH mine.
- (ii) GS Terminal represents the permission to operate at the customs bonded terminal.

# 17 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.

	Place of				
	incorporation	Particulars of issued	Equity att	ributable	
Name of company	and business	and paid up capital	to the Co	ompany	Principal activities
			Direct	Indirect	
Mongolian Coal Corporation Limited	Hong Kong	1 share	100%	-	Investment holding
Mongolian Mining Corporation Pte. Ltd. <sup>(i)</sup>	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	Mongolia	117,473,410 shares of USD2 each	-	100%	Mining and trading of coal
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 MNT1,000 each	-	100%	Power supply and water exploration project
Baruun Naran S.à.r.l. (" <b>BNS</b> ")	Luxembourg	24,918,394 shares of EUR1 each	-	100%	Investment holding
Khangad Exploration LLC (" <b>KEX</b> ")	Mongolia	34,532,399 shares of USD1 each	-	80%	Mining and trading of coal
Tianjin Zhengcheng Import and Export Trade Co., Ltd. (" <b>TZJV</b> ") <sup>(ii)</sup>	China	RMB10,000,000	-	51%	Trading of coals and machinery equipment
Inner Mongolia Fangcheng Trade Co., Ltd. <sup>(iii)</sup>	China	RMB5,000,000	-	51%	Trading of coals and machinery equipment
Erdene Mongol LLC	Mongolia	209,369,988 shares of MNT 1,000 each	-	50%	Mining and trading of gold
Leader Exploration LLC	Mongolia	100 shares of MNT 1,000 each	-	50%	Exploration of gold and other precious metals

# Notes:

- (i) Incorporated as Private Company under the laws of Singapore.
- (ii) Registered as Sino-Foreign Cooperative Equity Joint Ventures under China law.
- (iii) Registered as Private Enterprise under China 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	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.

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	
	2024 USD'000	2023 USD'000
Gross amounts of the associate:		
Current assets	2,054	2,265
Non-current assets	831	692
Current liabilities	2,506	2,363
Equity	379	594
Revenue	2,818	4,486
(Loss)/profit from continuing operations	(185)	86
Other comprehensive income	(30)	5
Total comprehensive income	(215)	91
Reconciled to the Group's interests in associate:		
Gross amounts of net assets of the associate	379	594
Group's effective interest	40%	40%
Group's share of net assets of the associate	151	237
Carrying amount in the consolidated financial		
statements	151	237

30,639

6,544

# 18 Interests in associates (continued)

19

	Guoneng Inner Mongolia Ganqimaodu International Energy Co., Ltd.	
	2024 USD'000	2023 USD'000
Gross amounts of the associate:		
Current assets	21,583	21,981
Non-current assets	70,315	73,304
Current liabilities	6,233	10,855
Non-current liabilities	-	4,225
Equity	85,665	80,205
Revenue	23,933	23,595
Profit from continuing operations	10,309	9,615
Other comprehensive income	(2,320)	(2,191)
Total comprehensive income	7,989	7,424
Dividend received from the associate	240	168
Reconciled to the Group's interests in associate:		
Gross amounts of net assets of the associate	85,665	80,205
Group's effective interest	10%	10%
Group's share of net assets of the associate	8,567	8,021
Carrying amount in the consolidated financial		
statements	8,567	8,021
Other non-current assets		
	2024	2023
	USD'000	USD'000
Prepayments in connection with construction work,		
equipment purchases and others	30,025	5,930
Other financial asset (Note)	614	614

Note: The Group has an investment of 2.25% equity interest in International Medical Center LLC.

# 20 Inventories

21

# (a) Inventories in the consolidated statement of financial position comprise:

	2024 USD'000	2023 USD'000
Coal Materials and supplies	125,961 32,815	85,986 23,403
	158,776	109,389
Less: Provision on coal inventories	(10,437)	(10,437)
	148,339	98,952

# (b) The analysis of the amount of inventories recognised as an expense and included in profit or loss is as follows:

	2024 USD'000	2023 USD'000
Carrying amount of inventories sold	628,177	593,180
Trade and other receivables		
	2024 USD'000	2023 USD'000
Trade receivables (Note (a)) Other receivables (Note (c))	40,672 57,225	33,700 111,452
Less: allowance for credit losses (Note (b))	97,897	145,152 -
	97,897	145,152

# 21 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:

	2024 USD'000	2023 USD'000
Within 90 days	20.630	28,847
91 to 180 days	13,977	4,853
181 to 270 days	5,079	-
271 to 365 days	986	-
	40,672	33,700

### (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(j)(i)).

As at 31 December 2024, the Group evaluated the loss allowance for ECL and no loss allowance of trade receivables (2023: 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

	2024 USD'000	2023 USD'000
Amounts due from related parties Prepayments and deposits VAT and other tax receivables (Note (i)) Others (Note (ii))	9,603 47,123 499	22 7,232 62,732 41,466
	57,225	111,452

#### Notes:

- (i) 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.
- (ii) As at 31 December 2023, others mainly represent the prepayments made in relation to the acquisition of EM (see Note 33).

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:

	2024 USD'000	2023 USD'000
Cash on hand Cash at bank	2 140,519	2 175,797
Cash and cash equivalents in the consolidated cash flow statement	140,521	175,799

# (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.

	Borrowing	Senior Notes due 2026 (Note)	Total
	USD'000 (Note 25)	USD'000 (Note 23)	USD'000
At 1 January 2024		222,243	222,243
Changes from financing cash flows:			
Proceeds from borrowing Interest paid	20,000	(27,500)	20,000 (27,500)
Total changes from financing cash flows	20,000	(27,500)	(7,500)
Other changes:			
Interest expenses (Note 6(a)) Others	109 -	31,322 (1,693)	31,431 (1,693)
Total other changes	109	29,629	29,738
At 31 December 2024	20,109	224,372	244,481

Note: Liabilities include accrued interest as disclosed in Note 24.

# 22 Cash and cash equivalents and other cash flow information (continued)

	Senior Notes due 2026 (Note) USD'000 (Note 23)	Senior Notes due 2024 (Note) USD'000	<i>Total</i> USD'000
At 1 January 2023		381,106	381,106
Changes from financing cash flows:			
Interest paid Repurchase of Senior Notes due 2024 Revenue for refinencing and redemption	-	(31,316) (36,227)	(31,316) (36,227)
of Senior Notes due 2024 Proceeds from new issue of Senior	-	(174,035)	(174,035)
Notes due 2026	44,222		44,222
Total changes from financing cash flows	44,222	(241,578)	(197,356)
Other changes:			
Interest expenses (Note 6(a)) Refinancing of Senior Notes due 2024 Gain on repurchase of Senior Notes due	8,087 170,442	26,588 (160,258)	34,675 10,184
2024 (Note 7) Others	(508)	(4,691) (1,167)	(4,691) (1,675)
Total other changes	178,021	(139,528)	38,493
At 31 December 2023	222,243		222,243

Note: Liabilities include accrued interest as disclosed in Note 24.

# 23 Senior notes

	2024 USD'000	2023 USD'000
Senior Notes due 2026 (Note)	216,122	213,993

Note:

On 13 September 2023, the Group issued Senior Notes due 2026 with initial principal amount of USD180,000,000. Further on 14 December 2023, the Group issued additional USD40,000,000 principal amount of Senior Notes due 2026. The Senior Notes due 2026 is listed on the SGX-ST, bears interest at 12.50% per annum fixed rate, payable semi-annually, and is due on 13 September 2026 (See Note 7 (ii)).

The Senior Notes due 2026 is 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 2024 was nil. The liability component was initially recognised at its fair value, taking into account attributable issuance discount, and will be accounted on amortised cost subsequently.

Fair value of the derivative component was estimated by the Directors based on the Binomial model.

#### 24 Trade and other payables

	2024	2023
	USD'000	USD'000
Trade payables (Note (i))	86,862	68,856
Amounts due to related parties (Note (ii))	7,949	5,249
Payables for purchase of equipment	1,554	1,282
Interest payable (Note (iii))	8,359	8,250
Other taxes payables	22,824	34,020
Others (Note (iv))	11,422	9,079
	138,970	126,736

# 24 Trade and other payables (continued)

#### Notes:

(i) As of the end of the reporting period, the ageing analysis of trade creditors based on the invoice date is as follows:

	2024 USD'000	2023 USD'000
Within 90 days	86,530	68,326
91 to 180 days	192	254
181 to 365 days	2	4
Over 365 days	138	272
	86,862	68,856

- (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 2024, interest payable for Senior Notes due 2026 was USD8,250,000 (2023: USD8,250,000) and interest payable for borrowing was USD109,000 (2023: nil).
- (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 Borrowing

	At 31 Decemb	At 31 December 2024		ber 2023
	Effective interest rate	USD'000	Effective interest rate	USD'000
Long-term borrowing (Note)	13.30%	20,000	-	-

#### Note:

On 4 December 2024, EM entered into a loan agreement with a local bank in Mongolia for USD50,000,000. The loan bears interest at 13.3% per annum fixed rate, payable monthly, and is repayable in six equal monthly instalments at the end of its maturity on 4 December 2026. As at 31 December 2024, USD20,000,000 was drawn down from the loan, with the remaining USD30,000,000 undrawn.

#### Income tax in the consolidated statement of financial position 26

#### Tax payable in the consolidated statement of financial position represents: (a)

	2024 USD'000	2023 USD'000
At 1 January	69,249	9,617
Provision for the year (Note 8(a))	105,542	81,493
Offsetting with other tax receivables	(52,377)	-
Income tax paid	(65,556)	(22,743)
Exchange adjustments	13,803	882
At 31 December	70,661	69,249

#### Deferred tax assets and liabilities recognised (b)

The components of deferred tax assets/(liabilities) recognised in the consolidated statement of financial position and the movements during the year are as follows:

	Revaluation of other properties USD'000	<i>Tax losses</i> 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	<i>Total</i> USD'000
Deferred tax arising from:								
At 1 January 2023 Credited/(charged) to	(68,876)	1,468	(199)	(3,143)	23,480	(98,875)	-	(146,145)
(Note 8(a))	4,152	(251)	146	4,121	(24,063)	800	1,654	(13,441)
reserves	1,063	10	1	21	(172)	-	46	969
At 31 December 2023	(63,661)	1,227	(52)	999	(755)	(98,075)	1,700	(158,617)
At 1 January 2024 Credited/(charged) to	(63,661)	1,227	(52)	999	(755)	(98,075)	1,700	(158,617)
(Note 8(a))	4,057	(100)	377	7,596	172	803	(14)	12,891
subsidiary (Note 33)	-	-	-	-	(44)	-	-	(44)
reserves	980	(2)	(1)	(73)	1	-	(4)	901
At 31 December 2024	(58,624)	1,125	324	8,522	(626)	(97,272)	1,682	(144,869)
						<i>2024</i> USD'000	ι	<i>2023</i> JSD'000
Net deferred ta statement of f	ix assets re financial po	ecognised	in the cor	nsolidated		15,654		7,574
consolidated	statement	of financia	ed in the al position			(160,523)	(	166,191)
						(144,869)	(	158,617)

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# 26 Income tax in the consolidated statement of financial position (continued)

#### (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 USD410,130,000 as at 31 December 2024 (2023: USD406,257,000) 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 China will expire in five years under the Chinese tax regulations.

Expiry of unrecognised tax losses of group entities located in Mongolia and China:

	2024	2023
	USD'000	USD'000
Year of expiry		
2025	9	9
2026	307	347
2027	1,020	1,020
2028	168	54
	1,504	1,430

In relation to group entities located in the jurisdictions other than Mongolia and China, the tax losses do not expire under current tax legislations.

#### 27 Equity-settled share-based payment transactions

On 16 June 2021, the Company adopted share option scheme ("**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.

On 3 April 2023, 33,250,000 share options were granted to a director and employees of the Company under the share option scheme. 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.

6,604,000 share options were exercised during the year ended 31 December 2024 (2023: nil).

# 27 Equity-settled share-based payment transactions (continued)

Grant Date	Number of options (Note (b)) '000	Vesting conditions	Contractual life of options
		3 April 2023	3 April 2023
3 April 2023	8,312	to 3 April 2024	to 3 April 2028
		3 April 2023	3 April 2023
3 April 2023	8,312	to 3 April 2025	to 3 April 2028
		3 April 2023	3 April 2023
3 April 2023	8,312	to 3 April 2026	to 3 April 2028
		3 April 2023	3 April 2023
3 April 2023	8,314	to 3 April 2027	to 3 April 2028
Total share options	33 250		
	00,200		

(a) The terms and conditions of the grants as at 31 December 2024 are as follows:

# (b) The movement of the number and weighted average exercise prices of share options are as follows:

	2024		2023	
	Weighted average exercise price HKD	Number of options '000	Weighted average exercise price HKD	Number of options '000
Outstanding at 1 January Granted during the year Forfeited during the year Exercised during the year	3.26 3.26 3.26	32,750 (938) (6,604)	3.26 3.26	- 33,250 (500) -
Outstanding at 31 December	3.26	25,208	3.26	32,750
Exercisable at 31 December	3.26	1,584		

The options outstanding at 31 December 2024 had a remaining contractual life of 3.26 years (2023: 4.26 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 binomial 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:

Share PriceHKD1.100 - HKD1.680Share PriceHKD3.260Exercise priceHKD3.260Option life5 yearsRisk-free interest rate3.020%Expected volatility60.0%Expected dividends-

The expected volatility is based on the normalised historical share price movement of the Company prior to the option grant date for a period over the option life. Expected dividends are based on management's estimates. The risk-free interest rate is based on the yield of Hong Kong Government Bond corresponding to the options life 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

	2024 USD'000	2023 USD'000
Accrued reclamation obligations	32,030	24,959

# 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 2024 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:

	2024 USD'000	2023 USD'000
At 1 January	24,959	16,737
Increase for reassessment of estimated costs	3,737	6,909
Accretion expense (Note 6(a))	3,334	1,313
At 31 December	32,030	24,959

Accrued reclamation costs change during the years ended 31 December 2024 and 2023 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))	<i>Total equity</i> USD'000
At 1 January 2023		104,248	773,014	21,169	(132,079)	55,476	821,828
Changes in equity for 2023:							
Total comprehensive income		-	-	-	(5,650)	-	(5,650)
Equity-settled share-based transactions	27	-		2,162			2,162
At 31 December 2023		104,248	773,014	23,331	(137,729)	55,476	818,340
At 1 January 2024		104,248	773,014	23,331	(137,729)	55,476	818,340
Changes in equity for 2024:							
Total comprehensive income		-	-	-	(3,818)	-	(3,818)
Repurchase of perpetual notes		-	-	-	(87,052)	(55,476)	(142,528)
Distribution made to holders of perpetual notes		-	-	-	(21,348)	-	(21,348)
Equity-settled share-based transactions	27	660	3,065	914	-	-	4,639
At 31 December 2024		104,908	776,079	24,245	(249,947)	-	655,285

# 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 2024 (dividend in respect of the year ended 31 December 2023: nil).

#### (c) Share capital

	2024		2023	
	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
	20	24	202	23
	Number of shares'000	USD'000	Number of shares'000	USD'000
Ordinary shares, issued and fully paid				
At 1 January Impact of share option exercise	1,042,477 6,604	104,248 660	1,042,477	104,248
At 31 December	1,049,081	104,908	1,042,477	104,248

6,604,000 share options were exercised during the year ended 31 December 2024 (2023: Nil).

#### (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).
#### 29 Capital, reserves and dividends (continued)

#### (iii) Exchange reserve

The exchange reserve comprises all foreign exchange adjustments arising from the translation of the MNT, RMB and EUR 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(g).

#### (e) Perpetual notes

The Company issued perpetual notes which were listed on the SGX-ST on 4 May 2017, with a principal amount of USD195,000,000 ("**Perpetual Notes**") and with a fair value of USD75,897,000. 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. 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.

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.

Pursuant to the Perpetual Notes' indenture, it began to accrue distribution from 1 April 2023. During the reporting period, the Company has paid USD21,348,000 to the holders of the Perpetual Notes as distribution.

During the previous reporting periods, the Company redeemed an aggregate principal amount of USD52,472,000 from the Perpetual Notes, with a carrying amount of USD20,421,000. During the year ended 31 December 2024, the Company redeemed all of the outstanding principal amount of USD142,528,000 from the Perpetual Notes with a carrying amount of USD55,476,000. As at 31 December 2024, the outstanding principal amount of the Perpetual Notes was nil.

#### (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 2024 was 11.1% (2023: 10.7%)

#### (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.

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. At the end of the reporting period, the Group believes loss allowance for trade receivables is required in the consolidated financial statements is immaterial. The Group does not hold any collateral as security for these receivables. The Group has a certain concentration credit risk as seven debtors accounted for 100% (2023: three debtors accounted for 100%) of the total trade receivables as at 31 December 2024.

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 (expressed in	to foreign cur <u>n United State</u> 2024	rrencies es Dollars)		
	Mongolian Togrog USD'000	Australian Dollar USD'000	<i>Euros</i> USD'000	Renminbi USD'000	Singapore Dollar USD'000	Hong Kong Dollar USD'000	United States Dollar USD'000
Trade and other receivables Cash and cash equivalents Trade and other payables	2,757 19,094 (72,661)	(106)	1 (76)	39,410 12,262 (10,716)	(6)	1,177 (92)	17,734
Net exposure arising from recognised assets and liabilities	(50,810)	(106)	(75)	40,956	(6)	1,085	17,734

			Exposure (expressed i	to foreign cui <u>n United State</u>	rrencies es Dollars)		
				2023			L linita d
	Mongolian Togrog USD'000	Australian Dollar USD'000	<i>Euros</i> USD'000	<i>Renminbi</i> USD'000	Singapore Dollar USD'000	Hong Kong Dollar USD'000	States Dollar USD'000
Trade and other receivables Cash and cash equivalents Trade and other payables	36 22,700 (60,619)		1 (34)	33,726 50,571 (10,358)	- - -	20 (228)	- 4 -
Net exposure arising from recognised assets and liabilities	(37,883)		(33)	73,939		(208)	4

#### (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 (2023: (decrease)/increase profit after taxation) by the amount shown below. This analysis assumes that all other risk variables remained constant.

Profit/loss for the year	2024 USD'000	2023 USD'000
5% increase in MNT	(1,905)	(2,138)
5% decrease in MNT	1,905	2,138
5% increase in AUD	(5)	-
5% decrease in AUD	5	-
5% increase in EUR	-	(3)
5% decrease in EUR	-	3
5% increase in RMB	1,531	2,631
5% decrease in RMB	(1,531)	(2,631)
5% increase in SGD	-	-
5% decrease in SGD	-	-
5% increase in HKD	55	(8)
5% decrease in HKD	(55)	8
5% increase in USD	1,354	-
5% decrease in USD	(1,354)	-

#### (d) Interest rate risk

The Group's interest rate risk arises from senior notes and borrowing. Borrowings issued at variable rates and fixed rates expose the Group to cash flow interest rate risk and fair value interest rate risk, respectively.

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 borrowings are disclosed in Notes 23 and 25.

	2024 USD'000	2023 USD'000
Net fixed rate borrowings:		002 000
Senior Notes due 2026 Borrowing	216,122 20,000	213,993
	236,122	213,993
Net floating rate borrowings:		
Less: Bank deposits	(140,519)	(175,797)
	(140,519)	(175,797)
Total net borrowings:	95,603	38,196

As at 31 December 2024, the interest rate risk of the Group was immaterial.

#### (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 2024 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 Group has USD60,000,000 standby facility from a local bank in Mongolia, including EM's undrawn loan of USD30,000,000 (Note 25), as of the reporting date. The Directors have carried out a detailed review of the cash flow forecast of the Group for the twelve months ending 31 December 2024. 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:

	Co	ntractual undiscoi	2024 unted 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 December USD'000
Senior Notes due 2026 (Note 23) Borrowing (Note 25) Trade and other payables (Note 24)	27,500 2,565 138,970 169.035	247,500 22,105  269.605		275,000 24,670 138,970 438,640	216,122 20,000 138,970 375.092

-	<u></u>	entro atual undiago	2023		
-	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 December USD'000
Senior Notes due 2026 (Note 23) Trade and other payables (Note 24)	27,500 126,736	27,500	247,500	302,500 126,736	213,993 126,736
	154,236	27,500	247,500	429,236	340,729

#### (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. 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.

The fair value of redemption options embedded in Senior Notes due 2026 were measured at Level 3 and were nil as at 31 December 2024 and 2023.

During the year ended 31 December 2024, there were no transfers between Level 1 and Level 2, or transfers into or out of Level 3 (2023: 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
Redemption option embedded in			9.20%
Senior Notes due 2026	Binomial model	Expected volatility	(2023: 6.20%)

The fair value of redemption option embedded in Senior Notes due 2026 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 2024, 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.

The redemption option embedded in Senior Notes due 2026 was nil as at the years ended 31 December 2024.

The net gains or losses resulting from the remeasurement of the redemption option embedded in the Senior Notes due 2026 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 2024 and 31 December 2023 except for the following financial instruments, for which their carrying amounts and fair value are disclosed below:

	At 31 December 2024		At 31 December 2023		
-	Carrying		Carrying		
	amount	Fair value	amount	Fair value	
	USD'000	USD'000	USD'000	USD'000	
Liability component of Senior Notes due 2026	216,122	239,428	213,993	252,408	

#### 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:

	2024 USD'000	2023 USD'000
Contracted for Authorised but not contracted for	31,269 50,833	21,142 192
	82,102	21,334

#### (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'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

MCS Mongolia LLC ("MCS") Jiayou International Logictics Co., Ltd. ("Jiayou") Inner Mongolia Wanli Trading Co., Ltd. JASN International Pte. Ltd. MCS Property LLC MCS International LLC MCS Holding LLC International Medical Center LLC Uniservice Solution LLC M Armor LLC Shangri-La Ulaanbaatar LLC Univision LLC Top Motors LLC Tengerleg Ekh Oron LLC Erchim Suljee LLC M Bank JSC

Shareholder of MMC Shareholder of KEX Subsidiary of Jiayou Subsidiary of Jiayou Subsidiary of MCS Subsidiary of MCS

Relationship

#### 32 Material related party transactions (continued)

Particulars of significant transactions between the Group and the above related parties during the year ended 31 December 2024 are as follows:

	2024	2023
	USD'000	USD'000
Engineering, procurement and construction services		
(Note (i))	25,862	-
Ancillary services (Note (ii))	28,299	19,734
Lease of property, plant and equipment (Note (iii))	675	293
Purchase of property and goods (Note (iv))	1,077	607
Sales of goods (Note (v))	67,291	-
Other	325	131

Notes:

- (i) Engineering, procurement and construction services represent costs incurred in relation to the construction work of BKH mine, paid to MCS Property LLC.
- (ii) Ancillary services represent expenditures for support services, including security services, vehicle inspection fees, cleaning and canteen expenses, power and heat generation, agent fees, and distribution and management fees paid to M Armor LLC, Uniservice Solution LLC, MCS International LLC, Inner Mongolia Wanli Trading Co., Ltd., MCS and its affiliates. The service charges are based on comparable or prevailing market rates, where applicable.
- (iii) Lease of property, plant and equipment represents rental charges paid for properties leased from Shangri-La Ulaanbaatar LLC. The rental charges are based on comparable or prevailing market rates, where applicable.
- (iv) 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.
- (v) Sales of goods represent the coal sales to JASN International Pte. 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

	2024 USD'000	2023 USD'000
Other receivables (Note 21(c))		22
Other accruals and payables (Note 24)	(7,949)	(5,249)

#### 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:

<i>2024</i> USD'000	2023 USD'000
3,676	3,466
750	504
340	309
1,091	1,377
5,857	5,656
	2024 USD'000 3,676 750 340 1,091 5,857

#### (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 Acquisition of a subsidiary

#### Acquisition of EM

On 10 January 2023, the Group entered into the investment agreement with EM and Erdene Resource Development Corporation to subscribe for 50% of the issued and outstanding share capital of EM, a company engaged in the exploration of gold and other precious metals for a total consideration of USD40,000,000 (the "**Investment Agreement**"). Pursuant to the Investment Agreement, the Company has invested USD40,000,000 to EM in 2023. The completion of the Investment Agreement took place on 25 January 2024 (the "**Acquisition Date**"), and accordingly EM became a subsidiary of the Company.

EM's financial results are being consolidated into that of the Group from the Acquisition Date. As substantially all of the fair value of the gross assets acquired is concentrated in a group of similar identifiable assets, the acquisition of EM was treated as an asset acquisition.

The recognised amounts of assets acquired and liabilities assumed at the Acquisition date comprise the following:

	Acquisition Date USD'000
Intangible assets	22,154
Property, plant and equipment	20,261
Construction in progress	35,465
Other non-current asset	8,857
Cash and cash equivalents	6,028
Trade and other receivables	464
Inventories	1
Other payables	(13,186)
Deterred tax liabilities	(44)
Net identifiable assets acquired	80,000
Non-controlling interests	(40,000)
Total consideration paid in cash	40,000
Less: cash of the subsidiary acquired	6,028
prepayment for the acquisition	40,000
Net cash inflow arising from the acquisition of the subsidiary	(6,028)

#### 34 Disposal of 20% equity interest in a wholly-owned subsidiary

On 21 February 2024, the Company and BNS entered into a share purchase agreement with Jiayou International Logistics Co., Ltd. (the "**Purchaser**") to sell its 20% equity interest in KEX for a total consideration of USD88,810,000 ("**KEX Share Purchase Agreement**"). Upon completion of the KEX Share Purchase Agreement on 3 June 2024, the Company and the Purchaser held 80% and 20% equity interest in KEX, respectively and KEX remains as a subsidiary of the Company. This transaction did not cause loss of the Company's control over KEX and was accounted for as an equity transaction.

#### 35 Company-level statement of financial position

	Note	<i>2024</i> USD'000	2023 USD'000
Non-current assets			
Interests in subsidiaries Shareholder Ioan	17	719,272 52,067	743,815
Total non-current assets		771,339	743,815
Current assets			
Trade and other receivables Cash and cash equivalents		1,171 13,215	40,159 75,591
Total current assets		14,386	115,750
Current liabilities			
Trade and other payables		91,145	2,317
Total current liabilities		91,145	2,317
Net current (liabilities)/assets	3	(76,759)	113,433
Total assets less current liabilities		694,580	857,248
Non-current liabilities			
Senior Notes		39,295	38,908
Total non-current liabilities		39,295	38,908
NET ASSETS		655,285	818,340
CAPITAL AND RESERVES	29(a)		
Share capital Reserves		104,908 550,377	104,248 714,092
TOTAL EQUITY		655,285	818,340

Approved and authorised for issue by the board of directors on 24 March 2025.

Odjargal Jambaljamts Chairman

1-1

Battsengel Gotov Chief Executive Officer

87

#### 36 Non-adjusting events after the reporting period

On 11 December 2024, the Group entered into a securities purchase agreement (the "**Securities Purchase Agreement**") with Talst Investment LLC, to acquire 50.5% of the issued and outstanding share capital of Universal Copper LLC ("**UCC**"), a company engaged in the exploration of copper and other non-ferrous metals for a total consideration of USD20,500,000. Upon the completion of the Securities Purchase Agreement on 11 March 2025, UCC became a subsidiary of the Company.

#### 37 Possible impact of amendments, new standards and interpretations issued but not yet effective for the year ended 31 December 2024

Up to the date of issue of these financial statements, the IASB has issued a number of new or amended standards, which are not yet effective for the year ended 31 December 2024 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 IAS 21, The effects of changes in foreign exchange rates – Lack of exchangeability	1 January 2025
Amendments to IFRS 9, Financial instruments and IFRS 7, Financial instruments: disclosures – Amendments to the classification and measurement of financial instruments	1 January 2026
Annual improvements to IFRS Accounting Standards – Volume 11	1 January 2026
IFRS 18, Presentation and disclosure in financial statements	1 January 2027
IFRS 19, Subsidiaries without public accountability: disclosures	1 January 2027

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 2023



# 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 85, which comprise the consolidated statement of financial position as at 31 December 2023, 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, comprising material accounting policy information and other explanatory information.

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 2023 and of its consolidated financial performance and its consolidated cash flows for the year then ended in accordance with IFRS Accounting Standards as 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 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(g), 2(h), 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 Key Audit Matter 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.	<ul> <li>How the matter was addressed in our audit</li> <li>Our audit procedures to assess impairment of mining related assets included the following:</li> <li>evaluating the design and implementation of key internal controls over the estimations of the recoverable amounts of mining related assets;</li> <li>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;</li> <li>challenging the key assumptions and estimates used in the discounted cash flow forecast as at 31 December 2023, including those relating to future commodity prices.</li> </ul>
As at 31 December 2023, 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.	those relating to future commodity prices, future sales, future operating costs and the discount rate[s] 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;



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(g), 2(h), 3(a), 14, 15 and 17 to the c policies.	consolidated financial statements and the accounting
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.	<ul> <li>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;</li> <li>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</li> <li>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.</li> </ul>

# 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.



Independent Auditor's Report to the Shareholders of Mongolian Mining Corporation (continued) (Incorporated in the Cayman Islands with limited liability)

# 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 IFRS Accounting Standards as 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.



Independent Auditor's Report to the Shareholders of Mongolian Mining Corporation (continued)

(Incorporated in the Cayman Islands with limited liability)

# 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.



# Independent Auditor's Report to the Shareholders of Mongolian Mining Corporation (continued)

(incorporated in the Cayman Islands with limited liability)

#### 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.

KANG

Certified Public Accountants

8th Floor, Prince's Building, 10 Chater Road Central, Hong Kong

25 March 2024

#### Consolidated statement of profit or loss for the year ended 31 December 2023 (Expressed in United States dollars)

	Note	2023 USD'000	2022 USD'000
Revenue Cost of revenue	4 5	1,034,821 (593,180)	546,248 (451,131)
Gross profit		441,641	95,117
Other net income Selling and distribution costs General and administrative expenses <b>Profit from operations</b>	6(c)	7,414 (4,779) (57,272) 387,004	4,181 (2,434) (24,775) 72,089
Finance income Finance costs	6(a) 6(a)	1,855 (41,958)	6,286 (47,081)
Net finance costs	6(a)	(40,103)	(40,795)
(Loss)/gain from repurchase, refinancing and redemption of Senior Notes due 2024 Share of profits of associates Share of losses of joint ventures	7	(12,975) 996 	23,144 286 (16)

The notes on pages 16 to 85 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 2023 (continued) (Expressed in United States dollars)

	Note	2023 USD'000	2022 USD'000
Profit before taxation	6	334,922	54,708
Income tax	8	(94,820)	4,183
Profit for the year		240,102	58,891
Attributable to:			
Equity shareholders of the Company Non-controlling interests		239,686 416	59,177 (286)
Profit for the year		240,102	58,891
Basic earnings per share	9	21.95 cents	5.68 cents
Diluted earnings per share	9	21.95 cents	5.68 cents

The notes on pages 16 to 85 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 2023

(Expressed in United States dollars)

	Note	2023 USD'000	2022 USD'000
Profit for the year		240,102	58,891
Other comprehensive income for the year (after tax and reclassification adjustments)	12		
Item that may be reclassified subsequently to profit or loss:			
Exchange differences on re-translation		525	(21,726)
Other comprehensive income for the year		525	(21,726)
Total comprehensive income for the year		240,627	37,165
Attributable to: Equity shareholders of the Company Non-controlling interests		240,119 508	38,306 (1,141)
Total comprehensive income for the year		240,627	37,165

# Consolidated statement of financial position at 31 December 2023

(Expressed in United States dollars)

	Note	2023 USD'000	2022 USD'000
Non-current assets			
Property, plant and equipment, net	14	1,066,555	919,688
Construction in progress	15	7,236	47,387
Other right-of-use assets	16	48	49
Intangible assets	17	492,317	498,035
Interests in associates	19	8,258	7,657
Interest in joint ventures		6	4
Other non-current assets	20	6,544	59,537
Deferred tax assets	26(b)	7,574	28,505
Total non-current assets		1,588,538	1,560,862
Current assets			
Inventories	21	98,952	102,794
Trade and other receivables	22	145,152	92,157
Cash and cash equivalents	23	175,799	64,695
Total current assets		419,903	259,646
Current liabilities			
Trade and other pavables	25	126.736	136.369
Contract liabilities		237,447	182,246
Lease liabilities		-	56
Current taxation	26(a)	69,249	9,617
Total current liabilities		433,432	328,288
Net current liabilities		(13,529)	(68,642)
Total assets less current liabilities		1,575,009	1,492,220

# Consolidated statement of financial position at 31 December 2023 (continued) (Expressed in United States dollars)

	Note	2023 USD'000	2022 USD'000
Non-current liabilities			
Senior Notes	24	213,993	373,756
Provisions	28	24,959	16,737
Deferred tax liabilities	26(b)	166,191	174,650
Total non-current liabilities		405,143	565,143
NET ASSETS		1,169,866	927,077
CAPITAL AND RESERVES			
Share capital	29(c)	104,248	104,248
Reserves		1,010,589	768,308
Total equity attributable to equity			
shareholders of the Company		1,114,837	872,556
Perpetual notes	29(e)	55,476	55,476
Non-controlling interests		(447)	(955)
TOTAL EQUITY		1,169,866	927,077

Approved and authorised for issue by the board of directors on 25 March 2024.

Odjårgal/Jambaljamts Chairman

**Battsengel Gotov** Chief Executive Officer

Mongolian Mining Corporation Financial statements for the year ended 31 December 2023

# Consolidated statement of changes in equity for the year ended 31 December 2023 (Expressed in United States dollars)

			Attribu	table to equity sha	reholders of the C	ompany					
	Note	Share capita/ USD'000 (Note 29(c))	Share premium USD'000 (Note 29(d)(i))	Other reserve USD'000 (Note 29(d)(ii))	<i>Exchange</i> <i>reserve</i> 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 Other comprehensive income	12				- (20,871)		59,177 -	59,177 (20,871)		(286) (855)	58,891 (21,726)
Total comprehensive income					(20,871)		59,177	38,306		(1,141)	37,165
Repurchase of perpetual notes	29(e)	ı					1,102	1,102	(11,093)		(9,991)
Equity-sections transactions Reclassification of property	27	1,090	3,688	(1,453)		•		3,325		•	3,325
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

Mongolian Mining Corporation Financial statements for the year ended 31 December 2023

# Consolidated statement of changes in equity for the year ended 31 December 2023 (continued) (Expressed in United States dollars)

			Attribu	table to equity sha	reholders of the C	ompany					
	Note	<i>Share</i> <i>capital</i> USD'000 (Note 29(c))	Share premium USD'000 (Note 29(d)(i))	Other reserve USD'000 (Note 29(d)(ii))	<i>Exchange</i> <i>reserve</i> USD'000 (Note 29(d)(iii))	Property revaluation reserve USD'000 (Note 29(d)(iv))	Retained profits USD'000	Total USD'000	<i>Perpetual</i> <i>notes</i> USD'000 (Note 29(e))	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
Profit for the year Other comprehensive income	12				- 433		239,686 -	239,686 433		416 92	240,102 525
Total comprehensive income					433		239,686	240,119		508	240,627
Repurchase of perpetual notes	29(e)										
transactions Reclassification of property	27			2,162	·			2,162	,		2,162
revaluation reserve to retained profits upon disposals of assets concerned			'			(1,426)	1,426				
At 31 December 2023		104,248	773,014	37,036	(519,507)	368,890	351,156	1,114,837	55,476	(447)	1,169,866

# Consolidated cash flow statement for the year ended 31 December 2023 (Expressed in United States dollars)

	Note	2023 USD'000	2022 USD'000
Operating activities			
Profit before taxation Adjustments for:		334,922	54,708
Depreciation and amortisation Share of profits of associate and joint venture Loss/(gain) on disposals of property plant and	6(c)	94,119 (996)	61,708 (270)
equipment Loss on mining equipments transferred from	6(c)	1,635	(6)
mining contractor Net finance costs	6(a)	24,057 40,103	- 40,795
redemption of Senior Notes due 2024 Equity-settled share-based payment expenses	7 6(b)	12,975 2,162	(23,144) -
Changes in working capital: Decrease in inventories		3,842	56,869
receivables		(52,995)	7,363
contract liabilities Decrease/(increase) in other non-current assets		15,862	40,353
		28,936	(3,903)
Cash generated from operations		504,622	234,473
Income tax paid	26(a)	(22,743)	(694)
Net cash generated from operating activities		481,879	233,779

# Consolidated cash flow statement for the year ended 31 December 2023 (continued) (Expressed in United States dollars)

	Note	2023 USD'000	2022 USD'000
Investing activities			
Payments for acquisition of property, plant and equipment and construction in progress Proceeds from disposals of property, plant and		(133,798)	(80,379)
equipment Payments for acquisition of intangible asset Prepayments for acquisition of a subsidiary		8 (6) (40,000)	6 (715) - (6.951)
Payments for acquisition of an associate Interest received Dividends received from an associate		1,328 168	123
Net cash used in investing activities		(172,300)	(87,916)
Financing activities			
Capital element of lease rentals paid Repayment of Senior Notes due 2022	// \	(220)	(130) (14,912)
Repurchase of Senior Notes due 2024 Payment for refinancing of Senior Notes due 2024	23(b) 23(b)	(36,227) (174,035)	(39,671) -
Proceeds from new issue of Senior Notes due 2026 Repurchase of perpetual notes	23(b) 29	44,222	(9.991)
Interest element of lease rentals paid Proceeds from shares issued under share		(7)	(6)
Interest paid		(31,316)	(42,489)
Net cash used in financing activities		(197,583)	(103,874)
Net increase in cash and cash equivalents		111,996	41,989
Cash and cash equivalents at beginning of the year		64,695	25,937
Effect of foreign exchange rate changes		(892)	(3,231)
Cash and cash equivalents at end of the year	23	175,799	64,695

## 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 Material accounting policies

#### (a) Statement of compliance

These financial statements have been prepared in accordance with all IFRS Accounting Standards as issued by the International Accounting Standards Board ("**IASB**"). 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**"). Material accounting policies adopted by the Group is set out below.

The IASB has issued certain amendments to IFRS Accounting Standards 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 2023 comprise the Group and the Group's interests in associates and joint ventures.

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(g)); and
- Derivative financial instruments (see Note 2(n)).

Non-current assets and disposals groups held for sale are stated at the lower of carrying amount and fair value less costs to sell (see Note 2(y)).

The preparation of financial statements in conformity with IFRS Accounting Standards 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 Group had net current liabilities of USD13,529,000 as at 31 December 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 31 December 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 31 December 2023.

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 main operating subsidiaries located in Mongolia is USD and the functional currency of remaining subsidiaries located in Mongolia is Mongolian Togrog ("**MNT**"). The functional currency of subsidiaries located in People's Republic of China ("**China**") is Renminbi ("**RMB**"), the functional currency of Baruun Naran S.à.r.I ("**BNS**") is Euro ("**EUR**") and the functional currency of remaining overseas holding entities is USD.

The Company and the Group's presentation currency is USD.

Judgements made by management in the application of IFRS Accounting Standards 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 new and amended IFRS Accounting Standards that are first effective for the current accounting period of the Group. Of these, the following developments are relevant to the Group's financial statements:

- IFRS 17, Insurance contracts
- Amendments to IAS 8, Accounting policies, changes in accounting estimates and errors: Definition of accounting estimates
- Amendments to IAS 1, *Presentation of financial statements* and IFRS Practice Statement 2, *Making materiality judgements: Disclosure of accounting policies*
- 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 Pillar 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.

#### (d) Subsidiaries and non-controlling interests

Subsidiaries are entities controlled by the Group. The Group controls an entity when it is exposed to, 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. The financial statements of subsidiaries are included in the consolidated financial statements from the date on which control commences until the date on which control ceases.

Intra-group balances and transactions, and any unrealised income and expenses (except for foreign currency transaction gains or losses) arising from intra-group transactions, are eliminated. 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.

For each business combination, the Group can elect to measure any non-controlling interests ("NCI") either at fair value or at the NCI's proportionate share of the subsidiary's net identifiable assets. NCI are presented in the consolidated statement of financial position within equity, separately from equity attributable to the equity shareholders of the Company. NCI 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 ("OCI") as an allocation of the total profit or loss and total comprehensive income for the year between NCI and the equity shareholders of the Company. Loans from holders of NCI and other contractual obligations towards these holders are presented as financial liabilities in the consolidated statement of financial position in accordance with Notes 2(m) or (o) depending on the nature of the liability.

Changes in the Group's interests in a subsidiary that do not result in a loss of control are accounted for as equity transactions.

When the Group loses control of a subsidiary, it derecognises the assets and liabilities of the subsidiary, and any related NCI and other components of equity. Any resulting gain or loss is recognised in profit or loss. Any interest retained in that former subsidiary is measured at fair value when control is lost.

In the Company's statement of financial position, an investment in a subsidiary is stated at cost less impairment losses (see Note 2(j)), unless it is classified as held for sale (or included in a disposal group classified as held for sale) (see Note 2(y)).

#### (e) Associates and joint ventures

An associate is an entity in which the Group or the Company has significant influence, but not control or joint control, over the financial and operating policies. A joint venture is an arrangement in which the Group or the Company has joint control, whereby the Group or the Company has the rights to the net assets of the arrangement, rather than rights to its assets and obligations for its liabilities.

An interest in an associate or a joint venture is accounted for using the equity method, unless it is classified as held for sale (or included in a disposal group classified as held for sale) (see Note 2(y)). They are initially recognised at cost, which includes transaction costs. Subsequently, the consolidated financial statements include the Group's share of the profit or loss and OCI of those investees, until the date on which significant influence or joint control ceases.

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 any other long-term interests that in substance form part of the Group's net investment in the associate or the joint venture, after applying the expected credit loss ("ECL") model to such other long-term interests where applicable (see Note 2(j)(i)).

Unrealised gains arising from transactions with equity-accounted investees are eliminated against the investment to the extent of the Group's interest in the investee. Unrealised losses are eliminated in the same way as unrealised gains, but only to the extent there is no evidence of impairment.

In the Company's statement of financial position, an investment in an associate or a joint venture is stated at cost less impairment losses (see Note 2(j)), unless it is classified as held for sale (or included in a disposal group classified as held for sale) (see Note 2(y)).

#### (f) Other investments in securities

The Group's policies for investments in securities, other than investments in subsidiaries, associates and joint ventures, are set out below.

Investments in 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 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) Non-equity investments

Non-equity investments 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. ECLs, interest income calculated using the effective interest method (see Note 2(v)), foreign exchange gains and losses are recognised in profit or loss. Any gain or loss on derecognition is recognised in profit or loss.
- 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. ECLs, interest income (calculated using the effective interest method) and foreign exchange gains and losses are recognised in profit or loss and computed in the same manner as if the financial asset was measured at amortised cost. The difference between the fair value and the amortised cost is recognised in OCI. When the investment is derecognised, the amount accumulated in OCI is recycled from equity to 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 investment is not held for trading purposes and on initial recognition the Group makes an irrevocable election to designate the investment at FVOCI (non-recycling) such that subsequent changes in fair value are recognised in OCI. 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. If such election is made for a particular investment, at the time of disposal, the amount accumulated in the fair value reserve (non-recycling) is transferred to retained earnings and 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) Property, plant and equipment

The following properties held for own use are stated at their revalued amount , being their fair values at the date of the revaluation less any subsequent accumulated depreciation:

- 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, which includes capitalised borrowing costs, less accumulated depreciation and any accumulated impairment losses (see Note 2(j)):

- 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.

If significant parts of an item of property, plant and equipment have different useful lives, then they are accounted for as separate items (major components).

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.

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(j)). Cost comprises cost of materials, direct labour and an appropriate proportion of production overheads and borrowing costs (see 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.

Any gain or loss on disposal of an item of property, plant and equipment is recognised in profit or loss. 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 less their estimated residual values, if any, using the straight line method over their estimated useful lives, and is generally recognised in profit or loss.

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	

Depreciation methods, useful lives and residual values are reviewed at each reporting date and adjusted if appropriate.

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.

#### (h) 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(j)).

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.

#### (i) Leased assets

At inception of a contract, the Group assesses whether the contract is, or contains, a lease. This is the case 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 component(s) and non-lease component(s), 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 leases that have a short lease term of 12 months or less, and leases of low-value items such as laptops and office furniture. When the Group enters into a lease in respect of a low-value item, the Group decides whether to capitalise the lease on a lease-by-lease basis. If not capitalised, the associated lease payments are recognised in profit or loss 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 recognised 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 are charged to profit or loss as 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 adjusted for any lease payments made at or before the commencement date, plus any initial direct costs incurred and 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, less any lease incentives received. The right-of-use asset is subsequently stated at cost less accumulated depreciation and impairment losses (see Notes 2(g) and 2(j)(ii)).

Refundable rental deposits are accounted for separately from the right-of-use assets in accordance with the accounting policy applicable to investments in non-equity securities carried at amortised cost (see Notes 2(f)(i), 2(v)(ii) and 2(j)(i)). Any excess of the nominal value over the initial fair 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, if there is a change in the Group's estimate of the amount expected to be payable under a residual value guarantee, or if the Group changes its assessment of whether it will 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 lease modification, which means a change in the scope of a lease or the consideration for a lease that is not originally provided for in the lease contract, if such modification 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.

In the consolidated statement of financial position, the current portion of long-term lease liabilities is determined as the present value of contractual payments that are due to be settled within twelve months after the reporting period.
## (j) Credit losses and impairment of assets

(i) Credit losses from financial instruments, contract assets and lease receivables

The Group recognises a loss allowance for ECLs on:

- financial assets measured at amortised cost (including cash and cash equivalents, trade receivables and other receivables, including those loans to associates and joint ventures that are held for the collection of contractual cash flows which represent solely payments of principal and interest);
- contract assets (see Note 2(p));
- non-equity securities measured at FVOCI (recycling) (see Note 2(f)(i));
- lease receivables; and
- loan commitments issued, which are not measured at FVPL.

## Measurement of ECLs

ECLs are a probability-weighted estimate of credit losses. Generally, credit losses are measured as the present value of all expected cash shortfalls between the contractual and expected amounts.

For undrawn loan commitments, expected cash shortfalls are measured as the difference between (i) the contractual cash flows that would be due to the Group if the holder of the loan commitment draws down on the loan and (ii) the cash flows that the Group expects to receive if the loan is drawn down.

The expected cash shortfalls are discounted using the following rates if the effect 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;
- lease receivables: discount rate used in the measurement of the lease receivable;
- loan commitments: current risk-free rate adjusted for risks specific to the cash flows.

The maximum period considered when estimating ECLs is the maximum contractual period over which the Group is exposed to credit risk.

ECLs are measured on either of the following bases:

- 12-month ECLs: these are the portion of ECLs that result from default events that are possible within the 12 months after the reporting date (or a shorter period if the expected life of the instrument is less than 12 months); and
- lifetime ECLs: these are the ECLs that result from all possible default events over the expected lives of the items to which the ECL model applies.

Loss allowances are measured at an amount equal to lifetime ECLs, except for the following, which are measured at 12-month ECLs:

- financial instruments that are determined to have low credit risk at the reporting date; and
- other financial instruments (including loan commitments issued) for which credit risk (i.e. the risk of default occurring over the expected life of the financial instrument) has not increased significantly since initial recognition.

Loss allowances for trade receivables and contract assets are always measured at an amount equal to lifetime ECLs.

#### Significant increases in credit risk

When determining whether the credit risk of a financial instrument (including a loan commitment) has increased significantly since initial recognition and when measuring ECLs, the Group considers reasonable and supportable information that is relevant and available without undue cost or effort. This includes both quantitative and qualitative information and analysis, based on the Group's historical experience and informed credit assessment, that includes forward-looking information.

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 non-equity securities that are measured at FVOCI (recycling), for which the loss allowance is recognised in OCI and accumulated in the fair value reserve (recycling) does not reduce the carrying amount of the financial asset in the statement of financial position.

#### Credit-impaired financial assets

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;
- the restructuring of a loan or advance by the Group on terms that the Group would not consider otherwise;
- it is probable that the debtor will enter bankruptcy or other financial reorganisation; 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 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 non-current assets

At each reporting date, the Group reviews the carrying amounts of its non-financial assets (other than property carried at revalued amounts, investment property, inventories and other contract costs, contract assets and deferred tax assets) to determine whether there is any indication of impairment.

If any such indication exists, then the asset's recoverable amount is estimated. Goodwill is tested annually for impairment.

For impairment testing, assets are grouped together into the smallest group of assets that generates cash inflows from continuing use that are largely independent of the cash inflows of other assets or cash-generating units ("CGUs"). Goodwill arising from a business combination is allocated to CGUs or groups of CGUs that are expected to benefit from the synergies of the combination.

The recoverable amount of an asset or CGU is the greater of its value in use and its fair value less costs of disposal. Value in use is based on the estimated future cash flows, 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 or CGU.

An impairment loss is recognised if the carrying amount of an asset or CGU exceeds its recoverable amount.

Impairment losses are recognised in profit or loss. They are allocated first to reduce the carrying amount of any goodwill allocated to the CGU, and then to reduce the carrying amounts of the other assets in the CGU on a pro rata basis.

An impairment loss in respect of goodwill is not reversed. For other assets, an impairment loss is reversed only to the extent that the resulting carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortisation, if no impairment loss had been 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(j)(i) and (ii)).

#### (k) 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.

## (I) Trade and other receivables

A receivable is recognised when the Group has an unconditional right to receive consideration and only the passage of time is required before payment of that consideration is due.

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 (see Note 2(j)(i)).

Insurance reimbursement is recognised and measured in accordance with Note 2(t).

## (m) Interest-bearing borrowings

Interest-bearing borrowings are recognised initially at fair value less transaction costs. Subsequently, these 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.

## (n) Senior notes

At initial recognition the derivative component is measured at fair value and presented as part of derivative financial instruments. Derivatives are initially measured at fair value. Subsequently, they are measured at fair value with changes therein recognised in profit or loss, except where the derivatives qualify for cash flow hedge accounting or hedges of net investment in a foreign operation. Any excess of proceeds over the amount initially recognised as the derivative component is recognised as the host liability component. The host liability component is subsequently carried at amortised cost using effective interest method. Interest related to the host liability component is recognised in profit or loss.

## (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 terms in the contract. Contract assets are assessed for ECLs (see Note 2(j)(i)) and are reclassified to receivables when the right to the consideration becomes unconditional (see Note 2(I)).

A contract liability is recognised when the customer pays non-refundable consideration before the Group recognises the related revenue (see Note 2(v)). A contract liability is also recognised if the Group has an unconditional right to receive non-refundable consideration before the Group recognises the related revenue. In such latter cases, a corresponding receivable is also recognised (see Note 2(I)).

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 on hand, demand deposits with banks and other financial institutions, and other 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 ECL (see Note 2(j)(i)).

## (r) Employee benefits

(i) Short-term employee benefits and contributions to defined contribution retirement plans

Short-term employee benefits are expensed as the related service is provided. A liability is recognised for the amount expected to be paid if the Group has a present legal or constructive obligation to pay this amount as a result of past service provided by the employee and the obligation can be estimated reliably.

Obligations for contributions to defined contribution retirement plans are expensed as the related service is provided.

(ii) Share-based payments

The grant-date fair value of equity-settled share-based payments granted to employees is measured using the binomial lattice model. The amount is generally recognised as an expense, with a corresponding increase in equity, over the vesting period of the awards. The amount recognised as an expense is adjusted to reflect the number of awards for which the related service conditions are expected to be met, such that the amount ultimately recognised is based on the number of awards that meet the related service conditions at the vesting date.

#### (iii) Termination benefits

Termination benefits are expensed at the earlier of when the Group can no longer withdraw the offer of those benefits and when the Group recognises costs for a restructuring.

#### (s) Income tax

Income tax expense comprises current tax and deferred tax. It is recognised in profit or loss except to the extent that it relates to a business combination, or items recognised directly in equity or in OCI.

Current tax comprises the estimated tax payable or receivable on the taxable income or loss for the year and any adjustments to the tax payable or receivable in respect of previous years. The amount of current tax payable or receivable is the best estimate of the tax amount expected to be paid or received that reflects any uncertainty related to income taxes. It is measured using tax rates enacted or substantively enacted at the reporting date. Current tax also includes any tax arising from dividends.

Current tax assets and liabilities are offset only if certain criteria are met.

Deferred tax is recognised in respect of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for taxation purposes. Deferred tax is not recognised for:

- temporary differences on the initial recognition of assets or liabilities in a transaction that is not a business combination and that affects neither accounting nor taxable profit or loss and does not give rise to equal taxable and deductible temporary differences;
- temporary differences related to investment in subsidiaries, associates and joint venture to the extent that the Group is able to control the timing of the reversal of the temporary differences and it is probable that they will not reverse in the foreseeable future;

- taxable temporary differences arising on the initial recognition of goodwill; and
- those related to the income taxes arising from tax laws enacted or substantively enacted to implement the Pillar Two model rules published by the Organisation for Economic Co-operation and Development.

The Group recognised deferred tax assets and deferred tax liabilities separately in relation to its lease liabilities and right-of-use assets.

Deferred tax assets are recognised for unused tax losses, unused tax credits and deductible temporary differences to the extent that it is probable that future taxable profits will be available against which they can be used. Future taxable profits are determined based on the reversal of relevant taxable temporary differences. If the amount of taxable temporary differences is insufficient to recognise a deferred tax asset in full, then future taxable profits, adjusted for reversals of existing temporary differences, are considered, based on the business plans for individual subsidiaries in the Group. Deferred tax assets are reviewed at each reporting date and are reduced to the extent that it is no longer probable that the related tax benefit will be realised; such reductions are reversed when the probability of future taxable profits improves.

Deferred tax assets and liabilities are offset only if certain criteria are met.

#### (t) Provisions and contingent liabilities

Generally provisions are determined by discounting the expected future cash flows at a pretax rate that reflects current market assessment of the time value of money and the risks specific to the liability.

A provision for warranties is recognised when the underlying products or services are sold, based on historical warranty data and a weighting of possible outcomes against their associated probabilities.

A provision for onerous contracts is measured at the present value of the lower of the expected cost of terminating the contract and the expected net cost of continuing with the contract, which is determined based on the incremental costs of fulfilling the obligation under that contract and an allocation of other costs directly related to fulfilling that contract. Before a provision is established, the Group recognises any impairment loss on the assets associated with that contract (see Note 2(j)).

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 and other income

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.

Further details of the Group's revenue and other income recognition policies are as follows:

(i) Revenue from contracts with customers

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.

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 ("**VAT**") 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 VAT 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 using the effective interest method. The "effective interest rate" is the rate that exactly discounts estimated future cash receipts through the expected life of the financial asset to the gross carrying amount of the financial asset. In calculating interest income, the effective interest rate is applied to the gross carrying amount of the asset (when the asset is not credit-impaired). However, for financial assets that have become credit-impaired subsequent to initial recognition, interest income is calculated by applying the effective interest rate to the amortised cost of the financial asset. If the asset is no longer credit-impaired, then the calculation of interest income reverts to the gross basis.

## (w) Translation of foreign currencies

Transactions in foreign currencies are translated into the respective functional currencies of group companies at the exchange rates at the dates of the transactions.

Monetary assets and liabilities denominated in foreign currencies are translated into the functional currency at the exchange rate at the reporting date. Non-monetary assets and liabilities that are measured at fair value in a foreign currency are translated into the functional currency at the exchange rate when the fair value was determined. Non-monetary assets and liabilities that are measured based on historical cost in a foreign currency are translated at the exchange rate at the date of the transaction. Foreign currency differences are generally recognised in profit or loss.

However, foreign currency differences arising from the translation of the following items are recognised in OCI:

- an investment in equity securities designated as at FVOCI (except on impairment, in which case foreign currency differences that have been recognised in OCI are reclassified to profit or loss);
- a financial liability designated as a hedge of the net investment in a foreign operation to the extent that the hedge is effective; and
- qualifying cash flow hedges to the extent that the hedges are effective.

The assets and liabilities of foreign operations using the functional currency other than USD, including goodwill and fair value adjustments arising on acquisition, are translated into USD at the exchange rates at the reporting date. The income and expenses of foreign operations are translated into USD at the exchange rates at the dates of the transactions.

Foreign currency differences are recognised in OCI and accumulated in the exchange reserve, except to the extent that the translation difference is allocated to NCI.

When a foreign operation is disposed of in its entirety or partially such that control, significant influence or joint control is lost, the cumulative amount in the exchange reserve related to that foreign operation is reclassified to profit or loss as part of the gain or loss on disposal. On disposal of a subsidiary that includes a foreign operation, the cumulative amount of the exchange differences relating to that foreign operation that have been attributed to the NCI shall be derecognised, but shall not be reclassified to profit or loss. If the Group disposes of part of its interest in a subsidiary but retains control, then the relevant proportion of the cumulative amount is reattributed to NCI. When the Group disposes of only part of an associate or joint venture while retaining significant influence or joint control, the relevant proportion of the cumulative amount is reclassified to profit or loss.

### (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.

#### (y) Non-current assets held for sale

Non-current assets, or disposal group comprising assets and liabilities, are classified as held for sale if it is highly probable that they will be recovered primarily through sale rather than through continuing use.

Such assets, or disposal groups, are generally measured at the lower of their carrying amount and fair value less costs to sell. Any impairment loss on a disposal group is allocated first to goodwill, and then to the remaining assets and liabilities on a pro-rata basis, except that no loss is allocated to deferred tax assets, employee benefits assets, financial assets (other than investments in subsidiaries, associates and joint ventures) and investment properties, which continue to be measured in accordance with the Group's other accounting policies. Impairment losses on initial classification as held for sale or held for distribution and subsequent gains and losses on remeasurement are recognised in profit or loss.

Once classified as held for sale, intangible assets and property, plant and equipment are no longer amortised or depreciated, and any equity-accounted investee is no longer equity accounted.

#### (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).
  - (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.

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.

(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 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.

(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:

	2023	2022
	USD'000	USD'000
Washed hard coking coal	883,140	508,355
Washed semi-soft coking coal	85,047	27,342
Middlings	36,471	9,922
Washed mid-ash semi-hard coking coal	28,387	-
Raw thermal coal	1,776	629
	1,034,821	546,248

During the year ended 31 December 2023, the Group had one customer that individually exceeded 10% of the Group's revenue from sales of goods and rendering of services, being USD194,602,000. 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, respectively.

Revenue during the year ended 31 December 2023 includes approximately USD120,811,000 (2022: USD43,535,000) 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

	2023 USD'000	2022 USD'000
Mining costs Processing costs Transportation costs	250,465 63,456 92,291	147,846 43,734 100,942
Others (Note (I)) Cost of revenue during mine operations	<u> </u>	426.686
Cost of revenue during idled mine period (Note (ii))		24,445
Cost of revenue	593,180	451,131

Notes:

- (i) Others mainly include royalty tax on the coal sold.
- (ii) For the year ended 31 December 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 before taxation**

Profit before taxation is arrived at after (crediting)/charging:

## (a) Net finance costs:

	2023 USD'000	2022 USD'000
Interest income Net change in fair value of derivative component of senior notes Gain on derecognition of derivative component of Senior Notes due 2022 Foreign exchange gain, net	(1,855) - - -	(145) (2,661) (507) (2,973)
Finance income	(1,855)	(6,286)
Interest on liability component of senior notes (Note 23) Interest on lease liabilities Transaction cost Unwinding interest on accrued reclamation obligations (Note 28)	34,675 6 11 1,313	45,430 6 52 1,593
Net interest expense Foreign exchange loss, net	36,005 5,953	47,081
Finance costs	41,958	47,081
Net finance costs	40,103	40,795

No borrowing costs have been capitalised for the years ended 31 December 2023 and 2022.

## 6 **Profit before taxation (continued)**

## (b) Staff costs

	2023 USD'000	2022 USD'000
Salaries, wages, bonuses and benefits Retirement scheme contributions Equity-settled share-based payment expenses	38,903 4,889	26,494 3,722
(Note 27)	2,162	-
	45,954	30,216

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:

	2023 USD'000	2022 USD'000
Selling and distribution costs (Note (i))	4,779	2,434
Depreciation and amortisation	94,119	61,708
Net loss/(gain) on disposals of property, plant and equipment	1,635	(6)
Auditors' remuneration		
- audit and review services - tax and other services	641 353	639 7
	994	646
Cost of inventories (Note (ii))	593,180	426,686

Notes:

- (i) Selling and distribution costs represent fees and charges incurred for importing coal into China, logistics and transportation costs, governmental fees and charges and fixed agent fees associated with sales activities in inland China.
- (ii) Cost of inventories includes USD136,876,000 (2022: USD106,300,000) 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 USD11,109,000 (2022: USD479,000).

# 7 (Loss)/gain from repurchase, refinancing and redemption of Senior Notes due 2024

	2023 USD'000	2022 USD'000
Gain on repurchase of Senior Notes due 2024 (Note (i))	4,691	23,144
due 2024 (Note (ii))	(17,666)	_
	(12,975)	23,144

## Notes:

- (i) The Group repurchased a total of USD41,160,000 principal amount from senior notes (2022: USD63,591,000 principal amount) with initial principal amount of USD440,000,000 maturing on 15 April 2024 ("Senior Notes due 2024") through open market during the year ended 31 December 2023. The excess of derecognised carrying amount of the Senior Notes due 2024 over the consideration to settle the financial liabilities, amounting to approximately USD4,691,000 (2022: 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 2023.
- (ii) On 28 August 2023, the Company announced an invitation to exchange any and all of the outstanding Senior Notes due 2024 and potential issuance of new senior notes. As at the offer expiration date on 5 September 2023, an aggregate principal amount of USD251,029,000 of the Senior Notes due 2024 has been validly tendered for exchange and accepted in the exchange offer and USD175,713,000 principal amount of new senior notes due 2026 was issued pursuant to the exchange offer (the "Exchange Offer"). Pursuant to the Company's announcement dated 7 September 2023, the Company and Energy Resources LLC ("ER"), an indirect wholly-owned subsidiary of the Company, issued additional USD4,287,000 principal amount of senior notes due 2026 ("New Money Issuance"). As a result of the Exchange Offer and New Money Issuance, the outstanding principal amount of the Senior Notes due 2024 and senior notes due 2026 was USD 84,220,000 and USD180,000,000, respectively. The senior notes due 2026, issued on 13 September 2023, is listed on the Singapore Exchange Securities Trading Limited ("SGX-ST") and bears interest at 12.50% per annum fixed rate, payable semi-annually, and due on 13 September 2026 ("Senior Notes due 2026").

On 8 November 2023, the Company and ER redeemed the outstanding USD84,220,000 principal amount of Senior Notes due 2024 in full at redemption price of 102.313% ("**Optional Redemption**").

On 14 December 2023, the Company and ER issued additional USD40,000,000 of senior notes, which is consolidated and formed single series with the Senior Notes due 2026 ("Additional Issuance").

As a result of the Exchange Offer, New Money Issuance, Optional Redemption and Additional Issuance, a loss amounting to approximately USD17,666,000 has been recognised in profit or loss during the year ended 31 December 2023.

## 8 Income tax

## (a) Income tax in the consolidated statement of profit or loss represents:

	2023	2022
	USD'000	USD'000
Current tax		
Provision for the year (Note 26(a))	81,493	11,194
Over-provision in respect of prior years	(114)	(115)
Deferred tax		
Origination and reversal of temporary difference		
(Note 26(b))	13,441	(15,262)
	94,820	(4,183)

# (b) Reconciliation between tax expense and accounting profit/(loss) at applicable tax rates:

	2023 USD'000	2022 USD'000
Profit before taxation	334,922	54,708
Notional tax on profit before taxation	85,142	14,335
Tax effect of non-deductible items (Note (iii))	11,441	1,743
Tax effect of non-taxable items (Note (iii))	(1,908)	(20,678)
Prior year tax loss utilised	-	(163)
Tax losses not recognised	259	695
Over-provision in respect of prior years	(114)	(115)
Actual tax expenses	94,820	(4,183)

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 2023 and 2022. According to the Corporate Income Tax Law of China, the Company's subsidiaries in China 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 2023 and 2022.
- (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 2023 and 2022.

## 9 Earnings/(loss) per share

## (a) Basic earnings/(loss) per share

The calculation of basic earnings/(loss) per share is based on the adjusted profit attributable to ordinary equity shareholders of the Company of USD228,818,000 (loss attributable to ordinary equity shareholders of the Company of 2022: USD59,177,000) and the weighted average of 1,042,476,786 ordinary shares (2022: 1,042,476,786 ordinary shares) in issue during the year.

The adjusted profit/(loss) attributable to ordinary equity shareholders of the Company is calculated as follows:

	2023 USD'000	2022 USD'000
Profit/(Loss) attributable to ordinary equity shareholders	239,686	(59,177)
Allocation of profit of the year attributable to holders of perpetual notes (Note 29(e))	(10,868)	
Adjusted profit/(loss) attributable to ordinary equity shareholders	228,818	(59,177)

## (b) Diluted earnings/(loss) per share

For the years ended 31 December 2023 and 2022, basic and diluted earnings/(loss) per share are the same.

No potential dilutive shares existed as at 31 December 2023. 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 years ended 31 December 2023 and 2022.

## **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 2023		
	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 USD'000	Total USD'000
Executive directors						
Odjargal Jambaljamts (Chairman) Battsengel Gotov	19 19	1,139 919	75 75	99 81	- 641	1,332 1,735
Non-executive directors						
Enkhtuvshin Gombo	19	-	-	-	-	19
Od Jambaljamts	19	-	-	-	-	19
Myagmarjav Ganbyamba	19	-	-	-	-	19
Independent non-executive directors						
Khashchuluun Chuluundorj	19	-	-	-	-	19
Unenbat Jigjid	19	-	-	-	-	19
Chan Tze Ching, Ignatius	58	-	-	-	-	58
Total	191	2,058	150	180	641	3,220

			Year ended 31	December 2022		
	Directors' fee	Salaries, allowances and benefits in kind USD'000	Discretionary bonuses USD'000	Retirement scheme contributions USD'000	Equity-settled share-based payment expenses USD'000	Total
Executive directors	002 000	002 000	002000	002 000	002000	002 000
Odjargal Jambaljamts (Chairman) Battsengel Gotov	19 19	1,134 729	75 75	99 66	-	1,327 889
Non-executive directors						
Enkhtuvshin Gombo Myagmariay Ganbyamba	19	-	-	-	-	19
(appointed on 1 January 2022)	19	-	-	-	-	19
Od Jambaljamts Enkhtuvshin Dashtseren	19	-	-	-	-	19
(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

## Notes:

- 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 2023 and 2022.
- (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 2023 and 2022.

## **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 2023 and 2022.
- (iv) No consideration was provided to or receivable by third parties for making available Directors' services during the years ended 31 December 2023 and 2022.
- (v) These represent the estimated value of share options granted to the directors under the Company's share option schemes. 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).

The details of these benefits in kind, including the principal terms and number of options granted, are disclosed in Note 27.

## 11 Individuals with highest emoluments

The number of directors and non-directors included in the five highest paid individuals is set forth below:

2023	2022
Number of	Number of
individuals	individuals
2	2
3	3
5	5
	2023 Number of individuals 2 3 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:

	2023 USD'000	2022 USD'000
Basic salaries, allowances and benefits in kind	765	744
Discretionary bonuses	226	225
Retirement scheme contributions	81	79
Equity-settled share-based payment expenses	401	-
	1,473	1,048

## 11 Individuals with highest emoluments (continued)

The emoluments of the remaining individuals with the highest emoluments are within the following band:

	2023 Number of individuals	2022 Number of individuals
HKD2,500,001 to HKD3,000,000	-	3
HKD3,500,001 to HKD4,000,000	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 2023 and 2022.

## 12 Other comprehensive income

2023	2022
USD'000	USD'000
525	(21,726)
	2023 USD'000 525

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

		Machinery				
	<i>Buildings</i> and plants USD'000	and equipment USD'000	Motor vehicles USD'000	Office equipment USD'000	Mining properties USD'000	<i>Total</i> USD'000
Cost or valuation:						
At 1 January 2022	511,719	330,448	43,683	4,745	583,177	1,473,772
Disposals	(929)	(201)	(454)	(220)	44,099	40,730 (1.804)
Transfer from construction in	( )	( )	( )	( )		( , ,
progress	51	-	-	-	-	51
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
At 1 January 2023	485,171	319,832	44,877	5,187	612,092	1,467,159
Additions	(2,706)	2,750 (1,761)	101,594 (1,731)	(543)	83,411	(6 741)
Transfer from construction in	(_,,	(1,101)	(1,101)	(0.0)		(0,111)
progress	23,791	15,159	-	-	-	38,950
rehabilitation	-	-	-	-	6.909	6,909
Exchange adjustments	1,246	562	(2)	6	-	1,812
At 31 December 2023	509,449	336,542	144,738	5,363	702,412	1,698,504
Representing:						
Cost	760	-	144,738	5,363	702,412	853,273
Valuation	508,689	336,542	-		-	845,231
	509,449	336,542	144,738	5,363	702,412	1,698,504
Accumulated amortisation						
and depreciation:		000 750	07 400	4 4 9 4	400.000	505 004
Charge for the year	142,154	200,752	37,422	4,124	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
At 1 January 2023	147 477	212 101	41 415	4 135	142 343	547 471
Charge for the year	14,537	17,286	8,078	306	48,193	88,400
Written back on disposals	(877)	(1,730)	(1,727)	(519)	-	(4,853)
Exchange adjustments	550	378	(1)	4	-	931
At 31 December 2023	161,687	228,035	47,765	3,926	190,536	631,949
Carrying amount:						
At 31 December 2023	347,762	108,507	96,973	1,437	511,876	1,066,555
At 31 December 2022	337 60/	107 731	3 162	1 052	/60 7/0	010 699
	337,094	107,751	3,402	1,052	409,149	919,000

Notes:

- (a) Majority part of the Group's property, plant and equipment are located in Mongolia.
- (b) Mining properties as at 31 December 2023 include stripping activity assets with the carrying amount of USD483,446,000 (2022: USD447,797,000).
- (c) As at 31 December 2023, 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 2023 is approximately USD6,618,000 (2022: USD8,446,000). The Directors are of the opinion that the Group is entitled to lawfully occupy or use of these properties.
- (d) 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

	Fair value as at 31 December	Fair value measurements as a 31 December 2023 categorised			
	2023	Level 1	Level 2	Level 3	
	USD'000	USD'000	USD'000	USD'000	
Recurring fair value measurement					
Buildings and plants	347,762	-	-	347,762	
Machinery and equipment Buildings and plants, machinery and	108,507	-	-	108,507	
equipment under construction (Note 15)	7,236			7,236	
Total	463,505			463,505	

Recurring fair value measurement	Fair value as at 31 December 2022 USD'000	Fair valu <u>31 Decemb</u> Level 1 USD'000	e measuremen <u>per 2022 catego</u> Level 2 USD'000	ts as at <u>prised into</u> Level 3 USD'000
Buildings and plants Machinery and equipment Buildings and plants, machinery and equipment under construction (Note 15)	337,637 107,731 47,387	- - 	-	337,637 107,731 47,387
Total	492,755			492,755

During the year ended 31 December 2023, 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.

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.

(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 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:

	2023 USD'000	2022 USD'000
Buildings and plants Machinery and equipment	116,481 25,952	119,085 13,236
Buildings and plants, machinery and equipment under construction	3,715	23,670
	146,148	155,991

(e) 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 2023, 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.

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 2023 is consistent with that at the year end of 2022, 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.

## - 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 2023 (2022: post-tax discount rate of 17% and pre-tax discount rate of 23%). 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 2023, and has not resulted in the identification of an impairment loss for the year ended 31 December 2023. The Directors are of the opinion that the impairment provision is adequate as at 31 December 2023 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

	2023 USD'000	2022 USD'000
At 1. January	47.387	46 828
Additions	163	2,052
Transfer to materials and supplies	(38,950) (1,433)	(51)
Exchange adjustments	69	(1,442)
At 31 December	7,236	47,387

Note: The construction in progress is mainly related to machinery and equipment.

## 16 Other right-of-use assets

	2023 USD'000	2022 USD'000
Cost:		
At 1 January	65	65
At 31 December		65
Accumulated depreciation:		
At 1 January Charge for the year	16 1	15 1
At 31 December		16
Net carrying amount:	48	49

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	GS Terminal (Note (ii)) USD'000	Total
Cost:	000 000	000 000		
At 1 January 2022 Addition	701,557	3,676	3,031 143	708,264 143
At 31 December 2022 Addition	701,557	3,676	3,174	708,407
At 31 December 2023	701,557	3,676	3,174	708,407
Accumulated amortisation and impairment loss:				
At 1 January 2022	205,540	2,574	64	208,178
the year	765	368	1,061	2,194
At 31 December 2022	206,305	2,942	1,125	210,372
the year	4,292	367	1,059	5,718
At 31 December 2023	210,597	3,309	2,184	216,090
Carrying amount:				
At 31 December 2023	490,960	367	990	492,317
At 31 December 2022	495,252	734	2,049	498,035

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	Particulars of issued	Equity att	ributable	Principal activities	
Name of company	and business	and paid up capital	Direct	Indirect	Principal activities	
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	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 (" <b>KEX</b> ")	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. (" <b>TZJV</b> ") <sup>(ii)</sup>	China	RMB2,035,998	-	51%	Trading of coals and machinery equipment	
Inner Mongolia Fangcheng Trade Co., Ltd. <sup>(iii)</sup>	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 China law.
- (iii) Registered as Private Enterprise under China 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:

			_		tributable 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.

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	
	2023 USD'000	2022 USD'000
Gross amounts of the associate:		
Current assets	2,265	1,639
Non-current assets	692	627
Current liabilities	2,363	1,763
Equity	594	503
Revenue	4,486	1,565
Profit from continuing operations	86	180
Other comprehensive income	5	(86)
Total comprehensive income	91	94
Reconciled to the Group's interests in associate:		
Gross amounts of net assets of the associate	594	503
Group's effective interest	40%	40%
Group's share of net assets of the associate	237	201
Carrying amount in the consolidated financial		
statements	237	201

6,544

59,537

# 19 Interests in associates (continued)

20

	Guoneng Inner Mongolia Ganqimaodu International Energy Co., Ltd	
	2023 USD'000	2022 USD'000
Gross amounts of the associate:		
Current assets	21,981	20,745
Non-current assets	73,304	77,057
Current liabilities	10,855	11,649
Non-current liabilities	4,225	11,597
Equity	80,205	74,556
Revenue	23,595	12,211
Profit from continuing operations	9,615	2,139
Other comprehensive income	(2,191)	(6,381)
Total comprehensive income	7,424	(4,242)
Dividend received from the associate	168	-
Reconciled to the Group's interests in associate:		
Gross amounts of net assets of the associate	80,205	74,556
Group's effective interest	10%	10%
Group's share of net assets of the associate	8,021	7,456
Carrying amount in the consolidated financial		
statements	8,021	7,456
Other non-current assets		
	2023	2022
	USD'000	USD'000
Prepayments in connection with construction work,		
equipment purchases and others (Note 22(c)(ii))	5,930	58,923
Other financial asset (Note)	614	614

Note: The Group has an investment of 2.25% equity interest in International Medical Center LLC.

# 21 Inventories

22

# (a) Inventories in the consolidated statement of financial position comprise:

	2023 USD'000	2022 USD'000
Coal Materials and supplies	85,986 23,403	96,945 16,286
	109,389	113,231
Less: Provision on coal inventories	(10,437)	(10,437)
	98,952	102,794

# (b) The analysis of the amount of inventories recognised as an expense and included in profit or loss is as follows:

	<i>2023</i> USD'000	2022 USD'000
Carrying amount of inventories sold	593,180	426,686
Trade and other receivables		
	<i>2023</i> USD'000	2022 USD'000
Trade receivables (Note (a)) Other receivables (Note (c))	33,700 111,452	4,432 87,725
Less: allowance for credit losses (Note (b))	145,152	92,157
	145,152	92,157

# 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:

	2023	2022
	USD'000	USD'000
Within 90 days	28,847	4,245
90 to 180 days	4,853	187
180 to 270 days	<u> </u>	-
	33,700	4,432

#### (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(j)(i)).

As at 31 December 2023, the Group evaluated the loss allowance for ECL and no loss allowance of trade receivables (2022: 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

	2023 USD'000	2022 USD'000
Amounts due from related parties (Note (i)) Prepayments and deposits (Note (ii)) VAT and other tax receivables (Note (iii)) Others (Note (iv))	22 7,232 62,732 41,466	3 53,809 33,150 763
	111,452	87,725

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, 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.
- (iv) At 31 December 2023, others mainly represent the prepayments made in relation to the acquisition of Erdene Mongol LLC ("EM") (see Note 34).

All other receivables were aged within one year and expected to be recovered or expensed off within one year.

63

# 23 Cash and cash equivalents and other cash flow information

# (a) Cash and cash equivalents comprise:

	2023 USD'000	2022 USD'000
Cash on hand Cash at bank	2 175,797	2 64,693
Cash and cash equivalents in the consolidated cash flow statement	175,799	64,695

# (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 2026 (Note) USD'000 (Note 24)	Senior Notes due 2024 (Note) USD'000 (Note 24)	Total USD'000
At 1 January 2023	-	381,106	381,106
Changes from financing cash flows:			
Interest paid Repurchase of Senior Notes due 2024 Payment for refinancing and redemption of	-	(31,316) (36,227)	(31,316) (36,227)
Senior Notes due 2024	-	(174,035)	(174,035)
2026	44,222		44,222
Total changes from financing cash flows	44,222	(241,578)	(197,356)
Other changes:			
Interest expenses (Note 6(a)) Refinancing of Senior Notes due 2024 Gain on repurchase of Senior Notes due 2024 Others	8,087 170,442 - (508)	26,588 (160,258) (4,691) (1,167)	34,675 10,184 (4,691) (1,675)
Total other changes	178,021	(139,528)	38,493
At 31 December 2023	222,243		222,243

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)	<i>Total</i> USD'000
At 1 January 2022	18,183	443,308	461,491
Changes from financing cash flows:			
Interest paid Repayment of Senior Notes due 2022 Repurchase of Senior Notes due 2024	(1,190) (14,912) 	(41,299) - (39,671)	(42,489) (14,912) (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)) Excess of derecognised carrying amount over	1,153	44,277	45,430
the consideration Others	(66)	(23,144) (2,365)	(23,144) (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.

# 24 Senior notes

	2023 USD'000	2022 USD'000
Senior Notes due 2024 (Note (i)) Senior Notes due 2026 (Note (ii))	213,993	373,756
	213,993	373,756

Notes:

- (i) On 15 April 2019, the Group issued the Senior Notes due 2024 with a principal amount of USD440,000,000 which was listed on the SGX-ST. The Senior Notes due 2024 bore interest at 9.25% per annum fixed rate, payable semi-annually, and was due on 15 April 2024. During the year ended 31 December 2023, all the outstanding Senior Notes due 2024 were repurchased, redeemed or exchanged to Senior Notes due 2026 (See Note 7). As at 31 December 2023, the outstanding principal amount of Senior Notes due 2024 was nil.
- (ii) On 13 September 2023, upon the completion of the Exchange Offer and the New Money Issuance, the Group issued Senior Notes due 2026 with a principal amount of USD180,000,000. Further on 14 December 2023, the Group issued additional Senior Notes due 2026 with a principal amount of USD40,000,000. The Senior Notes due 2026 bear interest at 12.50% per annum fixed rate, payable semi-annually, and is due on 13 September 2026 (See Note 7).

The Senior Notes due 2026 is 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 2023 was nil. The liability component was initially recognised at its fair value, taking into account attributable issuance discount, and will be accounted on amortised cost subsequently.

Fair value of the derivative component was estimated by the Directors based on the Binomial model.

# 25 Trade and other payables

	2023	2022
	USD'000	USD'000
Trade payables (Note (i))	68,856	103,987
Amounts due to related parties (Note (ii))	5,249	3,986
Payables for purchase of equipment	1,282	2,013
Interest payable (Note (iii))	8,250	7,350
Other taxes payables	34,020	11,015
Others (Note (iv))	9,079	8,018
	126,736	136,369

#### Notes:

(i) As of the end of the reporting period, the ageing analysis of trade creditors based on the invoice date is as follows:

	2023 USD'000	2022 USD'000
Within 90 days 90 to 180 days 180 to 365 days Over 365 days	68,326 254 4 272	71,264 - 32,723
	68,856	103,987

- (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 2023, interest payables for Senior Notes due 2026 was amounting to USD8,250,000. As at 31 December 2022, interest payables for Senior Notes due 2024 was amounting to USD7,350,000.
- (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:

2023 USD'000	2022 USD'000
9,617	65
81,493	11,194
(22,743)	(694)
882	(948)
69,249	9,617
	2023 USD'000 9,617 81,493 (22,743) 882 69,249

#### (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	<i>Total</i> USD'000
At 1 January 2022 Credited/(charged) to	(75,344)	7,104	(1,044)	(2,430)	10,675	(99,150)	158	(160,031)
(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)
At 1 January 2023 Credited/(charged) to								
(Note 8(a))	4,152	(251)	146	4,121	(24,063)	800	1,654	(13,441)
reserves	1,063	10	1	21	(172)		46	969
At 31 December 2023	(63,661)	1,227	(52)	999	(755)	(98,075)	1,700	(158,617)

# 26 Income tax in the consolidated statement of financial position (continued)

	2023 USD'000	2022 USD'000
Net deferred tax assets recognised in the consolidated		
statement of financial position	7,574	28,505
consolidated statement of financial position	(166,191)	(174,650)
	(158,617)	(146,145)

#### (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 USD406,257,000 as at 31 December 2023 (2022: USD406,173,000) 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 China will expire in five years under the Chinese tax regulations.

Expiry of unrecognised tax losses of Group entities located in Mongolia and China:

	2023	2022
	USD'000	USD'000
Year of expiry		
2023	-	96
2024	-	-
2025	9	9
2026	347	347
2027	1,020	1,020
2028	54	-
	1,430	1,472

In relation to group entities located in the jurisdictions other than Mongolia and China, the tax losses do not expire under current tax legislations.

# 27 Equity-settled share-based payment transactions

On 16 June 2021, the Company adopted share option scheme ("**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.

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 year ended 31 December 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 year ended 31 December 2023.

#### (a) The terms and conditions of the grants as at 31 December 2023 are as follows:

Grant Date	Number of options (Note (b)) '000	Vesting conditions	Contractual life of options
3 April 2023	8,312	3 April 2023 to 3 April 2024	3 April 2023 to 3 April 2028
3 April 2023	8,312	3 April 2023 to 3 April 2025	3 April 2023 to 3 April 2028
3 April 2023	8,312	3 April 2023 to 3 April 2026	3 April 2023 to 3 April 2028
3 April 2023	8,314	3 April 2023 to 3 April 2027	3 April 2023 to 3 April 2028
Total share options	33,250		

# 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:

	2	023	20	22
	Weighted average exercise price HKD	Number of options '000	Weighted average exercise price HKD	Number of options '000
Outstanding at 1 January Granted during the year Forfeited during the year Exercised during the year	3.26 3.26 -	33,250 (500) 	2.39 - - 2.39	10,900 - (10,900)
Outstanding at 31 December	3.26	32,750	-	-
Exercisable at 31 December				

The options outstanding at 31 December 2023 had a remaining contractual life of 4.26 years (2022: nil).

#### (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 binomial 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:

3 April 2023

Fair value at measurement date	HKD1.100-HKD1.680
Share Price	HKD3.260
Exercise price	HKD3.260
Option life	5 years
Risk-free interest rate	3.020%
Expected volatility	60.0%
Expected dividends	-

The expected volatility is based on the normalised historical share price movement of the Company prior to the option grant date for a period over the option life. Expected dividends are based on management's estimates. The risk-free interest rate is based on the yield of Hong Kong Government Bond corresponding to the options life 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**

	2023 USD'000	2022 USD'000
Accrued reclamation obligations	24,959	16,737

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 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 Increase/(decrease) for reassessment	16,737	30,928
of estimated costs	6,909	(15,784)
Accretion expense (Note 6(a))	1,313	1,593
At 31 December	24,959	16,737

Accrued reclamation costs change during the years ended 31 December 2023 and 2022 resulted from the reassessment of estimated costs.

#### 29 Capital, reserves and dividends

#### Movements in components of equity (a)

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))	<i>Total equity</i> USD'000
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
At 1 January 2023		104,248	773,014	21,169	(132,079)	55,476	821,828
Changes in equity for 2023:							
Total comprehensive income		-	-	-	(5,650)	-	(5,650)
Equity-settled share-based transactions	27	-	-	2,162	-	-	2,162
At 31 December 2023		104,248	773,014	23,331	(137,729)	55,476	818,340

# 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 2023 (dividend in respect of the year ended 31 December 2022: nil).

### (c) Share capital

	2023		202	22
	Number of		Number of	
	shares'000	USD'000	shares'000	USD'000
Ordinary shares, authorised				
At 1 January and 31 December	1,500,000	150,000	1,500,000	150,000
	20	23	202	22
	Number of		Number of	
	shares'000	USD'000	shares'000	USD'000
Ordinary shares, issued and fully paid				
At 1 January	1,042,477	104,248	1,031,577	103,158
Impact of share option exercise			10,900	1,090
At 31 December	1,042,477	104,248	1,042,477	104,248

No share option was exercised during the year ended 31 December 2023 (2022: 10,900,000).

#### (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.

(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).

# 29 Capital, reserves and dividends (continued)

#### (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(g).

#### (e) Perpetual notes

The Company issued perpetual notes which were listed on the SGX-ST on 4 May 2017, with a principal amount of USD195,000,000 ("**Perpetual Notes**") 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 USD2,120,000 and USD6,380,000, respectively, with a carrying amount of USD8,610,000 and USD2,483,000. As at 31 December 2023, the outstanding principal 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.

Pursuant to the Perpetual Notes' indenture, it began to accrue distribution from 1 April 2023.

#### (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 2023 was 10.7% (2022: 20.5%)

#### (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.

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. At the end of the reporting period, the Group believes loss allowance for trade receivables is required in the consolidated financial statements is immaterial. The Group does not hold any collateral as security for these receivables. The Group has a certain concentration credit risk as three debtors accounted for 100% (2022: two debtors accounted for 100%) of the total trade receivables as at 31 December 2023.

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) 2023					
	Mongolian Togrog USD'000	<i>Euros</i> USD'000	<i>Renminbi</i> USD'000	Hong Kong Dollar USD'000	United States Dollars USD'000	
Trade and other receivables Cash and cash equivalents Trade and other payables	36 22,700 (60,619)	- 1 (34)	33,726 50,571 (10,358)	20 (228)	4	
Net exposure arising from recognised assets and liabilities	(37,883)	(33)	73,939	(208)	4	

	Exposure to foreign currencies (expressed in United States Dollars) 2022				
	Mongolian Togrog USD'000	<i>Euros</i> USD'000	<i>Renminbi</i> USD'000	Hong Kong Dollar USD'000	United States Dollars USD'000
Trade and other receivables Cash and cash equivalents Trade and other payables	55 3,005 (58,249)	1 (14)	4,467 18,600 (10,562)	4 (179)	3 (272)
Net exposure arising from recognised assets and liabilities	(55,189)	(13)	12,505	(175)	(269)

#### (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 (2022: (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	<i>2023</i> USD'000	2022 USD'000
5% increase in MNT	(2,138)	(2,070)
5% decrease in MNT	2,138	2,070
5% increase in RMB	2,631	470
5% decrease in RMB	(2,631)	(470)
5% increase in EUR	(3)	(1)
5% decrease in EUR	3	1
5% increase in USD	-	(12)
5% decrease in USD	-	12
5% increase in HKD	(8)	(9)
5% decrease in HKD	8	9

#### (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.

	2023 USD'000	2022 USD'000
Senior Notes due 2026 Senior Notes due 2024	213,993	373,756
	213,993	373,756
<b>Net floating rate borrowings:</b> Less: Bank deposits	(175,797)	(64,693)
	(175,797)	(64,693)
Total net borrowings:	38,196	309,063

As at 31 December 2023, the interest rate risk of the Group was immaterial.

#### (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 2023 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:

			2023		
		Contractual une	discounted cash o	utflow	
	<i>Within 1 year</i> 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 December USD'000
Senior Notes due 2026 (Note 24) Trade and other payables (Note 25)	27,500 126,736 154,236	27,500	247,500  	302,500 126,736 429,236	213,993 126,736 

			2022		
		Contractual un	discounted cash c	outflow	
	<i>Within</i> 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 December USD'000
Senior Notes due 2024 (Note 24) Trade and other payables (Note 25) Lease liabilities	27,467 136,369 56	393,818 - -	- - -	421,285 136,369 56	373,756 136,369 56
	163,892	393,818		557,710	510,181

#### (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. 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.

The fair value of redemption options embedded in Senior Notes due 2026 and Senior Notes due 2024 were measured at Level 3 and were nil as at 31 December 2023 and 2022.

During the year ended 31 December 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.

Information about Level 3 fair value measurements

	Valuation techniques	Significant unobservable inputs	Weighted average
Redemption option embedded in			6.20%
Senior Notes due 2026	Binomial model	Expected volatility	(2022: Not applicable)
Redemption option embedded in			Not applicable
Senior Notes due 2024	Binomial model	Expected volatility	(2022: 12.8%)

The fair value of redemption option embedded in Senior Notes due 2026 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 2023, 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.

The redemption option embedded in Senior Notes due 2026 was nil as at the years ended 31 December 2023.

The net gains or losses resulting from the remeasurement of the redemption option embedded in the Senior Notes due 2026 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 2023 and 31 December 2022 except for the following financial instruments, for which their carrying amounts and fair value are disclosed below:

	At 31 Decen	At 31 December 2023		ember 2022
	<i>Carrying amount</i> USD'000	<i>Fair value</i> USD'000	Carrying amount USD'000	<i>Fair value</i> USD'000
Liability component of Senior Notes due 2026	213,993	252,408	-	-
due 2024	-	-	373,756	352,414

#### 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:

	2023 USD'000	2022 USD'000
Contracted for	21,142	-

#### (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'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 (" <b>MCS</b> ")	Shareholder of MMC
MCS International LLC	Subsidiary of MCS
MCS Holding 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
M Agro LLC	Subsidiary of MCS

Particulars of significant transactions between the Group and the above related parties during the year ended 31 December 2023 are as follows:

	2023 USD'000	2022 USD'000
Ancillary services (Note (i))	19,734	14,379
Lease of property, plant and equipment (Note (ii))	293	215
Purchase of property and goods (Note (iii))	607	283
Sales of property (Note (iv))	-	(6)
Sales of goods (Note (v))	-	(6,107)
Other	(131)	-

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.

# 32 Material related party transactions (continued)

- (iv) Sales of property represents sale of motor vehicle to International Medical Center LLC in 2022.
- (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

	2023 USD'000	2022 USD'000
Other receivables (Note 22(c))	22	3
Other accruals and payables (Note 25)	(5,249)	(3,986)

# (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:

	2023 USD'000	2022 USD'000
Salaries and other emoluments	3,466	3,040
Discretionary bonus	504	442
Retirement scheme contributions	309	269
Equity-settled share-based payment expenses	1,377	-
	5,656	3,751

# (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	2023 USD'000	2022 USD'000
Non-current assets			
Interests in subsidiaries	18	743,815	820,999
Total non-current assets		743,815	820,999
Current assets			
Trade and other receivables Cash and cash equivalents		40,159 75,591	83 1,278
Total current assets		115,750	1,361
Current liabilities			
Trade and other payables		2,317	314
Total current liabilities	-	2,317	314
Net current assets		113,433	1,047
Total assets less current liabilities	i.	857,248	822,046
Non-current liabilities			
Senior Notes		38,908	218
Total non-current liabilities	1	38,908	218
NET ASSETS		818,340	821,828
CAPITAL AND RESERVES	29(a)		
Share capital Reserves		104,248 714,092	104,248 717,580
TOTAL EQUITY		818,340	821,828

Approved and authorised for issue by the board of directors on 25 March 2024

Odjargal Jambaljamts Chairman

Battsengel Gotov Chief Executive Officer

# 34 Non-adjusting events after the reporting period

(i) Acquisition of a subsidiary

The Company entered into an investment agreement with EM and Erdene Resource 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 ("**Investment Agreement**"). Pursuant to the Investment Agreement, the Company has paid USD40.0 million to EM in 2023. The completion of the Investment Agreement took place on 25 January 2024, and accordingly EM has become a subsidiary of the Company.

(ii) Disposal of 20% interest in a wholly-owned subsidiary

Pursuant to the Company's announcement dated 21 February 2024, the Company and BNS entered into an agreement with Jiayou International Logistics Co., Ltd. (the **"Purchaser**") to sell 20% equity interest in KEX for a total consideration of USD88,810,000, subject to fulfilment of certain conditions precedent (the **"Share Disposal**"). Upon completion of the Share Disposal, KEX will continue to be a subsidiary of the Company. As the effect of the Share Disposal is not expected to cause a loss of the Company's control over KEX, the disposal is expected to be accounted for as an equity transaction, without resulting in any gain or loss being recognized in the consolidated statement of profit or loss.

(iii) Payment of distribution and partial redemption of the Perpetual Notes

Pursuant to the Company's announcement dated 15 September 2023, the Company elected to defer the Perpetual Notes' distribution of USD7,126,396 in whole, which was otherwise scheduled to be paid on 1 October 2023 ("**Deferred Distribution**"). On 29 February 2024, the Company gave a notice to its holders of the Perpetual Notes in respect of its election to pay the Deferred Distribution, together with the accrued distribution thereon, and the distribution accrued from 1 October 2023 to 1 April 2024 in whole. In the same notice, the Company informed its holders of the Perpetual Notes of its intention to redeem a principal amount of USD20,000,000 from the Perpetual Notes.

# 35 Possible impact of amendments, new standards and interpretations issued but not yet effective for the year ended 31 December 2023

Up to the date of issue of these financial statements, the IASB has issued a number of new or amended standards, which are not yet effective for the year ended 31 December 2023 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 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: Non- current liabilities with covenants	1 January 2024
Amendments to IFRS 16, <i>Leases: Lease liability in a sale and leaseback</i>	1 January 2024
Amendments to IAS 7, Statement of cash flows and IFRS 7, Financial Instruments: Disclosures: Supplier finance arrangements	1 January 2024
Amendments to IAS 21, The effects of changes in foreign exchange rates: Lack of exchangeability	1 January 2025

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-005/25 07<sup>th</sup> February 2025

Dr. Battsengel Gotov Executive Director and Chief Executive Officer Mongolian Mining Corporation 16<sup>th</sup> Floor, Central Tower, Great Chinggis Khaan's Square, SBD-8, Ulaanbaatar-210620a, MONGOLIA

Dear Sir

# <u>SUBJECT:</u> Baruun Naran and Tsaikhar Khudag Coal Deposit (BN/THG) – Statement of Open Cut Coal Reserves as at 1st January 2025

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 and THG coal deposit. The Statement reports the Coal Reserves as at 01 January 2025 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").

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

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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 beneficiation plant, which is commonly known in the industry as "product coal"

Estimate of the JORC (2012) compliant Coal Resource within the Baruun Naran ("BN") deposit has been updated as of 31 December, 2024. Total estimate is now 404 Mt, comprising 322 Mt Measured, 51 Mt Indicated and 31 Mt Inferred component quantities.

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.

As at 1 January 2025, the BN total Open Cut Coal ROM reserves of 272 Mt are shown in Table-1 and the total Marketable reserve of 159 Mt are shown in Table -2. In this study topographic survey information was only updated to account for depletion as result of 31 December 2024 and no other changes has been done from previous reserves report.

The previous Coal Reserves Statement for BN was published as at 01 January 2024 by Glogex Consulting LLC ("GLOGEX"). The Coal Reserves estimated in that Statement were 276 Mt. The comparison between two estimates is outlined below in Table-3.

The Thaikhar Khudag deposit has been optimized for open pit mining, but does not have economically viable reserves.

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# Table-1. Total coal reserve as at 01 January 2025 (ROM)

Coal two	Reserve category (Mt)		
Coal type	Proved	Probable	Total (Proven+Probable)
Coking Coal	239	23	262
Thermal Coal	9	1	10
Total	248	24	272

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

# Table-2. Total Marketable reserve as at 01 January 2025

Coaltura	Reserve category (Mt)		
Coartype	Proved	Probable	Total (Proven+Probable)
Coking Coal	110	10	120
Midlings	27	2	29
Thermal Coal	9	1	10
Total	146	13	159

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 2024 (ROM)	276
Coal Mined and depleted 01 January 2024 to 31 December 2024	(4)
Increase in Coal Reserves identified in the 2024 Reserves estimate that are economically viable for mining at 01 January 2025	-
Coal Reserves as at 01 January 2025 (ROM)	272

Notes:

- Estimate has been rounded to reflect accuracy
- Reserve is above 400m 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 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 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 23 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)

Glogex Consulting (Glogex) LLC

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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: 25<sup>th</sup> February, 2022

Prepared by GLOGEX CONSULTING LLC





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# **Executive Summary**

Mongolian Mining Corporation ("MMC") is a Hong Kong Stock Exchange listed mining company with highquality 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 1<sup>st</sup> 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):
- Semi-soft coking coal < 9.5% ash (dry):
- Middlings coal ~ benchmark CV 6,000 kcal/kg (gar):
- Thermal coal ~ benchmark CV 5,000 kcal/kg (gar):

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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US\$128.8/t product (ar), US\$95.9/t product (ar), US\$48.8/t product (ar), US\$30.7/t product (ar).



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.

	Reserve category (Mt)							
Coal type	Proved	Probable	Total (Proved + Probable)					
Coking Coal	246	23	269					
Thermal Coal	10	1	11					
Total	256	24	280					

## Total coal reserve as at 01 January 2022 (ROM)

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

	Reserve category (Mt)							
Coal type	Proved	Probable	Total (Proved + Probable)					
Coking Coal	114	10	124					
Middlings	28	2	30					
Thermal Coal	10	1	11					
Total	152	13	165					

Notes:

#### GC-02/FEBRAURY 2022



- 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	(3.5)	
2022	· · · ·	
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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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				
Т	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				
К 25.94		1.79	37.53	4,794				
J 26.67		1.87 28.80		5,628				
	18.10	2.45	26.24	5,832				
Н	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				

## Total Open Cut Coal Reserves by Seam

(Note: Estimate has been rounded to reflect accuracy)

# Marketable Coking Coal Reserves by Seam

Coking	Proved		Pro	obable	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	
Т	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	
Ν	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	
	10.22	10.70	0.69	10.70	10.90	10.70	
Н	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%)

#### GC-02/FEBRAURY 2022



Coking	Pro	ved	Р	robable	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	
Т	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	0.04 18.00 0.00 18.00		0.05	18.00		
Ν	0.68 18.00 0.06 18.00 0.1		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	
Н	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	

## Marketable Middlings Coal Reserves by Seam

(Note: Estimate has been rounded to reflect accuracy, Product Middlings coal total moisture is 9%)

Thermal	Pro	oved	Pro	obable		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
Т	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
	0.34	6,219	0.00	5,638	0.34	6,214
Н	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
Ē	0.40	5,194	-		0.40	5,194
Total	9.63	5,820	0.98	5,612	10.61	5,801

# Marketable Thermal Coal Reserves by Seam

(Note: Estimate has been rounded to reflect accuracy, Thermal coal total moisture is 2.62%)

GC-02/FEBRAURY 2022



# Table of Contents

Execu	utive Su	mmary	5
1.	Intro	duction	14
	1.1.	Overview	14
	1.2.	Approach	16
	1.3.	Relevant Report and Studies	17
	1.4.	Previous Coal Reserve Statements	18
2.	Com	petent Persons Statement	18
3.	Proj	ect Description	20
	3.1.	General Background	20
	3.2.	Location and Titles	21
4.	Geo	logy, 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.	I ransportation and logistics cost UHG-GM	.35
	5.0.8.	Custom duty	.30
	5./.	Dit Optimization Deputts	30
	5.ð.	Pit Optimization Results	31
	Э. <del>У</del> . Г 10		40
	5.10.	Audits and Keviews	40
	5.11.		41
	5.12.	Coal Reserves Reconciliation with Coal Resources	44
	5.13.	Coal Reserves Comparison to Previous Coal Reserves Statement	45

GC-02/FEBRAURY 2022



## 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	
Figure 4-1. Regional geology	
Figure 5-1. Final Pit	Error! Bookmark not defined.
Figure 5-2. Optimized Pit Shell	
Figure 5-3. Mineable Pit Design, cross section (Micromine)	
List of Graphics	

# 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

GC-02/FEBRAURY 2022



# 1. Introduction

# 1.1. Overview

Mongolian Mining Corporation ("MMC") is a Hong Kong Stock Exchange listed mining company with highquality 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.

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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 1<sup>st</sup> 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 GC-02/FEBRAURY 2022

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;

GC-02/FEBRAURY 2022



- 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 1<sup>st</sup> 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

GC-02/FEBRAURY 2022

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.

#### GC-02/FEBRAURY 2022

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- 1. "BN Revised Design table for LOM study", AMC Consultants Pty Ltd (February 2013)
- "Baruun Naran Coal Project Mine Pre-Feasibility Study", RPM (formerly Minarco-MineConsult) (May 2008)
- "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)
- "Initial geotechnical assessment of Baruun Naran Coal Project", by Seedsman Geotechnics Pty Ltd (November 2007)
- "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 1<sup>st</sup> 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).

GC-02/FEBRAURY 2022

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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.

GC-02/FEBRAURY 2022



# 3. Project Description

# 3.1. General Background

Mongolian Mining Corporation ("MMC") is a Hong Kong Stock Exchange listed mining company with highquality 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.

#### GC-02/FEBRAURY 2022



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

GC-02/FEBRAURY 2022

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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.

#### GC-02/FEBRAURY 2022



# 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:

GC-02/FEBRAURY 2022

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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.

#### GC-02/FEBRAURY 2022

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.

GC-02/FEBRAURY 2022

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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 31<sup>st</sup> 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;

GC-02/FEBRAURY 2022



- 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.

Volume (x1,000,000 м <sup>3</sup> )	Tonnes (x1,000,00 0)	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	

Table 4-1. BN Coal Resource by Depth (ar)

GC-02/FEBRAURY 2022



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 <sup>3</sup> )	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 1<sup>st</sup> 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

## 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 1<sup>st</sup> of January 2022 based on the BN Coal Resource Estimation as of December 2021.



# Figure 5-1. Pit optimization result

GC-02/FEBRAURY 2022



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.

GC-02/FEBRAURY 2022



 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%.

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 1	Summary	of DN	Mining	Modif	vina	Eastara
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# 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.

#### GC-02/FEBRAURY 2022

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.

	Coking Product					
Seam	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			

Table 5-3. Coking Coal "ROM Ash – Y	Yield" Curve (Wash Plant -	1.4 Cut-Point Density)
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GC-02/FEBRAURY 2022



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					
0ean	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

GC-02/FEBRAURY 2022

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.

ltem	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

# Table 5-5. Pit Optimization Input Costs

#### 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

Total	2.21
Drill and blast cost	0.39
Mining cost	1.82
Item	Mining cost, USD/BCM (2020 actual)

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.

GC-02/FEBRAURY 2022



## 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.

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

Table 5-7	7. Transp	ortation a	nd logist	tics cost	per ton	product

Source: MMC annual report 2018-2020, MMC interim report 2021

#### GC-02/FEBRAURY 2022



## 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 Gangimaodou port, China)

USD/t	2020*	2021*	2022**	2023**	2024**	2025**	Averag e	Royalty exclusiv e	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	40.5	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	Α	М	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

#### GC-02/FEBRAURY 2022



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:

٠	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:

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

## Table 5-9. Royalty

## 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

GC-02/FEBRAURY 2022



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).

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

Table 5-10. Pit Optimization Results – Coal Price Sensitivity

**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

GC-02/FEBRAURY 2022



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



GC-02/FEBRAURY 2022



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

GC-02/FEBRAURY 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.

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.

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			
Т	22.7	20.72	6,309			
R	10.8	39.63	4,545			
Q	8.2	39.58	4,590			
Ν	40.3	34.25	4,980			
К	23.0	37.02	4,840			
J	22.3	28.78	5,637			
	16.9	26.05	5,850			
Н	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			

Table 5-11. Proved Open Cut Coal Reserves by Seam

(Note: Estimate has been rounded to reflect accuracy)

#### GC-02/FEBRAURY 2022
	Probable re	eserves	
Seam	ROM Coal (Mt)	Ash (%)	Calorific Value (kcal/kg)
V	0.3	50.51	3,395
U	2.1	38.25	4,615
Т	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
Н	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

### Table 5-12. Probable Open Cut Coal Reserves by Seam

(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	
Т	23.8	21.17	6,267	
R	11.6	39.86	4,526	
Q	8.9	39.54	4,591	
Ν	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	
Н	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)

### GC-02/FEBRAURY 2022



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

Coking	P	roved	Pro	obable		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
Т	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
Ν	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
	10.22	10.70	0.69	10.70	10.90	10.70
Н	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

### Table 5-14. Marketable Coking Coal Reserves by Seam

(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.

Coking	Pro	oved	P	robable	T	otal
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
Т	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
Ν	0.68	18.00	0.06	18.00	0.73	18.00
К	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
	2.02	18.20	0.14	18.20	2.16	18.20
Н	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

Table 5-15. Marketable Middlings Coal Reserves by Seam

(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.

### GC-02/FEBRAURY 2022

Thermal	Pro	ved	Pro	bable	-	Fotal
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
Т	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
Ν	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
	0.34	6,219	0.00	5,638	0.34	6,214
Н	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

### Table 5-16. Marketable Thermal Coal Reserves by Seam

(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 Resource	es and Coal Reserves	s (Mt)
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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

GC-02/FEBRAURY 2022



### 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.

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	407 5
economically viable for mining at 01 January 2022	107.5
Coal Reserves as at 01 January 2022 (ROM)	280

### Table 5-18. Comparison of Coal Reserves to Previous Coal Reserves Statement (Mt)

• Estimate has been rounded to reflect accuracy

GC-02/FEBRAURY 2022



## 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

GC-02/FEBRAURY 2022



# Section 1- Sampling Techniques and Data (Source: JORC (2012) Standard Resource Estimation of Baruun Naran Mining License -14493A and Teaikhar Khudan Mining License MV-017336

Criteria	Commentary
	Nature and quality of sampling.
	<ul> <li>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.</li> </ul>
	· 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 identitied from the geophysics. Core borenoles 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
Sampling	regular periods whilst onsite.
techniques	· A central logging facility was designed at BN coal mine where all borehole cores were stored, logged, photographed and sampled. A standard set of
	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).



	<ul> <li>Based on the brightness of coal macerals, similar brightness sections within a ply were sampled together.</li> <li>These samples would indicate changes in quality i.e. higher ash/higher density. Rock partings ≤50cm within or between plies were sampled separately.</li> <li>The core coal interval observations were confirmed with down-hole geophysics.</li> </ul>
Drilling techniques	<ul> <li>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.).</li> <li>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.</li> <li>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).</li> <li>Core bits were diamond impregnated and surface set to maximise recovery and minimise shattering of core.</li> <li>Generally boreholes were drilled at an angle to optimally intercept the highly dipping coal seams and all had down-hole verticality Logs run.</li> </ul>
Drill sample recovery	<ul> <li>Method of recording and assessing core and chip sample recoveries and results assessed.</li> <li>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.</li> <li>Downhole geophysics was used to further assess the amount and location of linear core loss.</li> <li>Core photography in boxes also assisted later evaluation of loss.</li> <li>Core photography in boxes also assisted later evaluation of loss.</li> <li>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.</li> <li>Samples were measured for weight but this mainly served as a cross check with the laboratory.</li> <li>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.</li> <li>Measures taken to maximise sample recovery and ensure representative nature of the samples.</li> <li>High quality drilling pipe, coring and driller bits used.</li> <li>Chip samples collected on a 1m basis and displayed clearly for rig geologist observation.</li> <li>Chip samples collected on a 1m basis and displayed clearly for rig geologist observation.</li> <li>Chip samples collected on a 1m basis and geore, minimising sample bias may have occurred due to preferential loss/gain of fine-coares material.</li> <li>High linear core recovery and sastied with documentation of actual loss cleph heorided with interline geologist observation.</li> </ul>
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. <ul> <li>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.</li> </ul>



	<ul> <li>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.</li> <li>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.</li> <li>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.</li> </ul>
	r ne totar rengtri and percentage or the relevant intersections rogged. · All coal plies were fully cored and logged to CoalLog standard. All logged coal cores were fully sampled including rock parting ≤ 50cm.
	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. <ul> <li>Not applicable for coal.</li> </ul>
Sub-sampling techniques and sample preparation	<ul> <li>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 wapped 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. 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 was kept to a constant temperature. 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 core were paced on the brightness of coal macerals, similar brightness sections within a ply were sampled together. Rock partings 22cm and 550cm 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 with finally the sample information written on the outside plastic bags with sample bag was weighed with weight corrected for the sample bag mass.</li> <li>Geotechnical rock samples were collected on each change of major lithotype. The samples were written on the sample with sample number wes digitally recorded in the logging software 'LogCheck'.</li> </ul>
	<ul> <li>Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.</li> <li>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.</li> <li>The ERML was accredited to ISO/IEC 17025:2017 (MNS ISO/IEC 17025:2018) standard in November 2020 and expires in July 2023.</li> </ul>
	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. <ul> <li>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.</li> </ul>



	· 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.
	The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.
	<ul> <li>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).</li> </ul>
	<ul> <li>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).</li> </ul>
	· 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
	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.
Quality of assay	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.
data and Iahoratory tests	• 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
	ure bivario i no sues ana ar regurar perious writist orisite. Gradiant array racietivity europy was undartaban by Goomastar I I C /"Goomastar") in Tuly 2005 with more than 43bm? along Baruun Naran yallay
	Monmap LLC ("Monmap"), survey was unvertaken by devinaster LLC ( devinaster ) in July 2003 with more than 13km <sup>2</sup> along baruon yaray. 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 <sup>2</sup> . The results were high level and provided some quidance 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.
	<ul> <li>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 incolories are mandatory with accreditation with dunlicate fasting and round robin testing done.</li> </ul>
	· Laboratory certificates were supplied by ERML. No certificates were supplied by QGX Coal Ltd ("QGX") for testing completed at the SGS or ACIRL
	laboratories.
	Mongolia ("ALS") laboratory (100 samples) and the Mining Institute ("UUH") laboratory (615 samples). As the same lab and processes were used for BN and TUC of 641 ILC 445 following composition is relied to an analysis of the same lab and processes were used for BN and TUC of 641 ILC 445 following composition is relied to an analysis of the same lab and processes were used for BN and TUC of 641 ILC 445 following composition is relied to an analysis of the same lab and processes were used for BN and TUC of 641 ILC 445 following composition is relied to an analysis of the same lab and processes were used for BN and TUC of 641 ILC 445 following composition is relied to an analysis of the same lab and processes were used for BN and TUC of 641 ILC 445 following composition is relied to an analysis of the same lab and processes were used for BN and TUC of 641 ILC 445 following composition is relied to an analysis of the same lab and processes were used for BN and TUC and 641 ILC 445 following composition is relied to analysis of the same lab and processes were used for BN and TUC and 641 ILC 445 following composition is relied to analysis of the same lab and processes were used for BN and TUC and 641 ILC 445 following composition is relied to analysis of the same lab and processes were used for BN and the same lab and processes were used for BN and the same lab and processes were used for BN and the same lab and processes were used for BN and the same lab and processes were used for BN and the same lab and processes were used for BN and the same lab and processes were used for BN and the same lab and processes were used for BN and the same lab and processes were used for BN and the same lab and processes were used for BN and the same lab and processes were used for BN and the same lab and processes were used for BN and the same lab and processes were used for BN and the same lab and t
	and increasion one uneromowing comparison is value. The EXML analytical results were compared to the other laboratories by means or cross prots 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.



<ul> <li>Teng vraiting of micromany stated.</li> <li>Teng vraiting vraiting sorthysts, core photographs, and paper logs.</li> <li>The MGCK boreholes 2005-009 MGE for y pan depondent and part of where it or predict method in the procedures and collection of the data method tably downhole geophysics. seame, core photographs, and paper logs.</li> <li>Te multi downhole geophysics, seame, core photographs, speer and digital logs.</li> <li>A number of pre GCK breacholes. 2005-009 MGE for y photocols.</li> <li>A number of pre GCK breacholes. 2005-009 MGE for photocols.</li> <li>A number of pre GCK breacholes are whith a photocol.</li> <li>A number of pre GCK breacholes. Seame, core photographs, speer and digital logs.</li> <li>MC did not twin any CCK breacholes were whithe divid man defection. <i>J data storage (physical and electronic) protocols.</i></li> <li>MC did not twin any CCK breacholes were whithed phy Nomestical and anti-apped data measignment software diffigue roots were provery. geological coverid and unpacted on hard copy farmer y data storage (physical and electronic) protocols.</li> <li>MC did not twin any CCK breacholes were whith a fibra data verification, data storage (physical and electronic) protocols.</li> <li>MC did not twin any CCK breacholes are action in the log compary storage in the company storage and electronic protocols.</li> <li>MC did not with LSG fibra data management software. The data ware storage and upped data measgement software to company storage and electronic protocols.</li> <li>MC did nat ware an encertain the Log code data management software. The data ware storage active storage actinte storage active storage active storage active storage active</li></ul>
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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.
	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.
	<ul> <li>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</li> </ul>
	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.
Location of data	Specification of the grid system used.
Sillod	· The grid system coordinates are UTM Zone 48 North. The same system was used for all survey data.
	Quality and adequacy of topographic control.
	<ul> <li>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.</li> </ul>
	<ul> <li>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.</li> </ul>
	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 anart with breacholes 50m to 150m senaration. In the southern half of the license, breacholes 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.
Data spacing and	Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral
distribution	Resource and Ore Reserve estimation procedure(s) and classifications applied.
	<ul> <li>The data spacing is sufficient to establish a high degree of geological and grade continuity appropriate for the Mineral Resource and classifications applied.</li> </ul>
	· 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.
	<ul> <li>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.</li> </ul>



	Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the
Orientation of data in relation to geological	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.
structure	<ul> <li>No evidence of bias due to borehole orientation has been observed.</li> <li>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.</li> </ul>
	· No evidence of bias due to borehole orientation has been observed.
	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):
Sample security	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 different lithological contents were subjected to sample. Washing of one with clean water was used only for work in the field conditions to avoid distorting of samples because of fors of any lithological component, they were selected together in one sample. Then these intersections were whole explined is many filtholype. Usually in average it equals to 1.0-1.5 m, but sometimes was more when really homogeneous components were sampled separately. If dill core contains some intersections of original lithological component, they were selected together in one sample. Then these intersections were weffied through togging. Sometimes, if separation of roce documents were selected together in one sample. Then these intersections were weffied through togging. Sometimes, if separation of roce documents were selected together in one sample and to such samples were related to appropriate componient, they were selected together in one sample. Then these intersections were weffied threat and accepted through logging. Core recovery for coal was determined with utilization of volumetric and linear methods into sample divisions, which were regronable for core documents were also examined there and completed through logging and accordant 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 table to appropriate completed through loggether in one sample. Then these intersections into asomption into the synthetic bags was made. Selected samples were sent monthly to laboratory. <sup>1</sup> The bare cores during the term of the synthetic bags was made. Selected samples were sent monthly to laboratory. <sup>2</sup> The bare cores for the BN coal deposited units 2005 were collected by Noves cores and there and concertant and uncertanted wi



	<ul> <li>From 2011 until present the MMC's Exploration &amp; 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 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 is location within the BN mine site. The mine site has 24 hour high level securely in plastic for shift. The BN central logging facility is location within the BN mine site. The mine site has 24 hour high level securely in plastic for until sent to the laboratory. The aboratory is located at the UHG mine approximately 30km from the BN central logging facility. The cone boxes were delivered (average distance 2km) to BN central logging facility. The cone was laid out on specifically designed and built logging tables. The atmospheric environment inside the BN central logging facility. The cone 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 with finally the sample 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 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 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 were secure relared to the Baoratory and couple plastic bag. The sample weighed into t</li></ul>
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) at AZ 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 entlusiastic geologys with heave 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. Said (Compten Procedures. • In addition, Mr. Ballantine still holds responsibility for budgeting, planning, training and overall oversight of exploration procedures. • In addition, Mr. Ballantine still holds responsible frequent is a stall relevant. • In addition, Mr. Ballantine still holds responsibility for budgeting, planning, training and overall oversight of exploration procedures. • In addition, Mr. Ballantine still holds in the UHG under compleace or an event the second stoce report as at June 2012 has partored stocession of capable individual still hore



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 · In 2018, Technical information in this BN and THG Coal Resource estimation has been internally peer reviewed by Mr. Lkhagva-Ochir Said Executive 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.

# APPENDIX B: REPORTING EXPLORATION RESULTS

"CHECKLIST OF ASSESSMENT AND REPORTING CRITERIA" (TABLE 1 – JORC CODE),

	Tsaikhar Khudag Mining License MV-017336
Criteria	Commentary
	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.
Mineral tenement	<ul> <li>The BN coal deposit now consists of two mining licenses:</li> <li>Baruun Naran Mining License 14493A covering 4486 hectares ("ha"), converted from an Exploration License on 01 December 2008; and</li> </ul>
and land tenure status	<ul> <li>Tsaikhar Khudag Mining License MV-017336 covering 8340 ha, partially converted from Exploration License 4326X on 24 August 2013.</li> <li>These licenses were granted under the Law on Minerals (1997), are valid for 30 vears and can be extended twice more for 20 vears each.</li> </ul>
	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.
	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.
	<ul> <li>During the Mongolian-Russian exploration work at the BN coal deposit in 1983, three shallow vertical boreholes (approximately 70m each) were drilled.</li> <li>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<sup>2</sup> (Khosbavar et al., 1983).</li> </ul>
Exploration done by other parties	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
	<ul> <li>1-30m were identified with 4 of these seams reported metallurgical quality (Gankhuyag, 1990).</li> <li>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.</li> </ul>
	· Exploration was sufficient for JORC (2004) Resource and Reserve estimations to be made by MBGS and SRK respectively in 2010.
Geology	<ul> <li>Deposit type, geological setting and style of mineralisation.</li> <li>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.</li> </ul>

Section 2- Reporting Exploration Results (Source: JORC (2012) Standard Resource Estimation of Baruun Naran Mining License -14493A and

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	<ul> <li>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 Tartiary, 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.</li> </ul>
	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
Drill hole	o hole length.
Information	· No exploration results are reported.
	<ul> <li>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.</li> </ul>
	· 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.
	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.
Data aggregation methods	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 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	These relationships are particularly important in the reporting of Exploration Results.
between	· No exploration results are reported.
mineralisation	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.



widths and	· No exploration results are reported.
unercept lengths	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').
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	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.
6 mode	· No exploration results are reported.
	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.
Other	· No exploration results are reported.
substantive exploration data	<ul> <li>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.</li> </ul>
	<ul> <li>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</li> </ul>
	The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).
E. of the contract of the	· 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. <ul> <li>No exploration results are reported.</li> </ul>

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.
	<ul> <li>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.</li> </ul>
	<ul> <li>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</li> </ul>
	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



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.
	<ul> <li>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.</li> </ul>
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.
	<ul> <li>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.</li> </ul>
	<ul> <li>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:</li> </ul>
	'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.
	<ul> <li>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.</li> </ul>

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Criteria	<ul> <li>In addition Mr Ballantine still holds resonnsibility for budgeting planning training and oversight of exploration at LIHG and BN</li> </ul>
	• In addition, WIT. Ballahume still holds responsibility for budgeting, planning, training and overall oversignt of exploration at UPIG 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.
	<ul> <li>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.</li> <li>All GPS coordinates of boreholes and boundary pegs checked were within the tolerance of the GPS device.</li> </ul>
	<ul> <li>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).</li> </ul>
	<ul> <li>If no site visits have been undertaken indicate why this is the case.</li> <li>Not applicable, see above section.</li> </ul>
Geological interpretation	<ul> <li>Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.</li> <li>Detailed mapping from the various campaigns from the 1940's.</li> </ul>
	<ul> <li>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.</li> </ul>
	<ul> <li>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,</li> </ul>



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.
	<ul> <li>The Limit of Oxidation ("LOX") was determined by close spaced drilling and confirmed by mapping and sampling from mine geology team.</li> </ul>
	<ul> <li>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.</li> </ul>
	• 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.
	<ul> <li>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.</li> </ul>
	Nature of the data used and of any assumptions made.
	<ul> <li>The essence of the data used is borehole observations with support from detailed mapping, resistivity and 2D High Resolution Seismic Survey.</li> </ul>
	<ul> <li>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 OGX drilling data which demonstrated a distinct variance from the expected 1 Ising the transformation</li> </ul>
	'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.
	<ul> <li>There are no alternative interpretations known to the Competent Person at this time.</li> </ul>
	The use of geology in guiding and controlling Mineral Resource estimation.



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 provision of the second
	indicates it progressively overtuins toward the west, before the coal searins are no longer present. The southern mino 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.
	<ul> <li>The coal resource area for BN is oriented generally around a synclinal fold plunging to the southwest approximately 15 degrees and is</li> </ul>
	some 7.5km long and 1 km wide.
	<ul> <li>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</li> </ul>
	<ul> <li>BN Mining License (14493A) has a total area of 4486 ha.</li> </ul>
	• THG Mining License (MV-017336) has a total area of 8340 ha.
	<ul> <li>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.</li> </ul>
	<ul> <li>No Resource has been estimates outside of the Lease boundaries.</li> </ul>
Estimation and	The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining internolation parameters and maximum distance of extranolation from data points. If a computer assisted estimation method was
moaening techniques	chosen include a description of computer software and parameters used.
	<ul> <li>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.</li> </ul>



Criteria	Commentary
	<ul> <li>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.</li> </ul>
	<ul> <li>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</li> </ul>
	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 longed bly. Stone parting intervals were longed in the raw database, but where they were missing they were added to all bly groups.
	for each borehole even in cases where the parting thickness was zero.
	<ul> <li>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</li> </ul>
	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").
-	<ul> <li>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.</li> </ul>
•	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
•	<ul> <li>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:</li> </ul>
	<ul> <li>No maximum seam thickness.</li> <li>Minimum seam thickness to be included in the Resource of 0.5m to 400m.</li> </ul>
	<ul> <li>Maximum parting thickness to be included in the Resource of 0.5m.</li> <li>Coal Quality limit with Ash content greater than 50% (DRY basis) being excluded from the Resource estimate.</li> </ul>
•	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.
	<ul> <li>Partings within the model limits but without coal quality were given default coal quality parameters based on rock quality analyses.</li> </ul>

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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.
	<ul> <li>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.</li> </ul>
	<ul> <li>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.</li> </ul>
	• 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 produced and proceeded to access the organization of the mine tectored is less there is a notable variance.
	The assumptions made regarding recovery of by-products.
	<ul> <li>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.</li> </ul>
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).
	<ul> <li>No work to the knowledge of the CP has been completed for BN or THG licenses.</li> <li>In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.</li> </ul>
	<ul> <li>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 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</li> </ul>



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.
	<ul> <li>All seams were modelled, therefore there were no 'specific' horizons that were separately modelled.</li> </ul>
	Any assumptions about correlation between variables.
	<ul> <li>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.</li> </ul>
	Description of how the geological interpretation was used to control the resource estimates.
	<ul> <li>Geological interpretation using the seismic results was critical in identifying major structure and confirming seam correlation and continuity.</li> </ul>
	<ul> <li>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.</li> </ul>
	• 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.
	<ul> <li>A greater than 50% ash (DRY basis) cut-off was used to determine what coal was and what rock was.</li> </ul>
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.
	<ul> <li>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 book model.</li> </ul>



Criteria	Commentary
	<ul> <li>The model was reconciled against the mined area and is closely aligned.</li> </ul>
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.
	<ul> <li>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.</li> <li>The estimated Resource is reported on 'as received' basis and 'air dried' basis</li> </ul>
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.
	<ul> <li>No maximum seam thickness.</li> <li>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.</li> </ul>
	<ul> <li>Maximum parting thickness to be included in the Resource of 0.5m.</li> <li>Coal Quality limit with Ash content greater than 50% (DRY basis) being excluded from the Resource estimate.</li> </ul>
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.
	<ul> <li>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.</li> </ul>
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.



Criteria	Commentary
	<ul> <li>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.</li> <li>The Resource estimate for this report has had no assumptions made on the estimate for beneficiation.</li> </ul>
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.
	<ul> <li>All environmental issues are managed by the Company's environmental department which has operated since the start of mining.</li> <li>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.</li> <li>During all site visits there have been no obvious environmental issues of leachates emanating from spoil piles or from coal stockpiles.</li> </ul>
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.
	<ul> <li>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.</li> <li>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.</li> </ul>
	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.
	<ul> <li>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.</li> </ul>



Criteria	Commentary
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.
	<ul> <li>Partings within the model limits but without coal quality were given default coal quality parameters based on rock quality analyses.</li> </ul>
Classification	The basis for the classification of the Mineral Resources into varying confidence categories.
	<ul> <li>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).</li> </ul>
	• The basis of the classification confidence categories is from the results of an investigation of expected error for the 95 <sup>th</sup> 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).
	<ul> <li>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.</li> </ul>
	<ul> <li>The QGX era 2005-2009 was completed by Norwest and MBGS.</li> </ul>
	<ul> <li>Since 2011, the MMC Exploration &amp; 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.</li> </ul>
	<ul> <li>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</li> </ul>
	too.
	Whether the result appropriately reflects the Competent Person's view of the deposit.
	<ul> <li>The Competent Person has confidence in the Resource figures reflecting well the contained coal resource.</li> </ul>

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Criteria Audits or reviews	Commentary           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 interburden 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.
	<ul> <li>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 &amp; 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.</li> </ul>
	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 measuration of the moints of observation and the modelling stands to the final estimate.
	<ul> <li>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</li> </ul>

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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.
	<ul> <li>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.</li> </ul>
	<ul> <li>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.</li> </ul>
	<ul> <li>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.</li> </ul>
	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.
	<ul> <li>The Resource estimates for this report is a global estimate to international standards and meets all JORC (2012) requirements.</li> <li>All assumptions and procedures for the Resource estimate are documented within the report sections or as Appendices.</li> </ul>
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.



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.

### 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

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# Appendix D: Estimation and Reporting of Ore Reserves

Section 4: Estimation and Reporting of Ore Reserves

Criteria Mineral Resource	JORC Code explanation     Description of the Mineral Resource estimate used as a basis for the terms of the Mineral Resource estimate used as a basis for the terms of the Mineral Resource estimate used as a basis for the terms of the terms of the Mineral Resource estimate used as a basis for the terms of the terms of the terms of	<ul> <li>Commentary</li> <li>The Mineral Resource estimate used as the basis of this Coal Reserves Statement is "JORC</li> </ul>	
estimate for conversion to Ore Reserves	<ul> <li>conversion to an Ore Reserve.</li> <li>Clear statement as to whether the Mineral Resources are report additional to, or inclusive of, the Ore Reserves.</li> </ul>	<ul> <li>(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.</li> </ul>	
		<ul> <li>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</li> </ul>	
		<ul> <li>Petroleum Engineering, Mongolian University of Science and Technology", and is a Member of the Australian Institute of Mining and Metallurgy (#318198).</li> <li>The Coal Resources are reported inclusive of those Coal Resources modified to produce the Coal Reserves.</li> </ul>	
Site visits	Comment on any site visits undertaken by the Compete Person and the outcome of those visits.	<ul> <li>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</li> </ul>	
D 77	If no site visits have been undertaken indicate why this is the case.	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 Resourc to be converted to Ore Reserves.	<ul> <li>A LOM study update, equivalent to a Feasibility Study update was completed in January 2018 by GLOGEX.</li> </ul>	
	The Code requires that a study to at least Pre-Feasibility Study lev has been undertaken to convert Mineral Resources to Ore Reserve Such studies will have been carried out and will have determined	<ul> <li>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.</li> </ul>	
	ning plan that is technically achievable and economically viable and that material Modifying Factors have been considered.		
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Criteria	JORC Code explanation	Commentary
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	<ul> <li>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</li> </ul>
Mining factors or assumptions	<ul> <li>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).</li> <li>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.</li> <li>The assumptions made regarding geotechnical parameters (eg pit slopes, stope sizes, etc), grade control and pre-production drilling.</li> <li>The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).</li> <li>The mining dilution factors used.</li> <li>Any minimum mining widths used.</li> <li>The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.</li> <li>The infrastructure requirements of the selected mining methods.</li> </ul>	<ul> <li>Pit Optimization and LOM planning has been used as the basis of converting Coal Resources to Coal Reserves.</li> <li>The selected mining method is that in use in the operating mine, i.e., open cut truck and dumping of waste.</li> <li>Geotechnical parameters for the design of stable slopes have been provided by Australian Mining Consultants ("AMC").</li> <li>The mining factors used were:</li> <li>Minimum parting mining thickness of 0.5 m.</li> <li>Mineable coal section roof flot mm.</li> <li>Mineable coal section roof loss of 100 mm.</li> <li>Mineable coal section roof loss of 100 mm.</li> <li>Mineable coal section roof dilution of 100 mm.</li> <li>Mineable coal sec</li></ul>

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Criteria		JORC Code explanation		Commentary
Metallurgical factors assumptions	o	<ul> <li>The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.</li> <li>Whether the metallurgical process is well-tested technology or novel in nature.</li> <li>The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.</li> <li>Any assumptions or allowances made for deleterious elements. The existence of any bulk sample or pilot scale test work and the orebody as a whole.</li> <li>For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?</li> </ul>	The meta used. It is is well te processe and adju these sea The proco 11.5% (ad of varied Internatio curves fo coal sean Thermal c	allurgical process for washing the coking coal seams is already in place and being s a low cut high cut dense media processing plant at the UHG mine site. The process ested and robust. UHG Coking coal seams 0C, 3A, and 4 have been mined and ed through this plant and the ash-yield curves for these seams have been reconcile isted with the laboratory generated curves from the back analysis of results when ams were washed. Sess generates primary coking coal product from a low cut point that will produce and) ash SHCC and 9.5% (ad) ash SSCC product, and a secondary middlings produc ash per customer request produced from a variable high cut point. The processing consultant Norwest Corporation has generated ash-yield or major coking coal seams. MMC recently modified ash yield curves of extracter ms in the mine based on in pit bulk sampling. coal seams to produce a relatively high ash low energy thermal coal product suitable t or domestic use.
Environmental		<ul> <li>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.</li> </ul>	An Envirc approvals Waste rou procedure Coal proc accordane	onmental Impact Statement has been prepared and all environmental is obtained. Occ characterization results do not require special placement requirements or es in the dumps. cessing plant reject is stored appropriately in the waste dumps or storage cells in the with the environmental approvals.
Infrastructure		<ul> <li>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.</li> </ul>	All neces the UHG the trans nearby b provided i	ssary infrastructure to support the BN mine is in place at either the mine site or a imine industrial area. Power is supplied from an onsite coal fired power station with smission line connected to the Mongolian power grid. Water is supplied from a core field. The workforce is accommodated in a purpose built camp or in housing in the nearby communities.
Costs 60-02/FEBRAURY 202	sv.	<ul> <li>The derivation of, or assumptions made, regarding projected capital costs in the study.</li> <li>The methodology used to estimate operating costs.</li> <li>Allowances made for the content of deleterious elements.</li> <li>The derivation of assumptions made of metal or</li> </ul>	Project ca The minir and impo MMC yes reviewed	capital cost estimates for mining plant and equipment have been provided by MMC. Ing, hauling, processing, handling, administration, transportation, air pollution, logisti ort duty charges costs were adjusted from an actual costs incurred at BN provided b are to date 1st January 2022 based on 2850 MNT/USD exchange rate. GLOGE) I key cost inputs and accepted for pit optimization.

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Criteria	JORC Code explanation		Commentary
	<ul> <li>commodity price(s), for the principal minerals and co-products.</li> <li>The source of exchange rates used in the study.</li> <li>Derivation of transportation charges.</li> <li>The basis for forecasting or source of treatment and refining</li> </ul>		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; nowever. for presentation in Table 5.5 GLOGEX converted to \$/t ROM using the weight
	<ul> <li>charges, penalties for failure to meet specification, etc.</li> <li>The allowances made for royalties payable, both Government and private</li> </ul>		average relative density of coal in the pit shells. Coal processing costs are based on contract price between Energy Resources and Khangad
		•	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.
evenue factors	<ul> <li>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,</li> </ul>	ຫ ໙ິ໙	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.
	<ul> <li>etc.</li> <li>The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.</li> </ul>	•	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. -td ("Shanxi Fenwei") product value at the DAP Ganqimaodou port of China. The coal selling
		a † 0	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
		≥ \0 U	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 3 angimaodou port of China.
		The co	oal selling prices assigned to each product, were: Semihard coking coal < 11.5% ash (dry): Coard of the service
		• • •	<ul> <li>Detrin-son coking coal &lt; 5.5% asn (ory).</li> <li>Middlings coal &lt; benchmark CV 6,000 kcal/kg (gar):</li> <li>US\$48.8/t product (ar),</li> <li>US\$30.7/t product (ar)</li> </ul>



•	consumption trends and factors likely to affect supply and demand into the future.	principal coking and thermal coal markets in Mongolia and China in April 2021.
•	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.	
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.	<ul> <li>No economic analysis</li> </ul>
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.



Criteria	JORC Code explanation	Commentary
Classification	<ul> <li>The basis for the classification of the Ore Reserves into varying confidence categories.</li> </ul>	Measured Resources have been classified a Proved Reserves, Indicated Resources have been classified as Probable Reserves. No Probable
	<ul> <li>Whether the result appropriately reflects the Competent Person's view of the deposit.</li> </ul>	<ul> <li>Reserves have been derived from Measured Resources.</li> <li>No Inferred Resources have been converted to Reserves (although Inferred</li> </ul>
	<ul> <li>The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).</li> </ul>	Resource was assigned revenue in the pit optimiser and reported as mineable ROM coal in the LOM schedule).
		<ul> <li>The result reflects the Competent Persons view of the deposit.</li> </ul>
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	<ul> <li>Internal peer review by GLOGEX CONSULTING LLC of the Reserves estimate has been completed.</li> <li>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 Resources and Ore Reserves, The JORC Code (2012).</li> </ul>

Discussion		•	Where appropriate a statement of the relative accuracy and confidence level in	<ul> <li>Coal production at BN commenced in 2011 and since that time some</li> </ul>
			the Ore Reserve estimate using an approach or procedure deemed appropriate	34 Mbcm of waste and 4.9 Mt of ROM coal has been mined until 1st
of	relative		by the Competent Person. For example, the application of statistical or ,	January 2018.
accuracy/			geostatistical procedures to quantify the relative accuracy of the reserve within	Run-of-Mine ("ROM") coal production of 4.9 Mt was reported by mine survey
confidence			stated confidence limits, or, if such an approach is not deemed appropriate, a	neasurement from 2011 until end of 2021.
			qualitative discussion of the factors which could affect the relative accuracy and	<ul> <li>Since the preparation of Reserves estimate effective as of 1 January</li> </ul>
			confidence of the estimate.	2018 the BN mine has completed reconciliations of actual coal mined against
		•	The statement should specify whether it relates to global or local estimates, and,	the geological model for the period January 2017 to January 2018. Last Coal
			if local, state the relevant tonnages, which should be relevant to technical and	Reserves Statement for BN was prepared as at 1st January 2018 by GLOGEX
			economic evaluation. Documentation should include assumptions made and the	and reported as 176Mt (ROM).
			procedures used.	<ul> <li>As a result of the coal recovery reconciliations that have been undertaken by</li> </ul>
		•	Accuracy and confidence discussions should extend to specific discussions of	MMC and the observations made associated with the mining activities over this
			any applied Modifying Factors that may have a material impact on Ore Reserve	period. The mining modifying factors in this Reserves estimate have been
			viability, or for which there are remaining areas of uncertainty at the current study	adjusted to accommodate size of the equipment being used in the mine (i.e.,
			stage.	excavator) and the reassignment of hard coking coal to semihard coking coal.
		•	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.	



## **MONGOLIAN MINING CORPORATION**

Our ref:

Ulaanbaatar

Memo To:	MMC Executive Committee
From:	Mr. Avirmed Khishigbuyan (Competent Person, Member #3127840)
Date:	5 <sup>th</sup> February 2025
Subject:	Baruun Naran JORC Statement 31 December 2024

Estimate of the JORC (2012) compliant Coal Resource within the Baruun Naran ("BN") deposit has been updated as of 31 December, 2024. Total estimate is now 404 Mt, comprising 322 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, 2024, and 31 December, 2024.

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,

Avirmed Khishigbuyan Chief Geologist (Geology and geotechnical)

# **Appendix 1**

Volume	Tonnes	RD (g/cc)	ASH (%)	TM (%)	VM (%)	CV (kcal/kg)	TS (%)	FC (%)	Classification
(x1,000,000 m3)	(x1,000,000)				. ,		. ,		
BUQA - BHWE		4	<b></b>	<b></b>	<b></b>	<u> </u>	<u>.</u>	<u> </u>	-
3.4	5.4	1.57	29.12	2.20	24.00	5,502	1.18	44.67	MEASURED
0.7	1.1	1.62	31.57	2.08	23.67	5,251	1.09	42.68	INDICATED
0.4	0.7	1.62	31.24	2.39	24.06	5,268	1.08	42.31	INFERRED
4.5	7.1	1.59	29.70	2.20	23.96	5,441	1.15	44.14	SUBTOTAL
BHWE - 100m		•	-	-	-	<u>.</u>	•		-
34.9	54.9	1.57	29.14	2.12	23.85	5,517	1.14	44.89	MEASURED
5.5	8.8	1.61	31.14	2.08	23.64	5,307	1.06	43.14	INDICATED
3.1	5.0	1.60	30.45	2.36	24.13	5,351	1.09	43.07	INFERRED
43	69	1.58	29.49	2.14	23.84	5,478	1.13	44.53	SUBTOTAL
100 - 200m	-	-				_	_		-
55.7	87.4	1.57	28.57	2.02	24.04	5,577	1.12	45.37	MEASURED
7.5	12.0	1.61	30.91	2.11	23.69	5,330	1.07	43.29	INDICATED
4.8	7.7	1.60	29.92	2.41	24.30	5,397	1.07	43.37	INFERRED
68.0	107.1	1.58	28.93	2.06	24.02	5,536	1.11	44.99	SUBTOTAL
200 - 300m	-	-					-		
56.4	88.6	1.57	28.60	1.98	24.01	5,574	1.10	45.41	MEASURED
8.3	13.3	1.59	29.99	2.06	23.73	5,424	1.10	44.21	INDICATED
5.2	8.2	1.59	29.40	2.37	24.32	5,457	1.08	43.91	INFERRED
69.9	110.1	1.57	28.83	2.02	24.00	5,547	1.10	45.15	SUBTOTAL
300 - 400m	-	-	_			_		_	
55.1	86.5	1.57	28.54	1.94	23.96	5,583	1.12	45.56	MEASURED
9.8	15.7	1.60	30.49	2.07	23.56	5,372	1.10	43.88	INDICATED
5.7	9.0	1.58	28.84	2.32	24.30	5,518	1.10	44.54	INFERRED
70.6	111.2	1.58	28.84	1.99	23.93	5,548	1.12	45.24	SUBTOTAL
256.5	404.3	1.58	28.98	2.05	23.96	5,531	1.11	45.01	GRAND TOTAL
256	400	1.6	29.0	2.0	24.0	5,531	1.1	45.0	*Total (Rounded)

#### BN mining license Coal Resource, by depth and category, as at 31 December, 2024:

Note:

*(iii)* Due to rounding, discrepancy may exist between sub-totals and totals.

<sup>(</sup>i) Technical information in this BN Coal Resource estimation has been compiled by Mr. Byambaa Barkhas, General Manager for Mining, Mongolian Mining Corporation. 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, 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 2024, 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).

<sup>(</sup>ii) Technical information in this BN Coal Resource estimation has been internally peer reviewed by Mr. Lkhagva-Ochir Said Chef Operating Officer 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 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 (2012).



## **MONGOLIAN MINING CORPORATION**

Our ref:

Ulaanbaatar

Memo To:	MMC Executive Committee
From:	Mr. Avirmed Khishigbuyan (Competent Person, ,Member #3127840)
Date:	5 <sup>th</sup> February 2025
Subject:	Tsaikhar Khudag JORC Statement 31 December 2024

Estimate of the JORC (2012) compliant Coal Resource within the Tsaikhar Khudag ("THG") deposit has been updated as of 31 December, 2024. 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,

Avirmed Khishigbuyan Chief Geologist (Geology and geotechnical)

# Appendix 1

Volume (x1.000.000 m3)	Tonnes (x1.000.000)	RD (g/cc)	ASH (%)	TM (%)	VM (%)	CV (kcal/kg)	TS (%)	FC (%)	Classification
BUQA - BHWE	BUQA - BHWE								
0.4	0.7	1.7	38.3	3.8	21.8	4465	0.9	36.1	INDICATED
0.1	0.2	1.6	36.7	2.9	22.3	4707	0.7	38.1	INFERRED
0.5	0.9	1.6	37.9	3.6	21.9	4526	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		-	e	-	-	-			
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	35.8	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	23	4,700	0.7	38	*Total (Rounded)

#### THG mining license Coal Resource, by depth and category, as at 31 December, 2024:

Note:

(ii) Technical information in this THG Coal Resource estimation has been internally peer reviewed by Mr. Lkhagva-Ochir Said Chef Operating Officer 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 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 (2012).

*(iii)* Due to rounding, discrepancy may exist between sub-totals and totals.

Technical information in this THG Coal Resource estimation has been compiled by Mr. Byambaa Barkhas, General Manager for Mining, Mongolian Mining Corporation. 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, 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 2024, 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).

JORC (2012) Standard Resource Estimation

Baruun Naran Mining Licence [MV-014493]

And

Tsaikhar Khudag Mining License [MV-017336]





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Prepared by MONGOLIAN MINING CORPORATION ENERGY RESOURCES LLC DEC 2021

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         3.1       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 BREGIONAL EXPLORATION       29         4.2       PREVIOUS BREGIONAL EXPLORATION       30         4.2.2       PREVIOUS REGIONAL EXPLORATION       30         4.2.2       2007 EXPLORATION (WATER BORES)       36         4.2.4       2008 EXPLORATION (UOX)       36         4.2.5       2007 EXPLORATION       37         4.2.6       2011-12 EXPLORATION       39         4.2.7       2014 EXPLORATION       39      <	CONT	ENTS	
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 LICENCE INFORMATION       19         3.3       PHYSIOGRAPHY AND CLIMATE       24         3.4       OWNERSHIP AND MINERAL TENURE       27         4       EXPLORATION HISTORY       29         4.1       PREVIOUS BEJORATION       29         4.2       PREVIOUS BN EXPLORATION       29         4.2.1       PAST EXPLORATION (PRE-QGX)       30         4.2.2       2005 6 EXPLORATION (PRE-QGX)       30         4.2.3       2007 EXPLORATION (WATER BORES)       36         4.2.4       2008 EXPLORATION (WATER BORES)       36         4.2.5       2009 EXPLORATION       37         4.2.6       2011-12 EXPLORATION       37         4.2.7       2014 EXPLORATION       39         4.2.7       2014 EXPLORATION       39         4.2.7       2014 EXPLORATION       40         4.3       PREVIOUS RESOURCE AND RESERVE ESTIMATES       41         <	1 EX	ECUTIVE SUMMARY	11
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       29         4.2.1       PAREVIONS BN EXPLORATION       30         4.2.2       PREVIOUS BN EXPLORATION (PRE-QGX)       30         4.2.1       PAST EXPLORATION (QGX)       30         4.2.2       2005 - EXPLORATION (CATE BORES)       36         4.2.3       2007 EXPLORATION (CATE BORES)       36         4.2.4       2008 EXPLORATION (LOX)       36         4.2.7       2014 EXPLORATION       37         4.2.6       2011-12 EXPLORATION       40         4.3       PREVIOUS RESOURCE AND RESERVE ESTIMATES       41         4.3.1       BARUUN NARAN LICENSE.       42         4.4       PREVIOUS PRODUCTION	2 IN	FRODUCTION	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 BEGIONAL EXPLORATION       30         4.2.1       PAST EXPLORATION (PRE-QGX)       30         4.2.2       2005-6 EXPLORATION (QGX)       30         4.2.3       2007 EXPLORATION (QGX)       36         4.2.4       2008 EXPLORATION (QGX)       36         4.2.5       2009 EXPLORATION (LOX)       36         4.2.6       2011-12 EXPLORATION       37         4.2.6       2011-12 EXPLORATION       37         4.2.6       2011-12 EXPLORATION       40         3.9       42.7       2014 EXPLORATION       37         4.2.6       2011-12 EXPLORATION       41         4.3.1       BARUUN NARAN LICENSE       41         4.3.2       TSAIKHAR KHUDAG LICENSE       41         4.3.4       PREVIOUS PRODUCTION       43 <td>21</td> <td>SCOPE OF WORK</td> <td>17</td>	21	SCOPE OF WORK	17
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 BIN EXPLORATION       30         4.2.1       PAST EXPLORATION (PRE-QGX)       30         4.2.1       PAST EXPLORATION (QGX)       30         4.2.2       2005 - EXPLORATION (COX)       36         4.2.4       2005 EXPLORATION (LOX)       36         4.2.4       2008 EXPLORATION (LOX)       36         4.2.7       2014 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         5.2.2	2.2	RELIANCE ON OTHER EXPERTS	18
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         4.1       PREVIOUS BIO EXPLORATION       29         4.2       PREVIOUS BN EXPLORATION (PRE-QGX)       30         4.2.1       PAST EXPLORATION (PRE-QGX)       30         4.2.2       2005 - EXPLORATION (QGX       31         4.2.3       2007 EXPLORATION (LOX)       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       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       5.2.1       Davinin asystem       45	3 LO	CATION, ACCESS AND LICENCE INFORMATION	19
3.1       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 BEGIONAL EXPLORATION       29         4.1       PREVIOUS BN EXPLORATION       29         4.2       PAST EXPLORATION (PRE-QGX)       30         4.2.2       PAST EXPLORATION (WATER BORES)       30         4.2.2       2005-6 EXPLORATION (WATER BORES)       36         4.2.4       2008 EXPLORATION (LOX)       36         4.2.5       2009 EXPLORATION (LOX)       36         4.2.6       2011-12 EXPLORATION       37         4.2.6       2011-12 EXPLORATION       37         4.2.6       2011-12 EXPLORATION       37         4.2.7       2014 EXPLORATION       41         4.3.1       BARUUN NARAN LICENSE       41         4.3.2       TSAIKHAR KHUDAG LICENSE       42         4.4       PREVIOUS RESOURCE AND RESERVE ESTIMATES       41         4.3.2       TSAIKHAR KHUDAG LICENSE       42         4.4       PREVIOUS PRODUCTION       43         5.2.1       Devonian system       45	3 1		10
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 (LOX)       36         4.2.6       2011-12 EXPLORATION       37         4.2.6       2011-12 EXPLORATION       39         4.2.7       2014 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       Devonian system       45         5.2.1.1       Tsetsgershand formation (D2_3cs)       45         5.2.	3.1	PROJECT ACCESS AND INFRASTRUCTURE	19
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 (PGX)       31         4.2.3       2007 EXPLORATION (MATER 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         5.2.2       Upper Carbonaccous-lower Permian       45         5.2.2.1       Dushiin ovoo formation ( $D_2$ ,ccs)       45         5.2.2.2       Togottsetsii formation ( $P_2ch$ )       46         5.2.3.1       Tsaiski system (T)       46	3.3	PHYSIOGRAPHY AND CLIMATE	24
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       37         4.2.6       2011-12 EXPLORATION       40         4.3       PREVIOUS RESOURCE AND RESERVE ESTIMATES       41         4.3.1       BARUUN NARAN LICENSE       41         4.3.2       TSAIKHAR KHUDAG LICENSE       41         4.3.1       BARUUN NARAN LICENSE       41         4.3.2       TSAIKHAR KHUDAG LICENSE       44         5       GEOLOGY       44         5.1       REGIONAL GEOLOGY       44         5.2.2       Upper Carbonaceous-lower Permian.       45         5.2.2.1       Dushiin ovoo formation (D_2.scs)       45         5.2.2.1       Dushiin ovoo formation (P_2C)       46         5.2.2.1       Duper Permian.       45 <tr< td=""><td>3.4</td><td>Ownership and Mineral Tenure</td><td>27</td></tr<>	3.4	Ownership and Mineral Tenure	27
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       37         4.2.7       2014 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       Devonian system       45         5.2.1       Devonian system       45         5.2.2.1       Dushin ovoo formation ( $D_2$ - $P_1ds$ )       46         5.2.2.1       Dushin ovoo formation ( $P_2ch$ )       46         5.2.2.1       Dushin formation ( $P_2ch$ )       46         5.2.2.2       Tosogtisetsii formation ( $P_2ch$ )       46	4 EX	PLORATION HISTORY	29
4.2       PREVIOUS BN EXPLORATION       30         4.2.1       PAST EXPLORATION (PRE-QGX)       30         4.2.2       2005-6 EXPLORATION (QX       31         4.2.3       2007 EXPLORATION (WATER BORES)       36         4.2.4       2008 EXPLORATION (LOX)       36         4.2.5       2009 EXPLORATION (LOX)       36         4.2.6       2011-12 EXPLORATION       37         4.2.6       2014 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       Decinal GeoLOGY       44         5.2       Devonian system       45         5.2.1.1       Tsetsgershand formation ( $D_2$ -scs)       45         5.2.2.1       Dushin ovoo formation ( $P_2$ - $P_1$ / $ds$ )       45         5.2.2.2       Togetisetsii formation ( $P_2$ ch)       46         5.2.3.1       Tsankhi formation ( $P_2$ ch)       46         5.2.4       Triassic system (T)       46 <td>4.1</td> <td>PREVIOUS REGIONAL EXPLORATION.</td> <td></td>	4.1	PREVIOUS REGIONAL EXPLORATION.	
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         4.2.4       2008 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         4.3.1       BARUUN NARAN LICENSE       42         4.4       PREVIOUS PRODUCTION       43         5       GEOLOGY       44         5.1       REGIONAL GEOLOGY       44         5.2.1       Devonian system       45         5.2.2.1       Dushiin ovoo formation (D23CS)       45         5.2.2.2       Tsogttsetsii formation (P2ch)       46         5.2.3.1       Tushki formation (P2ch)       46         5.2.2.2       Tsogttsetsii formation (P2ch)       46         5.2.3.1       Tushkin formation (P2ch)       46         5.2.3.2       Tavan Tolgoi formation (P2ch)       46         5.2.4       Triassic system (T)       46 <t< td=""><td>4.2</td><td>PREVIOUS BN EXPLORATION</td><td>30</td></t<>	4.2	PREVIOUS BN EXPLORATION	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 (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         5.2.2.1       Dushiin ovo o formation (D <sub>2-3</sub> cs)       45         5.2.2.1       Dushiin ovo o formation (P <sub>2-3</sub> cs)       45         5.2.2.1       Dushiin ovo o formation (P <sub>2-3</sub> cs)       45         5.2.2.1       Dushiin ovo o formation (P <sub>2-1</sub> P <sub>1</sub> ds)       45         5.2.2.2       Tayan Tolgoj formation (P <sub>2</sub> ch)       46         5.2.3.1       Tsankhi formation (P <sub>2</sub> ch)	4.2.1	PAST EXPLORATION (PRE-QGX)	30
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       5.2.1       Devonian system       45         5.2.2.1       Devonian system       45         5.2.2.1       Dushiin ovoo formation ( $D_{2,3}c_S$ )       45         5.2.2.2       Tsogetsetsii formation ( $P_1CC$ )       46         5.2.3.1       Tsankhi formation ( $P_2ch$ )       46         5.2.3.2       Tavan Tolgoi formation ( $P_2ch$ )       46         5.2.3.2       Tavan Tolgoi formation ( $P_2ch$ )       46         5.2.3.1       Tsankhi formation ( $P_2ch$ )       46         5.2.4       Triassic system (T)	4.2.2	2005-6 EXPLORATION - QGX	31
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         5.2.1       Devonian system       45         5.2.1       Devonian system       45         5.2.2       Upper Carbonaceous-lower Permian       45         5.2.2.1       Dushiin ovoo formation (D2-3cs)       45         5.2.2.2       Tsogtsetsii formation (P1cC)       46         5.2.3.1       Tsankhi formation (P2ch)       46         5.2.3.2       Tavan Tolgoi formation (P2ch)       46         5.2.5.1       Sainshand formation (P2ch)       46         5.2.5.1       Sainshand formation (K2ss)       47         5.2.6       Cenozoic group (Kz)       47         5.2.7       Paleogenic system (P)       47	4.2.3	2007 EXPLORATION (WATER BORES)	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       5.2.1       Devonian system       45         5.2.2       Upper Carbonaceous-lower Permian       45         5.2.2.1       Dushiin ovoo formation ( $D_{2-3}cs$ )       45         5.2.2.2       Tsogttsetsii formation ( $P_1CC$ )       46         5.2.3.1       Tsankhi formation ( $P_2ch$ )       46         5.2.3.2       Tavan Tolgoi formation ( $P_2ch$ )       46         5.2.4       Triassic system (T)       46         5.2.5.1       Sainshand formation ( $R_{2ss}$ )       47         5.2.5.1       Sainshand formation ( $K_{2ss}$ )       47         5.2.6       Cenozoic group (Kz)       47         5.2.7       Paleogenic system (P)	4.2.4	2008 EXPLORATION (LOX)	36
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         5.2.1       Devonian system       45         5.2.2.1       Devonian system       45         5.2.2.1       Devonian system       45         5.2.2.1       Dushiin ovoo formation ( $D_{2-3}cs$ )       45         5.2.2.1       Dushiin ovoo formation ( $P_{2-1}cs$ )       45         5.2.2.1       Dushiin ovoo formation ( $P_{1-2}cs$ )       46         5.2.2.1       Toushiin ovoo formation ( $P_{2-1}cs$ )       46         5.2.3.1       Tsankhi formation ( $P_{2-1}ch$ )       46         5.2.3.2       Tay of the formation ( $P_{2-1}ch$ )       46         5.2.3.2       Tay of the formation ( $P_{2-1}ch$ )       46         5.2.3.1       Tsankhi formation ( $P_{2-1}ch$ )       46         5.2.3.2       Tay of the formation ( $P_{2-1}ch$ )       46         5.2.5 <td>4.2.5</td> <td>2009 Exploration</td> <td>37</td>	4.2.5	2009 Exploration	37
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       5.2.1       Devonian system       45         5.2.2       Upper Carbonaceous-lower Permian       45         5.2.2.1       Dushiin ovoo formation ( $D_{2.3}cs$ )       45         5.2.2.2       Tsogttsetsii formation ( $P_{1}CC$ )       46         5.2.3.1       Tsankhi formation ( $P_{1}CC$ )       46         5.2.3.1       Tsankhi formation ( $P_{2}ch$ )       46         5.2.3.2       Tavan Tolgoi formation ( $P_{2}ch$ )       46         5.2.4       Triassic system (T)       46         5.2.5       Cretaceous system       47         5.2.5       Cretaceous system ( $P$ )       47         5.2.5       Sainshand formation ( $K_{2}ss$ )       47         5.2.6       Cenozoic group ( $Kz$ )       47         5.2.7       Paleogenic system	4.2.6	2011-12 EXPLORATION	39
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         5.2.2       Upper Carbonaceous-lower Permian       45         5.2.2.1       Dushin ovoo formation ( $D_{2-3}cs$ )       45         5.2.2.2       Tsogttsetsii formation ( $P_{1-2}h_ds$ )       45         5.2.2.1       Dushin ovoo formation ( $P_{2-1}h_ds$ )       46         5.2.2.2       Tsogttsetsii formation ( $P_{2}ch$ )       46         5.2.3.1       Tsankhi formation ( $P_{2}ch$ )       46         5.2.4       Triassic system (T)       46         5.2.5       Cretaceous system ( $T$ )       46         5.2.5       Cretaceous system ( $T$ )       47         5.2.6       Cenozoic group ( $Kz$ )       47         5.2.7       Paleogenic system ( $P$ )       47         5.2.8       Neogene system ( $N$ )       47         5.2.8       Neogene system ( $N$ )<	4.2.7	2014 EXPLORATION	40
4.3.1       DAROUN NARAN ELCENSE       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       Devonian system       45         5.2.2       Upper Carbonaceous-lower Permian       45         5.2.2.1       Dushiin ovoo formation ( $D_{2-3}cs$ )       45         5.2.2       Tsogttsetsii formation ( $P_1CC$ )       46         5.2.2.1       Dushiin ovoo formation ( $P_2ch$ )       46         5.2.3.1       Tsankhi formation ( $P_2ch$ )       46         5.2.4       Triassic system (T)       46         5.2.5       Cretaceous system       47         5.2.5       Cretaceous system ( $P_{2-1}$ )       46         5.2.7       Paleogenic system ( $P_{2-1}$ )       47         5.2.6       Cenozoic group ( $K_2$ )       47         5.2.7       Paleogenic system ( $P_{1-2}$ )       47         5.2.8       Neogene system ( $N$ )       47         5.2.8       Neogene system ( $N$ )       47	4.5	PREVIOUS RESOURCE AND RESERVE ESTIMATES	41
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       Devonian system       45         5.2.1       Devonian system       45         5.2.1       Devonian system       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         5.2.3.1       Upper Permian       46         5.2.3.2       Tavan Tolgoi formation $(P_2ch)$ 46         5.2.4       Triassic system $(T)$ 46         5.2.5       Cretaceous system       47         5.2.6       Cenozoic group $(Kz)$ 47         5.2.7       Paleogenic system $(P)$ 47         5.2.7       Paleogenic system $(P)$ 47         5.2.8       Neogene system $(N)$ 47         5.2.8.1       Miocene $(N_1)$ 47         5.2.8.2       Pliocene $(N_2)$ 47         5.2.8       Plocene $(N_2$	4.3.1	TSAIKHAR KHUDAG LICENSE	41
5       GEOLOGY       44         5.1       REGIONAL GEOLOGY       44         5.2       REGIONAL STRATIGRAPHY       45         5.2.1       Devonian system       45         5.2.2       Upper Carbonaceous-lower Permian       45         5.2.2.1       Dushiin ovoo formation ( $C_3$ - $P_1$ ds)       45         5.2.2.2       Tsogttsetsii formation ( $P_1$ CC)       46         5.2.3       Upper Permian       46         5.2.3.1       Tsankhi formation ( $P_2$ ch)       46         5.2.3.2       Tavan Tolgoi formation ( $P_2$ th)       46         5.2.4       Triassic system (T)       46         5.2.5       Cretaceous system       47         5.2.5.1       Sainshand formation ( $K_{2}$ ss)       47         5.2.6       Cenozoic group ( $K_2$ )       47         5.2.7       Paleogenic system (P)       47         5.2.7       Paleogenic system (P)       47         5.2.8       Neogene system (N)       47         5.2.8.1	4.4	PREVIOUS PRODUCTION	
5.1       REGIONAL GEOLOGY       44         5.2       REGIONAL STRATIGRAPHY       45 $5.2.1$ Devonian system       45 $5.2.1$ Dushiin ovoo formation $(D_{2.3}cs)$ 45 $5.2.2$ Upper Carbonaceous-lower Permian       45 $5.2.2$ Upper Carbonaceous-lower Permian       45 $5.2.2.1$ Dushiin ovoo formation $(C_3-P_1ds)$ 46 $5.2.2.2$ Tsogttsetsii formation $(P_1CC)$ 46 $5.2.3.1$ 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 $5.2.8$ Ne	5 GF		
5.1       REGIONAL GEOLOGY       44         5.2       REGIONAL STRATIGRAPHY       45 $5.2.1$ Devonian system       45 $5.2.1$ Devonian system       45 $5.2.1$ Tsetsgershand formation (D <sub>2-3</sub> cs)       45 $5.2.2$ Upper Carbonaceous-lower Permian       45 $5.2.2$ Upper Carbonaceous-lower Permian       45 $5.2.2.1$ Dushiin ovoo formation (C <sub>3</sub> -P <sub>1</sub> ds)       45 $5.2.2.2$ Tsogttsetsii formation (P <sub>1</sub> CC)       46 $5.2.3.2$ Tsogttsetsii formation (P <sub>1</sub> CC)       46 $5.2.3.1$ Tsankhi formation (P <sub>2</sub> ch)       46 $5.2.3.2$ Tavan Tolgoi formation (P <sub>2</sub> tb)       46 $5.2.4$ Triassic system (T)       46 $5.2.5$ Cretaceous system       47 $5.2.5$ Cretaceous system       47 $5.2.6$ Cenozoic group (Kz)       47 $5.2.7$ Paleogenic system (P)       47 $5.2.8$ Neogene system (N)       47 $5.2.8.1$ Miocene (N <sub>1</sub> )       47 $5.2.8.2$ Pliocene (N <sub>2</sub> )       47 $5.2.8.2$ Pli	5 1		4.4
5.2       REGIONAL STRATIGRAPHY       45         5.2.1       Devonian system       45         5.2.1.1       Tsetsgershand formation $(D_{2-3}cs)$ 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         5.2.3.1       Dyper Permian       46         5.2.3.2       Tavan Tolgoi formation $(P_2ch)$ 46         5.2.4       Triassic system $(T)$ 46         5.2.5       Cretaceous system       47         5.2.5       Cretaceous system       47         5.2.6       Cenozoic group (Kz)       47         5.2.7       Paleogenic system (P)       47         5.2.8       Neogene system (N)       47         5.2.8.1       Miocene $(N_1)$ 47         5.2.8.2       Pliocene $(N_2)$ 47         5.2.8.2       Pliocene $(N_2)$ 47	5.1	REGIONAL GEOLOGY	44
5.2.1       Devolution system       45         5.2.1.1       Tsetsgershand formation $(D_{2-3}cs)$ 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         5.2.4       Triassic system (T)       46         5.2.5       Cretaceous system       47         5.2.5       Cretaceous system       47         5.2.6       Cenozoic group (Kz)       47         5.2.7       Paleogenic system (P)       47         5.2.7       Paleogenic system (P)       47         5.2.7       Paleogenic system (P)       47         5.2.8       Neogene system (N)       47         5.2.8.1       Miocene (N_1)       47         5.2.8.2       Pliocene (N_2)       47         5.2.8.2       Pliocene (N_2)       47	5.2 5.2	L Devonian system	43
5.2.1.1       Housgershand formation ( $D_{2}$ -ses)       15         5.2.2       Upper Carbonaceous-lower Permian       45         5.2.2.1       Dushiin ovoo formation ( $C_3$ - $P_1$ ds)       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         5.2.6       Cenozoic group ( $K_2$ )       47         5.2.7       Paleogenic system (P)       47         5.2.7       Paleogenic system (P)       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	1 Devoniun system	45
5.2.2.1       Dushiin ovoo formation $(C_3 - P_1 ds)$ 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         5.2.6       Cenozoic group $(Kz)$ 47         5.2.7       Paleogenic system $(P)$ 47         5.2.7       Paleogenic system $(P)$ 47         5.2.7       Paleogenic system $(P)$ 47         5.2.8       Neogene system $(N)$ 47         5.2.8.2       Pliocene $(N_2)$ 47         5.2.8.2       Pliocene $(N_2)$ 47	5.2	<ol> <li>Upper Carbonaceous-lower Permian</li> </ol>	45
5.2.2.2       Tsogttsetsii formation ( $P_1CC$ )	5.2	2.1 Dushiin ovoo formation ( $C_3$ - $P_1ds$ )	
5.2.3       Upper Permian	5.2	2.2 Tsogttsetsii formation ( $P_1CC$ )	46
5.2.3.1       Tsankhi formation ( $P_2ch$ )	5.2	3 Upper Permian	46
5.2.3.2       Tavan Tolgoi formation ( $P_2tb$ )	5.2	3.1 Tsankhi formation ( $P_2ch$ )	46
5.2.4       Triassic system (T)       46         5.2.5       Cretaceous system       47         5.2.5.1       Sainshand formation (K <sub>2</sub> ss)       47         5.2.6       Cenozoic group (Kz)       47         5.2.7       Paleogenic system (P)       47         5.2.7.1       Lower and middle Oligocene (P <sub>1, 2</sub> )       47         5.2.8       Neogene system (N)       47         5.2.8.1       Miocene (N <sub>1</sub> )       47         5.2.8.2       Pliocene (N <sub>2</sub> )       47         5.2.9       Ouaternersy sediments (O <sub>2</sub> s)       47	5.2	<i>3.2</i> Tavan Tolgoi formation (P <sub>2</sub> tb)	46
5.2.5       Cretaceous system	5.2	4 Triassic system (T)	46
5.2.5.1       Sainshand formation ( $K_{2}ss$ )       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       Ouaternary sediments ( $\Omega_{2,4}$ )       47	5.2	5 Cretaceous system	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       Ouatarrary sediments ( $\Omega_{2, 4}$ )       47	5.2	5.1 Sainshand formation (K <sub>2</sub> ss)	47
5.2.7       Paleogenic system (P)	5.2. 5.2	.6 Cenozoic group (Kz)	4/
5.2.7.1       Lower and made Ongocene $(1_{1,2})$ 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       Ousternary sediments $(O_{2,4})$ 47	5.2. 5.2	7 1 Lower and middle Oligogene (P)	4/ 17
5.2.6 $Mogene system (1)$	5.2	8 Neogene system (N)	4/ 17
5.2.8.2 Pliocene $(N_2)$	5.2	8.1 Miocene (N1)	
5.2.9 Quaternary sediments $(O_{2,4})$ 47	5.2	8.2 <i>Pliocene</i> ( <i>N</i> <sub>2</sub> )	
$5.2.7$ $\mathcal{G}$	5.2	9 Quaternary sediments ( $Q_{3-4}$ )	47
$\mathbf{y} = \mathbf{y} + $	5.2	8.2 Pliocene $(N_2)$	47

5.3	LOCAL STRATIGRAPHY	50
5.4	DEPOSIT TYPE	54
5.5	STRUCTURE	
5.6	INTRUSIVES	
5./	COAL SEAMS	
5.7.1	Seam/ply Hierarchy	33
5.7.1	1.1 Seam Group 'A'	33
5.7.1	2 Seam Group 'B'	33
5.7.1	.3 Seam Group C.	33
5.7.1	.4 Seam Group 'D'	33
5.7.1	5 Seam Group 'E'	55
5.7.1	6 Seam Group 'F'	56
5.7.1	7.7 Seam Group 'G'	56
5.7.1	.8 Seam Group 'H'	56
5.7.1	.9 Seam Group '1'	56
5.7.1	.10 Seam Group 'J'	56
5.7.1	.11 Seam Group 'K'	56
5.7.1	1.12 Seam Group 'N'	57
5.7.1	1.13 Seam Group 'Q'	57
5.7.1	1.14 Seam Group 'R'	57
5.7.1	1.15 Seam Group 'T'	57
5.7.1	1.16 Seam Group 'U'	57
5.7.1	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	2 Coal Quality	63
5.7.2	P.1 Database	64
5.7.2	2.2 Rank of the coal	80
5.7.2	2.3 Regression formulae to estimate missing coal quality data	81
5.7.2	P.4 Observations regarding the distribution of CSN values	93
5.7.2	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	102
5 10	13 Slope and Waste Dump Design Review	107
5 10	14 Summary of Current RN Pit Slone Design Specifications	107
5 10	15 Exervators Operating on Top of Coal Ranches	110
5.10.		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 JO	RC
(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 $\tilde{E}R$ 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	
8.1.1 Drilling Method prior to 1993	129
8.1.2 Drilling Method OGX	
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	A Geophysics Method FR 2018	135
86	SEISMIC	135
87	GEOLOGICAL LOCCING AND SAMPLING	130
87	1 Mongolian-Russian Logging and Sampling prior to 1993	
87	2 OGX Logging and Sampling	137
8.7	3 FR Exploration-Logaing and Sampling	
87	31 Geological Logging and Sampting	138
8.7	3.7 Sampling	130
8.8	ANALYTICAL METHOD	139
8.8	1 Analysis before ER	139
8.8	2 Analyses of Energy Resources	140
8.8	<i>Accreditation</i>	
8.9	LABORATORY INSPECTION	
89	1 Laboratory Inspection October 2010	142
8.9	2 Laboratory Inspection March 2012	
8.10	REPRODUCIBILITY OF ANALYSES BETWEEN LABORATORIES.	
8.1	0.1 Database	
8.1	0.2 ERCCL Laboratory compared with SM Laboratory	
8.1	0.2.1 Analysis moisture	
8.1	0.2.2 Ash.	
8.1	0.2.3 Volatile matter	
8.1	0.2.4 Total sulphur	
8.1	0.2.5 Calorific value	
8.1	0.2.6 True relative density	
8.1	0.2.7 Free Swelling Index (equivalent of CSN)	147
8.1	0.3 ERCCL Laboratory compared with UUH Laboratory	
8.1	0.3.1 Analysis moisture	
8.1	0.3.2 Ash	
8.1	0.3.3 Volatile matter	
8.1	0.3.4 Total sulphur	
8.1	0.3.5 Calorific value	
8.1	0.3.6 True relative density	
8.1	0.3.7 Three groups of seams according to CSN distributions. Free S	welling Index
(eq	uivalent of CSN)	
8.1	0.4 Conclusions for reproducibility of analyses between labs	
8.11	POINT OF OBSERVATION DEFINITION AND CALCULATION	159
8.12	USE OF CONDITIONAL SIMULATION GEOSTATISTICS TO DETERMINE THE	EXPECTED
ERRO	R OF ESTIMATION AS AN AID IN THE UNDERSTANDING OF CONFIDENCE IN T	HE
CLASS	SIFICATION CATEGORIES	160
9 RE	SOURCE ESTIMATION METHODOLOGY	
91	RESOURCE ESTIMATION METHODOLOGY - BN	165
9.1	SOFTWARE USED	165
93	DATABASE COMPILATION	
9.4	DATA VALIDATION	
9.5	EXPLORATORY DATA ANALYSIS	
9.6	DATA PROCESSING.	
9.7	MODEL GEOSTATISTICS	
9.8	Gridding	
9.9	BLOCK MODELLING	

9	.10	RESOURCE CLASSIFICATION, SEAM CODING AND GRADE INTERPOLATION	172
9	.11	BLOCK MODEL VALIDATION	173
9	.12	KESOURCE ESTIMATION METHODOLOGY - 1 HG	1/4
9	.15 14	DATADASE COMDILATION	1/4
9	.14	DATA VALIDATION	1/4
9	.15	FXPLORATORY DATA ANALYSIS	175
9	17	DATA PROCESSING	176
9	.18	MODEL GEOSTATISTICS	177
9	.19	GRIDDING	
9	.20	BLOCK MODELLING	178
9	.21	RESOURCE CLASSIFICATION, SEAM CODING AND GRADE INTERPOLATION	181
9	.22	BLOCK MODEL VALIDATION	182
10	RES	SOURCE STATEMENT	183
1	0.1	RESOURCE BN	183
1	0.2	RESOURCE THG	185
1	0.3	COMPARISON FOR BN MODEL BETWEEN NEW JORC (2012) - 31 DECEMBER 202	21 AND
Р	REVIO	DUS JORC (2012) - 30 JUNE 2015 RESOURCE ESTIMATES TO 400M	186
1	0.4	COMPARISON FOR THG MODEL BETWEEN NEW JORC (2012) - 31 DECEMBER 24	021
А	nd Pi	REVIOUS JORC (2012) – 30 JUNE 2015 RESOURCE ESTIMATES TO 400M	187
11	CO	NCLUSIONS AND RECOMMENDATIONS	189
12	DIS	CLAIMER	195
13	DA	ГЕ AND SIGNATURE	196
14	STA	<b>ATEMENT OF QUALIFICATIONS</b>	197
15	STA	ATEMENT OF INDEPENDENCE	198
16	REI	FERENCES	199
17	GL	OSSARY OF TECHNICAL TERMS	200
API	PENI	DIX 1: MINERAL TENURE LICENSE	202
API	PENI	DIX 2: PROCEDURES	203
API AL	PENI L BO	DIX 3: TABLE OF BASE OF WEATHERING AND QUATERNARY FOP REHOLES THAT IT WAS LOGGED	R 204
API	PENI	DIX 4A: POINTS OF OBSERVATION – (AS-RECEIVED BASIS)	205
API	PENI	DIX 4B: POINTS OF OBSERVATION – (AIR-DRY BASIS)	206
API	PENI	DIX 5: LABORATORY CERTIFICATES	207
API RE(	PENI CEIV	DIX 6A: COMPLETE ANALYTICAL DATABASE SHOWING (AS- /ED) COAL QUALITY	208
API CO	PENI AL Ç	DIX 6B: COMPLETE ANALYTICAL DATABASE SHOWING (AIR-DR) QUALITY	Y) 209
API QU	PENI ALIT	DIX 7: GRAPHS ON A SEAM BY SEAM BASIS AND FOR EACH COAI	210
ΔPI	PENI	DIX 8: BOREHOLE PROFILES WITH LAS AND COAL OUALITY	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	
APPENDIX 15: GEOTECHNICAL REPORT	
APPENDIX 16: LIST OF DOWNHOLE GEOPHYSICAL EQUIPMENT	
APPENDIX 17: FAULTED BOREHOLES AND PLIES	221
APPENDIX 18: INSERTED AND EXTRAPOLATED DATA POINTS	222
APPENDIX 19: RESOURCE CATEGORY AREAS PER PLY	
APPENDIX 20: CAPABILITY STATEMENT	224
APPENDIX 21: UHG GEOCHEMISTRY	
APPENDIX 22: RESERVES	
APPENDIX 23: HYDROGEOLOGY	227
APPENDIX 24: VARIOGRAMS	
APPENDIX 25: JORC TABLE 1	

### 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	
FIGURE 4-1: SOVIET-MONGOLIAN DRILL HOLES	31
FIGURE 4-2: RESISTIVITY SURVEY	
FIGURE 4-3: 2005 BOREHOLES BY TYPE	34
FIGURE 4-4: 2006 BOREHOLES BY TYPE	35
FIGURE 4-5: 2008 BOREHOLES BY TYPE	
FIGURE 4-6: 2009 BOREHOLES BY TYPE	
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 I HG.	
FIGURE 5-6: BN AREA SEAM H VARIOGRAM OF GAUSIAN TRANSFORMED MOISTURE ON AIR I	DRY
BASIS	66
FIGURE 5-/: BN AREA QGX DATA SORTED HIGHEST-LOWEST AND ER DATA SHOWED LOWES	Т-
	6/
FIGURE 5-8: BN AREA EXPECTED ERROR FOR QGX DATASET AND ER DATASET	67
FIGURE 5-9: BN AREA EK HISTOGRAM- H SEAM COAL SAMPLE MOISTURE (AS-RECEIVED)	68
FIGURE 5-10: BN AREA QGX HISTOGRAM- H SEAM COAL SAMPLE MOISTURE (AS-RECEIVED)	1.69
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)	)./0
FIGURE 5-13: BN AREA ER HISTOGRAM- H SEAM COAL SAMPLE MOISTURE (AIR-DRY)	/0
FIGURE 5-14: BN AREA QGX HISTOGRAM- H SEAM COAL SAMPLE MOISTURE (AIR-DRY)	/1
FIGURE 5-15: BIN AREA EK HISTOGRAM- H SEAM ROCK SAMPLE MOISTURE (AIR-DRY)	/ 1
FIGURE 5-16: BN AREA QGX HISTOGRAM- H SEAM ROCK SAMPLE MOISTURE (AIR-DRY)	72
FIGURE 5-1 /: BN KELATIONSHIP BETWEEN TOTAL MOISTURE AND AIR-DRY MOISTURE.	/4
FIGURE 5-18: BN RELATIONSHIP BETWEEN ASH AND TRUE RELATIVE DENSITY	/ 3
FIGURE 5-19: BN RELATIONSHIP BETWEEN ASH AND VOLATILE MATTER.	/ 5
FIGURE 5-20: BN RELATIONSHIP BETWEEN ASH AND CALORIFIC VALUE.	/6
FIGURE 5-21: BN RELATIONSHIP BETWEEN ASH AND TOTAL SULPHUR.	/6
FIGURE 5-22: THG KELATIONSHIP BETWEEN MOISTURE AS RECEIVED AND AIR DRY	//
FIGURE 5-23: I HG RELATIONSHIP BETWEEN ASH AND TRUE RELATIVE DENSITY	/8
FIGURE 5-24: I HG RELATIONSHIP BETWEEN ASH AND VOLATILE MATTER.	/8
FIGURE 5-25: I HG RELATIONSHIP BETWEEN ASH AND CALORIFIC VALUE	/9
FIGURE 5-26: THG RELATIONSHIP BETWEEN ASH AND TOTAL SULFUR	79
FIGURE 5-2/: BN AS I M CLASSIFICATION OF THE COAL BASED ON RANK.	80
FIGURE 5-28: THG AS I M CLASSIFICATION OF THE COAL BASED ON RANK	81
FIGURE 5-29: BN ALL DATA TRANSFORMED MOISTURE AS RECEIVED VERSUS AIR DRY MOISTU	JRE
Every $= 5.20$ DN v compared and $= 1000$ mm and $= 2010$ with $2010$ and $= 1000$	86
FIGURE 5-30: BIN MOISTURE RELATIONSHIP BETWEEN PRE 2018 AND 2018 DRILLING	0.0
CAMPAIGNS.	80
FIGURE 5-31: BIN ASH VERSUS CALORIFIC VALUE REGRESSION	8/
FIGURE 5-32: BIN CALORIFIC VALUE RELATIONSHIP BETWEEN PRE 2018 AND 2018 DRILLING	00
CAMPAIGNS.	88
FIGURE 5-33: BIN ALL DATA, ASH VERSUS VOLATILE MATTER REGRESSION.	89
FIGURE 5-34: THG ALL DATA, ASH VERSUS VOLATILE MATTER REGRESSION	89
FIGURE 5-55: BIN 2012 JURC REPORT: ARD VERSUS TRD FOR CONVERTION	90
FIGURE 5-30: BIN ALL DATA ASH AND TRUE RELATIVE DENSITY REGRESSION	91
FIGURE 5-57. BIN SAMPLE RESULTS SELECTED FOR CALCULATION OF MISSING DATA	91
FIGURE 5-38: BIN 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 USIN DISTRIBUTIONS.	93
FIGURE 5-41: DETERMINING LIMITS OF WEATHERING	90
FIGURE 5-42: DIN SYNCLINAL STRUCTURE SHOWING PRESENT EXCAVATIONS (SCHEMATIC).	
FIGURE 5-45: DIN EAST FIL, STRUCTURAL ROSETTES BY FIT SECTOR	103
FIGURE 5-44: DIN WEST FIT STRUCTURAL ROSETTES BY FIT SECTOR	104 CO)
FIGURE J-4J. DIN GEUTECHNICAL ZUNES FOR LOWI STUDY (AFTER KUNGE FINCOCK MINAR	110
EXAMPLE 7.1. $OCV$ 2005, 2006 DODE NOT ES	110
FIGURE /-1; QUA 2003-2000 BUREHULES	119

FIGURE 7-2: OGX 2008 BOREHOLES	120
FIGURE 7-3: OGX 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: OGX TRENCHING AT BARUUNNARAN	131
FIGURE 8-2: DIFFERENCE MAP OF COLLAR SURVEY AND TOPOGRAPHY SURVEY GEOPHYSICS (	)F
BN	133
FIGURE 8-3: DIFFERENCE MAP OF COLLAR SURVEY AND TOPOGRAPHY SURVEY GEOPHYSICS (	)F
THG	133
FIGURE 8-4: RN AREA SEISMIC LINES PLAN MAP	136
FIGURE 8-5: EXAMPLE OF CORE PHOTOGRAPHS	138
FIGURE 8-6: PHOTOGRAPH OF ERFEZER WHERE COAL SAMPLES WERE STORED WHILE WALTING	150
FOR ANALYSIS	139
FIGURE 8-7: LABORATORY ACCREDITATION CERTIFICATE	141
FIGURE 8.8: COMPARISON OF ANALYSIS MOISTURE DETERMINATIONS	1/1
FIGURE 8-0. COMPARISON OF ASH DETERMINATIONS	148
FIGURE 8-7. COMPARISON OF ASH DETERMINATIONS.	148
FIGURE 8-10. COMPARISON OF VOLATILE MATTER DETERMINATIONS.	140
FIGURE 8-11: COMPARISON OF TOTAL SOLITON DETERMINATIONS.	1/10
FIGURE 8-12. COMPARISON OF CALORIFIC VALUE DETERMINATIONS	150
FIGURE 8-13. COMPARISON OF TRUE RELATIVE DENSITY VALUES.	150
FIGURE 8-14. COMPARISON OF TREE 5 WELLING INDEX DETERMINATIONS,	150
FIGURE 6-13. COMPARISON OF ANALYSIS MOISTURE DETERMINATIONS.	154
FIGURE 6-10. COMPARISON OF ASH DETERMINATIONS.	155
FIGURE 6-17: COMPARISON OF VOLATILE MATTER DETERMINATIONS.	155
FIGURE 8-18: COMPARISON OF TOTAL SULPHUR DETERMINATIONS.	150
FIGURE 8-19: COMPARISON OF CALORIFIC VALUE DETERMINATIONS.	150
FIGURE 8-20: COMPARISON OF TRUE RELATIVE DENSITY VALUES.	157
FIGURE 8-21: COMPARISON OF FREE SWELLING INDEX DETERMINATIONS.	15/
FIGURE 8-22: EXPECTED ERROR FOR SEAM HOUD 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 WIT	TH 1 C A
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 ANGL	LΕ
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 CATEGOR	Y
(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	
TABLE 3-2: GEOGRAPHICAL COORDINATES OF LICENCE MV-017336	
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	
TABLE 4-4: DRILLING SUMMARY OF QGX 2008 EXPLORATION PROGRAM	
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 TH	ΗE
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 JO	ORC
	186
TABLE 10-6: COMPARISON OF NEW WITH PREVIOUS JORC RESOURCE ESTIMATES - NON JO	ORC
	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<sup>2</sup>) in area and is located in southcentral 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 <u>peer</u> 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 and 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.

Volume	Tonnes	Relative	Ash (%)	Total	Volatile	Gross Calorific	Sulphur (%)	Fixed	Classification	
(x1,000,000 m <sup>3</sup> )	(x1,000,000)	Density (g/cc)	A311 (70)	Moisture (%)	Matter (%)	Value (Kcal/kg)	Sulphui (70)	Carbon (%)	Classification	
BUQA - BHWE	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, cla	* JORC Code, clause 25, Rounding.									

### Table 1-1: Total Resources on an As-Received (AR) Basis

(Source: Energy Resources LLC)

Volume	Tonnes	Relative		Inherrent	Volatile	Gross Calorific		Fixed		
(x1,000,000 m <sup>3</sup> )	(×1,000,000)	Density (g/cc)	Ash (%)	Moisture (%)	Matter (%)	Value (Kcal/kg)	Sulphur (%)	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)	
* IORC Code, clause 25 Rounding										

Table 1-2: Total Resources on an Air-Dry (AD) Basis

(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.

Volume (x1,000,000 м <sup>3</sup> )	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 1-3: Total Resources on an As-Received (AR) Basis

(Source: Energy Resources LLC)

Table 1-4: Total Resources on an Air-Dry (AD) Basis

Volume	Tonnes	Relative	Ash (%)	Inherrent	Volatile	Gross Calorific	Sulphur (%)	Fixed	Classification
(x1,000,000 m <sup>3</sup> )	(x1,000,000)	Density (g/cc)		Moisture (%)	Matter (%)	Value (Kcal/kg)		Carbon (%)	
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)
* IORC 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 31<sup>st</sup> 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 nonqualified 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<sup>2</sup> 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)

Page 21

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.

<sup>6</sup>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' <sup>1</sup>



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  $32.6^{\circ}$ C to  $39.9^{\circ}$ 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.<sup>'1</sup>

'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

<sup>&</sup>lt;sup>1</sup> "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.<sup>2</sup>



Figure 3-9: Gobi desert fauna and flora

<sup>&</sup>lt;sup>2</sup> "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.

Point	Longitude			Latitude			
Number	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"	

## Table 3-1: Geographical Coordinates of licence MV-014493

(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:	Geogra	phical	Coordir	ates o	f licence	MV-017336

Point		Longitude		Latitude		
Number	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

# 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 19<sup>th</sup> 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<sup>2</sup> 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 "3<sup>rd</sup> 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).

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

## Table 4-1: Drilling summary of Soviet-Mongolian exploration program

(Source: QGX)



Figure 4-1: Soviet-Mongolian Drill Holes

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 interbed 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).

Year	Company	Drilling type	Borehole	Total depth (m)
2005	067	Core	137	34204.3
2005	2005 QGX	Structure borehole	31	1930
	Total		168	36134.3

(Source: QGX)



Figure 4-3: 2005 Boreholes by Type

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 ex	ploration	program
J					

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

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. 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.

Year	Company	Drilling type	Borehole	Total depth (m)
2008	QGX	Structure borehole	38	1533
	Total		38	1533

## Table 4-4: Drilling summary of QGX 2008 exploration program

<sup>(</sup>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).

Year	Company	Drilling type	Borehole	Total depth (m)
		Core	45	5200
2009	QGX	Structure borehole	46	10400
		Large diameter	11	1000
	Total		102	16600

Table 4-5. Drining Summary of QGA 2009 exploration program	Table	4-5:	Drilling	summary	of	QGX	2009	expl	oration	prog	ram
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(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.

Site	Year	Company	Drilling type	Borehole	Total meter
			Large diameter	10	653.5
BN	2011	MMC	Structure borehole	16	3366
	te Year C N 2011 HG 2012		Core	33	10355
THG	2012		Core	32	9961.7
		Total		91	24336.2

 Table 4-6: Drilling summary of 2011-12 exploration program



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.

Site	Year	Company	Drilling type	Borehole	Total depth (m)
BN	2014	MMC	Core	33	13537
Total					13537



<sup>(</sup>Source: QGX)



Figure 4-8: 2014 Boreholes by Type

# 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
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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.

Measured (Mt)	Indicated (Mt)	Inferred (Mt)	Total (Mt)
209	72.6	0.5	282.1

#### Table 4-9: Total In Place Resources

(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	Table	4-12:	<b>Total</b>	In	Place	Reserves
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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.

Measured (Mt)	Indicated (Mt)	Inferred (Mt)	Total (Mt)
0	0	55	55.0

## Table 4-13: Total In Place Resources

(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
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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 1<sup>st</sup> 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  $31^{st}$  of December 2021 = 5.08 Mt ROM

# 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<sup>3</sup>.

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

<sup>&</sup>lt;sup>3</sup> 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<sub>2-3</sub>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<sub>3</sub>-P<sub>1</sub>ds)

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<sub>1</sub>CC)

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<sub>2</sub>ch)

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<sub>2</sub>tb)

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<sup>2</sup> while within the Ukhaa Khudag deposit is 29.5 km<sup>2</sup>. 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<sub>2</sub>ss)

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<sub>1, 2</sub>)

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<sub>1</sub>)

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<sub>2</sub>)

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<sub>3-4</sub>)

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.

Period	Unit Name		Description	Thickness	
Lower			Greenish grey siltstones and mudstones with interbedded yellow sandstones.	Varied	
Jurassic			Conglomerate, conglomeratic sandstone, siltstone and mudstone	Varied	
~~~~~	~~~~~~~	~~~~~~	Unconformity ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
		Upper Unit	Dark grey siltstone, sandstone, conglomeratic sandstone; minor calcareous beds; flora fossils; COAL SEAMS X to XV.		
	Tavan TolgoiUpper Part Lower UnitGroupLower Part Lower Unit	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;	965 to 1,990 m	
Upper Permian		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	Tsogt-tsets	sii Group	Siltstone with flora fossils, andesitic breccia, andesite and dacite.	400 m to 900 m	
Permian	Dusino-Ovoo Group		Light green massive andesite, basalt, dacite, tufaceous conglomerate, and tuff.	800 m to 1.100 m	

# Table 5-1: Generalized Stratigraphic Column, Tavan Tolgoi

(Source: Norwest 2009)

JORC (2012) Standard Resource Estimation Report for Baruun Naran and Tsaikhar Khudag Licenses



Page 49

(Source: Energy Resources LLC)

Figure 5-2: Regional geological map of Tavan Tolgoi coalfield

# 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 ( $P_2$ tb) 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

JORC (2012) Standard Resource Estimation Report for Baruun Naran and Tsaikhar Khudag Licenses



# Figure 5-4: General Geology BN from Northeast to Northwest



Figure 5-5: General Geology THG

# 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 <u>type of deposit</u> 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 microcontinents 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  $24^{\circ}$  towards  $240^{\circ}$ . The north-western limb is near vertical to overturned and the south-eastern limb steepens from the fold axis to approximately  $75^{\circ}$  (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").<sup>4</sup>

## 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

<sup>&</sup>lt;sup>4</sup> 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 'l'

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.

Nº	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	
		V555		0.33	1	0.63	7			
			V5069	0.22	2.72	1.33	8			
			V5068	0.3	1.55	0.92	10			
		V506	V5067	0.41	1.66	0.95	8			
		1000	V5066	0.57	2.72	1.46	9			
			V5065	0.35	4.63	1.5	11			
1	V500		V 5064	0.27	1.99	0.74	9	V500	=>95	
			V 5059	0.23	5.01	1.01	9			
			V5057	0.05	3.75	1.36	13			
		V505	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			
	U600	U6050		0.03	2.65	1.17	3	U600	=>95	
			U5069	0.22	1.45	0.74	7			
			U5068	0.35	4.32	2.1	11			
		U506	U5067	0.01	2.82	1.28	19		=>95	
			U5066	0.2	5.46	1.7	76			
2			U5065	0.27	4.65	2.06	75			
2	U500	11505	U5055	0.17	5.00	2.08	82	U500		
		0303	U5054	0.28	2.3	1.05	4			
		U504	03031	0.06	5.76	1.95	84			
		11502	U5036	0.01	1.88	0.43	60			
		0503	U5035	0.01	1.66	0.49	54			
		U502		0.07	0.21	0.14	5			
		T516		0.5	0.95	0.72	2		=>95	
		T515		0.2	3.35	1.1	111			
	T500	T514		0.17	2.44	1.05	111	T500		
		T513 T507		0.32	0.33	0.32	2			
		T506	T5067	0.39	3.3 2.48	0.93	111			
			T5066	0.2	2.40	0.93	107			
3		1000	T5065	0.11	2.85	1.1	105			
-			T5058	0.2	4.71	1.55	111			
		T505	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			
	<b>D</b> 500	T504		0.43	3.67	1.63	111	<b>D</b> 500	> 05	
	R300	K300		0.27	9.14	2.43	80	R300	=>93	
	R300			0.28	7 14	2.08	82	R 300	=>95	
	10500	R206		0.08	3.72	1.02	75	10500	->95	
4		R205		0.32	7.3	1.88	61			
	R200	D204	R2045	0.03	2.62	0.87	33	R200	=>95	
		K204	R2044	0.23	2.12	0.77	26			
		R203		0.55	1	0.77	2			
		Q550		0.3	4.3	1.35	77			
	0.500	Q506	0.500.5	0.12	5.23	1	72	0.000		
5	Q500	Q505	Q5055	0.34	5.05	1.63	31	Q500	=>95	
		0502	Q5054	0.19	0.19 4.01 1.51 29	<u> </u>				
	0400	0400		0.08	1.49	0.82	5	0400	=>05	
	Q 100	N507		0.08	1 79	0.77	15	Q-100		
		N506		0.25	9.57	3.87	94			
	N500	N505		0.21	10.15	2.1	96	N500	=>95	
6		N504		0.36	9.45	2.11	98			
		N503		0.08	11.67	2.25	35	N400	=>95	
		N405		1.04	4.9	3.38	6			
	N400	N404	N4045	0.28	8.26	2.15	72			
1			1,104	N4044	0.18	4.24	1.22	70		

# Table 5-2: Seam Hierarchy for BN

Page 59

Nº	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		
		K506	K 5055	2.37	3.07	2.72	2		
		K505	K 5055	0.12	14.71	2.39	93		
	K500	K504	120001	0.14	7.87	2.36	88	K500	=>95
7		K 503	K5036	0.14	2.56	0.8	72		
/		K303	K5035	0.05	6.42	0.9	80		
		K407		0.15	2.64	1.06	<u>66</u>		
	K400	K400		0.14	3.68	0.55	64	K400	=>95
		K404		0.53	1.97	1.08	9		
	J605			0.08	1.03	0.48	11	J605	=>95
	J604			0.43	6.09	2.49	133	J604	=>95
	J600	1500		0.08	2.46	0.67	69	J600	=>95
8		1505		0.01	5.91	3.46	131		
0	J500	J504		0.36	1.14	0.76	4	J500	=>95
		J503		0.46	0.55	0.5	3		
	1400	J406			7.61	0.97	69		=>05
	3400	J405		0.01	2.43	0.92	62	3400	75
0	1500	I506	15066	0.03	11.26	1.21	160	1500	. 05
9	1500	1505	15065	0.02	6.38 8.94	1.38	160	1500	=>95
		1505	H5086	0.10	5.07	1.5	213		
		H508	H5085	0.01	8.3	2.09	213		
		H507		0.01	14.96	3.32	223		
		H506		0.01	27.05	3.06	224		
10	H500	H505		0.04	16.42	2.73	224	H500	=>95
		H504		0.02	10.13	2.29	220		
		H502		0.01	0.93	0.42	134		
		H501		0.01	0.97	0.28	84		
		G506		0.03	1.12	0.33	73		
		G505		0.17	3.54	1.49	178		=>90
		G504	0.502.5	0.23	5.36	1.17	175		
			G5035 G5034	0.07	4.9	1.29	172		
	G500	G503	G5034	0.04	2.95	0.69	115	G500	
			G5032	0.06	0.55	0.34	113		
		G502		0.04	4.46	0.74	133		
		G501	G5016	0.01	4.3	0.92	116		
		0.501	G5015	0.01	2.78	0.64	108		
11		G450	G457	0.29	0.45	0.37	2		
		0450	G455	0.14	0.42	0.27	13		
		G408	0100	0.11	3.48	0.99	117		
		G407		0.01	6.79	1.18	122		
	G400	G406		0.06	4.38	1.02	130	G400	=>90
	0400	G405	0.40.45	0.09	4.95	0.98	157	0400	- 10
		G404	G4045	0.15	3.39	1.28	160		
			G4044	0.20	4.27	0.72	146		
		G403	G4034	0.03	5.53	1.79	161		
		G402		0.09	7.43	0.9	95		
		F506		0.2	3.28	1.03	10		
	F500	F505		0.14	13.45	3.02	96	F500	=>95
		F504		0.16	19.77	3.51	91	1300	
12		F303		0.05	1.5	1.89	16		
		F405		0.03	14.41	2.81	67	F400	
	F400	F404		0.21	15.26	2.26	54		=>95
		F403		0.18	12.76	2.41	37		
		E508		0.38	1.49	0.82	6		
13	E500	E506		0.28	4.6	1.22	12	E500	=>90
1		E505		0.12	7.39	2.37	23		

Nº	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		
	F400	E405		0.33	7.19	1.76	6	F400	=>90
	L400	E404		0.19	2.39	0.92	5	1,400	-> 50
		D555		0.28	0.48	0.41	3		
		D554		0.83	1.48	1.15	2		=>90
		D552		0.52	0.83	0.67	2		
	D500	D507		0.48	1.04	0.7	3	D500	
14	D300	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
	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		
15		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		
		B506		1.36	1.65	1.51	2	B500	=>90
		B505		0.77	3.56	2.18	5		
16	B500	B504		0.46	1.54	1.01	4		
		B503		0.54	2.4	1.24	4		
		B502		0.47	1.64	0.91	3		
		A504							
	A 500	11001	A 5035					A 500	=>90
	11000	A503	A 5034					- A500	- 70
		A405	110001					A400	
	A400	A404							=>90
17		A 305							
		A 304						A300	
	A 300	A 303							=>90
	A300	A303	A 3025						
		A302	A3024						

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rable	<b>J-J</b> :	Seam	nierarchy	TOL	ING

Nº	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	
	¥500	Y504		4.17	4.17	4.17	1	V500	->00	
	1500	Y503		7.88	7.88	7.88	1	1300	90	
1		Y405		0.39	0.39	0.39	1		=>90	
	Y400	Y404		0.5	1.39	0.95	2	Y400		
		Y403		0.22	1	0.61	2			
		X513		0.47	5.47	1.5	6	X500	=>90	
	X500	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			
2		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			
	¥400	X407		3.1	3.1	3.1	1	¥400	->00	
	A400	X405		0.4	2	1.05	5	A400	=>90	
Nº	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	
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		X404		0.65	2.38	1.64	7			
		X403		0.28	4.17	1.83	6			
		X402 X401		0.91	1.9	2.7	6			
		X305		0.53	0.53	0.53	1			
	X300	X304		0.8	0.8	0.8	1	X300	=>90	
		X303		0.25	0.25	0.25	1			
		W 508		0.38	1.51	0.78	4			
		W506		0.23	2.85	1.46	6			
3	W500	W505		0.74	4.41	2.55	5	W500	=>90	
		W504		0.24	0.83	0.63	4			
		W503		0.21	3.88	2.05	2	-		
		W501		0.49	0.55	0.52	2			
		V555	N/COCO							
			V 5069 V 5068	1	1	1	2			
		V506	V5065	0.85	0.85	0.85	1			
			V5064	0.41	2.71	1.22	3			
	1/500		V5059	0.35	0.78	0.57	2	NGOO	2.05	
	V 500		V 5058 V 5057	0.65	6.79	3.11	11	V 500	=>95	
		V505	V5056	0.37	2.2	1.1	11			
			V5055	0.59	4.23	1.71	11	]		
4			V5054	0.4	3	1.21	13			
		V504	V 3033	0.8	6.43	2.72	6			
		V405		0.35	2.28	1.12	8			
		V404		0.1	4.3	2.5	11			
	V400	V403		0.41	6.61	1.89	11	V400	=>95	
		V402 V401		0.43	2.38	0.96	8			
		V307		0.15	2.89	0.77	7			
	V300	V305		0.43	0.43	0.43	1	V300	=>95	
		V 304 V 303		0.55	0.55	0.55	1			
		¥ 303	U5069	0.55	0.55	0.55	1			
		U506	U5068							
			U5067	0.74	2.49	2.11	7	-		
			U5065	0.74	<u> </u>	2.11	22			
	U500	11505	U5056	1.69	5.06	2.86	6	U500	=>95	
_		0303	U5055	0.28	6.03	1.76	21			
5		U504	115025	0.25	6.62	1.93	17			
		U502	03033	0.25	2.4	1.73	<u></u>			
		U405		0.25	8.25	2.63	14			
	*****	U404		0.54	12.9	3.07	13			
	U400	U403		0.57	7.17	2.54	10	U400	=>95	
		U402		10.69	10.69	10.69	1			
		T516		0.4	5.95	1.82	16			
		T515		0.15	3.2	1.02	21			
		T514 T513		0.4	1.7	1.01	19			
		T512		0.25	10.82	2.23	17			
		T511		0.24	5.02	1.44	15			
6	T500	T508		0.5	10.73	2.58	15	T500	=>95	
		1507	T5067	0.3	5.38	1.66	6			
		T506	T5066	1.8	1.8	1.8	1			
			T5065	0.28	6.67	2.02	9			
		7505	T5058	1.1	2.68	1.65	7			
			1305	T5056	0.97	4.21	2.1	6		

N₂	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		
		D 505	T5045	0.82	2.61	1.74	6		
		R507		0.2	8.3	1.93	18		
		R506		0.44	9.04	1.98	22		
	R500	R505 R504		0.4	5.52	2.03	6	R500	=>95
		R 503		0.43	2.1	1.09	4		
		R 502		0.85	0.85	0.85	1		
		R408		0.3	4.03	1.5	16		
7		R407		0.5	6.96	1.74	11		
	R400	R406		0.75	2.41	1.36	8	R400	=>95
		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
		R206		0.94	1.77	1.26	5		
	R200	R205		0.8	0.8	0.8	1	R200	=>95
		R204	R2045	2.22	2.22	2.22	10		
		0550	Q556	0.15	1.86	0.78	12		
		Q550	Q555	0.44	4.43	1.39	12		
		0506	Q554	0.45	3.25	1.52	12		
		Q300	05055	0.2	4.05	0.6	2		
8	Q500	Q505	05055	0.5	4 23	1.89	10	Q500	=>95
		0504	Q3034	0.5	1.45	0.99	5		
		0503		0.57	1.54	0.92	3		
		Q502							
		Q501		1.06	1.06	1.06	1		
		N508		0.24	7.4	1.81	9		
		N507		0.28	1.66	0.81	8		
		N506		0.45	7.29	1.87	8		
	N500	N505		0.37	11.96	4.59	4	N500	=>95
		N504		0.55	14.14	8.32	8		
		N503		1.1	12.97	7.87	5		
		N502		1.9	1.9	1.9			
9		N408		0.45	4.31	1.03	6		
		N407		0.4	5.14	2	6		
	N400	N405		0.5	4 54	2 23	6	N400	=>95
	11100	N404	N4044	0.57	7.3	2.9	5	11100	. ,5
		N403		0.01	1.08	0.55	5		
		N402		0.85	1.77	1.26	3		
	NI200	N356		0.95	0.95	0.95	1	NI200	-> 05
	11300	N355		0.95	0.95	0.95	1	11300	93
		K506		0.7	5.46	2.32	3		
		K505	K5055	2.74	5.87	4.36	2		
		K504		1.18	6.45	5.06	3		
	K500	TT COO	K5036	3.47	3.47	3.47	2	K500	=>95
10		K503	K5035	1.05	1.05	1.05	1		
		TZ 500	K5034	0.43	0.6	0.52	2		
		K502		1.68	1.68	1.68	1		
	K400	K407		1.09	1.09	1.09	1	K 400	->05
	<b>K</b> 400	K405		5.82	5.82	5.82	1	K400	95

(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.

Туре	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

## Table 5-4: Summary of the BN original analytical database.

The THG original laboratory database, number of samples and the available laboratory determined analytical results are summarised in Table 5-5.

Туре	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
Gindex	-	

Table 5-5: Summary of the THG original analytical database.

(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.

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

Table 5-6: Summary of the BN original analytical database.

(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 airdry 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

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;

## o 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)



Xtrans = 1.86 + (1.11 x ((Mar - 4.71)/2.16))

Figure 5-10: BN area QGX Histogram- H seam coal sample moisture (asreceived)



Figure 5-11: BN area ER Histogram- H seam rock sample moisture (asreceived)



Xtrans = 2.28 + (1.11 x ((Mar – 5.35)/2.25))

Figure 5-12: BN area QGX Histogram- H seam rock sample moisture (asreceived)



Figure 5-13: BN area ER Histogram- H seam coal sample moisture (air-dry)



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)



Figure 5-15: BN area ER Histogram- H seam rock sample moisture (air-dry)



# 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.

	Туре	Number	%
Total num	ber 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

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 airdry 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.







Figure 5-19: BN Relationship between ash and volatile matter. (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.



Figure 5-23: THG Relationship between ash and true relative density.



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.

### 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.



Figure 5-28: THG ASTM classification of the coal based on rank.

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:

## o 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 moistures.

### Table 5-8: Summary of the moisture transformation formulas for QGX data

				••••••		16.6	
-	All and fired	alwest.	- Marrow	and a second	-	Constant.	ICHINA
	as based on	104	6.76	110	8/8	2.85	TRACT + 1121 (MP-112)(122)
1.21	as also say	(111)	2.87	0.00	427	1.78	7%(<237+(0.00+))800+627(0.70)
101	100	0.00	18.75		1.40	8.94	1448+811+(8.8).4(7/447+7.4(20.5G)
		100	6.11	0.00	2.18	0.08	185, -113+(0.001)(//wst-2.0003.86))
	as mining	.014	1.14	1.29	1.(2	113	TH(+1.0+(1.20+))NW+0.06(2.17)
1.1		188	1.76	1.18	4.17	1.8*	THE # 1/10+(110+1/100++17/10.07)
1.5	44.44	(1.8	3.47	1644	4.89	12.25	1444 + 231+ (231+ (0/44+1), M((0.22))
		198	6.19	10.92	2.84	1,66	1446 × 1.16+ 20.00 ± (2546+1.10010.461)
1500	as account.	.02.6			ARE	177	This a trace is a second second second and the second seco
14.1	1.1.1.1.1.1.1.1.1	1980		1.000	-4.94	1.1.8	This was from the set of the set
1.5%	and the second	(2.8	2.78	0.26	1.00		104.434.79485496001144547640C
1	10.00	12(2)	+		- 4		TANK of the Rest Construction (Instrument Design)
	as month and	11.9	1.75	9.13	238	5-20	m(+191+(0.00+(0.00))
	11111111111	108	2.88	840	418	4.2.9	744+249+(K48+[]Am+478(128))
123	arm.	12.8	- 344	3638			Tab. + to Net for Hills in prepared
	5575 C	100	4.75	6.22			Harry was been been an you would be an
	as made and	10.0	3.75	1.07		5.00	THE # 2 TE # (1.82 * (1.82 * (1.86 + #.04) E.84)
1.00	1.1.1.1.1.1.1	168	1.17	1.29	6.22	1.79	74.+517+(228+)(AM-+682)(278)
12.	100	10.0	285	1.22	1.11	625	(del) + 0.00+ (0.00+(///w/-1.12//0.12))
	1998 C	120	1.12	1524	118	5.25	5461+128-3131+(/Wet+132)(230)
	acceptence of	C26	5.88	3.22	4.71	2.18	N(+C10+(L11))N(+470/L10)
		.7908	2.18	8.83	5.88	2.29	(%4+128+(\$31+10m>410G128))
10.1	at any	ink	1.878	622	546	6.29	Mart + 12.73+ 32.32+(3Wart + 6.42)(3-38)
	Print .	1908	L KOM	4.68	2,54	0.78	Field # 229+10.29+10-46+2.20(10.20)
11	at worked.	204	1.10	1,14	4.41	1.96	\$44139+3.00+138#+4405.001
1123		1965	3.77	8.87	5.08	647	TR2+122F+122T+120W++525012271
1.5%	and the second s	1000	- 15.84	634	8.74	6.58	fall_=2.82+12.84+((Next-1.70)(0.96)
1	P. 1911	100	1.11	6.58	2.98	0.90	1846-+131-0.01/11/00-1201-0.001
	at land one	104	447	530	446	236	745.e 6.874 (E.83.41) HB + 4.44(2.28)
1.0	10 - 10 C	1001	3.84	\$33	8.07	1.60	TVL+3.21+12.32×3/WW-5.079/2.081
20		124	28.0	2.87	2.94	0.33	Alget = 2 42 + 12.87 +13/84 + 5 461/2 201
1	area a	158	1.19	6.48	180	594	\$85,41,88+32,514(1)(\$81-1,81)(0,86)
-	as about the	188	1.51	(音報)	5.96	232	794+582+72.62+3.00#-5.00(243)-
1.00	and the second	1996	8.13	429	8.08	2.52	765+538+1538+1538+138# +833074485
1.25	46943	72.6	3.98	8.54	1.58	8.27	585+038+(0.5)+(548+1.85/0.21)
	1. 1. 1.	1967	5.88	986	3.28	\$25	1466 v 2287 v 328 v 326
	and	12.8	3.85	ATT	\$.28	2.04	WA+282+(5.17+()N#C+524((2124))
100	0.00000	100	5.82	1.11	\$32	1.61	764 x XX2+(122.4)(MW +8.32)/18())
100	61.65	100.00	\$.13	76.35	5.30	6.17	Marts + 1.1.1 + 30.25 x ( ( Mart + 1.365 (5.27))
-	100 M 100	100	5.85	675	4.28	118	586(+180+0.59)/3682+4.0621.551
	as more all	044	1.84	0.65	438	2.40	74-141-141-10A0-0344-1496/310
141		100	2.89	424	#35	1.82	154/w2.88/v25.52 x35 Mdf +4.75(/3.86)
1.00	22.22	104	8.04	6.63	2.75	0.37	686,+3.08+(0.01+(1986-1.02)0.02)
-		ink	1.89	045	201	0.16	5642 = 1.85+35 Ht + 104645 = 2.06575 MT
	al and a second s	128	1.89	040	8.00	1.87	7%+1.89+(0.40)(9/8++840)(1.87)
100		1981	8.12	3.844	-A33	2.68	MAAL12+0297+(NW-+6222/256)
100	at an	62.6	1.00	1.44	128	11.80	Field + 1.20+(0.40+(0.903+2.20)/0.303)
1		19.00	8.22	0.98	140	0.77	1045-1173-05.8F1()/WHT-2.9520.8C0
	arminant.	124	18.84	10.68		1.85	Bill 4239+[0.801] Hill -44(23.88)
1	111111111	1948	3.00	1.01	4.54	1.64	THE + 3 RR + [1.22 + ] N/+ + + 24(13.8%)
1	1000	104	1.18	1034	2.08	6.85	1,04,+1,13+(0,14+)(0,00+-1,12)(0,00)
	and a second	110	147	40	1.50	1.14	Mell + 1.87+ (0.00+)/Med +1.00+0.000
	ALL STATES	100	10.00	1.04	838	1114	No. and Surgerman in Long Street
1.0		188	5.28	3.00	\$47	275	No. + the Employeet an job attacking to be
1.1	Sec. 10	(2.8	3.03.	(0.17)	1.76	0.03	\$46.+1.01+(0.07+(i)/86+1.10i/0.00)
-	and a	100	1.34	134	2.28	849	Mex.+128+36.841)(Hex-2.20/0.851)

### 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
- $Vd = 100 / (100 Mad) \times Var$
- FCd = 100 Ad Vd
- $CVd = 100 / (100 Mad) \times CVar$
- $TSd = 100 / (100 Mad) \times Tsar$
- *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:

- $Aar_t = (100 TM_t) / 100 x Ad$
- $Var_t = (100 TM_t) / 100 x Vd$
- $FCar_t = 100 TM_t Aart Vart$
- $CVar_t = (100 TM_t) / 100 \times CVd$
- $TSar_t = (100 TM_t) / 100 \times TSd$
- $TRDar_t = (100 TM_t) / 100 \times TRDd$

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
- $CVadt = (100 Madt) / 100 \times CVd$
- $TSadt = (100 Madt) / 100 \times TSd$
- 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.

Seam.;	Coal	Rock
E	1.5	2.68
F	2.71	2.47
5	1.72	2.37
н	2.12	2.48
t	2.32	2.76
ji ji	2.09	3.29
×	1.87	3.62
N	1.82	3.34
Q	1.81	3.53
8	1.97	2.97
T	1.78	2.34
:U.	2.33	2.98

#### Table 5-9: Missing moisture as-received values

Seam	Coal	Rock
D	1	1.9
E	0.88	1.35*
F	0.81	1.28
G	0.71	1.21
Н	0.75	1.09
I	0.83	1.36
J	0.82	1.41
К	0.93	1.68
N	0.88	1.69
Q	1.11	1.9
R	1.06	1.69
Т	1.2	1.23
U	1.18	1.47

## Table 5-10: Missing moisture air-dry values

(Source: Tsolmon)

## 5. <u>Validating previous regressions for added coal quality datasets</u>

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



Figure 5-30: BN moisture relationship between pre 2018 and 2018 drilling campaigns.

(Source: Tsolmon)

## • Madt=0.0037\*TMt<sup>2</sup>+0.1634\*TMt+0.6539

## o 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.



Figure 5-32: BN calorific value relationship between pre 2018 and 2018 drilling campaigns.

## • 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.



Figure 5-34: THG All data, ash versus volatile matter regression.

(Source: Tsolmon)

## o 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



Figure 5-38: BN sample results selected for calculation of missing data

## • TRDadt = 1.2518 x exp ( 0.0081 x Aadt)

8. <u>Calculate transformed as-received basis from transformed air-dry basis.</u>

After estimating the missing coal quality values from the above regressions, asreceived 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. <u>Calculate transformed as-received basis from transformed air-dry basis.</u>

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.

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

 Table 5-11: Distribution of CSN values by coal seam.

(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.

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

Table 5-12: Cumulative percentage distribution of CSN values.

(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.

### 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

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  $45^{\circ}$ .

• 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  $50^{\circ}$  there would be a 3.2% probability of a critical plane existing.

## 5.10.4 East Pit

Steep older batters (about  $65^{\circ}$  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  $35^{\circ}$  and  $40^{\circ}$ .

## 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  $25^{\circ}$ . 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.

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

 Table 5-13: BN Geotechnical Domains, Mohr Coulomb Criterion

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  $54/307^{\circ}$  and  $63/340^{\circ}$ . Set 3 consists chiefly of faults and jointing with a scatter of bedding planes and has mean dip and dip direction of  $71/172^{\circ}$ .

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  $54/310^{\circ}$  and  $65/341^{\circ}$  respectively. Set 3 has a dip and dip direction of  $74/172^{\circ}$ . 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.

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

## Table 5-14: Structural Summary for East and West Pits

(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)

Page 103



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  $15^{\circ}$ .

		Slope Angle			Critical Surfaces		
Pit Wall Sector*	Wall Section	Batter Scale	Trial Slope	Slope Dip Direction	Analysis Type^	Critical (%)	Remarks
		42		160	WSA	8	
ED/NI	West		34		WSA	5	
EF/N	west	42			FTA	8	
			25		FTA	3	
		58			PSA	5	
			50	191	PSA	3	
ED/NI	Fact	58			WSA	27	
EP/N	East		31		WSA	5	
		58			FTA	5	
			46		FTA	3	
		44		132	FTA	32	
			24		FTA	4	
		44			DTA	7	Direct toppling
EP/NW					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

Table 5-15: BN East Pit, Summary of Kinematic Analysis Results

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)

			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		
	West		34		WSA	5		
		69		162	PSA	17		
			56		PSA	4		
W/D/N	Central	69			WSA	33		
VVI /IN	Contrai		46		WSA	5		
		69			FTA	21		
			30		FTA	0		
		61		189	WSA	21		
	East		37		WSA	5		
W P/IN	East	61			FTA	11		
			43		FTA	4		
	NT - 141-	64		201	FTA	14		
WP/NE	North		42		FTA	0		
		76		165	PSA	15		
			45		PSA	3		
	North	76			WSA	36		
WP/NW			32		WSA	4		
		76			FTA	12		
			35		FTA	4		
	0 1	45		136	WSA	16		
WP/NW	Central		33		WSA	5		
		54		124	WSA	21		
	C(1		32		WSA	5		
WP/NW	South	54			FTA	6		
			47		FTA	3		
		44		312	PSA	2		
	<b>NT</b> 4		50		PSA	3	Maximum angle	
WP/SE	North	44			WSA	6	ŭ	
			42		WSA	5		
		45		321	PSA	2		
WD/CE	Control 1		50		PSA	3	Maximum angle	
WP/SE	Central	45			WSA	8	<u>U</u>	
			42		WSA	4		
NUD (GE	0 1	40		324	PSA	0		
WP/SE	South		50		PSA	4	Maximum angle	

Table 5-16: BN West Pit, Summary of Kinematic Analysis Results

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  $30^{\circ}$  to  $37^{\circ}$  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  $15^{\circ}$  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  $23^{\circ}$  (assuming a  $30^{\circ}$  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).

Weathered Overburden	
(Minimum depth 30 m): Maximum batter of catch berm at base of weathering.	$45^{\circ}$ or bedding dip (whichever is the lower) and minimum 10 m wide
Fresh Overburden	
End walls and low walls, overall slope a	ngles, 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°.
<b>High walls:</b> maximum overall slope angle 3 and berm width 9 m.	$55^{\circ}$ with maximum batter angle of 50°. Maximum batter height 20 m
Interim wall angles: Under review	

Table 5-17: Summary of Current BN Pit Slope Design Specifications

(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).

Weathered Overburden					
(Minimum depth 30 m): Maximum batter of catch berm at base of weathering.	$45^{\circ}$ or bedding dip (whichever is the lower) and minimum 10 m wide				
Fresh Overburden					
High walls, overall slope angles, batter	angles and batter heights				
	Maximum overall slope angle $35^{\circ}$ with maximum batter angle of $50^{\circ}$ .				
North and South Limbs	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 a	angles, and batter heights				
	Bedding dip 0° to 20°: Maximum overall slope angle 30° Bedding dip 20° to 30° develop parallel to bedding.				
North and South Limbs	Bedding dip >30°: maximum OSA 30°.				
North and South Limos	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 a	ngles, and batter heights				
South limb	Maximum overall slope angle $35^\circ$ with maximum batter angle of $50^\circ$				
	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 Courth limba	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					

Table 5-18: BN Geotechnical Design Table for LOM Study (February 2013)

(Source: AMC)

In the 2010 report the term South Limb was used to describe the shallower dipping (southern) side of the syncline (seam dips  $30^{\circ}$  to  $70^{\circ}$  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  $70^{\circ}$  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  $70^{\circ}$  coal bench slopes at 40 m depth, the EX3600 model was also run for a slope of  $40^{\circ}$  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).

Excavator and Weight in Tonnes	Ground I Mod (kF	Pressure elled Pa)	Cover Depth (m)	Seam Dip (°)	Stand-off Distance from Crest	4 m High Bench FOS Solid Coal	4 m High Bench FOS Sheared Coal
	Front 2 m	Rear			(m)		
Liobharr P4000					2	1.07	0.53
(346)	345	225	40	70	1.5	0.97	
					1	0.87	0.42
	290	200	40	70	2	1.14	0.56
					1.5	1.04	
Hitachi EX3600					1	0.94	0.45
(346)			200	70	1.5	1.04	
			40	40	1.5	2.28	1.09
					2	1.18	0.57
(239)	270	190	40	70	1.5	1.07	
					1	0.97	0.45
Cat 200DI (99)	160	115	40	70	2	1.47	0.65
Cat 590DL (90)	100	115	40	70	1	1.22	0.53

Table 5-19: Coal Bench FOS for Excavators at Varying Offset Distances from the Crest

(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 shortterm 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<sup>3</sup>/h and 1193.4 m<sup>3</sup>/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,  $1 \ge 1$  meter bombs were taken from 5 seams.

Bhole	Bhole Depth	True Depth	Seam	Total (M <sup>3</sup> /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	1500	4.41

Table 5-20: Indicative Gas bomb results

# 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 expit 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 1<sup>st</sup> 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.

Your 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.

Year	Company	Drilling type	Borehole	Total depth (m)
2005	067	Core	137	34204.3
2005	QGA	Structure borehole	31	1930
2006	QGX	Core	213	61512.7
Total			381	97647

Table 7-1: QGX 2005- 2006 borehole data summary

(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 2	007- 2009 borehole	data summary
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Drining Type	Core	PCD	RC	TOTAL
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)

Page 120



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.

Site	Year	Company	Drilling type	Borehole	Total meter
2011		MMC	Large diameter	10	653.5
	2011	MMC	Structure borehole	16	3366
BN 2012	MMC	Core	33	10355	
	2014	MMC	Core	33	13537
ТКН	2012	MMC	Core	32	9961.7
		124	37873.2		

Table 7.2. Ensure	Decession 2014	0040 0044	h a na h a l a	
Table 7-5: Energy	Resources 2011-	2012, 2014	Dorenoie	uata summary

(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
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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<sup>2</sup> 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  $C^{\circ}$  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<sup>2</sup> 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)

Page 133
# 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.

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.

# 8.6 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: ashcontents, volatiles, and thickness of plastic rock beds for simple samples for all seamintersections 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 inseam 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:

٠	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

٠	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.

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.

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

Table 8-1: ERCCL Laboratory and SM Laboratory compared.

\*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.

	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						

Table 8-2: Average ERCCL values and differences compared.

\*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).

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

#### Table 8-3: Reproducibility limits between laboratories.

\*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.

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

Table 8-4: Reproducibility of results between ERCCL and SM

\*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.



Figure 8-9: Comparison of ash determinations.



Figure 8-10: Comparison of volatile matter determinations.

(Source: Pretorius)

Page 148



Figure 8-11: Comparison of total sulphur determinations.

(Source: Pretorius)



Figure 8-12: Comparison of calorific value determinations.



Figure 8-13: Comparison of true relative density values.



\*Note: Free Swelling Index (FSI) = Crucible SwellingNumber (CSN)

#### Figure 8-14: Comparison of Free Swelling Index determinations.

(Source: Pretorius)

Page 150

#### 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.

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

Table 8-5: ERCCL Laboratory and UUH Laboratory compared.

\*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.

	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

#### Table 8-6: Average ERCCL values and differences compared.

\*Note: Free Swelling Index (FSI) = Crucible Swelling Number (CSN)

Borehole	Sampla number	Sulphur (% dry)		
number	Sample number	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	

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.

 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.

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

 Table 8-8: Reproducibility of results between ERCCL and UUH

\*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.



Figure 8-16: Comparison of ash determinations.



Figure 8-17: Comparison of volatile matter determinations.



Figure 8-18: Comparison of total sulphur determinations.



(Source: Pretorius)

Figure 8-19: Comparison of calorific value determinations.



Figure 8-20: Comparison of true relative density values.



\*Note: Free Swelling Index (FSI) = Crucible SwellingNumber (CSN)



(Source: Pretorius)

Page 157

#### 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 95<sup>th</sup> 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).

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

# Table 9-1: Summary of Points of Observation File

(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 A	As-Received Coal Quality
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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		IM	Ash	VM	FC	Gross CV	S
	RD (g/cc)	(%)	(%)	(%)	(%)	(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 31<sup>st</sup> 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.

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.



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)

Page 171

#### 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.

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		

Table 9-5: Default coal quality values for partings

(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)

Page 173

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).

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

#### Table 9-6: Summary of Points of Observation File

(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.

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

#### Table 9-7: Summary of data used for Resource Estimate

(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	RD	ТМ	Ash	VM	FC	Gross CV	S
STATISTCS	(g/cc)	(%)	(%)	(%)	(%)	(Kcal/kg)	(%)
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

	RD	IM	Ash	VM	FC	Gross CV	S
All-DIV STATISTCS	(g/cc)	(%)	(%)	(%)	(%)	(Kcal/kg)	(%)
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

#### 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.

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.



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)

Page 180

#### 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.

Air I	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		

#### Table 9-10: Default coal quality values for partings

(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.

Volume (x1,000,000 м <sup>3</sup> )	Tonnes (x1,000,000)	Relative Density (g/cc)	Ash (%)	Total Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA - BHWE	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, cla	use 25, Rounding								

#### Table 10-1: Total Resources on an As-Received (AR) Basis

(Source: Energy Resources LLC)

Volume	Tonnes	Relative	Ash (%)	Inherrent	Volatile	Gross Calorific	Sulphur (%)	Fixed	Classification
(x1,000,000 m <sup>3</sup> )	(x1,000,000)	Density (g/cc)		Moisture (%)	Matter (%)	Value (Kcal/kg)		Carbon (%)	
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, cla	* IORC Code, clause 25, Rounding.								

Table 10-2: Total Resources on an Air-Dry (AD) Basis

The volume of unclassified resources is 332 million m<sup>3</sup>.

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.

Volume	Tonnes	Relative	A = h (0()	Total	Volatile	Gross Calorific	Culabur (0/)	Fixed	Classification
(x1,000,000 m <sup>3</sup> )	(x1,000,000)	Density (g/cc)	Asn (%)	Moisture (%)	Matter (%)	Value (Kcal/kg)	Sulphur (%)	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, cla	use 25, Rounding								

Table 10-3: Total Resources on an As-Received (AR) Basis

Table 10-4: Total Resources on an Air-Dry (AD) Basis

Volume (x1,000,000 м <sup>3</sup> )	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, cla	use 25, Rounding								

The volume of unclassified resources is 36 million m<sup>3</sup>.

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.

MMC 30th June 2015 - J	JORC (2012)				
Total Coal Resources		Resource	es 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 202	21 - JORC (201	2)			
Total Coal Resources		Resource	es Category (as	received)	
Depth Limits	Measured	easured 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 - JC	ORC (2012) vs M	MC 31st Decem	ber 2021 - JOR	C (2012)
Total Coal Resources		Resources C	ategory (as reco	eived) 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 C	Category (as reco	eived) 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%

## Table 10-5: Comparison of New with Previous JORC Resource estimates – Non JORC

(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.

MMC 30th June 2015 - J	ORC (2012)								
Total Coal Resources		Resourc	es 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		Resourc	es 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 - JC	ORC (2012) vs M	MC 31st Decen	ıber 2021 - JOR	C (2012)				
Total Coal Resources		Resources C	Category (as reco	eived) 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 C	ategory (as reco	eived) 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%				

 Table 10-6: Comparison of New with Previous JORC
 Resource estimates – Non

 JORC

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<sup>2</sup> 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  $36^{\circ}$ C and  $-38^{\circ}$ 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 <u>peer</u> 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 and 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.

Volume (x1.000.000 μ <sup>3</sup> )	Tonnes (x1.000.000)	Relative Density (g/cc)	Ash (%)	Total Moisture (%)	Volatile Matter (%)	Gross Calorific Value (Kcal/kg)	Sulphur (%)	Fixed Carbon (%)	Classification
BUQA - BHWE	Kajoogooom) (kajoogooom) (kaj								
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)

Table 11-1: Total Resources on an As-Received (AR) Basis

Volume	Tonnes	Relative	A = h (0()	Inherrent	Volatile	Gross Calorific	Culabur (0()	Fixed	Slassifiaatian
(x1,000,000 m <sup>3</sup> )	(x1,000,000)	Density (g/cc)	Asn (%)	Moisture (%)	Matter (%)	Value (Kcal/kg)	Sulphur (%)	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, cla	use 25, Rounding	3.							

Table 11-2: Total Resources on an Air-Dry (AD) Basis

(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.

Volume	Tonnes	Relative	Ash (%)	Total Moisturo (%)	Volatile	Gross Calorific	Sulphur (%)	Fixed	Classification
(X1,000,000 M )	(X1,000,000)	Density (g/cc)		worsture (76)	Iviattei (70)	value (Kcal/Kg)		Carbon (76)	
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	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, cla	use 25, Rounding	Į.							

Table 11-3: Total Resources on an As-Received (AR) Basis

(Source: Energy Resources LLC)

Volume (x1,000,000 m <sup>3</sup> )	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)

Table 11-4: Total Resources on an Air-Dry (AD) Basis

(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

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#### 13 Date and Signature

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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.

#### 16 References

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## 17 Glossary of technical terms

3D	Three-dimensional.
0⁄0	Percent.
° 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.
СР	'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
М	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 <sup>3</sup>	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

## **Appendix 2: Procedures**

# Appendix 3: Table of Base of Weathering and Quaternary for all boreholes that it was logged.

Appendix 4a: Points of Observation – (as-received basis)
### Appendix 4b: Points of Observation – (air-dry basis)

### **Appendix 5: Laboratory Certificates**

#### Appendix 6a: Complete analytical database showing (asreceived) coal quality

# Appendix 6b: Complete analytical database showing (air-dry) coal quality

## Appendix 7: Graphs on a seam by seam basis and for each coal quality parameter

#### Appendix 8: Borehole profiles with LAS and coal quality

## **Appendix 9: Borehole sections**

## Appendix 10: Seismic sections & map

#### Appendix 11a: Resources by seam (air-dry)

Appendix 11b: Resources by seam (as-received)

### Appendix 12: Laboratory audit reports

## Appendix 13: Seismic reports

Appendix 14: PEER review

## Appendix 15: Geotechnical report

#### Appendix 16: List of Downhole geophysical equipment

### Appendix 17: Faulted boreholes and plies

(Please see CD or Hard copies that accompany this report)

Page 221

#### Appendix 18: Inserted and extrapolated data points

#### Appendix 19: Resource category areas per ply

### Appendix 20: Capability Statement

## Appendix 21: UHG Geochemistry

Appendix 22: Reserves

## Appendix 23: Hydrogeology

#### Appendix 24: Variograms

## Appendix 25: JORC Table 1

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#### Section 1: Sampling Techniques and Data

Criteria	Commentary
Sampling	Nature and quality of sampling.
techniques	<ul> <li>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.</li> <li>Each coal ply was logged for brightness and sampled separately in</li> </ul>
	intervals of $\leq 2$ metres ("m"). Stone bands $\leq 2$ 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
	<ul> <li>appropriate calibration of any measurement tools or systems used.</li> <li>For cored boreholes, coal plies were fully cored and sampled.</li> <li>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.</li> <li>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.</li> <li>The logging geologists were supervised and regularly tested on performance for procedural compliance by Mr. Barkhas, Chief Geologist, geology and geotechnical, as internal auditor.</li> </ul>

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).
	<ul> <li>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:</li> </ul>
	- $C1 = >90\%$ bright
	- $C2 = 60-90\%$ bright
	- $C3 = 40-60\%$ bright
	- $C4 = 10-40\%$ bright
	- $CS = 1-10\%$ 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	Method of recording and assessing core and chip sample recoveries and results
recovery	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
	<ul> <li>Samples were measured for weight but this mainly served as a cross check with the laboratory.</li> </ul>
	• 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.
	<ul> <li>All coal plies were fully cored and logged to CoalLog standard. All logged coal cores were fully sampled including rock parting ≤ 50cm.</li> </ul>
Sub-sampling	If core, whether cut or sawn and whether quarter, half or all core taken.
techniques and sample	• The whole core was sampled for coal analysis.
preparation	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.
	<ul> <li>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.</li> <li>At the BN central logging facility core boxes were placed in the dedicated photography area and photos taken. The core was laid out on</li> </ul>

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.
	<ul> <li>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.</li> <li>The ERCCL was accredited to ISO/IEC 17025:2017 (MNS ISO/IEC 17025:2018) standard in November 2020 and expires in July 2023.</li> </ul>
	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.
	<ul> <li>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.</li> <li>The ERCCL generally reported the coal quality parameters lower than the ALS laboratory and generally higher than the UUH laboratory with variant degrades of mereoducibility between laboratories.</li> </ul>

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	The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.
data and laboratory tests	<ul> <li>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).</li> <li>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), Calorific value (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).</li> <li>The coal analyses are sufficient to determine a Resource.</li> <li>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.</li> <li>For geophysical tools, spectrometers, handheld XRF instruments, etc., the parameters used in determining the analysis including instrument make and model, reading times, 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.</li> </ul>
	• Gradient-array resistivity survey was undertaken by Geomaster LLC ("Geomaster") in July 2005 with more than 13km <sup>2</sup> 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 <sup>2</sup> . 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.
	<ul> <li>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.</li> <li>Laboratory certificates were supplied by ERCCL . No certificates were supplied by QGX Coal Ltd ("QGX") for testing completed at the SGS or ACIBL laboratories.</li> </ul>
	<ul> <li>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.</li> </ul>
Verification of sampling and	The verification of significant intersections by either independent or alternative company personnel.
assaying	<ul> <li>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.</li> <li>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.</li> </ul>
	• The MMC driffed 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.
	<ul> <li>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.</li> <li>All data from all exploration either historical or current has been coded</li> </ul>
	and converted into the CoalLog coding and form system and resides as one database.

Criteria	Commentary
	Discuss any adjustment to assay data.
	<ul> <li>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.</li> <li>It was identified that as-received and air-dried moisture from QGX</li> </ul>
	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	Data spacing for reporting of Exploration Results.
distribution	<ul> <li>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.</li> <li>Boreholes within the northern half of the BN license are roughly spaced</li> </ul>
	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	Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the denosit type
data in relation	
to geological structure	• 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.
	<ul> <li>For pre-2005 bore cores for the BN deposit, the following is quoted from (Dashkhorol et.al. 1989):</li> <li>'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</li> </ul>
	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.'
	<ul> <li>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 &lt;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.</li> <li>From 2006 to 2009 MBGS was commissioned to revise and update the sampling methodology. This sampling methodology is dependent upon</li> </ul>
	(i) the reconciliation of geological core logs to geophysical logs prior to sampling (ensuring better allocation of core losses), and (ii) the
Criteria	Commentary
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	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.
	<ul> <li>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:</li> <li><i>The UHG exploration procedures and practices are of extremely high calibre, exceeding both the Australian Standards for coal evaluation and sampling (AS 2519—1993 &amp; 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.'</i></li> </ul>
	• 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
	<ul> <li>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.</li> <li>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).</li> </ul>

#### 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.
	<ul> <li>The BN coal deposit now consists of two mining licenses:</li> <li>Baruun Naran Mining License MV-014493 covering 4486 hectares ("ha"), converted from an Exploration License on 01 December 2008; and</li> </ul>
	- 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	Acknowledgment and appraisal of exploration by other parties.
Exploration done by other parties	<ul> <li>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.</li> <li>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<sup>2</sup> (Khosbayar et al., 1983).</li> <li>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 northwesterly 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).</li> <li>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.</li> </ul>
	estimations to be made by MBGS and SKK respectively in 2010.
Geology	<ul> <li>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.</li> <li>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</li> </ul>

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:
	$\circ~$ easting and northing of the drill hole collar
	<ul> <li>elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar</li> </ul>
	$\circ$ dip and azimuth of the hole
	$\circ~$ down hole length and interception depth
	$\circ$ 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	These relationships are particularly important in the reporting of Exploration Results.
mineralisation	• No exploration results are reported.
widths and intercept lengths	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.
	<ul> <li>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.</li> </ul>
	<ul> <li>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</li> </ul>

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
	<ul> <li>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.</li> <li>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.</li> </ul>
	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
	<ul> <li><i>those visits.</i></li> <li>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</li> </ul>

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.
	<ul> <li>Detailed mapping from the various campaigns from the 1940's.</li> <li>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.</li> <li>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</li> </ul>

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.
	<ul> <li>The essence of the data used is borehole observations with support from detailed mapping, resistivity and 2D High Resolution Seismic Survey.</li> <li>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.</li> </ul>
	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.
	<ul> <li>The geology was used in understanding deposit limits and structure. The geology was also used to determine deposit type.</li> </ul>
	• 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
	<ul> <li>No work to the knowledge of the CP has been completed for BN or THG licenses.</li> </ul>
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed
	<ul> <li>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 grids.</li> </ul>
	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.
	<ul> <li>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.</li> <li>The estimated Resource is reported on 'as received' basis and 'air dried' basis</li> </ul>
Cut-off	The basis of the adopted cut-off grade(s) or quality parameters applied.
parameters	• 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.
	<ul> <li>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.</li> <li>The Resource estimate for this report has had no assumptions made on the estimate for beneficiation.</li> </ul>
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.
	<ul> <li>All environmental issues are managed by the Company's environmental department which has operated since the start of mining.</li> <li>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.</li> <li>During all site visits there have been no obvious environmental issues of leachates emanating from spoil piles or from coal stockpiles.</li> </ul>
Bulk density	<ul> <li>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.</li> <li>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.</li> <li>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.</li> </ul>

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 95 <sup>th</sup> 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: <i>'The UHG exploration procedures and practices are of extremely</i> <i>high calibre, exceeding both the Australian Standards for coal</i> <i>evaluation and sampling (AS 2519—1993 &amp; AS 2617—1996) and</i> <i>the benchmark coal industry best practices (as observed by Mr.</i> <i>Sercombe in the Bowen Basin, Australia). The accurate and</i> <i>unbiased assignment of coal core loss to coal samples, achieved in</i> <i>the UHG practices, is commendable. The coding, for modelling, of</i> <i>all significant stone band partings in the seams and of inter-burden</i> <i>units between the seams is also praiseworthy. The Exploration and</i> <i>Geology Department are a group of young enthusiastic geologists</i> <i>who have been well trained and led by Gary Ballantine. I would</i> <i>have high confidence in the reportable results obtained from the</i> <i>UHG exploration procedures.'</i>
	<ul> <li>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.</li> <li>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 &amp; Geology group and knowledge transfer,</li> </ul>

Criteria	Commentary
	<ul> <li>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.</li> <li>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).</li> </ul>
Discussion of relative accuracy/ confidence	<ul> <li>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.</li> <li>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.</li> <li>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</li> </ul>

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, it local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.			
	<ul> <li>The Resource estimates for this report is a global estimate to international standards and meets all JORC (2012) requirements.</li> <li>All assumptions and procedures for the Resource estimate are documented within the report sections or as Appendices.</li> </ul>			
	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-006/25 07<sup>th</sup> February 2025

Dr. Battsengel Gotov Executive Director and Chief Executive Officer Mongolian Mining Corporation 16<sup>th</sup> Floor, Central Tower, Great Chinggis Khaan's Square, SBD-8, Ulaanbaatar-210620a, MONGOLIA

Dear Sir

# <u>SUBJECT:</u> Ukhaa Khudag Coal Mine (UHG) – Statement of Open Cut Coal Reserves as at 1st January 2025

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 of 01 January 2025 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**").

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 when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include

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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"

Estimate of the Coal Resource of UHG deposit has been updated as of 31 December 2024 by MMC. In this statement UHG has identified a Coal Resource of 539 Mt (as received moisture basis) of which 445 Mt is classified as Measured, 29 Mt as Indicated and 65 Mt as Inferred Geological Resources to a depth of up to 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, competent person). Coal quality studies have identified the potential to produce both hard and semi-soft coking coal and thermal coal products. Since completion of the previous Coal Resource estimate, no further exploration data has been incorporated into structural or coal quality geological models.

UHG is a complex and highly faulted coal deposit, with moderate to steeply dipping seams of predominantly hard coking coals.

As at 01 January 2025, the UHG total Open Cut Coal ROM reserves of 340 Mt are shown in Table-1 and the total Marketable reserve of 210 Mt are shown in Table -2. In this study topographic survey information was only updated to account for depletion as result of 31 December, 2024 and no other changes has been done from previous reserves report.

The previous Coal Reserves Statement for UHG was prepared as at 01 January 2024 by Glogex Consulting LLC ("Glogex"). The comparison between two statements is outlined in Table-3.

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Table-1. Total coal reserve	as at 01 January 2025 (ROM)
-----------------------------	-----------------------------

Coal type	Reserve category (Mt)		
	Proved	Probable	Total (Proven+Probable)
Coking Coal	311	10	321
Thermal Coal	19	0	19
Total	330	10	340

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

#### Table-2. Total Marketable reserve as at 01 January 2025

Cool turo	Reserve category (Mt)		
Coartype	Proved	Probable	Total (Proven+Probable)
Coking Coal	144	4	148
Midlings	42	1	43
Thermal Coal	19	0	19
Total	205	5	210

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)

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Coal Reserves as at 01 January 2024 (ROM)	354
Coal Mined and depleted 01 January 2024 to 01 January 2025	(14)
Increase in Coal Reserves identified in the 2024 Reserves estimate that are economically viable for mining at 01 January 2025	-
Coal Reserves as at 01 January 2025 (ROM)	340

## Table-3: Comparison of Coal Reserves to Previous Coal Reserves Statement (Mt)

Notes:

- Estimate has been rounded to reflect accuracy
- Coal Reserve is above 450m depth limit below topographical surface

Coal Reserves as at 01 January 2025 (ROM)

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 23 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

1

GLOGEX CONSULTING LLC ("GLOGEX")



GC-01/FEBRAURY 2022



## **Document Control Sheet**

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Mongolian Mining Corporation			
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Statement of Open Cut Coal Reserves	25 <sup>th</sup> February, 2022		
As at 1st January 2022, UKHAA KHUDAG Coal Mine			
Report No	Revision No		
GC-01-22	1		

Authorizations					
	Name	Position	Signature	Date	
Reviewed by	Naranbaatar Lundeg	Mining management, AusIMM member #326646, General director	A	25 <sup>th</sup> February, 2022	
Prepared by	Byambaa Barkhas	Associate consultant and Senior Geologist, AusIMM member #318198	Ħ	25 <sup>th</sup> February, 2022	
Prepared by	Buyan-Ulzii Narankhuu	Associate consultant, Senior mineral processing engineer, AusIMM member#327826	app	25 <sup>th</sup> February, 2022	
Prepared by	Khaliun Tsolmon	Associate consultant Senior mining engineer AusIMM member #326531	the	25 <sup>th</sup> February, 2022	
Prepared by	Sambuudorj Erdenebat	Senior mineral economist.	Contessoon	25 <sup>th</sup> February, 2022	

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## 5. Mining Unknown Factors

The ability of any person to achieve forward-looking production and economic targets is dependent on numerous factors that are beyond GLOGEX's control and that GLOGEX cannot anticipate. These factors include, but are not limited to, site-specific mining and geological conditions, management and personnel capabilities, availability of funding to properly operate and capitalize the operation, variations in cost elements and market conditions, developing and operating the mine in an efficient manner, unforeseen changes in legislation and new industry developments. Any of these factors may substantially alter the performance of any mining operation.

GC-01/FEBRAURY 2022



# **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 1<sup>st</sup> 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, 31<sup>st</sup> 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.

GC-01/FEBRAURY 2022



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

## Summary of UHG Mining Modifying Factors

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 1<sup>st</sup> 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:

039134.1/t product (ar),
US\$95.9/t product (ar),
US\$48.8/t product (ar),
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

#### GC-01/FEBRAURY 2022



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 Proved Coal 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.

	Reserve category (Mt)			
Coal type	Proved	Probable	Total (Proved + Probable)	
Coking Coal	341	10	351	
Thermal Coal	20	0	20	
Total	361	10	371	

#### Total coal reserve as at 01 January 2022 (ROM)

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 1<sup>st</sup> 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

#### GC-01/FEBRAURY 2022



Coal Reserves as at 1 <sup>st</sup> 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 01 <sup>st</sup> January 2022 (ROM)	371

#### Comparison of Coal Reserves to Previous Coal Reserves Statement (Mt)

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).

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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		

# Total Open Cut Coal Reserves by Seam

(Note: Estimate has been rounded to reflect accuracy)

GC-01/FEBRAURY 2022



Coking	Proved		Pr	obable	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	

# Marketable Coking Coal Reserves by Seam

(Note: Estimate has been rounded to reflect accuracy, Product coking coal total moisture is 8%)

GC-01/FEBRAURY 2022



Coking	Р	roved	Pr	obable	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	

# Marketable Middlings Coal Reserves by Seam

(Note: Estimate has been rounded to reflect accuracy, Product Middlings coal total moisture is 9%)

GC-01/FEBRAURY 2022

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– Ex G-11 –



Thermal	Proved		Prot	bable	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	

# Marketable Thermal Coal Reserves by Seam

# (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.

This report may only be presented in its entirety. Parties wishing to publish or edit selected parts of the text, or use the Statement for public reporting, must obtain prior written approval from Glogex Consulting LLC and the signatory of this report.

GC-01/FEBRAURY 2022



# Table of Contents

Exe	cutive Sum	mary	5
1.	Introduct	ion	16
	1.1.	Overview	16
	1.2.	Approach	17
	1.3.	Relevant Report and Studies	19
	1.4.	Previous Coal Reserve Statements	20
2.	Competer	nt Persons Statement	20
3.	Project D	escription	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 Res	erves 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

GC-01/FEBRAURY 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.

13



# 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	
Table 5-15. Coal historical price and benchmark price forecast exclusive VAT (DAP Ganqimaudu port,	China)
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

GC-01/FEBRAURY 2022



15

# 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

GC-01/FEBRAURY 2022



# 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 1<sup>st</sup> 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".

#### GC-01/FEBRAURY 2022



• **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.

GC-01/FEBRAURY 2022

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18



- 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 1<sup>st</sup> 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.

GC-01/FEBRAURY 2022





#### 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 30<sup>th</sup> 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 1<sup>st</sup> 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 1<sup>st</sup> 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

GC-01/FEBRAURY 2022

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- Ex G-19 -

20



## 1.4. Previous Coal Reserve Statements

The previous Coal Reserve Statement was the Statement of Open Cut Coal Reserves as at 1<sup>st</sup> 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.

GC-01/FEBRAURY 2022



21



## 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, 31<sup>st</sup> 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.

GC-01/FEBRAURY 2022



# 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").

#### GC-01/FEBRAURY 2022



# 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, 31<sup>st</sup> 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.

GC-01/FEBRAURY 2022

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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

#### GC-01/FEBRAURY 2022



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.

#### GC-01/FEBRAURY 2022



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).

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
<b>BUQA-BHWE</b>									
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)

## Table 4-1. Coal Resource by Depth (ar)

(Source: JORC (2012) Standard Resource Estimation Ukhaa Khudag JORC Statement as at 1st January 2022)

GC-01/FEBRAURY 2022



27

#### 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 1<sup>st</sup> January 2022, and have been carried out in accordance with the principles and guidelines of the Australasian Code for Reporting of Exploration 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.

GC-01/FEBRAURY 2022



## 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 1<sup>st</sup> 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.

GC-01/FEBRAURY 2022



Pit Highwall	Corresponding Ground	Maximum Overall		
Titriighwan	Control District	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		

# Table 5-1. Pit Optimiser Geotechnical Parameters

(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.

#### GC-01/FEBRAURY 2022

30



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%.

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	Summary	of UHG	Mining	Modifying	Factors
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#### GC-01/FEBRAURY 2022



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

# Table 5-3. UHG Default Dilutant Qualities

(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 30<sup>th</sup> 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 1<sup>st</sup> 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

#### GC-01/FEBRAURY 2022



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.

Seam Ply Hard Coking Product			
Search     Ply     ROM Ash - Yield Curve (% ad)     Product       7B     0.0127 x BOM Ash% + 0.0271		Product Ash (% ad)	
7	7B	-0.0127 x ROM Ash% + 0.9271	8.4
I	7A	-0.0139 x ROM Ash% + 0.9054	10.7
	6C	-0.0145 x ROM Ash% + 0.9039	12.3
6	6B	-0.0127 x ROM Ash% + 0.979	9.3
	6A	-0.0168 x ROM Ash% + 1.0211	9.1
	5AU	-0.0123 x ROM Ash% + 0.9349	7.8
5	5AL	-0.0105 x ROM Ash% + 0.7934	9.9
	5ALL	-0.0123 x ROM Ash% + 0.9163	9.8
	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
1	4A20	-0.0119 x ROM Ash% + 0.8723	9.3
4	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
	3AU	-0.0149 x ROM Ash% + 0.9775	11.3
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
Z	2	-0.0049 x ROM Ash% + 0.3916	12.5
1	1	-0.0049 x ROM Ash% + 0.3916	12.5
	0D	-0.0094 x ROM Ash% + 0.6882	15.4
0	0CR	-0.0094 x ROM Ash% + 0.6882	15.4
U	0CUU	-0.0102 x ROM Ash% + 0.7162	14.7
	0CUM	-0.0082 x ROM Ash% + 0.6613	13.7

Table 5-4. Hard Coking Coal "ROM Ash – Yield" Curve (Wash Plant - 1.425 Cut-Point Density)

GC-01/FEBRAURY 2022

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32

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
OBL	-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 Plv		Semi-Soft Coking Prod	luct
Seam	Fly	ROM Ash - Yield Curve (% ad)	Product Ash (% ad)
	12C	-0.0115 x ROM Ash% + 0.8126	7.1
12	12B	-0.0115 x ROM Ash% + 0.8126	7.1
	12A	-0.0115 x ROM Ash% + 0.8126	7.1
	11C	-0.0115 x ROM Ash% + 0.8126	7.1
11	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
10	10A	-0.0117 x ROM Ash% + 0.7921	8.7
0	9B	-0.01 x ROM Ash% + 0.7297	9.2
3	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.

GC-01/FEBRAURY 2022



		Middling Product				
Seam	Ply	Primery Product	Primery Cut- Point Density	ROM Ash - Yield Curve (% ad)	Product Ash (% ad)	
	12C	SSCC	1.40	-0.002 x ROM Ash% + 0.1304	18.0	
12	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	
	11C	SSCC	1.40	-0.002 x ROM Ash% + 0.1304	18.0	
11	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	
10	10A	SSCC	1.40	-0.0024 x ROM Ash% + 0.1661	18.0	
0	9B	SSCC	1.40	-0.0024 x ROM Ash% + 0.2137	18.0	
9	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	
1	7A	HCC	1.425	-0.0008 x ROM Ash% + 0.0919	23.2	
	6C	HCC	1.425	-0.0015 x ROM Ash% + 0.1831	23.1	
6	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	
	5AU	HCC	1.425	-0.0011 x ROM Ash% + 0.1021	19.9	
5	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	
	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	
1	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	
	3AU	HCC	1.425	-0.002 x ROM Ash% + 0.1411	20.5	
3	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	
<u> </u>	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	
	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	
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	

# Table 5-6. Middlings Coal "ROM Ash – Yield" Wash Plant Curves

GC-01/FEBRAURY 2022



1	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 1<sup>st</sup> 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.

GC-01/FEBRAURY 2022

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

# Table 5-8. Historical mining cost per ROM ton of coal, 2018-2021H1

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

#### GC-01/FEBRAURY 2022



## 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**.

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

# Table 5-11. Historical site admin cost per BCM

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

GC-01/FEBRAURY 2022



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

#### GC-01/FEBRAURY 2022



# DAP price coal quality of MMC coals at Ganqimaodu (excl. customs duty, VAT and prices prior to inspection)

		CV	А	Μ	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							
o	- ·								

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 Gangimaodou port of China.

The coal selling prices assigned to each product, were:

- Hard coking coal < 11.0% ash (dry):
- Semi-soft coking coal < 9.5% ash (dry):
- Middlings coal ~ benchmark CV 6,000 kcal/kg (gar):
- Thermal coal ~ benchmark CV 5,000 kcal/kg (gar):

US\$134.7/t product (ar), US\$95.9/t product (ar), US\$48.8/t product (ar), US\$30.7/t product (ar).

GC-01/FEBRAURY 2022



The royalty provided by MMC was assigned as a percentage of revenue generated by the product coal as summarized in Table 5-16.

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				

## Table 5-16. Royalty

# 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).

GC-01/FEBRAURY 2022

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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.

GC-01/FEBRAURY 2022





# Graph 5-1. Pit Optimization - Coal Price Sensitivity



Figure 5-2. Pit Optimization shell

GC-01/FEBRAURY 2022



Figure 5-3. Cross sections



#### GC-01/FEBRAURY 2022

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43



# 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.

GC-01/FEBRAURY 2022


### 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.

		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

### Table 5-18. Proved Open Cut Coal Reserves by Seam

(Note: Estimate has been rounded to reflect accuracy)

GC-01/FEBRAURY 2022

		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

### Table 5-19. Probable Open Cut Coal Reserves by Seam

(Note: Estimate has been rounded to reflect accuracy)

GC-01/FEBRAURY 2022



	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

### Table 5-20. Total Open Cut Coal Reserves by Seam

(Note: Estimate has been rounded to reflect accuracy)

GC-01/FEBRAURY 2022



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**.

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

### Table 5-21. Marketable Coking Coal Reserves by Seam

(Note: Estimate has been rounded to reflect accuracy, Product Coking coal total moisture is 8%)

GC-01/FEBRAURY 2022



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**.

Coking	Pi	roved	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

### Table 5-22. Marketable Middlings Coal Reserves by Seam

(Note: Estimate has been rounded to reflect accuracy, Product Middlings total moisture is 9%)

GC-01/FEBRAURY 2022



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.

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

Table 5-23.	Marketable	Thermal	Coal	Reserves	bv	Seam
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(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 1<sup>st</sup> January 2022. The reconciliation between reported Total Coal Resources estimated at 1<sup>st</sup> January 2022 and Total Coal Reserves estimated at 1<sup>st</sup> 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)

GC-01/FEBRAURY 2022



### 5.13. Coal Reserves Comparison to Previous Coal Reserves Statement

The previous Coal Reserves Statement for UHG was published at 1<sup>st</sup> January 2021 by GLOGEX. The Coal Reserves estimated in that Statement were 305 Mt. The comparison with the Coal Reserves presented in the 1<sup>st</sup> 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.

Coal Reserves as at 1 <sup>st</sup> 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 01 <sup>st</sup> January 2022 (ROM)	371

### Table 5-25. Comparison of Coal Reserves to Previous Coal Reserves Statement (Mt)

(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	<ul> <li>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.</li> <li>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 samples from open holes and trench samples were used for continuity purposes and were not used for resource calculations.</li> <li>Chip samples from open holes and trench samples were used for continuity purposes and were not used for resource calculations.</li> <li>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.</li> <li>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.</li> </ul>
	<ul> <li>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used</li> </ul>	<ul> <li>For cored boreholes, coal plies were fully cored and sampled.</li> <li>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.</li> <li>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.</li> <li>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</li> </ul>

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Criteria	JORC Code explanation	Commentary
	<ul> <li>Aspects of the determination of mineralisation that are Material to the Public Report</li> </ul>	<ul> <li>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 = &gt;90% bright, C2=60-90% bright, C3=40-60% bright, C4=10-40% bright, C5=1-10% bright and C6=&lt;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.</li> </ul>
Drilling techniques	<ul> <li>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.).</li> </ul>	<ul> <li>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.</li> <li>Core was mostly HQ3 size with some PQ3 size.</li> <li>Core bits were diamond impregnated and surface set to maximise recovery and minimise shattering of core.</li> <li>Generally, boreholes were drilled vertically with most having a down-hole verticality Log run.</li> <li>A small number of angle boreholes were drilled in the fault zone to determine the structure</li> </ul>
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	<ul> <li>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.</li> <li>Downhole geophysics was used to further assess the amount and location of linear core loss.</li> <li>Core photography in boxes also assisted later evaluation of loss.</li> <li>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.</li> <li>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.</li> </ul>

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Criteria	JORC Code explanation	Commentary
	<ul> <li>Measures taken to maximise sample recovery and ensure representative nature of the samples.</li> </ul>	<ul> <li>Modern drilling equipment and trained coal drillers was utilized.</li> <li>High quality drilling pipe, coring and drilling bits used.</li> <li>Expected high core recovery particularly in coal plies enforced with drilling contractor where ply sections with less than ≥95% were redrilled.</li> <li>Chip samples collected on a 1m basis and displayed clearly for rig geologist observation.</li> </ul>
	<ul> <li>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.</li> </ul>	<ul> <li>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.</li> </ul>
Logging	<ul> <li>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.</li> <li>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.</li> <li>The total length and percentage of the relevant intersections logged.</li> </ul>	<ul> <li>All core was logged geologically and geotechnically and recorded in hard copy and electronic format to COALLOG standard.</li> <li>Geological and geotechnical logging was qualitative with codes used to describe the different geological and geotechnical aspects of the core as per COALLOG standard.</li> <li>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.</li> <li>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.</li> </ul>

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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.
			• • •	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 10h shift. The coal core boxes are stored in refrigerated containers until logging. After logging anc sampling, the samples were returned to refrigerated containers until logging. After logging anc sampling, the samples were returned to refrigerated containers until logging. After logging anc sampling, the samples were returned to refrigerated containers until logging. After logging anc sampling, the samples were returned to refrigerated 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 torrected for the sample bag mass. Geotechnical rock samples were collected on each change of major lithotype. The samples were were placed in aluminium foil, then plastic and then water proof tape. The sample in double was weighed under the 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 accordited to 1 ISO/IEC 17025:2017(MNS ISO/IEC 17025:2018) standard in November 2020 and expires in July 2023.

GLOGEX CONSULTING LLC		UKHAA KHUDAG Coal Reserve Report
	<ul> <li>Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-halfsampling.</li> </ul>	<ul> <li>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</li> </ul>
		<ul> <li>Iaboratories by means of cross plots and basic statistical parameters.</li> <li>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</li> </ul>
		<ul> <li>laboratories.</li> <li>For work previously completed before 2009, it is unknown if a similar comparison exercise was done.</li> </ul>
		<ul> <li>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) Monodia branch in Illanchestar The EP Central Chemical Laboratory analytical results were</li> </ul>
		<ul> <li>The ER Central Chemical Laboratory by means of cross plots and basic statistical parameters.</li> <li>The ER Central Chemical Laboratory generally reported the coal quality parameters higher than the SGS Laboratory with varying degrees of reproducibility between laboratories.</li> </ul>
	<ul> <li>Whether sample sizes are appropriate to the grain size of the material being sampled.</li> </ul>	<ul> <li>Bulk samples were taken for dry and wet tumbler sizing analysis in 2008 and 2012.</li> <li>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.</li> <li>The 2012 work was completed for seams (0C, 3A, 4A and 4C) and the work was analysed at the ALS – Ulaanbaatar, Mongolia laboratory.</li> </ul>
		<ul> <li>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 10mm.</li> </ul>
		<ul> <li>The results of this work were for the design of the CHPP and Reserves. It did not have an impact on the Resource estimate.</li> <li>For work previously completed before 2008, it is unknown if a similar exercise was done.</li> </ul>

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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.	<ul> <li>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).</li> <li>In addition, bulk samples were taken in 2008 and 2012 for coke testing.</li> <li>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 ISO 589:2008), Analytical moisture (MNS GB/T 212:2015), Ash (MNS GB/T 212:2015), Volatile matter (MNS ISO 589:2008), Analytical moisture (MNS GB/T 212:2015), Ash (MNS GB/T 212:2015), Volatile matter (MNS ISO 589:2008), Crucible swelling number (MNS ISO 501:2003) and Caking index (MNS ISO 589:2005), Crucible swelling number (MNS ISO 501:2003) and Caking index (MNS ISO 589:2008), Total sulphur (ASTM D4239:2005), Crucible swelling number (MNS ISO 501:2003) and Caking index (MNS ISO 15585:2014).</li> <li>The coal analyses are sufficient to determine a Resource estimate and determine the potential coal products and support the marketability of the coal products.</li> <li>The coal analyses are sufficient to determine a Resource estimate and determine the potential coal products and support the marketability of the coal products.</li> <li>The coal analyses are sufficient to determine a Resource estimate and determine the potential coal products and support the marketability of the coal products.</li> <li>The laboratory under its certification did regular reproducibility and repeatability 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 constr</li></ul>
Criteria	JORC Code explanation	Commentary
	<ul> <li>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.</li> </ul>	<ul> <li>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.</li> <li>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.</li> </ul>
	<ul> <li>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.</li> </ul>	<ul> <li>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.</li> <li>Laboratory certificates were supplied by ERCCL, ALS the Russian lab and SGS lab.</li> <li>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.</li> </ul>

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<ul> <li>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.</li> <li>The ER Central Chemical Laboratory generally reported the coal quality parameters higher than the SGS Laboratory with varying degrees of reproducibility between laboratories.</li> </ul>	<ul> <li>A number of pre-2008 boreholes were twinned by the Norwest and Energy Resources ("ER") drilling programs.</li> <li>Coal thickness intervals were check with a high level of agreement.</li> <li>Coal thickness intervals were check with a high level of agreement.</li> <li>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, which were accepted for points of observation used in Inferred areas. In these boreholes, which were accepted for points of observation used in later 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.</li> <li>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.</li> </ul>
•	• The verification of significant intersections by either independent or alternative company personnel.
	Verification of Sampling and assaying

<b>GEX CONSULTING LLC</b>	

UKHAA KHUDAG Coal Reserve Report	Commentary	<ul> <li>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.</li> <li>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.</li> </ul>	<ul> <li>A number of pre 2008 boreholes were twinned by the Norwest and ER drilling programs.</li> <li>Coal thickness intervals were check with a high level of agreement.</li> <li>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.</li> <li>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, 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.</li> <li>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.</li> <li>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.</li> </ul>
X CONSULTING LLC	Criteria JORC Code explanation		The use of twinned holes.

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Criteria	JORC Code explanation	Commentary
	<ul> <li>Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</li> </ul>	<ul> <li>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.</li> <li>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 coal quality results were built into the existing ER Excel spreadsheets for validation and uploaded into the LogCheck data management software.</li> <li>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 company master database stored on the Micromine GeoBANK system. All data styrem and all data has been uploaded into the company master database stored on the Micromine GeoBANK system. All data form all exploration either historical or current has been coded and compary servers where the company master database stored on the Micromine GeoBANK system. All data form all exploration either management control the security server dire the Company ma</li></ul>

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 air determined coar quainy data on a seam group dasis were constructed and missing data calculated and added to the digital database.
		<ul> <li>Coal interval thicknesses were matched with wire-line geophysics according to normal industry standards. Expanded coal interval intersections and corresponding sample thickness were</li> </ul>
		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	<ul> <li>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.</li> </ul>	<ul> <li>The topographic and borehole collar survey was carried out by ER's own survey team using Trimble equipment.</li> <li>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</li> <li>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.</li> </ul>
	Specification of the grid system used.	<ul> <li>The grid system coordinates are UTM Zone 48 North. The same system was used for all survey data.</li> </ul>
	Quality and adequacy of topographic control.	<ul> <li>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.</li> <li>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.</li> </ul>
Data spacing and distribution	Data spacing for reporting of Exploration Results.	<ul> <li>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.</li> <li>The 2008 program was an infill drilling program that appeared to have an irregular design and spacing.</li> <li>The drilling program that covered 2009–2011 was a 50x50m square grid on</li> </ul>

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Criteria		JORC Code explanation	Gommentary
			<ul> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> </ul>
	<ul> <li>Whether the the degree the Mineral and classific.</li> </ul>	data spacing and distribution is sufficient to establish of geological and grade continuity appropriate for Resource and Ore Reserve estimation procedure(s) ations applied.	<ul> <li>The data spacing is sufficient to establish a high degree of geological and grade continuity appropriate for the Mineral Resource and classifications applied.</li> <li>An exercise in geostatistics to calculate estimated error on the estimate was completed which confirms high degree of geological and grade continuity.</li> </ul>
	Whether san	nple compositing has been applied.	<ul> <li>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.</li> </ul>
Orientation of data in relation to geological structure	Whether the of possible considering l	e orientation of sampling achieves unbiased sampling structures and the extent to which this is known, the deposit type.	<ul> <li>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.</li> <li>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.</li> </ul>

Commentary	<ul> <li>No evidence of bias due to borehole orientation has been observed.</li> </ul>	<ul> <li>No evidence of bias due to borehole orientation has been observed.</li> <li>As part of the geostatistical review on estimated error a check for anisotropy was made with no evidence that there was one.</li> </ul>	• 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 a seam without any amendment. In such cases, a complicated structure interval of a seam without any amendment. In such cases, a complicated structure interval of a seam without any amendment. In such cases, a complicated structure interval of a seam without any amendment. In such cases, a complicated structure interval of a seam without any amendment. In such cases, a complicated structure interval of a seam without any amendment. In such cases, a complicated structure interval of a seam without any amendment. In such cases, a complicated structure interval of a seam without any amendment. In such cases, a complicated structure interval of a seam without any amendment. In such cases, a complicated structure interval of a seam without any am
JORC Code explanation		<ul> <li>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.</li> </ul>	The measures taken to ensure sample security.
Criteria			Sample security

Criteria	JORC Code explanation	Commentary
preparation of samples, labe	lling and packing into the synthetic bags was made. Selected sample	<ul> <li>swere sent monthly to laboratory.</li> <li>The 2008 bore cores, little was mentioned in the Norwest report on sample security. The</li> </ul>
		following is summarised (Norwest 2008): only borehole core samples were assayed. Field camples usually no more than 0.5m of core length Incremental camples 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 megral coal seam units. Large diameter (1 Jurnin) core samples of kev 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

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Commentary	<ul> <li>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.</li> <li>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 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 importing into the master Excel spreadsheets for further processing and validation. Final data was seamlessly passed to the LogCheck software 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.</li> </ul>	<ul> <li>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 &amp; 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 at UHG.</li> <li>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 independent experienced competent Person qualified geologist provide a site visit and peer review. This was done by Mr Todd</li> </ul>
JORC Code explanation		<ul> <li>The results of any audits or reviews of sampling techniques and data.</li> </ul>
Criteria		Audits or reviews

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Commentary	<ul> <li>Sercombe, senior consultant for GasCoal Pty Ltd, a coal geologist with 18 years coal experience. Mr Sercombe's findings from the site visit were; <i>The UHG exploration procedures and practices are of extremely high calible, exceeding both the Australian Standards for coal evaluation and sampling (AS 2519–1993 &amp; 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 led by Gary Ballantine. I would have high confidence in the reportable results obtained from the UHG exploration and led by Gary Ballantine. I would have high confidence in the reportable results obtained from the UHG exploration are group of young enthusisatic geologysts who have been well trained and led by Gary Ballantine. I would have high confidence in the reportable results obtained from the UHG exploration and Ceology badinatine. I would have high confidence in the reportable results obtained from the UHG exploration are group of young enthusisatic geologysts 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.</i></li> <li>The exploration procedures.</li> <li>Mr Ballantine was Executive General Manager, Exploration and Geology and has responsibility for budgeting, planning, training and overall oversight of exploration at UHC. As part of the ongoing evolution of the ER geology group and knowledge transfer, supervised and structured succession of capable individuals, is planned.</li> <li>Mr Ballantine was Executive General Manager, Exploration and Geology and has responsibility for budgeting, planning, training and overall oversight of exploration procedures.</li> <li>Mr Ballantine was Executive </li></ul>
JORC Code explanation	
Criteria	

## 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	id tenure status and • 7		
JORC Code explanation	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 security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.	
Commentary	<ul> <li>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.</li> </ul>	<ul> <li>The license is 100% secure and owned by ER.</li> </ul>	

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done Irties	•	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 approach in conducts by confacted K D Demostroy.
			ai ≤ =	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.
			ب <u>م</u>	In 1977 at the request of the Government, MPR (Mongolian People's Republic), 'LENGIPROSHAHT' conducted technical and economic assessment for detailed
			Ш. Ө	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
			다. 다.	these was the area of UHG, which

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Commentary	<ul> <li>underwent a preliminary survey in 1987. As results of exploration-evaluation work established that the most valuable coal seams by quality and thickness are located the UHG deposit.</li> <li>In 1984-1989 continual testing of coal by the USSR's VUHIN Institute of Mincherm Institute completed studies of the chemical characteristics of the coking coal for Tse preliminary reports of the coal from Ukhaa Khudag and Tavan Tolgoi South.</li> <li>ER conducted an infill drilling and bulk sampling program at UHG in 2008, which was p and managed by Norwest. The purpose of this program was to address the issues id above and bring the bulk of the UHG resource to a level of geologic assurance su for mine planning and feasibility level study.</li> <li>A total of 111 Russian drilled holes were used in the Norwest model, the majority cored holes. The Norwest program included a total of 121 holes, comprised of gauge core holes (PQ/HQ), 99 slim rotary holes (± 100mm) and 5 large diameter co sample locations. A grand total of 232 holes were used in the creation of the current geologic model with an average drilled depth of approximately 200m.</li> <li>The 2008 program sufficiently increased the prior borehole density and validat historic Russian data to an extent sufficient for categorizing the UHG mine are masured plus indicated resource according to the JORC Code and thereby per advanced mine planning and economic evaluations to be conducted at current interm standards. The drilling plan will also penetrate to a depth of 600m, thus bringing pot underground mineable resources into a higher level of confidence.</li> </ul>	<ul> <li>and style</li> <li>The late Paleozoic was marked by the continental collision of a number of small continents that came together as convergent margins. As the Siberian Craton a North China block converged, ancient continental crust was thrust onto the continengin and small island arcs, subduction wedges, and ophiolitic belts were at as pre-existing</li> </ul>
JORC Code explanation		<ul> <li>Deposit type, geological setting of mineralisation.</li> </ul>
Criteria		Geology

GLOGEX CONSULTING LL	O	UKHAA KHUDAG Coal Reserve Report
Criteria	JORC Code explanation	Commentary
		<ul> <li>basement rock was deformed and faulted, and uplift initiated.</li> <li>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.</li> </ul>
Drill hole Information	<ul> <li>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:         <ul> <li>easting and northing of the drill holes:</li> <li>easting and northing of the drill hole collar</li> <li>elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar</li> <li>dip and azimuth of the hole</li> <li>down hole length and interception depth</li> <li>hole length.</li> </ul> </li> </ul>	<ul> <li>No exploration results are reported.</li> <li>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.</li> <li>Points of observation derived from this data are in Appendix 4A and 4B of this report.</li> </ul>
	<ul> <li>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.</li> </ul>	<ul> <li>No information was excluded from above criteria.</li> </ul>
Data aggregation methods	<ul> <li>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.</li> </ul>	<ul> <li>No exploration results are reported.</li> </ul>

Commentary		<ul> <li>No exploration results are reported.</li> </ul>	No exploration results are reported.	<ul> <li>No exploration results are reported.</li> </ul>	<ul> <li>No exploration results are reported.</li> </ul>	<ul> <li>No exploration results are reported.</li> </ul>	<ul> <li>No exploration results are reported.</li> </ul>	<ul> <li>No exploration results are reported.</li> <li>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.</li> <li>Polaris Seismic International was awarded the contract to conduct 2D Land High Resolution Seismic Survey at UHG in 2010. The 2D UHG 2010 Seismic program recorded 22 lines totalling 46,000m and the 2011</li> </ul>
JORC Code explanation	<ul> <li>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.</li> </ul>	<ul> <li>The assumptions used for any reporting of metal equivalent values should be clearly stated.</li> </ul>	These relationships are particularly important in the reporting of Exploration Results.	<ul> <li>If the geometry of the mineralization with respect to the drill hole angle is known, its nature should be reported.</li> </ul>	<ul> <li>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').</li> </ul>	<ul> <li>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.</li> </ul>	<ul> <li>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</li> </ul>	<ul> <li>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.</li> </ul>
Criteria			Relationship between mineralization widths and	nterceptienguns		Diagrams	Balanced reporting	Other substantive exploration data

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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	<ul> <li>No exploration results are reported.</li> </ul>	No exploration results are reported.
JORC Code explanation		<ul> <li>The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).</li> </ul>	<ul> <li>Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.</li> </ul>
Criteria		Further work	

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	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.	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●	or programs pre-2009, hard copy and scanned data was part of the data set supplied to R. All care has been taken in the translation, recoding and digitizing of this data into the OALLOG format. This data has been loaded into the LogCheck data management offware and validated for codes, depth errors and consistency. Where photographs exited are these were checked against the coded data. Final checks were data management ine-line geophysics and through sections with neighbouring boreholes for consistency. Or 2009-2014 programs the raw data was captured in forms using codes in the COALLOG timat in hard copy format. This data was then entered into the LogCheck data anagement software which has very strict validation rules. These rules assist in data anagement software which has very strict validation rules. These rules assist in data anagement software which has very strict validation rules. These rules assist in data anagement software which has very strict validation rules. These rules assist in data anagement software which has very strict validation rules. These rules assist in data anagement software which has very strict validation rules. These rules assist in data anagement software which has very strict validation rules. These rules assist in data as seamlessly uploaded into the GeoBANK database for laboratory access. Once the into the mase entered by the laboratory and validated it could be passed back to Geology for porting into the masset back data mase entered by the LogCheck data mase entered into the masset of further processing and validation. Correlation and points of observation checks are completed, points of observation and points of observation checks are completed, points of observation are produced by the LogCheck data mase entered in the cold be passed back to Geology for the mase seamlessly passed to the LogCheck data mase entered in the could be passed back to Geology for the tabilitation, correlation and validation and validation. Sinth was seamlessly passed to the LogCheck data mase of th	

Commentary	<ul> <li>The COALLOG codes and forms were used for logging which controlled the format al codes to be used. This data was entered once into the LogCheck data manageme software which has very strict validation rules on entered data.</li> <li>Once the coded and depth entered data was validated, borehole profiles were produce with wire-line geophysics. Coal intersections were validated with wire-line geophysical intersections and core loss or expansion was noted. Where coal loss occurrit was entered into the lithology log as a loss. These final boreholes are recorded Appendix 8 in the report. Borehole sections in southing and northing directions we 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 an anomalies investigated.</li> <li>Data was entered once into the LogCheck data management software figeology/header/drilling/LAS/Geotech data and once into the GeoBANK database fanalytical data. Data transfer for analytical data into LogCheck data management software software and LogCheck into the Micromine modelling software was done by passing cifles seamlessly.</li> </ul>	<ul> <li>An initial site visit was completed by Mr Ballantine as a consultant for Micromine F Ltd in late January 2009. The visit was commissioned by Mr Andrew Little, Technic Director (at the time) for ER. The purpose of this visit was to audit the topographical a geological data and to assess the quality of the information recorded into the digit 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 referent 'Australian Standards for coal evaluation and sampling (AS 2519—1993 &amp; AS 2617, 1996)' to compare with the data collected and is referred to as the standard. Numeroi issues were identified and Mr Ballantine was asked provided a full time service where providing budgeting, planning, procedures and training for required ongoing explorating following the initial visit (January 2009) recommendations overall oversight of exploration UHG.</li> </ul>
JORC Code explanation	Data validation procedures used.	<ul> <li>Comment on any site visits undertaken by the Competent Person and the outcome of those visits.</li> </ul>
Criteria		Site visits

Criteria	JORC Code explanation	Commentary
		<ul> <li>Mr Ballantine (Competent Person, Resource estimate- June 2012), thought it prudent</li> </ul>
		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.
		<ul> <li>Mr Ballantine currently holds the position of Executive General Manager, Exploration and</li> </ul>
		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.

Code explanation en undertaken indicate versely, the uncertaint of the mineral deposit.	Commentary	why this is the         All GPS coordinates of boreholes and boundary pegs chere           GPS device.         • Not applicable, see above section.	<ul> <li>V of) the Not applicable, see above section.</li> <li>Not applicable, see above section.</li> <li>Detailed mapping from the various campaigns from the 1: <ul> <li>A ground Magnetic and Gravity program was undert 2010. The results were high level and provided guidar anomaly and confirmation of broad coal basin limits.</li> <li>The 2D High Resolution Seismic Survey recorded 37 I and Roll Off methodology with 240 maximum active source proved invaluable in locating and understanding showed areas of little to no structure and this is c Seismic. In addition, the seismic results gave detailed surface limits.</li> </ul> </li> </ul>
JORC If no site visits have be case. Confidence in (or con geological interpretation	JORC Code explanation	If no site visits have been undertaken indicate case.	case. Confidence in (or conversely, the uncertaint) geological interpretation of the mineral deposit.
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Criteria	JORC Code explanation		Commentary
		The northern and southern fau by face-wall mapping by the	ult boundaries coal/basement contact has been confirmed geology mine team and angled geotechnical drilling along
		strike to confirm continuity.	
		The 'limit of oxidation' was detr and sampling from mine geolog	ermined by close spaced drilling and confirmed by mapping
		Seam correlation, continuity ar	d coal quality was confidently predicted by use of close
		spaced drilling in the easter	n and western areas and these results confirmed and
		supported by detailed ZU seism confidence where drill spacing	IIC. The confirmation of the seismic by artilling results gives is less that correlation and continuity in the seismic provides
		Where seismic displayed ma	Xists. ior structural zones and within these zones boreholes
		intercepting coal had low confi	dence 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 co	omputer 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 confide	nce to procedure to the final estimate.
		As a high level overarching cl	heck on the estimate and the confidence of the estimate,
		expected error on the estima	ate 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 o	determining overall error which, can be used to determine
		maximum error for Measure an	d Indicated categories which was 6% and 12% respectfully.
	Nature of the data used and of any assumptions made.	The essence of the data used i	s borehole observations with support from detailed mapping
		No assumption with a mate	courvey. rial 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 a	issumed to be adequate for inclusion of the estimate.

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UKHAA KHUDAG Coal Reserve Report	Commentary	<ul> <li>The geology was used in understanding deposit limits and structure. The geology was also used to determine deposit type.</li> </ul>	<ul> <li>The coal measure was limited by surface outcrop of the seams in the easternboundary.</li> <li>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.</li> <li>The western boundary was limited by the license boundary but the seams are continuous beyond this point.</li> <li>Within the deposit, major structural zones effected coal seam could and coal Rank increases due to the major structures effected coal quality.</li> </ul>	<ul> <li>The coal resource area is oriented generally in an east-west direction and is some 7.5km long and 3 km wide.</li> <li>The area of the license is 2960.23 hectare</li> <li>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.</li> <li>Drilling in the western area went to 700m depth and it is estimated the coal measures still extend another 300m past the drilling.</li> <li>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.</li> </ul>
		•	••••	se s
c	JORC Code explanation	The use of geology in guiding and controlling Mineral Resource estimation.	The factors affecting continuity both of grade and geology.	<ul> <li>The extent and variability of the Mineral Resource expressed a length (along strike or otherwise), plan width, and depth belo surface to the upper and lower limits of the Mineral Resource.</li> </ul>
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Criteria	JORC Code explanation	Commentary
Estimation and	The nature and appropriateness of the estimation technique(s)	The UHG resource estimate was carried out using Micromine's 18.0 and LogCheck
modelling techniques	applied and key assumptions, including treatment of extreme grade	Version 7.277 using the COALLOG geology data format as the database.
	values, domaining, interpolation parameters and maximum	<ul> <li>The method used for estimating Resources at UHG involved modelling an elevation grid for</li> </ul>
	uistance or extrapolation ironi uata points. In a computer assisted octimation mothod was choson include a description of computer	the major ply, 0AL, and modelling thickness grids for the other plies and partings. These
	estimation metrod was chosen include a description of computed software and parameters used.	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
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		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.
		<ul> <li>In order to create a reliable model of the seam morphology a cell size of 10m by 10m</li> </ul>
		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.

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riteria	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 arror tachnique so the experience of the Competent Derson 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.
		<ul> <li>Measured resources were estimated with points of observation at 350m, Indicated</li> </ul>
		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 for th Parti para	e applied to make sure that only points of observation for the selected ply were used ne interpolation of the blocks for that ply. ings within the model limits but without coal quality were given default coal quality imeters based on rock quality analyses.
	<ul> <li>The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.</li> </ul>	<ul> <li>Norvariable</li> <li>Norvation</li> <li>(exclained)</li> <li>exclained</li> <li>the vass</li> <li>t</li></ul>	west completed a JORC (2004) estimate in 2010. There was a 23 per cent increase in air-dried Resource with the JORC (2004) estimate completed by ER in 2012 (uding mine depletion). The JORC (2012) estimate (excluding mine depletion) based his report compares well with an increase in 3 per cent in total as-received Resource. completed a JORC (2012) estimate (excluding mine depletion) estimate in 2014. There a -17 per cent decrease in total as-received Resource with the JORC (2012) estimate pleted by ER in 2020 (excluding mine depletion). The art of the mine depletion). The art of the mine depletion is the mine depletion based is a -17 per cent decrease in total as-received Resource with the JORC (2012) estimate pleted by ER in 2020 (excluding mine depletion). The mine has produced 75.0 Mt since April 2009 and the mine geology team completes that (monthly) reconciliation of model/mined ROM tonnage. Where the model has good shole control the mine recovery is well aligned, however, once borehole control is there is a notable variance. The drilling campaigns that this estimate is based on the review of category limits under JORC (2012) means this notable variance will be mised and demonstrates the estimate is valid.
	<ul> <li>The assumptions made regarding recovery of by- products.</li> </ul>	<ul> <li>The Dependence</li> <li>prodi</li> </ul>	report in section 4.7.2.6 shows typical production figures from the CHPP. ending on which seam is being washed and what blends are being appointed three n products are produced. A mid-vol hard coking product, high-vol semi soft coking luct and high-ash middling by- product for the thermal coal market.
	<ul> <li>Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).</li> </ul>	Norv     for A     Furth     furth     All h     All h	west in their JORC (2004) estimate in 2010 mentions that samples were collected cid Generating Potential in 2008. her rock and in seam parting samples were collected by the ER geology team for ter work by EGI on Acid Generating Potential. tal of 631 samples were tested from these holes, including coal and parting samples. toles were sampled continuously except where there were missing intervals. Sample vals were selected by site geologists

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		<ul> <li>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.</li> <li>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 mittigate 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.</li> <li>This work lead to the design and disposal of high sulphur reject material from the CHPP in the waste dumps.</li> </ul>
	<ul> <li>In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.</li> </ul>	<ul> <li>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 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 the low the elevation grid and block size by RL was the Z value from the low the low grids.</li> </ul>

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	<ul> <li>Any assumptions behind modelling of selective mining units.</li> </ul>	All sea     modell     Resou     past th	ams were modelled, therefore there were no 'specific' horizons that were separately led. However, there is a change in minimum seam thickness for below 400m rices from 0.5m to 1.5m to reflect the possibility of only underground Resources lis depth.
	<ul> <li>Any assumptions about correlation between variables.</li> </ul>	<ul> <li>Missing regress</li> <li>assum</li> </ul>	g or non-analysed coal quality data due to limited sample mass was calculated by sions of determined coal quality data on a seam group basis and this has been led to be adequate for inclusion of the estimate.
	Description of the geological interpretation which was used to control the resource estimates.	<ul> <li>Geolog</li> <li>and continuent cont</li></ul>	gical interpretation using the seismic results was critical in identifying major structure confirming seam correlation and continuity. Much of these results have been med and updated by mine geology team detailed in-pit and face-wall mapping. orthern and southern fault boundaries coal/basement contact has been confirmed ac-wall mapping by the geology mine team and angled geotechnical drilling along to confirm continuity. mit of oxidation' was determined by close spaced drilling and confirmed by mapping impling from mine geology team. • seismic displayed major structural zones and within these zones boreholes these areas and deem them as Inferred which was not dependent on points of vation distance.
	<ul> <li>Discussion of basis for using or not using grade cutting or capping.</li> </ul>	<ul> <li>A grea what rc</li> </ul>	ater than 50% ash (DRY basis) cut-off was used to determine what coal was and ock was.
	<ul> <li>The process of validation, the checking process used, the comparison of model data to drill hole data, and use</li> </ul>	<ul> <li>The bl that blo</li> </ul>	lock model was firstly checked to ensure that all blocks were populated and ock values were within the same range as the input

to consider notential minima methods hur the	riteria JORC riteria of reconciliation data if available. • Whether the tonnages are moisture, and the method applied. • Assumptions made regaro nining dimensions and in dilution. It is always nee determining reasonable pri-	code explanation       code       cod <tr< th=""><th>Commentary         Commentary           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, 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 G0205f. QD333, G02212 and G02056 for the ply 3AU which was compared with the block model. The manual result was within 3 per cert in tonnage of the block model result. This comparison is within acceptable limits.           Molisture 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.           Molisture 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.           Molisture was analysed as TM (MNS ISO 589:2008) and Analytical moisture (MNS GB/T 2015.015). TM was assumed to equal in-situ moisture and the Preston Sanders formula was used to convert air-dry relative density. The estimated Resource is r</th><th></th></tr<>	Commentary         Commentary           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, 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 G0205f. QD333, G02212 and G02056 for the ply 3AU which was compared with the block model. The manual result was within 3 per cert in tonnage of the block model result. This comparison is within acceptable limits.           Molisture 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.           Molisture 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.           Molisture was analysed as TM (MNS ISO 589:2008) and Analytical moisture (MNS GB/T 2015.015). TM was assumed to equal in-situ moisture and the Preston Sanders formula was used to convert air-dry relative density. The estimated Resource is r	
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to consider potential mining methods, but the	determining reasonable pr to consider potential	sspects for eventual economic extraction nining methods, but the	maximum in-seam parting thickness which has been taken from engineering operational	
determining reasonable prospects for eventual economic extraction maximum in-seam parting thickness which has been taken from engineering operational	<ul> <li>Assumptions made regarce</li> <li>Assumptions made regarce</li> <li>mining dimensions and in dilution. It is always need</li> </ul>	ing possible mining methods, minimum ternal (or, if applicable, external) mining essary as part of the process of	<ul> <li>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</li> </ul>	
Mining factors or assumptions         Assumptions made regarding possible mining mining dimensions and internal (or, if applicable, external) mining assumptions         The UHG mine has produced 79.2 Mt since April 2009 as a large-scale "truck and shove" operation and has an 15Mt/year capacity CHPP. No mining assumptions have dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction         The UHG mine has produced 79.2 Mt since April 2009 as a large-scale "truck and shove" operation and has an 15Mt/year capacity CHPP. No mining assumptions have dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction         The UHG mine has produced 79.2 Mt since April 2009 as a large-scale "truck and show in the mining assumptions have been applied to the Resource estimate other than minimum coal thickness and determining reasonable prospects for eventual economic extraction			<ul> <li>Maximum parting thickness to be included in the Resource of 0.5m.</li> <li>Coal Quality limit with Ash content greater than 50% (DRY basis) being excluded from the Resource Estimate.</li> </ul>	
<ul> <li>Maximum parting thickness to be included in the Resource of 0.5m.</li> <li>Maximum parting thickness to be included in the Resource of 0.5m.</li> <li>Coal Quality limit with Ash content greater than 50% (DRY basis) being excluded from the Resource Estimate.</li> <li>Assumptions made regarding possible mining methods, minimum assumptions and internal (or, if applicable, external) mining assumptions and internal (or, if applicable, external) mining determining reasonable prospects for eventual economic extraction determining reasonable prospects for eventual economic extraction</li> </ul>	ameters • The basis of the adopted applied.	cut-on grade(s) or quality parameters	<ul> <li>No maximum seam unickness.</li> <li>Minimum seam thickness to be included in the Resource of 0.5m to 400m depth and then 1.5m below 400m.</li> </ul>	
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<ul> <li><i>Cut-off parameters</i></li> <li><i>The basis of the adopted cut-off grade(s) or quality parameters</i></li> <li>The estimated Resource is reported on "as received "basis and "air dried" basis</li> <li><i>Cut-off parameters</i></li> <li>The basis of the adopted cut-off grade(s) or quality parameters</li> <li>No maximum seam thickness to be included in the Resource of 0.5m to 400m depth and then 1.5m below 400m.</li> <li>Mining factors or and the adopted regarding possible mining methods, minimum assumptions and internal (or, if applicable, external) mining dilution. It is always mecessary as part of the process of the applied to the Resource stration thickness and internal (or, if applicable, external) mining dilution. It is always mecessary as part of the process of the applied to the Resource stration minimum contraction and the restingtion and internal (or, if applicable, external) mining dilution. It is always mecessary as part of the process of the applied to the Resource stration and has an 15Mt/year capacity CHPP. No mining assumptions and determining reasonable prospects for eventual economic extraction</li> </ul>	Whether the tonnages are     muisting and the method	estimated on a dry basis or with natural	Moisture was analysed as TM (MNS ISO 589:2008) and Analytical moisture (MNS GB/T	
Moisture         Whether the tormages are estimated on a dry basis or with natural moisture content.         Moisture was analysed as TM (MNS ISO 589:2008) and Analytical moisture (MNS GB/T moisture) and the method of determination of the moisture content.           212:2015). The was assumed to equal in-situ moisture and the method of determination of the moisture content.         212:2015). Th was assumed to equal in-situ moisture and the Preston Sanders formula was used to convert air-dry relative density.           Cut-off parameters         The basis of the adopted cut-off grade(s) or quality parameters         No maximum seam thickness.           Cut-off parameters         The basis of the adopted cut-off grade(s) or quality parameters         No maximum seam thickness.           Rut-off parameters         The basis of the adopted cut-off grade(s) or quality parameters         No maximum seam thickness.           Rut-off parameters         No maximum seam thickness.         No maximum seam thickness.           Rut-off parameters         No maximum seam thickness to be included in the Resource of 0.5m to 400m depth and then 1.5m below 400m.           Rut-off parameters         No maximum seam thickness to be included in the Resource of 0.5m to 400m depth and then 1.5m below 400m.           Rut-off parameters         No maximum seam thickness to be included in the Resource of 0.5m.           Assumptions         Minimum seam thickness to be included in the Resource of 0.5m.           Assumptions         Assumptions made regarding posstible mining methods, mininum the Resource Estimate. <th></th> <td></td> <td></td> <td></td>				
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Moleture       • Whether the lonnages are estimated on a dry basis or with natural       • Moleture block model result. This comparison is within acceptable limits.         Moleture       • Whether the lonnages are estimated on a dry basis or with natural       • Moleture and the method of determination of the moleture content.         Noteture       • Whether the lonnages are estimated on a dry basis or with natural       • Moleture and the method of determination of the moleture content.         Noteture       • Whether the lonnages are estimated on a dry basis or with natural       • Moleture as analysed as TM (MNS ISO 5892008) and Analytical moleture (MNS GBT 212:2015). Thus was assumed to equal in-situ moleture (MNS GBT and situe (MNS GBT and situe) and the method of determination of the moleture.         Cut-offparameters       • The basis of the adopted cut-off grade(s) or quality parameters.       • No maximum seam thickness.         Cut-offparameters       • The basis of the adopted cut-off grade(s) or quality parameters.       • No maximum seam thickness.         Cut-offparameters       • The basis of the adopted cut-off grade(s) or quality parameters.       • No maximum seam thickness.         Cut-offparameters       • No maximum seam thickness.       • No maximum seam thickness.         Cut-offparameters       • No maximum seam thickness.       • No maximum seam thickness.         Cut-offparameters       • No maximum seam thickness.       • No maximum seam thickness.         Cut-offparameters       • No maximum parting thicknese			<ul> <li>The further manual check will be completed by the Competent Person where an area including boreholes G02057. G02193. G02212 and G02056 for the plv 3AU which was</li> </ul>	
<ul> <li>The further manual check will be competed by the Competent Person where an area including boreholds G02056 for the pty 3AU which was compared with the block model. The manual result was within 3 per cert in tormage of the block model result. This comparison is within accoptable limits.</li> <li>Whether the tormages are estimated on a dry basis or with natural model result. This comparison is within accoptable limits.</li> <li>Whether the tormages are estimated on a dry basis or with natural model result. This comparison is within accoptable limits.</li> <li>Whether the tormages are estimated on a dry basis or with natural model result. This comparison is within accoptable limits.</li> <li>Whether the tormages are estimated on a dry basis or with natural model result. This comparison is within accoptable limits.</li> <li>Whether the tormages are estimated on a dry basis or with natural model result. This comparison is writing accoptable limits.</li> <li>Whether the tormages are estimated on a dry basis or with natural model result. This comparison is writing accoptable limits.</li> <li>Whether the tormages are estimated on a dry basis or with natural model result. This comparison is writing according to the module of the moliture was analysed as TM (MNS ISO 589, 2008) and Analytical moisture (MNS GBT model model</li></ul>			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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Minung     Action     Analytical molecular and the presence of outstandy and topographic surfaces. Each conservation file agreed with the places in the original points of conservation file agreed with the black multi be completent by the Completent Person where an area including presence and the presence of the post-original points of conservation file agreed with the black. Multi be completent by the Completent Person where an area including presence and the presence and the presence of the post-original points.       Mining factors or     The further manual check will be completed by the Completent Person where an area including and with the black model. This name and the presence and the presence of the post-original points.       Mining factors or     The further manual check will be completed by the Completent Person where an area including in the method of determination of the molsture content.     The further manual check will be completed by the Completent Person where an area including the black model. This comparison is within acceptable limits.       Mining factors or     The basis of the adopted cut-off grade(s) or quality parameters     No maximum seam thickness.     No maximum seam thickness.       Additional factors or     The basis of the adopted cut-off grade(s) or quality parameters     No maximum seam thickness.     No maximum seam thickness.       Additional factors or     The basis of the adopted cut-off grade(s) or quality parameters     No maximum seam thickness.     No the preceive dasis and aid dried basis and aid dried basis and aid dried basis and aid dried basis and aid dried basis.       Cut-off parameters     The basis of the adopted cut-off grade(s) or quality parameters     No maximum seam th	oi reconciliation data li available.		values. Following this a visual validation was conducted by loading the plock model into the Micromine 3D viewer together with borehole traces, plies from the original points of	
Moisture       • Minimize and the individual of the point of the poin	JORC 1 of reconciliation data if available	code explanation	Commentary values Enllowing this a visual validation was conducted by loading the block model into	
Oriteria         Donc Code explanation         Commentary           In conclutation data if available.         JORC Code explanation         a lates. Following this a visual validation was conclude dy lating the original points of observation file, base of weathering, base of oustameny and topographic surfaces. Each conservation file, base of weathering, base of oustameny and topographic surfaces. Each conservation file, base of weathering, base of oustameny and topographic surfaces. Each conservation file, base of weathering, base of oustameny and topographic surfaces. Each conservation file, base of weathering, base of oustameny and topographic surfaces. Each conservation file appendix with the polise in the book model.           Monter the homages are estimated on a dry basis or with natural means (new with the book model. The manual result was with) 3 per cent in tronsing of the book model. The manual result was with 3 per cent in tronsing of the book model. The manual result was with 3 per cent in tronsing of the book model.           Monter         •         Whether the homages are estimated on a dry basis or with natural result was with 3 per cent in tronsing for the book model. The manual result was with 3 per cent in tronsing for the book model.           Monter manual result was the interval or the order of the model result. This comparison is within acceptable limits.         212/2015) TM was assumed to explore dro for dried basis.           Monter manual result was monted and the model result. This comparison is within acceptable limits.         212/2015) TM was assumed to equilibrit was with 3 per cent in tronsing result was used to convert and the dra by addition to a resolved the transiture conted.           Monter manual result for manage result man			-	

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Commentary	exploration process sufficient roof and floor sampling and analysis has been completed for Reserve estimates of dilution.	<ul> <li>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.</li> <li>The Resource estimate for this report has had no assumptions made on the estimate for beneficiation.</li> </ul>	<ul> <li>All environmental issues are managed by the company's environmental department which has operated since the start of mining.</li> <li>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.</li> <li>During all site visits there have been no obvious environmental issues of leachates emanating from spoil piles or from coal stockpiles.</li> </ul>	<ul> <li>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.</li> <li>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.</li> </ul>
JORC Code explanation	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.	<ul> <li>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.</li> </ul>	<ul> <li>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 potential environmental environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.</li> </ul>	<ul> <li>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.</li> </ul>
Criteria		Metallurgical factors or assumptions	Environmental factors or assumptions	Bulk density

Criteria	JORC Code explanation		Commentary
	<ul> <li>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.</li> </ul>	•	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.
	<ul> <li>Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.</li> </ul>	•	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	<ul> <li>The basis for the classification of the Mineral Resources into varying confidence categories.</li> </ul>	• •	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.
	<ul> <li>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).</li> </ul>	• • •	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.	<ul> <li>The Competent Person has confidence in the resource figures reflecting well the contained coal resource.</li> </ul>
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	<ul> <li>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 &amp; 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 group has changed little from the previous JORC (2004) Resources report-June 2012 so the independent peer review by Mr Sercombe is still relevant.</li> <li>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 transfer, supervised and</li> </ul>

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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	<ul> <li>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.</li> </ul>	<ul> <li>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.</li> <li>In addition, the 3D model for the estimate was accurate and reliable due to a kriging augorithm 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.</li> <li>The use of high level 2D seismic, downhole geophysical data, modern dilling with 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.</li> </ul>

Criteria	JORC Code explanation	Commentary
	<ul> <li>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.</li> </ul>	<ul> <li>The Resource estimate for this report is a global estimate to international standards and meets all JORC 2012 requirements.</li> <li>All assumptions and procedures for the Resource estimate are documented within the report sections or as Appendices.</li> </ul>
	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 hat 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	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve	<ul> <li>The Mineral Resource estimate used as the basis of this Coal Reserves Statement is "JORC (2012) Standard Resource Estimation Likhaa Khudan Coal Mine (Licence 11952A)"</li> </ul>
to Ore Reserves	<ul> <li>Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.</li> </ul>	prepared by Mongolian Mining Corporation, Energy Resources LLC, Geology Department, January 2022.
		<ul> <li>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</li> </ul>
		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
		<ul> <li>I echnology', and is a Member of the Australian Institute of Mining and Metallurgy (#318198).</li> <li>The Coal Resources are reported inclusive of those Coal Resources modified to produce the Coal Reserves.</li> </ul>
Site visits	Comment on any site visits undertaken by the Competent Desconand throughout of three visits	• The Competent Person for the Coal Reserves Statement made consecutive site visits since
	<ul> <li>If no site visits have been undertaken indicate why this is the case.</li> </ul>	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
		<ul> <li>April 2022.</li> <li>The competent person believes a further site visit was warranted in 2022 to review changes in the mining progress as well as mining conditions.</li> </ul>
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	<ul> <li>A LOM study update, equivalent to a Feasibility Study update was completed in January 2018 bv GLOGEX.</li> </ul>
	The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves.	<ul> <li>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</li> </ul>
	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.	will be completed in April 2022.

Criteria	.IORC 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	<ul> <li>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).</li> <li>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.</li> <li>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).</li> <li>The mining dilution factors used.</li> <li>The mining victifies used.</li> <li>The mining studies and the Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.</li> <li>The infrastructure requirements of the selected mining methods.</li> </ul>	<ul> <li>Pit Optimization and LOM planning has been used as the basis of converting Coal Resources to Coal Reserves.</li> <li>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.</li> <li>Geotechnical parameters for the design of stable slopes have been provided by Australian Mining Consultants ("AMC").</li> <li>The mining factors used were: <ul> <li>Minimum parting mining thickness of 0.5 m.</li> <li>Minimum parting mining thickness of 0.5 m.</li> <li>Mineable coal section floor closs of 100 mm.</li> <li>Mineable coal section floor closs of 100 mm.</li> <li>Mineable coal section floor closs of 100 mm.</li> <li>Mineable coal section floor clist of 0.0 mm.</li> <li>Mineable coal section floor clist of 100 mm.</li> <li>Mineable coal section floor clist of 0.0 mm.</li> <li>Mineable coal section floor clist of 0.0 mm.</li> <li>Mineable coal section floor clist of 0.0 mm.</li> <li>Mineable coal section floor clist of 0.100 mm.</li> <li>Mineable coal section floor clist of 0.0 mm.</li> <li>Mineable coal section floor clist of 2.46 t/m3, and ash of 92%.</li> <li>Ary middlings product moisture 9% (ar), and thermal product coal moisture 2.68% (ar).</li> <li>The application of the basis of can prove precordilation results supplied by WWC for an 18 month period of sampling undertaken by MMC from January 2014 to June 2015.</li> <li>Inferted Coal Resources are assigned revenue in the LOM study pit optimizer and included in the LOM production schedule as mi</li></ul></li></ul>

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Criteria		.IORC 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?	<ul> <li>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.</li> <li>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 in the mine based on in pit bulk sampling.</li> <li>Thermal coal seams to produce a relatively high ash low energy thermal coal product suitable for export or domestic use.</li> </ul>
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.	<ul> <li>An Environmental Impact Statement has been prepared and all environmental approvals obtained.</li> <li>Waste rock characterization results do not require special placement requirements or procedures in the dumps.</li> <li>Coal processing plant reject is stored appropriately in the waste dumps or storage cells in accordance with the environmental approvals.</li> </ul>
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.	<ul> <li>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.</li> </ul>
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
	<ul> <li>commodity price(s), for the principal minerals and co- products.</li> <li>The source of exchange rates used in the study.</li> <li>Derivation of transportation charges.</li> <li>The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.</li> <li>The allowances made for royalties payable, both Government and private.</li> </ul>	<ul> <li>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.</li> <li>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)</li> <li>Coal processing costs are based on actual costs of existing CHPP operation.</li> <li>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.</li> </ul>
Revenue factors	<ul> <li>The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodify price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.</li> <li>The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.</li> </ul>	<ul> <li>Sharxi Fenwei Energy Consulting Co Ltd ("Sharxi Fenwei") completed an independent market study for UHG products and identified principal coking and thermal coal markets in Mongolia and China.</li> <li>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 for Semi-soft coking coal and Thermal coal were estimated based on 6 year average of 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 2020-2025, as provided by MMC's actual coal selling prices as well as 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.</li> <li>The coal selling prices assigned to each product, were:</li> <li>Hard coking coal &lt; 11.0% ash (dry): US\$95.9/t product (ar), Semi-soft coking coal &lt; 9.5% ash (dry)</li> <li>Semi-soft coking coal &lt; benchmark CV 5,000 kcal/kg (gar): US\$30.7/t product (ar), Thermal coal ~ benchmark CV 5,000 kcal/kg (gar): US\$30.7/t product (ar).</li> </ul>

<i>Market assessment</i>	• • • •	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	<ul> <li>The basis for the classification of the Ore Reserves into varying confidence categories.</li> <li>Whether the result appropriately reflects the Competent Person's view of the deposit.</li> <li>The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).</li> </ul>	<ul> <li>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.</li> <li>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).</li> <li>The result reflects the Competent Persons view of the deposit.</li> </ul>
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	<ul> <li>Internal peer review by GLOGEX CONSULTING LLC of the Reserves estimate has been completed.</li> <li>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 Resources and Ore Reserves, The JORC Code (2012).</li> </ul>

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<ul> <li>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.</li> <li>Since the preparation of Reserves estimate effective as of 1<sup>st</sup> 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 1<sup>st</sup> January 2022 by GLOGEX and reported as 371Mt (ROM) and the total Marketable reserve is 230 Mt.</li> </ul>	<ul> <li>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.</li> </ul>	
• •	•	
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 loca 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.
•	• •	•
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# **MONGOLIAN MINING CORPORATION**

Our ref:

Ulaanbaatar

Memo To:	MMC Executive Committee
From:	Mr. Avirmed Khishigbuyan (Competent Person, Member #3127840)
Date:	5 <sup>th</sup> February 2025
Subject:	Ukhaa Khudag JORC Statement 31 December 2024

Estimate of the JORC (2012) compliant Coal Resource within the Ukhaa Khudag ("UHG") deposit has been updated as of 31 December, 2024. Total estimate is now 539 Mt, comprising 445 Mt Measured, 29 Mt Indicated and 65 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, 2024, and 31 December, 2024.

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,

Avirmed Khishigbuyan Chief Geologist (Geology and geotechnical)

# **Appendix 1**

Volume	Tonnes	RD (g/cc)	ASH (%)	TM (%)	VM (%)	CV (kcal/kg)	TS (%)	FC (%)	Classification
(x1,000,000 m3)	(x1,000,000)								
BUQA - BHWE									
4.3	6.6	1.53	28.64	6.74	21.11	5,492	0.97	46.51	MEASURED
0.4	0.7	1.50	26.55	4.88	22.69	5,746	0.93	47.72	INDICATED
1.9	2.9	1.53	27.72	7.38	22.81	5,350	0.84	45.26	INFERRED
6.6	10.1	1.53	28.24	6.80	21.69	5,468	0.93	46.24	SUBTOTAL
BHWE - 100m	BHWE - 100m								
34.5	53.0	1.53	28.72	4.32	21.23	5,534	1.08	46.96	MEASURED
2.7	4.1	1.51	27.35	5.05	21.60	5,661	0.92	48.06	INDICATED
7.7	11.7	1.53	29.16	5.42	21.61	5,352	0.93	45.76	INFERRED
44.9	68.8	1.53	28.71	4.55	21.32	5,511	1.04	46.82	SUBTOTAL
100 - 200m			_			_	-	-	
57.2	86.5	1.51	26.83	3.71	21.76	5,744	1.03	48.43	MEASURED
5.9	9.0	1.53	28.04	4.61	20.43	5,647	0.86	48.65	INDICATED
12.1	18.5	1.54	28.67	3.98	19.69	5,580	0.90	48.65	INFERRED
75.2	114.0	1.52	27.22	3.83	21.32	5,710	1.00	48.48	SUBTOTAL
200 - 300m	_					_	_	-	
83.1	125.4	1.51	26.32	3.43	20.40	5,844	0.89	50.39	MEASURED
3.9	6.0	1.53	27.33	3.94	20.65	5,687	0.71	49.11	INDICATED
8.9	13.6	1.53	28.24	3.61	21.43	5,600	0.99	47.29	INFERRED
95.9	145.1	1.51	26.54	3.47	20.50	5,814	0.89	50.05	SUBTOTAL
300 - 400m									
57.6	88.1	1.53	27.58	3.19	19.39	5,712	0.70	50.16	MEASURED
1.6	2.5	1.55	26.64	3.63	19.29	5,681	0.74	51.03	INDICATED
2.7	4.0	1.52	27.26	3.57	21.93	5,726	0.73	47.76	INFERRED
61.9	94.6	1.53	27.54	3.22	19.49	5,712	0.70	50.08	SUBTOTAL
Below 400m									
56.7	85.2	1.50	25.80	3.82	20.45	5,869	0.51	50.78	MEASURED
4.4	6.9	1.55	27.59	3.48	18.24	5,671	0.38	51.21	INDICATED
9.2	13.7	1.49	24.20	4.29	20.88	6,006	0.52	51.93	INFERRED
70.4	105.8	1.50	25.71	3.86	20.36	5,874	0.51	50.95	SUBTOTAL
355.0	538.5	1.52	27	3.77	20.56	5820	0.83	49.47	GRAND TOTAL
355	540	1.5	27	3.7	21	5820	0.83	50	*Total (Rounded)

### UHG mining license Coal Resource, by depth and category, as at 31 December, 2024:

Note:

- Technical information in this UHG Coal Resource estimation has been compiled by Mr. Byambaa Barkhas, General Manager for Mining, Mongolian Mining Corporation. 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, 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 2024, 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 Chef Operating Officer 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 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 (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	EXI	ECUTIVE SUMMARY	8
2	INT	RODUCTION	15
	2.1	SCOPE OF WORK	15
	2.2	RELIANCE ON OTHER EXPERTS	16
3	LO	CATION, ACCESS AND LICENCE INFORMATION	17
	3.1	PROJECT LOCATION	17
	3.2	PROJECT ACCESS AND INFRASTRUCTURE.	17
	3.3 3.4	OWNERSHIP AND MINERAL TENLIRE	22
4	FYI	PLORATION HISTORY	27
7			27
	4.1	PREVIOUS EXPLORATION PREVIOUS RESOURCE AND RESERVE ESTIMATES	27
	4.3	MINING HISTORY	
5	GE	OLOGY	34
-	5 1	REGIONAL GEOLOGY	34
	5.2	REGIONAL STRATIGRAPHY	
	5.3	LOCAL STRATIGRAPHY	40
	5.4	DEPOSIT TYPE	44
	5.5	STRUCTURE	45
	5.7	COAL SEAMS	
	5.8	OUTCROP, SUB-CROP AND OXIDATION	89
	5.9	GEOCHEMISTRY	92
	5.10	GEOTECHNICAL ISSUES	92
	5.11	GAS	110
	5.12	MINING POTENTIAL	116
	5.14	COAL ECONOMICS	117
6	PEF	CR REVIEW AND SITE VISITS	119
	6.1	INITIAL SITE VISIT AND ONGOING COMPETENT PERSON VISITS FOR JORC (2004)	
	RESOU	RCE ESTIMATE – JUNE 2012	119
	6.2	SUMMARY OF ONGOING SITE VISITS, COMMENTS AND INTERNAL AUDITS FOR JORC	201
	(2012)	RESOURCE ESTIMATE - DECEMBER 2014         INTERNAL PEED PEVIEW         2021	121
_	0.5	$\frac{1}{100} = \frac{1}{100} = \frac{1}$	122
1	EXI	2LORATION	123
	7.1	DRILLING	123
0	1.2		131
8	QU	ALITY ASSURANCE AND QUALITY CONTROL	133
	8.1	DRILLING METHOD	133
	0.2 8 3	GEOPHYSICS	134
	0.5		155

8	8.4	GEOLOGICAL LOGGING AND SAMPLING	137
8	8.5	ANALYTICAL METHOD	141
8	8.6	LABORATORY INSPECTION	143
8	8.7	REPRODUCIBILITY OF ANALYSES BETWEEN LABORATORIES	145
8	8.8	POINT OF OBSERVATION DEFINITION AND CALCULATION	152
8	8.9	USE OF CONDITIONAL SIMULATION GEOSTATISTICS TO DETERMINE THE EXPECTED	
1	ERROR	OF ESTIMATION AS AN AID IN THE UNDERSTANDING OF CONFIDENCE IN THE	
(	CLASSI	FICATION CATEGORIES	153
9	RES	SOURCE 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	RES	SOURCE STATEMENT	171
	10.1 IORC	COMPARISON BETWEEN NEW JORC (2012) - 31 DECEMBER 2021 AND PREVIOUS	173
•	0110	(2004) = 51 December 2014 Resource ESTIMATES TO 400M	175
. 11		(2004) - 51 DECEMBER 2014 RESOURCE ESTIMATES 10 400M	175
11 12	CO DIS	(2004) - 51 DECEMBER 2014 RESOURCE ESTIMATES TO 400M NCLUSIONS AND RECOMMENDATIONS CLAIMER	175 180
11 12 13	CO DIS DA	(2004) - ST DECEMBER 2014 RESOURCE ESTIMATES TO 400M NCLUSIONS AND RECOMMENDATIONS CLAIMER FE AND SIGNATURE	175 175 180 181
11 12 13 14	COI DIS DA STA	(2004) - ST DECEMBER 2014 RESOURCE ESTIMATES TO 400M NCLUSIONS AND RECOMMENDATIONS CLAIMER FE AND SIGNATURE	175 180 181 182
11 12 13 14 15	CO DIS DA STA	(2004) - ST DECEMBER 2014 RESOURCE ESTIMATES TO 400M NCLUSIONS AND RECOMMENDATIONS CLAIMER FE AND SIGNATURE ATEMENT OF QUALIFICATIONS ATEMENT OF INDEPENDENCE	175 175 180 181 182 183
11 12 13 14 15 16	COI DIS DAT STA STA REI	(2004) - ST DECEMBER 2014 RESOURCE ESTIMATES TO 400M NCLUSIONS AND RECOMMENDATIONS CLAIMER FE AND SIGNATURE ATEMENT OF QUALIFICATIONS ATEMENT OF INDEPENDENCE FERENCES	175 175 180 181 182 183 184
11 12 13 14 15 16 17	COI DIS DA <sup>T</sup> STA STA REI GLO	NCLUSIONS AND RECOMMENDATIONS CLAIMER TE AND SIGNATURE ATEMENT OF QUALIFICATIONS ATEMENT OF INDEPENDENCE FERENCES DSSARY OF TECHNICAL TERMS	175 175 180 181 182 183 183 184 185
11 12 13 14 15 16 17 AP	COI DIS DA STA STA REI GLO PPENI	NCLUSIONS AND RECOMMENDATIONS NCLUSIONS AND RECOMMENDATIONS CLAIMER TE AND SIGNATURE ATEMENT OF QUALIFICATIONS ATEMENT OF INDEPENDENCE FERENCES OSSARY OF TECHNICAL TERMS DIX 1: MINERAL TENURE LICENSE	<ol> <li>175</li> <li>180</li> <li>181</li> <li>182</li> <li>183</li> <li>184</li> <li>185</li> <li>187</li> </ol>
11 12 13 14 15 16 17 AP AP	COI DIS DA STA STA REI GLO PPENI	NCLUSIONS AND RECOMMENDATIONS CLAIMER TE AND SIGNATURE ATEMENT OF QUALIFICATIONS ATEMENT OF INDEPENDENCE FERENCES DIX 1: MINERAL TENURE LICENSE DIX 2: PROCEDURES	175 180 181 182 183 184 185 187 188
11 12 13 14 15 16 17 AP AP	COI DIS DA STA STA REI GLO PPENI PPENI PPENI	NCLUSIONS AND RECOMMENDATIONS CLAIMER	175 175 180 181 182 183 184 185 187 188
11 12 13 14 15 16 17 AP AP AP AI AP	COI DIS DA STA STA REI GLO PENI PENI JL BO PENI	(2004) – 51 DECEMBER 2014 RESOURCE ESTIMATES TO 400M NCLUSIONS AND RECOMMENDATIONS CLAIMER	175 175 180 181 182 183 184 185 187 188 189 190
11 12 13 14 15 16 17 AP AP AP AI AP	COI DIS DA' STA STA REI GLO PENI PENI L BO PENI PENI	(2004) - ST DECEMBER 2014 RESOURCE ESTIMATES TO 400M NCLUSIONS AND RECOMMENDATIONS CLAIMER FE AND SIGNATURE ATEMENT OF QUALIFICATIONS ATEMENT OF INDEPENDENCE FERENCES OSSARY OF TECHNICAL TERMS DIX 1: MINERAL TENURE LICENSE DIX 1: MINERAL TENURE LICENSE DIX 2: PROCEDURES DIX 3: TABLE OF BASE OF WEATHERING AND QUATERNARY FOR REHOLES THAT IT WAS LOGGED DIX 4A: POINTS OF OBSERVATION – (AS-RECEIVED BASIS) DIX 4B: POINTS OF OBSERVATION – (AIR-DRY BASIS)	175 180 181 182 183 184 185 187 188 189 190 191
11 12 13 14 15 16 17 AP AP AI AP AP AP	COI DIS DA' STA STA REI GLO PENI PENI PENI PENI PENI	(2004) - 51 DECEMBER 2014 RESOURCE ESTIMATES TO 400M NCLUSIONS AND RECOMMENDATIONS CLAIMER TE AND SIGNATURE ATEMENT OF QUALIFICATIONS ATEMENT OF INDEPENDENCE FERENCES OSSARY OF TECHNICAL TERMS DIX 1: MINERAL TENURE LICENSE DIX 2: PROCEDURES DIX 2: PROCEDURES DIX 3: TABLE OF BASE OF WEATHERING AND QUATERNARY FOR REHOLES THAT IT WAS LOGGED DIX 4A: POINTS OF OBSERVATION – (AS-RECEIVED BASIS) DIX 4B: POINTS OF OBSERVATION – (AIR-DRY BASIS)	<ol> <li>175</li> <li>180</li> <li>181</li> <li>182</li> <li>183</li> <li>184</li> <li>185</li> <li>187</li> <li>188</li> <li>189</li> <li>190</li> <li>191</li> <li>192</li> </ol>
11 12 13 14 15 16 17 AP AP AP AP AP RE	COI DIS DA' STA STA REI GLO PENI PENI PENI PENI PENI PENI CEIV	ATEMENT OF UPLETE ANALYTICAL DATABASE SHOWING (AS- TE ADD SIGNATORY CERTIFICATES	<ol> <li>175</li> <li>180</li> <li>181</li> <li>182</li> <li>183</li> <li>184</li> <li>185</li> <li>187</li> <li>188</li> <li>189</li> <li>190</li> <li>191</li> <li>192</li> <li>193</li> </ol>

APPENDIX 7: GRAPHS ON A SEAM BY SEAM BASIS AND FOR EACH CO QUALITY PARAMETER	)AL 195
APPENDIX 8: BOREHOLE PROFILES WITH LAS AND COAL QUALITY	
APPENDIX 9: EAST-WEST & NORTH-SOUTH BOREHOLE SECTIONS	197
APPENDIX 10: SEISMIC SECTIONS & MAP	
APPENDIX 11A: RESOURCES BY SEAM (AIR-DRY)	
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	
APPENDIX 18: INSERTED AND EXTRAPOLATED DATA POINTS	207
APPENDIX 19: RESOURCE CATEGORY AREAS PER PLY	208
APPENDIX 20: CAPABILITY STATEMENT	
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	ز ۳۰
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 20.	20
DRILLING PROGRAM RESULTS (FROM JORC (2012) RESOURCE REPORT), BLUE DOTS SHOW	√ 
UZU DRILLING PROGRAM RESULTS.	.//
FIGURE 3-3U: KELATIONSHIP BETWEEN AIR-DRY MOISTURE AND TOTAL MOISTURE FOR SEAM	70
	. /ð
FIGURE 5-51: KELATIONSHIP BETWEEN ASH AND TRUE RELATIVE DENSITY FOR SEAM OCU	. /8
FIGURE 5-52: KELATIONSHIP BETWEEN ASH AND VOLATILE MATTER FOR SEAM UCU	. 79

FIGURE 5-33: RELATIONSHIP BETWEEN ASH AND CALORIFIC VALUE FOR SEAM 0CU.	.79
FIGURE 5-34: RELATIONSHIP BETWEEN ASH AND SULPHUR FOR SEAM OCU.	.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 ROC	KS
(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 CONSTRUCTIO	N
SEQUENCE1	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 1	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 RESOLUCE ON AN AS-RECEIVED (AR) BASIS	12
TABLE 1-1. TOTAL RESOURCE ON AN AS-RECEIVED (AR) DASIS	12
TABLE 1-2. TOTAL RESOURCE ON AN AIR-DRT (AD) DASIS	15
TABLE 5-1. GEOGRAFHICAL COORDINATES OF EICENCE WY-011952	
THE THE ARD THE ARD THE	21
TADLE $\Lambda$ 2. TOTAL AID ODIED RECOLDERS 300M DEDTHILIMIT MINIMUM ADDADENT SEAM	
THECKNESS OF 0.5M AND MAXIMUM ASH CUT OFF OF 50%	21
TADLE 4.2: TOTAL AID DRIED DESCURCES 400M DEPTILLINGT MINIMUM APPADENT SEAM	
THECKNESS OF 0.5M AND MAXIMUM ASH (DDX DASE) CUT OFF OF 50%	22
TADLE 4 A: TOTAL COAL DESERVE	
TABLE 4-4. TOTAL COAL RESERVE	33
TABLE 5-1. GENERALIZED STRATIGRAPHIC COLUMIN, TAVAN TOLGOT	30
TABLE 5-2. CHARACTERISTICS OF THE DISJUNCTIVE DISLOCATIONS AT THE UNO DEPOSIT	4 <i>3</i> 50
TABLE 3-3: LIST OF BOREHOLES WHICH HAVE INTERSECTED THE MAGNETIC ANOMALY	30
TABLE 5-4. SEAM FIERARCHY FOR UKHAA KHUDAG	05 64
TABLE 3-3: SUMMARY OF THE ANALY TICAL DATABASE.	04
TABLE 5-0. REGRESSION FORMULAE FOR COAL QUALITY PARAMETERS ON A SEAM BASIS	01
TABLE 5-7: DISTRIBUTION OF CSIN VALUES BY COAL SEAM.	84
TABLE 5-8: CUMULATIVE PERCENTAGE DISTRIBUTION OF CSIN 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.         TABLE 5-12: DEFINITION OF THE STREET OF THE STRE	89
1 ABLE 5-12: PRELIMINARY SHEAR STRENGTH PROPERTIES – SOUTH WALL RE-MINING ANAL	LYSES
	96
I ABLE 5-13: ESTIMATED SLOPE HEIGHTS AND ANGLES FOR SLOPES A, B AND C         THE 5-14 LINC METER OF STREET STREE	99
TABLE 5-14: UHG MINE SLOPE DESIGN TABLE UPDATED SEP 2015         Table 5-14: Design Design Table UPDATED SEP 2015	108
1 ABLE 5-15: REVISED ROCK STRENGTH VALUES FOR GALENA MODELLING (DECEMBER 20	13)
TABLE 6-1- SURVEY AUDIT ON COLLAR SURVEYS	122
TABLE 7-1: VOLUME OF THE BASIC CATEGORIES OF GEOLOGY-EXPLORATION WORK AT THE	100
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	7
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 ESTIMAT	ΓES
– 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 31<sup>st</sup> 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<sup>2</sup> in area and covers approximately 13 percent of the TT deposit of approximately 220 km<sup>2</sup>. 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 23<sup>rd</sup> 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 southwestern 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.

Volume	Tonnes	Relative	Ash (%)	Total	Volatile	Gross Calorific	Sulphur (%)	Fixed	Classification
(x1,000,000 m <sup>3</sup> )	(x1,000,000)	Density (g/cc)		Moisture (%)	Matter (%)	Value (Kcal/kg)		Carbon (%)	
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, clau	se 25, Rounding								

### Table 1-1: Total Resource on an As-Received (AR) Basis

(Source: Energy Resources LLC)

Volume	Tonnes	Relative	Ash (%)	Inherrent	Volatile	Gross Calorific	Sulphur (%)	Fixed	Classification
(x1,000,000 m <sup>3</sup> )	(x1,000,000)	Density (g/cc)		Moisture (%)	Matter (%)	Value (Kcal/kg)		Carbon (%)	
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)
IORC clause 25. Rounding									

### Table 1-2: Total Resource on an Air-Dry (AD) Basis

(Source: Energy Resources LLC)

In comparing the previous Resource estimate and the current Resource estimate, unadjusted 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 31<sup>st</sup> 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<sup>2</sup> in area and represents about 13 percent of the TT coalfield, which covers an area approximately 220 km<sup>2</sup>. 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  $32.6^{\circ}$ C to  $39.9^{\circ}$ 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 2<sup>nd</sup> 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 8<sup>th</sup> 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 10<sup>th</sup> August 2006 and 17<sup>th</sup> August 2006 respectively. These licenses were granted based upon the 1997 Mineral Law.

With effectiveness of the newly approved 2006 Mineral law from 26<sup>th</sup> 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 23<sup>rd</sup> January 2007 and is for a period of 30 years.

In accordance with this consensus the License Transfer Agreement was signed on 21<sup>st</sup> March 2008 and the coordinates of license [MV-011952] was increased from 1011 Ha up to 2962 Ha. On the 1<sup>st</sup> 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.

Point	Longitude			Latitude			
Number	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"	

Table 3-1: Geographical Coordinates of licence MV-011952

(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 19<sup>th</sup> 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<sup>2</sup> 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<sup>2</sup>, 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<sup>2</sup> 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, 13<sup>th</sup> 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**

Measured

#### 4.2.1 May 31, 2010 - Norwest

The UHG air-dried coal resources as of 31<sup>st</sup> May 2010, were estimated according to JORC (2004) standards by Norwest as indicated in Table 4-1.

seam thickness of 0.6m					
Category	Resource Volume	Density air dried	Total Tonnes		
	(m <sup>3</sup> ) '000	(g/cm <sup>3</sup> )	(Mt <sup>#1</sup> )		

1.52

1.52

1.52

# Table 4-1: Total air dried Resources – 300m depth limit, minimum apparent seam thickness of 0.6m

Total <b>281,176</b>		1.52		
#1. Mt = Millio	ir dried)			

137,043

136,892

7,241

(Source: Norwest Corporation)

208.9

207.6

11.0 **427.5** 

#### 4.2.2 June 30, 2012 – ER

The UHG air-dried coal resources as of 30<sup>th</sup> 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 <sup>3</sup> ) '000	Density air dried (g/cm <sup>3</sup> )	Total Tonnes (Mt <sup>#1</sup> )		
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  $31^{st}$  December 2014 were estimated according to JORC (2012) standards by ER as indicated in Table 4-3

Category	Resource Volume (m <sup>3</sup> )'000	Density air dried (g/cm <sup>3</sup> )	Total Tonnes (Mt <sup>#1</sup> )		
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)					

# Table 4-3: Total air-dried Resources – 400m depth limit, minimum apparentseam thickness of 0.5m and maximum Ash (dry base) cut-off of 50%

(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 31<sup>st</sup> 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 01<sup>st</sup> 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 31<sup>st</sup> 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).





# 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<sub>2-3</sub>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<sub>3</sub>-P<sub>1</sub>ds)

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, rosecoloured 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<sub>1</sub>CC)

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<sub>2</sub>ch)

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<sub>2</sub>tb)

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<sup>2</sup> while within the Ukhaa Khudag deposit is 29.5 km<sup>2</sup>. 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<sub>2</sub>ss)

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 (P1, 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<sub>1</sub>)

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<sub>2</sub>)

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<sub>3-4</sub>)

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 Tolgor						
Period	Unit Name		Description	Thickness		
Lower			Greenish grey siltstones and mudstones with interbedded yellow sandstones.	Varied		
Jurassic			Conglomerate, conglomeratic sandstone, siltstone and mudstone	Varied		
~~~~~~	~~~~~~	~~~~~ Un	conformity			
		Upper Unit	Dark grey siltstone, sandstone, conglomeratic sandstone; minor calcareous beds; flora fossils; COAL SEAMS X to XV.			
	Tavan Tolgoi Group	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.	965 to 1,990 m		
Upper Permian		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		
~~~~~~	~~~~~~	~~~~~ Dis	sconformity ~~~~~~~~~~~~~~~~~~~~~~~~			
Lower	Tsogt-tsetsii Group		Siltstone with flora fossils, andesitic breccia, andesite and dacite.	400 m to 900 m		
Permian	Dushiin ovoo Group		Light green massive andesite, basalt, dacite, tufaceous conglomerate, and tuff.	800 m to 1,100 m		

## Table 5-1: Generalized Stratigraphic Column, Tavan Tolgoi

(Source: Norwest 2009)

JORC (2012) Standard Resource Estimation Report for the Ukhaa Khudag Coal Mine



# 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<sub>2</sub>- $_3$ CS), Dushiin ovoo formation (C<sub>3</sub>-P<sub>1</sub>ds), Tsogttsetsii formation (P<sub>1</sub>CC), Tavan Tolgoi formation (P<sub>2</sub>tb) and Quaternary sediments (Q<sub>3</sub>-4) (refer Figure 5-4).



(Source: Energy Resources LLC)

Page 41

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.

JORC (2012) Standard Resource Estimation Report for the Ukhaa Khudag Coal Mine



# 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).

				Characteristics of dislocations			
Number	Name and type of dislocations	Dislocation outlined for boreholes (No of exploration lines)	Length, (km)	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

Table 5-2: Characteristics of the disjunctive dislocations at the UHG deposit

(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.'





(Source: Dashkhorol et.al.)

Page 46

Figure 5-6: 1989 Geological map of the UHG deposit

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.



Page 48



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).



JORC (2012) Standard Resource Estimation Report for the Ukhaa Khudag Coal Mine

Page 51

(Source: Energy Resources LLC)






Page 52

Figure 5-11: Seismic line 10-14 showing overthrust zone of 'Reverse Fault B'.



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 inpit 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.

N⁰	BHOLE ID	DEPTH FROM	DEPTH TO	INTERVAL	N⁰	BHOLE ID	DEPTH FROM	DEPTH TO	INTERVAL
	G00374	3.00	5.00	2.00		G01861	36.16	38.53	2.37
1	G00374	6.00	13.00	7.00	34	G01861	45.30	50.65	5.35
2	G00452	3.00	4.00	1.00		G01867	30.50	45.65	15.15
3	G02045	12.00	16.00	4.00		G01867	91.69	94.72	3.03
4	G02127	9,40	13.00	3.60	35	G01867	97.15	98.00	0.85
5	G02261	2.00	6.00	4.00		G01867	98.78	102.19	3.41
	G02055	5.00	6.00	1.00		G01867	105.53	106.80	1.27
6	G02055	25.00	29.00	4.00		G02354	0.00	15.30	15.30
7	G02054	6.00	8.00	2.00	36	G02354	15.30	21.20	5.90
-	G02273	3.00	12.00	9.00		G02355	0.00	33.80	33.80
8	G02273	12.00	18.00	6.00	37	G02355	35.95	36.23	0.28
	G02273	21.00	24.00	3.00	38	G02362	16.03	21.35	5.32
9	G02060	37.50	39.50	2.00	39	G02381	0.95	12.44	11.49
10	G02114	12.00	15.00	3.00		G02390	0.22	20.94	20.72
11	G02059	20.00	25.00	5.00	40	G02390	41.27	51.52	10.25
12	G02056	3.00	5.00	2.00		G02391	35.38	43.16	7.78
	G02094	4.00	6.00	2.00		G02391	43.75	53.48	9.73
13	G02094	10.00	12.00	2.00	41	G02391	54.58	58.06	3.48
	G02094	19.00	24.00	5.00		G02391	60.98	75.73	14.75
	G02121	6.00	7.00	1.00	42	G02602	1.49	3.72	2.23
14	G02121	9.00	10.00	1.00	43	G02604	4.50	15.50	11.00
15	G02042	7.00	9.00	2.00		G02605	6.16	13.50	7.34
16	G02220	13.00	14.00	1.00		G02605	23.00	24.40	1.40
	G02107	6.00	9.00	3.00		G02605	28.83	30.37	1.54
	G02107	18.00	23.00	5.00	44	G02605	31.28	33.57	2.29
17	G02107	31.00	33.00	2.00		G02605	48.42	51.33	2.91
	G02107	39.00	40.00	1.00		G02605	52.27	53.74	1.47
18	G02201	1.00	3.00	2.00		G02605	152.93	155.12	2.19
19	G02074	22.00	23.00	1.00		G02606	0.65	6.50	5.85
	G02095	3.00	5.00	2.00		G02606	11.75	17.85	6.10
20	G02095	10.00	13.00	3.00	45	G02606	59.30	64.10	4.80
21	G02084	6.00	9.00	3.00		G02606	71.80	87.50	15.70
22	G02044	2.00	10.00	8.00		G02606	90.90	99.50	8.60
23	G02247	3.00	6.00	3.00	46	G02607	18.60	20.62	2.02
24	G00288	8.50	8.62	0.12	47	G02610	0.00	1.70	1.70
24	G00288	12.00	13.36	1.36		G02612	0.40	10.00	9.60
25	G00718	35.77	36.94	1.17		G02612	10.00	12.50	2.50
25	G00718	37.00	37.12	0.12	48	G02612	12.50	18.50	6.00
26	G01826	62.83	65.41	2.58		G02612	52.00	70.50	18.50
	G01828	0.00	2.96	2.96		G02612	78.00	81.00	3.00
	G01828	4.14	7.15	3.01	10	G02613	15.50	20.00	4.50
	G01828	14.22	15.83	1.61	49	G02613	24.50	29.50	5.00
27	G01828	18.50	18.95	0.45	50	G02614	5.50	6.80	1.30
	G01828	20.04	27.67	7.63		G02623	1.00	11.90	10.90
	G01828	31.00	37.54	6.54	51	G02623	13.50	16.00	2.50
	G01828	38.92	48.73	9.81		G02623	16.00	21.20	5.20
28	G01833	0.00	22.89	22.89	52	G02628	0.40	5.90	5.50
29	G01837	0.00	28.00	28.00	52	G02628	9.70	17.95	8.25
30	G01838	0.00	10.24	10.24	52	G02631	1.00	3.10	2.10
31	G01839	81.77	84.23	2.46	55	G02631	3.10	5.60	2.50
22	G01843	120.65	123.93	3.28	54	G02633	0.00	6.50	6.50
52	G01843	123.93	124.23	0.30	55	G02646	22.62	23.29	0.67
22	G01845	35.73	50.47	14.74			TOTAL		575.12
55	G01845	122.34	130.70	8.36					

# Table 5-3: List of boreholes which have intersected the magnetic anomaly

(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.

Nº	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
		12C			4.5	9	5.04	2			=>95
1	12	12B			2	4.9	3.81	2	Seam 12	P12C	=>90
		12A			1.3	4.4	3.79	8		P12B	=>95
		11C			0.4	5.8	3.92	11		P12A	=>95
2	11	11B			0.6	40.1	19.2	17	Seam 11	P11C	=>95
		11A			0.8	9.9	4.31	22		P11B	=>95
2	10	10B			0.01	10.2	2.72	29	G 10	P11A	=>95
3	10	10A			0.2	10.9	4.12	45	Seam 10	P10B	=>95
4	0	9B			1.4	24.3	12.55	76	0	P10A	=>95
4	9	9A			0.1	11.5	4.95	73	Seam 9	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	Same 7	P8B	=>95
0	/	7A			0.16	13.7	5.6	126	Seam /	P7B	=>95
		6C			0.01	9	3.58	285		P7A	=>95
7	6	6B			0.01	11.4	4.14	289	Seam 6	P6C	=>95
		6A			0.01	9.1	3.61	295		P6B	=>95
			5 A LL	5AU	0.01	6.1	0.89	228		P6A	=>95
8	5	5A	SAU	5AL	0.01	7.36	3.03	232	Seam 5	P5AU	=>95
			5ALL	5ALL	0.01	1.82	0.81	204		P5AL	=>95
		40	4CR		0.2	1.8	0.6	23	Soom 4C	P5ALL	=>95
		40	4C		0.01	30.89	6.13	434	Sealli 4C	P4CR	=>95
		4B	4B		0.01	16.35	5.93	505	Seam 4B	P4C	=>95
0	4	4A20	4A20		0.01	2.2	3.09	49	Seam 4A20	P4B	=>95
9	4	4A10	4A10		0.01	7.7	0.87	63	Seam 4A10	P4A20	=>95
			4AR		0.01	0.95	0.44	39		P4A10	=>95
		4A	4AU		0.08	11.32	2.59	561	Seam 4A	P4AR	=>95
			4AL			14.35		634		P4AU	=>95
			3AU		0.01	14.55	3.01	701		P4AL	=>95
10	3	3A	3AM		0.01	5	1.82	686	Seam 3A	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
		0D			0.01	1.55	0.54	378	Seam 0D	P1	=>95
			0CR		0.01	0.9	0.23	50		P0D	=>95
				0CUU	0.01	8	1.71	780		P0CR	=>95
				0CUM	0.01	7	1.49	779	Seam OCU	P0CUU	=>95
		00	0CU	0CUL	0.2	14.26	3.46	826	Scall 000	P0CUM	=>95
		00		0CL4	0.01	4.9	0.72	771		P0CUL	=>95
				0CL3	0.01	4.05	0.65	784		P0CL4	=>95
14	0		OCT	0CL2	0.01	3.81	0.86	788	Seam OCI	P0CL3	=>95
14	0		OCL	0CL1	0.15	3.9	1.38	814	Scall OCL	P0CL2	=>95
											=>90
		0B	0BU		0.01	8.57	2.69	824	Seam OP	POBR	=>90
			0BL		0.1	14.4	3.34	880	Scall 013	POBU	=>90
			0AR		0.01	1.85	0.73	89		POBL	=>90
		0.4	0AU		0.13	13.1	3.74	801	Seam 0.4	POAR	=>90
		UA	0AL		0.18	18.15	3.12	823	Scall 0A	POAU	=>90
		0ALL		0.16	1.77	0.9	30		POAL	=>90	

# Table 5-4: Seam Hierarchy for Ukhaa Khudag

(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.

Туре	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

 Table 5-5: Summary of the analytical database.

(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.



Figure 5-19: Relationship between ash and true relative density. (Source: Adiya)

Page 66



Figure 5-20: Relationship between ash and volatile matter.



Figure 5-21: Relationship between ash and calorific value.

(Source: Adiya)

Page 67



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 (airdry) 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, ashfree 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, ashfree 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 southwestern 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.

JORC (2012) Standard Resource Estimation Report for the Ukhaa Khudag Coal Mine



Page 73



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)

Page 78



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)

Page 79



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

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 asreceived 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.

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	$R^2 = 0.9778$		
$TSad = 1.2223 * e^{(-0.012 * Aad)}$	$R^2 = 0.2505$		
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	$R^2 = 0.9094$		
TSad = -0.0002*Aad2 + 0.0212*Aad + 0.5526	$R^2 = 0.0142$		
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	$R^2 = 0.9318$		
$TSad = 1.0017 * e^{(-0.006 * Aad)}$	$R^2 = 0.0248$		
Seam 9			
$TRDad = 1.2339 * e^{(0.0086 * Aad)}$	R2 = 0.9103		
Mt = 1.2707*Mad2 - 2.3034*Mad + 5.2827	$R^2 = 0.0139$		
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	$R^2 = 0.9247$		
$TSad = 0.7394 * e^{(0.0143 * Aad)}$	$R^2 = 0.1231$		
Seam 8			
$TRDad = 1.2341 * e^{(0.0089 * Aad)}$	R2 = 0.8624		
Mt = 2.5025*Mad + 1.6006	$R^2 = 0.3488$		
$Mad = 0.0009 * Mt^2 + 0.0641 * Mt + 0.695$	R2 = 0.3394		
VMad = 33.248 * e^(- 0.011 * Aad)	R2 = 0.6146		
CVad = 0.0481*Aad2 - 105.38*Aad + 8558	$R^2 = 0.9276$		
$TSad = -0.0009 * Aad^2 + 0.1194 * Aad - 0.5269$	$R^2 = 0.1185$		
Seam 7			
$TRDad = 1.232 * e^{(0.0083 * Aad)}$	R2 = 0.9022		

Table 5-6: Regression formulae for coal quality parameters on a seam basis.

$\begin{array}{c} \mathrm{M} \ 1.576\ \mathrm{M} \ \mathrm{M} \ 2.0436\ \mathrm{M} \ \mathrm{M} \ 2.0436\ \mathrm{M} \  \  \  \  \  \  \  \  \  \  \  \  \  \  \  \ \mathbb$	Mt = 1.5796*Mad + 2.8408	$P^2 = 0.048$
$\begin{aligned} & \text{Mad} = -0.006 * \text{Aad}^2 - 0.176 * \text{Aad} + 29.372 & \text{R} 2 = 0.7595 \\ & \text{CVad} = -0.0449^* \text{Aad}^2 - 0.176 * \text{Aad} + 8558.4 & \text{R}^2 = 0.0504 \\ & \text{TSad} = -0.007 * \text{Aad}^2 + 0.0774 * \text{Aad} - 0.1441 & \text{R}^2 = 0.0504 \\ & \text{Mad} = 0.0097 * \text{Aad}^2 + 2.0933 * \text{Mad} + 1.7911 & \text{R} 2 = 0.0104 \\ & \text{Mt} = 0.1475 * \text{Mad}^2 + 2.0933 * \text{Mad} + 1.7911 & \text{R} 2 = 0.6197 \\ & \text{Mad} = 0.0097 * \text{Mr}^2 + 2.0093 * \text{Mad} + 1.7911 & \text{R} 2 = 0.6197 \\ & \text{Mad} = 0.0007 * \text{Aad}^2 + 0.0058 * \text{Aad} + 21.17 & \text{R} 2 = 0.4728 \\ & \text{CVad} = -9.735 * \text{Aad} + 8445.2 & \text{R}^2 = 0.8988 \\ & \text{TSad} = 0.7803 * c^*(-0.006 * \text{Aad}) & \text{R}^2 = 0.0284 \\ & \text{seam 5} & \text{TRDad} = 1.2481 * c^*(0.008 * \text{Aad}) & \text{R}^2 = 0.0384 \\ & \text{seam 5} & \text{TRDad} = 1.2481 * c^*(0.008 * \text{Aad}) & \text{R} 2 = 0.3431 \\ & \text{CVad} = -0.013 * \text{Mr}^2 + 0.2501 * \text{Mt} + 0.6836 & \text{R} 2 = 0.3743 \\ & \text{TSad} = 0.0323 * ada^2 - 99.564 * \text{Aad} + 8471.9 & \text{R}^2 = 0.0374 \\ & \text{TSad} = 0.0323 * ada^2 - 99.564 * \text{Aad} + 8471.9 & \text{R}^2 = 0.0374 \\ & \text{TSad} = 0.033 * \text{Aad}^2 + 0.0715 * \text{Aad} + 0.5407 & \text{R} 2 = 0.3701 \\ & \text{Mad} = -0.0033 * \text{Aad}^2 + 0.0715 * \text{Aad} + 0.5407 & \text{R} 2 = 0.3701 \\ & \text{TMDad} = 1.2281 * c^*(0.0082 * \text{Aad}) & \text{R}^2 = 0.0423 \\ & \text{Mad} = -0.0033 * \text{Aad}^2 - 0.0715 * \text{Aad} + 0.5407 & \text{R} 2 = 0.3701 \\ & \text{TMad} = 1.0234 * \text{Aad}^2 - 10.114 * \text{Aad} + 8589.1 & \text{R}^2 = 0.0427 \\ & \text{Seam 4B} & \text{R}^2 = 0.0427 \\ & \text{TRDad} = 1.2284 * ac^*(0.0083 * \text{Aad}) & \text{R} 2 = 0.9921 \\ & \text{TRDad} = 1.2284 * ac^*(0.0083 * \text{Aad}) & \text{R} 2 = 0.99265 \\ & \text{TSad} = -0.0006 * \text{Aad}^2 - 10.114 * \text{Aad} + 858.1 & \text{R}^2 = 0.0427 \\ & \text{Seam 4A} & \text{CVad} = 0.0547 * \text{Aad}^2 - 0.061 * \text{Aad} + 0.1374 & \text{R}^2 = 0.0427 \\ & \text{Seam 4A} & \text{CTAM} + 1.9626 & \text{R}^2 = 0.2073 \\ & \text{VMad} = 3.0624 * c^*(-0.013 * \text{Aad}) & \text{R} 2 = 0.9925 \\ & \text{TSad} = -0.0005 * \text{Aad}^2 - 0.013 * \text{Aad} + 0.0736 & \text{R}^2 = 0.0174 \\ & \text{Seam 4A} & \text{ST} \\ & \text{TRDad} = 1.2349 * c^*(0.0083 * \text{Aad}) & \text{R} 2 = 0.0173 \\ & \text{VMad} = 3.0634 * \text{Aad}^2 - 10.013 * \text{Aad}$	$M_{0}d = 0.6896 * Mt \wedge (0.1668)$	R = 0.048
$\begin{array}{c} \text{VMad} = -0.0049^* \text{Aad} - 20.116^* \text{Aad} + 29.372 & \text{R}^2 = 0.936 \\ \text{CVad} = -0.0449^* \text{Aad} - 21.1^*\text{Aad} + 858.4 & \text{R}^2 = 0.956 \\ \text{TSad} = -0.0007^* \text{Aad}^2 + 0.0774^* \text{Aad} - 0.1441 & \text{R}^2 = 0.0504 \\ \hline \text{Seam 6} & \text{TRDad} = 1.2431^* \text{e}^{\circ}(0.0081^* \text{Aad}) & \text{R}2 = 0.9104 \\ \text{Mt} = 0.1475^* \text{Mad}^2 + 2.0933^* \text{Mad} + 1.7911 & \text{R}2 = 0.6197 \\ \text{Mad} = 0.0097^* \text{Mt}^2 + 0.0092^* \text{Mt} + 0.7692 & \text{R}2 = 0.7060 \\ \text{VMad} = -0.0027^* \text{Aad}^2 + 0.0658^* \text{Aad} + 21.17 & \text{R}2 = 0.4728 \\ \text{Cvad} = -97.735^* \text{Aad} + 8445.2 & \text{R}^2 = 0.0898 \\ \text{TSad} = 0.7803^* \text{e}^{\circ}( - 0.006^* \text{Aad}) & \text{R}^2 = 0.0284 \\ \text{Seam 5} & \text{Seam 5} & \text{R}2 \\ \text{TRDad} = 1.2481^* \text{e}^{\circ}(0.008^* \text{Aad}) & \text{R}2 = 0.3849 \\ \text{Mad} = -0.0013^* \text{Mt}^2 + 2.884^* \text{Mad} + 1.5758 & \text{R}2 = 0.3949 \\ \text{Mad} = -0.0013^* \text{Mt}^2 + 0.2501^* \text{M} + 0.0836 & \text{R}2 = 0.3743 \\ \text{VMad} = -26.586^* \text{e}^{\circ}( - 0.01^* \text{Aad}) & \text{R}2 = 0.4841 \\ \text{CVad} = 0.0334^* \text{Aad}^2 + 9.564^* \text{Aad} + 8471.9 & \text{R}^2 = 0.0324 \\ \text{TSad} = 0.332^* \text{e}^{\circ}( - 0.008^* \text{Aad}) & \text{R}^2 = 0.0526 \\ \text{Seam 4C} & \text{TRDad} = 1.251^* \text{e}^{\circ}(0.0082^* \text{Aad}) & \text{R}2 = 0.9157 \\ \text{Mt} = 2.3812^* \text{Mad}^2 + 1.8078 & \text{Aad} + 0.5407 & \text{R}2 = 0.3701 \\ \text{VMad} = 29.424^* \text{e}^{\circ}( - 0.013^* \text{Aad}) & \text{R}2 = 0.7165 \\ \text{VMad} = -0.0024^* \text{Aad}^2 + 0.061^* \text{Aad} + 0.5407 & \text{R}2 = 0.3701 \\ \text{VMad} = 2.9261^* \text{Mad}^2 + 0.061^* \text{Aad} + 0.5407 & \text{R}2 = 0.3701 \\ \text{VMad} = 2.924^* \text{e}^{\circ}( 0.0083^* \text{Aad}) & \text{R}2 = 0.0716 \\ \text{Seam 4B} & \text{TRDad} = 1.2284^* \text{e}^{\circ}( 0.0083^* \text{Aad}) & \text{R}2 = 0.0273 \\ \text{Mt} = 2.2961^* \text{Mad}^2 + 1.9661^* \text{Aad} + 0.1374 & \text{R}^2 = 0.0217 \\ \text{Seam 4B} & \text{T}10.4^* \text{A}1.9626 & \text{R}^2 = 0.2037 \\ \text{VMad} = 0.634^* \text{Aad}^2 + 0.0513^* \text{Aad} + 0.0736 & \text{R}^2 = 0.0217 \\ \text{Seam 4B} & \text{T}10.4^* \text{A}1.9260 & \text{R}^2 = 0.0273 \\ \text{VMad} = 0.505^* \text{M}1^{\circ}(0.082^* \text{Aad}) & \text{R}2 = 0.2073 \\ \text{VMad} = 0.505^* \text{M}1^{\circ}(0.082^* \text{Aad}) & \text{R}2 = 0.0273 \\ \text{VMad} = 0.505^* \text{M}1^{\circ}(0.082^* \text{Aad}) & \text{R}2 = 0.0174 \\ \text{M}2 $	$VM_{ad} = 0.0006 * A_{ad}(2) = 0.176 * A_{ad} + 20.272$	$R_2 = 0.0003$
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	$\sqrt{Mad} = -0.0000 + Aad^{2} - 0.1/6 + Aad + 29.3/2$	$R_2 = 0.7393$
$\begin{split} & \text{Isad} = -0.0007 * \text{Add}^2 + 0.0714 * \text{Add} = 0.1441 & \text{R}^2 = 0.0304 \\ & \text{TRDad} = 1.2431 * e^{(0.0081 * \text{Aad})} & \text{R2} = 0.9104 \\ & \text{Mt} = 0.007 * \text{Mt}^2 + 0.0092 * \text{Mt} + 0.7692 & \text{R2} = 0.7060 \\ & \text{VMad} = -0.007 * \text{Mt}^2 + 0.0092 * \text{Mt} + 0.7692 & \text{R2} = 0.7060 \\ & \text{VMad} = -0.007 * \text{Mt}^2 + 0.0092 * \text{Mt} + 0.7692 & \text{R2} = 0.7060 \\ & \text{VMad} = -0.007 * \text{Mt}^2 + 0.0092 * \text{Mt} + 0.7692 & \text{R2} = 0.7060 \\ & \text{VMad} = -0.003 * e^{(-)} -0.006 * \text{Aad}) & \text{R}^2 = 0.4728 \\ & \text{Cvad} = -0.735 * \text{Aad} + 8445.2 & \text{R}^2 = 0.8388 \\ & \text{TRDad} = 1.2481 * e^{(0.008 * \text{Aad})} & \text{R}^2 = 0.0324 \\ & \text{Seam S} & \text{TRDad} = 1.2481 * e^{(-0.008 * \text{Aad})} & \text{R2} = 0.3743 \\ & \text{Mad} = -0.0013 * \text{Mt}^2 + 0.2501 * \text{Mt} + 0.0836 & \text{R2} = 0.3743 \\ & \text{VMad} = 26.586 * e^{(-)} - 0.01 * \text{Aad}) & \text{R2} = 0.4728 \\ & \text{Cvad} = -0.393^2 \text{Aad}^2 + 9.564^8 \text{Aad} + 8471.9 & \text{R}^2 = 0.9374 \\ & \text{TSad} = 0.832 * e^{(-)} - 0.008 * \text{Aad}) & \text{R2} = 0.0526 \\ & \text{Seam 4C} & \text{R2} = 0.0393^4 \text{Aad}^2 - 9.564^8 \text{Aad} + 8471.9 & \text{R}^2 = 0.0526 \\ & \text{Seam 4C} & \text{R}^2 = 0.0024^8 \text{Aad}^2 + 0.0715 * \text{Aad} + 0.5407 & \text{R2} = 0.9157 \\ & \text{Mt} = 2.3812^*\text{Mad} + 1.8978 & \text{R}^2 = 0.0403 \\ & \text{Mad} = 0.003 * \text{Aad}^2 + 0.0715 * \text{Aad} + 0.1374 & \text{R}^2 = 0.9211 \\ & \text{TSad} = -0.006 * \text{Aad}^2 + 0.0616 * \text{Aad} + 0.1374 & \text{R}^2 = 0.9211 \\ & \text{TSad} = -0.006 * \text{Aad}^2 + 0.0616 * \text{Aad} + 0.1374 & \text{R}^2 = 0.0427 \\ & \text{Vad} = 2.944 * e^{((-)} 0.003 * \text{Aad}) & \text{R2} = 0.7165 \\ & \text{Cvad} = -0.005 * \text{Aad}^2 + 0.0616 * \text{Aad} + 0.1374 & \text{R}^2 = 0.0427 \\ & \text{TRDad} = 1.2284 * e^{((-)} 0.03 * \text{Aad}) & \text{R2} = 0.073 \\ & \text{Mad} = 3.6602 * e^{(-)} 0.013 * \text{Aad} + 0.1374 & \text{R}^2 = 0.0427 \\ & \text{TRDad} = 1.2349 * e^{((-)} 0.038 * \text{Aad}) & \text{R2} = 0.7165 \\ & \text{Cvad} = -0.005 * \text{Aad}^2 + 0.0613 * \text{Aad} + 0.736 & \text{R}^2 = 0.0473 \\ & \text{TRDad} = 1.2349 * e^{((-)} 0.013 * \text{Aad} + 8756.6 & \text{R}^2 = 0.9265 \\ & \text{Cvad} = 0.005 * \text{Aad}^2 + 0.0513 * \text{Aad} + 0.736 & \text{R}^2 = 0.0174 \\ & \text{Seam 4A} & \text{R}^2 = 0.1118 \\ & \text{Mad}$	$Cvad = -0.0449^{*}Aad2 - 9/.11^{*}Aad + 8558.4$	$R^2 = 0.956$
Seam 0         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 = 0.04728           CVad = -97.735*Aad + 8445.2         R2 = 0.08988           TRDad = 0.7803 * e <sup>-(</sup> 0.006 * Aad)         R2 = 0.04728           Seam 5	1Sad = -0.000/* Aad'2 + 0.0//4* Aad - 0.1441	$R^2 = 0.0504$
IRDad = 1.2431 * $e^{\circ}(0.0081 * Aad)$ R2 = 0.9104         MI = 0.1475 * Mad^+ 2.20333 * Mad + 1.7911       R2 = 0.60617         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         Seam 5       R* = 0.8988         TSad = 0.7803 * $e^{\circ}(-0.006 * Aad)$ R2 = 0.0898         Seam 5       R2 = 0.0284         Seam 5       R2 = 0.3743         TRDad = 1.2481 * $e^{\circ}(0.008 * Aad)$ R2 = 0.3743         VMad = 26.586 * $e^{\circ}(-0.018 * Aad)$ R2 = 0.4841         CVad = -0.033*Aad2 - 99.564*Aad + 8471.9       R2 = 0.9374         TSad = 0.832 * $e^{\circ}(-0.008 * Aad)$ R2 = 0.9157         Mt = 2.1251 * $e^{\circ}(0.0082 * Aad)$ R2 = 0.9157         Mt = 2.3812*Mad + 1.8978       R2 = 0.3741         Mad = 0.0033 * Aad^2 + 0.0715 * Aad + 0.5407       R2 = 0.3701         VMad = 2.9.424 * $e^{\circ}(-0.013 * Aad)$ R2 = 0.7165         CVad = -0.0024*Aad2 - 101.14*Aad + 8589.1       R2 = 0.3701         VMad = 2.0424 * $e^{\circ}(0.0083 * Aad)$ R2 = 0.0273         Ma = 0.417 * Mt^{\circ}(0.3225)       R2 = 0.0213         Ma = 0.2006 * Aad^2 + 0.0611 * Aad + 0.1374       R2 = 0.0273         VMad = 30.602 * $e^{\circ}(-0.013 * Aad)$ R2 = 0.62905         TSad = 0.000		<b>D2</b> 0.0104
$\begin{array}{llllllllllllllllllllllllllllllllllll$	$TRDad = 1.2431 * e^{(0.0081 * Aad)}$	R2 = 0.9104
$\begin{array}{llllllllllllllllllllllllllllllllllll$	$Mt = 0.1475 * Mad^{2} + 2.0933 * Mad + 1.7911$	R2 = 0.6197
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$Mad = 0.0097 * Mt^{2} + 0.0092 * Mt + 0.7692$	R2 = 0.7060
$\begin{array}{llllllllllllllllllllllllllllllllllll$	VMad = - 0.0027 * Aad^2 + 0.0658 * Aad + 21.17	R2 = 0.4728
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	CVad = -97.735*Aad + 8445.2	$R^2 = 0.8988$
Seam 5         R2 = 0.8382           TRDad = 1.2481 * e^(0.008 * Aad)         R2 = 0.3842           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 <sup>2</sup> = 0.9374           TSad = 0.832 * e^(-0.008 * Aad)         R <sup>2</sup> = 0.9374           TSad = 0.832 * e^(-0.008 * Aad)         R <sup>2</sup> = 0.9157           Mt = 2.3812*Mad + 1.8978         R <sup>2</sup> = 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 = -0.0006 * Aad^2 + 0.061 * Aad + 0.1374         R <sup>2</sup> = 0.0427           Seam 4B         R <sup>2</sup> = 0.0427           Seam 4B         R <sup>2</sup> = 0.0427           TRDad = 1.2284 * e^(0.0083 * Aad)         R <sup>2</sup> = 0.0227           Seam 4B         R <sup>2</sup> = 0.02285           Mad = 0.5417 * Mt^(0.3225)         R2 = 0.2073           VMad = 30.602 * e^(-0.013 * Aad)         R2 = 0.2073           VMad = 30.602 * e^(-0.013 * Aad)         R2 = 0.0906           CVad = 0.053*Aad2 - 107.12*Aad + 8756.6         R <sup>2</sup> = 0.0245           TSad = 0.2349 * e^(0.0082 * Aad)         R2 = 0.1118           Mad = 0.5505 * Mt^(0.2874)         R2 = 0.9087           Mt = 2.80519 <td><math>TSad = 0.7803 * e^{(-0.006 * Aad)}</math></td> <td><math>R^2 = 0.0284</math></td>	$TSad = 0.7803 * e^{(-0.006 * Aad)}$	$R^2 = 0.0284$
$\begin{split} & \text{TRDad} = 1.2481 * e^{(0.008 * Aad)} & \text{R2} = 0.3832 \\ & \text{Mt} = -0.2234 * Mad^{2} + 2.8884 * Mad + 1.5758} & \text{R2} = 0.3949 \\ & \text{Mad} = -0.0013 * Mt^{2} + 0.2501 * Mt + 0.0836} & \text{R2} = 0.3743 \\ & \text{VMad} = 26.586 * e^{(-0.01 * Aad)} & \text{R2} = 0.0374 \\ & \text{TSad} = 0.332 * e^{(-0.008 * Aad)} & \text{R2} = 0.0374 \\ & \text{TSad} = 0.332 * e^{(-0.008 * Aad)} & \text{R2} = 0.0526 \\ & \text{Seam 4C} & & & & & & \\ & \text{TRDad} = 1.251 * e^{(0.0082 * Aad)} & \text{R2} = 0.0713 \\ & \text{Mad} = 0.0033 * Aad^{2} + 0.0715 * Aad + 0.5407 & \text{R2} = 0.3701 \\ & \text{VMad} = 2.9.424 * e^{(-0.013 * Aad)} & \text{R2} = 0.7165 \\ & \text{CVad} = -0.0024^* Aad^2 - 10.1.14^* Aad + 8589.1 & \text{R}^2 = 0.0427 \\ & \text{Seam 4B} & & & & \\ & \text{TRDad} = 1.2284 * e^{(-0.0083 * Aad)} & \text{R2} = 0.0427 \\ & \text{Seam 4B} & & & \\ & \text{TRDad} = 1.2284 * e^{(-0.0083 * Aad)} & \text{R2} = 0.2385 \\ & \text{Mad} = 0.5417 * Mt^{(0.3225)} & \text{R2} = 0.2385 \\ & \text{Mad} = 0.5417 * Mt^{(0.3225)} & \text{R2} = 0.2385 \\ & \text{Mad} = 0.5602 * Aad^{2} + 0.0513 * Aad + 0.0736 & \text{R}^2 = 0.9265 \\ & \text{TSad} = -0.0005 * Aad^{2} + 0.0513 * Aad + 0.0736 & \text{R}^2 = 0.0174 \\ & \text{Seam 4A10-20} & & \\ & \text{TRDad} = 1.2349 * e^{(0.0082 * Aad)} & \text{R2} = 0.9087 \\ & \text{Mt} = 2.8961*Mad + 1.7284 & \text{R}^2 = 0.1118 \\ & \text{Mad} = 0.5505 * Mt^{(0.2874)} & \text{M2} = 0.0174 \\ & \text{Seam 4A10-20} & & \\ & \text{TRDad} = 1.2386 * e^{((0.0082 * Aad)} & \text{R2} = 0.9087 \\ & \text{Mt} = 2.8961*Mad + 1.7284 & \text{R}^2 = 0.1118 \\ & \text{Mad} = 0.5055 * Mt^{(0.2874)} & \text{R2} = 0.0174 \\ & \text{Seam 4A} & & \\ & \text{TRDad} = 1.2386 * e^{((0.0084 * Aad)} & \text{R2} = 0.07468 \\ & \text{CVad} = -103.2^* Aad + 808.1 & \text{R}^2 = 0.0174 \\ & \text{Seam 4A} & & \\ & \text{TRDad} = 1.2386 * e^{((0.0084 * Aad)} & \text{R2} = 0.07462 \\ & \text{TSad} = 0.0002^* Aad2 + 0.0357^* Aad + 0.3264 & \text{R}^2 = 0.0174 \\ & \text{Mad} = 0.0001 * Aad^2 - 0.0596 * Aad + 23.43 & \text{R2} = 0.05668 \\ & \text{CVad} = -100.67^* Aad + 8651.9 & \text{R}^2 = 0.0379 \\ & \text{TRDad} = -0.0002^* Aad2 + 0.0284^* Aad) & \text{R2} = 0.9379 \\ & \text{TSad} = -0.0002^* Aad2 + 0.0284^* Aad + 0.4361 & \text{R}^2 = 0.0379 \\ & \text{TRDad} = -1.0067^* Aad + 8703.4 & $	Seam 5	
$\begin{array}{llllllllllllllllllllllllllllllllllll$	$TRDad = 1.2481 * e^{(0.008 * Aad)}$	R2 = 0.8382
MadMatherNumber of the state of the	$Mt = -0.2234 * Mad^2 + 2.8884 * Mad + 1.5758$	R2 = 0.3949
VMad = $26.586 * e^{-}(-0.01 * Aad)$ R2 = $0.4841$ $CVad = 0.0393^* Aad2 - 99.564^*Aad + 8471.9$ R <sup>2</sup> = $0.0374$ $TSad = 0.832 * e^{-}(-0.008 * Aad)$ R <sup>2</sup> = $0.0526$ Seam 4CTRDad = $1.251 * e^{-}(0.0082 * Aad)$ R2 = $0.9157$ $Mt = 2.3812^*Mad + 1.8978$ R <sup>2</sup> = $0.4073$ $Mad = 0.0033 * Aad^2 + 0.0715 * Aad + 0.5407$ R2 = $0.3701$ $VMad = 29.424 * e^{-}(-0.013 * Aad)$ R2 = $0.7165$ $CVad = -0.0024^*Aad2 - 101.14^*Aad + 8589.1$ R <sup>2</sup> = $0.0427$ $Seam 4B$ T $TRDad = -1.2284 * e^{-}(0.0083 * Aad)$ R2 = $0.8952$ $Mt = 2.2961^*Mad + 1.9626$ R <sup>2</sup> = $0.2385$ $Ma = 0.5417 * Mt^{+}(0.3225)$ R2 = $0.2073$ $VMad = 30.602 * e^{-}(-0.013 * Aad)$ R2 = $0.2073$ $VMad = 30.602 * e^{-}(-0.013 * Aad)$ R2 = $0.0906$ $CVad = -0.0054^*Aad^2 - 107.12^*Aad + 8756.6$ R <sup>2</sup> = $0.2073$ $TRDad = 1.2349 * e^{-}(0.0082 * Aad)$ R2 = $0.9087$ $Mt = 2.8961^*Mad + 1.7284$ R <sup>2</sup> = $0.1118$ $Mad = 0.5505 * Mt^{-}(0.2874)$ R2 = $0.9087$ $Mt = 2.8961^*Mad + 1.7284$ R <sup>2</sup> = $0.1118$ $Mad = 0.5067 * e^{-}(-0.014 * Aad)$ R2 = $0.9087$ $Mt = 2.8067 * e^{-}(-0.014 * Aad)$ R2 = $0.7468$ $CVad = -10.3.2^*Aad + 8808.1$ R <sup>2</sup> = $0.1128$ $Seam 4A$ R <sup>2</sup> = $0.1128$ $Mad = 0.0092 * Mt^{-}2 - 0.0596 * Aad + 23.43$ R2 = $0.97464$ $CVad = -103.2^*Aad + 8808.1$ R <sup>2</sup> = $0.97464$ $TRDad = 1.2386 * e^{-}(0.0084 * Aad)$ R2 = $0.97464$ $Mad = 0.0092 * Mt^{-}2 - 0.0596 * Aad + 23.43$ R2 = $0.97464$ <td><math display="block">Mad = -0.0013 *Mt^{2} + 0.2501 *Mt + 0.0836</math></td> <td>R2 = 0.3743</td>	$Mad = -0.0013 *Mt^{2} + 0.2501 *Mt + 0.0836$	R2 = 0.3743
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 4CTTRDad = $1.251 * e^{(}0.0082 * Aad)$ $R2 = 0.9157$ Mt = $2.3812^*Mad + 1.8978$ $R^2 = 0.4073$ Mad = $0.0033 * Aad^{-2} + 0.0715 * Aad + 0.5407$ $R2 = 0.3701$ VMad = $29.424 * e^{(} - 0.013 * Aad)$ $R2 = 0.0211$ TSad = $-0.0006 * Aad^{-2} + 0.0661 * Aad + 0.1374$ $R^2 = 0.9211$ TSad = $-0.0006 * Aad^{-2} + 0.0661 * Aad + 0.1374$ $R^2 = 0.0427$ Seam 4BTTRDad = $1.2284 * e^{(}0.0083 * Aad)$ $R2 = 0.8952$ Mt = $2.2961^*Mad + 1.9626$ $R^2 = 0.2385$ Mad = $0.5417 * Mt^{+}(0.3225)$ $R2 = 0.2073$ VMad = $30.602 * e^{(} - 0.013 * Aad)$ $R2 = 0.0203$ VMad = $30.602 * e^{(} - 0.013 * Aad)$ $R2 = 0.9085$ TSad = $-0.005 * Aad^{-2} + 0.0513 * Aad + 0.0736$ $R^2 = 0.9265$ TSad = $-0.005 * Aad^{-2} + 0.0513 * Aad + 0.0736$ $R^2 = 0.9087$ Mt = $2.8961^*Mad + 1.7284$ $R^2 = 0.1118$ Mad = $0.5505 * Mt^{+}(0.2874)$ $R2 = 0.9087$ Mt = $2.8961^*Mad + 1.7284$ $R^2 = 0.118$ Mad = $0.5505 * Mt^{+}(0.2874)$ $R2 = 0.9087$ Mt = $2.8961^*Mad + 1.3097$ $R^2 = 0.302$ Mad = $0.023 * Mt^{+} + 0.1502 * Mt + 0.3453$ $R2 = 0.0746$ VMad = $-0.002 * Aad2 + 0.0357^*Aad + 0.3264$ $R^2 = 0.302$ Mad = $-0.002 * Aad2 + 0.0357^*Aad + 0.3264$ $R^2 = 0.379$ TSad $= -0.002 * Aad2 + 0.0357^*Aad + 0.3264$ $R^2 = 0.9379$ TSad $= -0.0023 * Mt^{+} 2 + 0.1502 * Mt + 0.3453$ $R2 =$	$VMad = 26.586 * e^{(-0.01 * Aad)}$	R2 = 0.4841
TSad = $0.832 * e^{(-0.008 * Aad)}$ $R^2 = 0.0526$ Seam 4CR2TRDad = $1.251 * e^{(0.0082 * Aad)}$ R2 = $0.9157$ Mat = $0.033 * Aad^2 + 0.0715 * Aad + 0.5407$ R2 = $0.3701$ VMad = $29.424 * e^{(-0.013 * Aad)}$ R2 = $0.7165$ CVad = $-0.0024 * Aad2 - 101.14 * Aad + 8589.1$ R2 = $0.9211$ TSad = $-0.006 * Aad^2 + 0.0661 * Aad + 0.1374$ R2 = $0.0427$ Seam 4BR2 = $0.0427$ TRDad = $1.2284 * e^{(0.0083 * Aad)}$ R2 = $0.08952$ Mt = $2.2961 * Mad + 1.9626$ R <sup>2</sup> = $0.2073$ VMad = $30.602 * e^{(-0.013 * Aad)}$ R2 = $0.6906$ CVad = $0.0634^* Aad2 - 107.12^* Aad + 8756.6$ R <sup>2</sup> = $0.0265$ TSad = $-0.0005 * Aad^2 - 0.0513 * Aad)$ R2 = $0.9087$ Mt = $2.3961 * Mad + 1.7284$ R <sup>2</sup> = $0.0174$ Seam 4A10-20TTRDad = $1.2349 * e^{(0.0082 * Aad)}$ R2 = $0.9087$ Mt = $2.8961 * Mad + 1.7284$ R <sup>2</sup> = $0.1118$ Mad = $0.5505 * Mt^{(0.2874)}$ R2 = $0.9087$ Mt = $2.8961 * Mad + 1.7284$ R <sup>2</sup> = $0.1128$ Mad = $0.3067 * e^{(-0.014 * Aad)}$ R2 = $0.9087$ Mt = $2.8961 * Mad + 1.7284$ R <sup>2</sup> = $0.118$ Mad = $0.032 * Aad + 8808.1$ R <sup>2</sup> = $0.9087$ Mt = $2.0102 * Mt^{-}(0.014 * Aad)$ R2 = $0.7468$ Vad = $-0.0023 * Mt^{-}2 + 0.1502 * Mt + 0.3453$ R2 = $0.7145$ Seam 4AR2 $R^2 = 0.0214$ Mad = $-0.0023 * Mt^{-}2 + 0.1502 * Mt + 0.3453$ R2 = $0.02172$ VMad = $-0.0023 * Adc^2 + 0.0518 * Aad + 23.43$ R2 = $0.9379$ TSad = $-0.0023 * Mt^{-}2 - 0.0396 * Aad + 23.43$	CVad = 0.0393*Aad2 - 99.564*Aad + 8471.9	$R^2 = 0.9374$
Seam 4CR2 = 0.9157 $Mt = 2.3812*Mad + 1.8978$ $R^2 = 0.4073$ $Mad = 0.0033*Aad'2 + 0.0715*Aad + 0.5407$ $R2 = 0.3701$ $Vmad = 29.424*e'(-0.013*Aad)$ $R2 = 0.7165$ $CVad = -0.0024*Aad'2 + 0.0661*Aad + 0.5407$ $R^2 = 0.9211$ $TSad = -0.0006*Aad'2 + 0.0661*Aad + 0.1374$ $R^2 = 0.0427$ Seam 4B $R^2 = 0.0248*e'(-0.0083*Aad)$ $R2 = 0.8952$ $Mt = 2.2961*Mad + 1.9626$ $R^2 = 0.2385$ $Mad = 0.5417*Mt'(0.3225)$ $R2 = 0.2073$ $VMad = 30.602*e'(-0.013*Aad)$ $R2 = 0.02073$ $VMad = 30.602*e'(-0.013*Aad)$ $R2 = 0.02065$ $CVad = 0.0054*Aad'2 + 0.0513*Aad + 0.0736$ $R^2 = 0.0174$ Seam 4A10-20 $R^2 = 0.0174$ TRDad = 1.2349*e'(0.0082*Aad) $R2 = 0.9087$ $Mt = 2.8961*Mad + 1.7284$ $R^2 = 0.0174$ Seam 4A10-20 $R^2 = 0.0174$ TRDad = 1.2349*e'(0.0082*Aad) $R2 = 0.9087$ $Mt = 2.8961*Mad + 1.7284$ $R^2 = 0.1118$ Mad = 0.5055*Mt'(0.2874) $R2 = 0.9087$ $Mt = 2.103*Aad + 8808.1$ $R^2 = 0.1936$ $CVad = -103.2*Aad + 8808.1$ $R^2 = 0.1458$ Seam 4A $R^2 = 0.0144*Aad$ $Rad = 0.0002*Aad + 0.0056*Aad + 23.43$ $R2 = 0.8744$ $Mt = 2.0151*Mad + 2.3097$ $R^2 = 0.302$ $Mad = -0.002*Aad + 0.0357*Aad + 0.3264$ $R^2 = 0.0472$ Seam 3A $R^2 = 0.0174$ $Rad = -0.002*Aad + 0.0357*Aad + 0.3264$ $R^2 = 0.0472$ Seam 3A $R^2 = 0.0472$ $CVad = -10.66*Aad + 8703.4$ $R^2 = 0.0389$ $TSad = -0.0002*Aad + 0.0397*Aad + 0.3264$ <t< td=""><td><math>TSad = 0.832 * e^{(-0.008 * Aad)}</math></td><td><math>R^2 = 0.0526</math></td></t<>	$TSad = 0.832 * e^{(-0.008 * Aad)}$	$R^2 = 0.0526$
$\begin{array}{c c} {\rm TRDad} = 1.251 * e^{(}0.0082 * {\rm Aad}) & {\rm R2} = 0.9157 \\ {\rm Mt} = 2.3812*{\rm Mad} + 1.8978 & {\rm R}^2 = 0.4073 \\ {\rm Mad} = 0.0033 * {\rm Aad}^{\prime 2} + 0.0715 * {\rm Aad} + 0.5407 & {\rm R2} = 0.3701 \\ {\rm VMad} = 29.424 * e^{(} - 0.013 * {\rm Aad}) & {\rm R2} = 0.7165 \\ {\rm CVad} = -0.0024*{\rm Aad}^2 + 101.14*{\rm Aad} + 8589.1 & {\rm R}^2 = 0.9211 \\ {\rm TSad} = -0.0006 * {\rm Aad}^{\prime 2} + 0.0661 * {\rm Aad} + 0.1374 & {\rm R}^2 = 0.0427 \\ {\rm Seam}  4B & {\rm TRDad} = 1.2284 * e^{(}0.0083 * {\rm Aad}) & {\rm R2} = 0.8952 \\ {\rm Mt} = 2.2961*{\rm Mad} + 1.9626 & {\rm R}^2 = 0.2385 \\ {\rm Mad} = 0.5417 * {\rm Mt}^{(}0.3225) & {\rm R2} = 0.2073 \\ {\rm VMad} = 30.602 * e^{(} - 0.013 * {\rm Aad}) & {\rm R2} = 0.6906 \\ {\rm CVad} = 0.0634*{\rm Aad}^2 - 107.12*{\rm Aad} + 8756.6 & {\rm R}^2 = 0.9265 \\ {\rm TSad} = -0.0005 * {\rm Aad}^{\prime 2} + 0.0513 * {\rm Aad} + 0.0736 & {\rm R}^2 = 0.0174 \\ {\rm Seam}  410-20 & {\rm TRDad} = 1.2349*e^{(}0.0082 * {\rm Aad}) & {\rm R2} = 0.9087 \\ {\rm Mt} = 2.3961*{\rm Mad} + 1.7284 & {\rm R}^2 = 0.1118 \\ {\rm Mad} = 0.5505 * {\rm Mt}^{\prime}(0.2874) & {\rm R2} = 0.1936 \\ {\rm VMad} = 31.476 * e^{(} - 0.014 * {\rm Aad}) & {\rm R2} = 0.9087 \\ {\rm Mt} = 2.8961*{\rm Mad} + 1.7284 & {\rm R}^2 = 0.1118 \\ {\rm Mad} = 0.505 * {\rm Mt}^{\prime}(0.2874) & {\rm R2} = 0.1936 \\ {\rm VMad} = 31.476 * e^{(} - 0.014 * {\rm Aad}) & {\rm R2} = 0.7468 \\ {\rm CVad} = -103.2*{\rm Aad} + 808.1 & {\rm R}^2 = 0.1426 \\ {\rm TSad} = 0.8067 * e^{(} - 0.014 * {\rm Aad}) & {\rm R}^2 = 0.1426 \\ {\rm Seam}  4A & {\rm M} \\ \\ {\rm TRDad} = 1.2386 * e^{(}0.0084 * {\rm Aad}) & {\rm R2} = 0.5748 \\ {\rm CVad} = -0.0012^{*}{\rm Mad} + 2.3097 & {\rm R}^2 = 0.302 \\ {\rm Mad} = -0.0023^{*}{\rm Mt}^{\prime 2} - 0.1502 * {\rm Mt} + 0.3453 & {\rm R2} = 0.1712 \\ {\rm VMad} = -0.0011^{*}{\rm Aad}^{\prime 2} - 0.0596 * {\rm Mad} + 0.3264 & {\rm R}^2 = 0.0472 \\ {\rm Seam}  3A \\ \\ {\rm TRDad} = 1.2454 * e^{(}(0.0081 * {\rm Aad}) & {\rm R}^2 = 0.9379 \\ {\rm TSad} = -0.0002^{*}{\rm Aad} + 8651.9 & {\rm R}^2 = 0.9379 \\ {\rm TSad} = -0.0002^{*}{\rm Aad} + 861.9 & {\rm R}^2 = 0.9389 \\ {\rm Tsad} = -0.0002^{*}{\rm Aad}^{2} + 0.0238^{*}{\rm Aad} + 0.3264 & {\rm R}^2 = 0.9389 \\ {\rm TSad} = -0.0002^{*}{\rm Aad}^{2} + 0.028$	Seam 4C	
Mt = $2.3812*Mad + 1.8978$ R² = $0.4073$ Mad = $0.0033 * Aad^2 + 0.0715 * Aad + 0.5407$ R2 = $0.3701$ VMad = $29.424 * c^{\circ}(-0.013 * Aad)$ R2 = $0.7165$ CVad = $-0.0024*Aad2 - 101.14*Aad + 8589.1$ R² = $0.9211$ TSad = $-0.0006 * Aad^2 + 0.0661 * Aad + 0.1374$ R² = $0.0427$ Seam 4BR2 = $0.0427$ TRDad = $1.2284 * c^{\circ}(0.0083 * Aad)$ R2 = $0.8952$ Mt = $2.2961*Mad + 1.9626$ R² = $0.2385$ Mad = $0.5417 * Mt^{\circ}(0.3225)$ R2 = $0.2073$ VMad = $30.602 * c^{\circ}(-0.013 * Aad)$ R2 = $0.6906$ CVad = $0.0634*Aad2 - 107.12*Aad + 8756.6$ R² = $0.9265$ TSad = $-0.0005 * Aad^2 + 0.0513 * Aad + 0.0736$ R² = $0.0174$ Seam 4A10-20TTRDad = $1.2349 * c^{\circ}(0.0082 * Aad)$ R2 = $0.9087$ Mt = $2.8961*Mad + 1.7284$ R² = $0.1118$ Mad = $0.5505 * Mt^{\circ}(0.2874)$ R2 = $0.118$ Mad = $0.5505 * Mt^{\circ}(0.2874)$ R2 = $0.1936$ VMad = $31.476 * c^{\circ}(-0.014 * Aad)$ R2 = $0.7468$ CVad = $-103.2*Aad + 8808.1$ R² = $0.9422$ TSad = $0.8067 * c^{\circ}(-0.014 * Aad)$ R2 = $0.1712$ Mad = $-0.0023 * Mt^{\circ} - 0.1502 * Mt + 0.3453$ R2 = $0.1712$ VMad = $-0.0011 * Aad^{\circ} - 0.0596 * Aad + 23.43$ R2 = $0.5668$ CVad = $-10.067*Aad + 8651.9$ R² = $0.9379$ TSa = $-0.0002*Aad2 + 0.0357*Aad + 0.3264$ R² = $0.9379$ TSa = $0.0002*Aad2 + 0.0357*Aad + 0.3264$ R² = $0.9379$ TSa = $0.0002*Aad2 + 0.0357*Aad + 0.3264$ R² = $0.9389$ TSad = $-0.0002*Aad2 + 0.039*Mt + 0.7219$ R2 = $0.4622$ VMa	$TRDad = 1.251 * e^{(0.0082 * Aad)}$	R2 = 0.9157
Mad = $0.0033 * Aad^2 + 0.0715 * Aad + 0.5407$ R2 = $0.3701$ VMad = $29.424 * e^{(-0.013 * Aad)}$ R2 = $0.7165$ CVad = $-0.0024^*Aad2 - 101.14^*Aad + 8589.1$ R² = $0.9211$ TSad = $-0.0006 * Aad^2 + 0.0661 * Aad + 0.1374$ R² = $0.0427$ Seam 4BTTRDad = $1.2284 * e^{(0.0083 * Aad)}$ R2 = $0.8952$ Mt = $2.2961^*Mad + 1.9626$ R² = $0.2385$ Mad = $0.5417 * Mt^{(0.3225)}$ R2 = $0.2073$ VMad = $30.602 * e^{(-0.013 * Aad)}$ R2 = $0.6906$ CVad = $0.0634^*Aad2 - 107.12^*Aad + 8756.6$ R² = $0.9265$ TSad = $-0.0005 * Aad^2 + 0.0513 * Aad + 0.0736$ R² = $0.0174$ Seam 4A10-20TTRDad = $1.2349 * e^{(0.0082 * Aad)}$ R2 = $0.9087$ Mt = $2.8961 * Mad + 1.7284$ R² = $0.1118$ Mad = $0.5505 * Mt^{(0.2874)}$ R2 = $0.1936$ VMad = $31.476 * e^{(-0.014 * Aad)}$ R2 = $0.7468$ CVad = $-103.2^*Aad + 8808.1$ R² = $0.1936$ VMad = $-10.32.^*Aad + 8808.1$ R² = $0.1458$ Seam 4AR² = $0.1458$ Seam 4AR2 = $0.148 \times 10^{-2} + 0.0596 * Aad + 23.43$ R2 = $0.1742$ VMad = $-0.0023 * Mt^{-2} + 0.0596 * Aad + 23.43$ R2 = $0.0028 * Mt^{-2} + 0.0597 * Ma + 0.3264$ R² = $0.9379$ TSad $-0.0028 * Aad + 8651.9$ R² = $0.9379$ TSad $-0.0028 * Mad^{-2} + 0.0357*Aad + 0.3264$ R² = $0.9379$ TSad $-0.0002*Aad2 + 0.0357*Aad + 0.3264$ R² = $0.9379$ TSad $-0.0002*Aad2 + 0.0357*Aad + 0.3264$ R² = $0.9379$ TSad $-0.0002*Aad2 + 0.0309 * Mt + 0.7219$ R2 = $0.6699$ CVad $= -10.66*Aad + 8703.$	Mt = 2.3812*Mad + 1.8978	$R^2 = 0.4073$
$\begin{array}{c c} \mathrm{VMad} = 29.424 * \mathrm{e}^{(-} 0.013 * \mathrm{Aad}) & \mathrm{R}2 = 0.7165 \\ \mathrm{CVad} = .0.0024^* \mathrm{Aad}^2 + 101.14^* \mathrm{Aad} + 8589.1 & \mathrm{R}^2 = 0.9211 \\ \mathrm{TSad} = .0.0006 * \mathrm{Aad}^2 + 0.0661 * \mathrm{Aad} + 0.1374 & \mathrm{R}^2 = 0.0427 \\ \hline \mathbf{Seam 4B} & & \mathrm{R}^2 = 0.0008 * \mathrm{Aad}^2 + 0.0661 * \mathrm{Aad} + 0.1374 & \mathrm{R}^2 = 0.0427 \\ \hline \mathbf{Seam 4B} & & \mathrm{R}^2 = 0.08952 \\ \mathrm{Mt} = 2.2961^* \mathrm{Mad} + 1.9626 & \mathrm{R}^2 = 0.2385 \\ \mathrm{Mad} = 0.5417 * \mathrm{Mt}^{+}(0.3225) & \mathrm{R}2 = 0.2073 \\ \mathrm{VMad} = 30.602 * \mathrm{e}^{+}(-0.013 * \mathrm{Aad}) & \mathrm{R}2 = 0.6906 \\ \mathrm{C}^{+} \mathrm{C}^{+} \mathrm{C}^{+} \mathrm{O}^{+} \mathrm{C}^{+} \mathrm{O}^{+} \mathrm{C}^{+} \mathrm{A}^{+} \mathrm{A}^{+} \mathrm{S}^{+} \mathrm{S}^{+} \mathrm{S}^{-} \mathrm{G} & \mathrm{R}^{2} = 0.9265 \\ \mathrm{TSad} = -0.0005 * \mathrm{Aad}^{+} 2 + 0.0513 * \mathrm{Aad} + 0.0736 & \mathrm{R}^{2} = 0.0174 \\ \hline \mathbf{Seam} 4A10 - 20 & & & & & & & & & & & & & & & & & & $	$Mad = 0.0033 * Aad^2 + 0.0715 * Aad + 0.5407$	R2 = 0.3701
$\begin{array}{c c} CVad = -0.0024^*Aad2 - 101.14^*Aad + 8589.1 & R^2 = 0.9211 \\ TSad = -0.0006^*Aad^2 + 0.0661^*Aad + 0.1374 & R^2 = 0.0427 \\ \hline Seam 4B & & \\ TRDad = 1.2284^*e^{(}0.0083^*Aad) & R2 = 0.8952 \\ Mt = 2.2961^*Mad + 1.9626 & R^2 = 0.2385 \\ Mad = 0.5417^*Mt^{(}0.3225) & R2 = 0.2073 \\ VMad = 30.602^*e^{(}-0.013^*Aad) & R2 = 0.6906 \\ CVad = 0.0634^*Aad2 - 107.12^*Aad + 8756.6 & R^2 = 0.9265 \\ TSad = -0.0005^*Aad^2 + 0.0513^*Aad + 0.0736 & R^2 = 0.0174 \\ \hline Seam 4A10-20 & & \\ TRDad = 1.2349^*e^{(}0.0082^*Aad) & R2 = 0.9087 \\ Mt = 2.8961^*Mad + 1.7284 & R^2 = 0.1118 \\ Mad = 0.5505^*Mt^{(}0.2874) & R2 = 0.1936 \\ VMad = 31.476^*e^{(}-0.014^*Aad) & R2 = 0.1936 \\ CVad = -103.2^*Aad + 8808.1 & R^2 = 0.1948 \\ CVad = -103.2^*Aad + 8808.1 & R^2 = 0.9642 \\ TSad = 0.8067^*e^{(}-0.014^*Aad) & R2 = 0.7468 \\ CVad = -0.0023^*Mt^{'}2 + 0.1502^*Mt + 0.3453 & R2 = 0.1712 \\ VMad = -0.0023^*Mt^{'}2 + 0.1502^*Mt + 0.3453 & R2 = 0.1712 \\ VMad = -0.0011^*Aad^2 - 0.0596^*Aad + 23.43 & R2 = 0.5668 \\ CVad = -100.67^*Aad + 8651.9 & R^2 = 0.9379 \\ TSad = -0.0024^*Aad2 + 0.0357^*Aad + 0.3264 & R^2 = 0.9379 \\ TSad = -0.0024^*Aad2 + 0.0357^*Aad + 0.3264 & R^2 = 0.9379 \\ TRDad = 1.2454^*e^{(}(0.0081^*Aad) & R2 = 0.7146 \\ Mad = 0.0099^*Mt^{'}2 - 0.0309^*Mt + 0.7219 & R2 = 0.9152 \\ Mt = 1.617^*Mad + 2.0273 & R^2 = 0.1746 \\ Mad = 0.0099^*Mt^{'}2 - 0.0309^*Mt + 0.7219 & R2 = 0.9389 \\ TSad = -0.0002^*Aad2 + 0.0284^*Aad + 0.4361 & R^2 = 0.9389 \\ TRDad = 0.0001^*Aad^2 + 0.0284^*Aad + 0.4361 & R^2 = 0.9389 \\ TRDad = 0.0001^*Aad^2 + 0.0011^*Aad + 1.4156 & R2 = 0.8494 \\ Mt = 0.1446^*Mad2 + 1.2154^*Mad + 1.5441 & R^2 = 0.7464 \\ \end{array}$	$VMad = 29.424 * e^{(-0.013 * Aad)}$	R2 = 0.7165
Tsad $0.0006 * Aad^{2} + 0.0661 * Aad + 0.1374$ R <sup>2</sup> = 0.0427Seam 4BR2 = 0.8952Mt = 2.2961*Mad + 1.9626R <sup>2</sup> = 0.2385Mad = 0.5417 * Mt^{(0.3225)}R2 = 0.2073VMad = 30.602 * e^{(-0.013 * Aad)}R2 = 0.6906CVad = 0.0634*Aad2 - 107.12*Aad + 8756.6R <sup>2</sup> = 0.9265Tsad = -0.0005 * Aad^{2} + 0.0513 * Aad + 0.0736R <sup>2</sup> = 0.0174Seam 4A10-20TRDad = 1.2349 *e^{(0.0082 * Aad)}R2 = 0.9087Mt = 2.8961*Mad + 1.7284Mad = 0.5505 * Mt^{(0.2874)}R2 = 0.9087Mt = 2.8961*Mad + 1.7284R <sup>2</sup> = 0.1118Mad = 0.5505 * Mt^{(0.2874)}R2 = 0.9642Tsad = -103.2*Aad + 8808.1R <sup>2</sup> = 0.9642Tsad = 0.8067 * e^{(-0.014 * Aad)}R <sup>2</sup> = 0.9642Tsad = 0.8067 * e^{(-0.014 * Aad)}R <sup>2</sup> = 0.1458Seam 4ATTRDad = 1.2386 * e^{(0.0084 * Aad)}R2 = 0.9744Mt = 2.0151*Mad + 2.3097R <sup>2</sup> = 0.302Mad = - 0.0023 * Mt^2 + 0.1502 * Mt + 0.3453R2 = 0.1712VMad = - 0.0011 * Aad^2 - 0.0596 * Aad + 23.43R2 = 0.9379Tsad = -0.0023 * Mt^2 + 0.0357*Aad + 0.3264R <sup>2</sup> = 0.9379Tsad = -0.002*Aad2 + 0.0357*Aad + 0.3264R <sup>2</sup> = 0.1746Mad = 0.0099 * Mt^2 - 0.0309 * Mt + 0.7219R2 = 0.9152Mt = 1.617*Mad + 2.0273R <sup>2</sup> = 0.1746Mad = 0.0099 * Mt^2 - 0.0309 * Mt + 0.7219R2 = 0.4422VMad = 25.875 * e^{(-0.011 * Aad)}R2 = 0.9389Tsad = -0.0011 * Aad^2 + 0.0011 * Aad + 0.4361R <sup>2</sup> = 0.9389Tsad = -0.0002*Aad2 + 0.0284*Aad + 0.4361R <sup>2</sup> = 0.9389Tsad = -0.00	CVad = -0.0024*Aad2 - 101.14*Aad + 8589.1	$R^2 = 0.9211$
Seam 4BRTRDad = $1.2284 * e^{(0.0083 * Aad)}$ R2 = $0.8952$ Mt = $2.2961*Mad + 1.9626$ R <sup>2</sup> = $0.2385$ 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 <sup>2</sup> = $0.9265$ TSad = $-0.0005 * Aad^{2} + 0.0513 * Aad + 0.0736$ R <sup>2</sup> = $0.9087$ Mt = $2.8961*Mad + 1.7284$ R <sup>2</sup> = $0.0174$ Seam 4A10-20TTRDad = $1.2349 * e^{(0.0082 * Aad)}$ R2 = $0.9087$ Mt = $2.8961*Mad + 1.7284$ R <sup>2</sup> = $0.1118$ 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 <sup>2</sup> = $0.9642$ TSad = $0.8067 * e^{(-0.014 * Aad)}$ R <sup>2</sup> = $0.1458$ Seam 4ATTRDad = $1.2386 * e^{(0.0084 * Aad)}$ R2 = $0.302$ Mad = $-0.0023 * Mt^{-2} + 0.1502 * Mt + 0.3453$ R2 = $0.1712$ VMad = $-0.0011 * Aad^{-2} - 0.0596 * Aad + 23.43$ R2 = $0.9379$ TSad = $-0.002*Aad2 + 0.0357*Aad + 0.3264$ R <sup>2</sup> = $0.0472$ Seam 3ATTRDad = $1.2454 * e^{(0.0081 * Aad)}$ R2 = $0.9152$ Mt = $1.617*Mad + 2.0273$ R <sup>2</sup> = $0.1746$ Mad = $0.0099 * Mt^{-2} - 0.0309 * Mt + 0.7219$ R2 = $0.4422$ VMad = $25.875 * e^{(-0.011 * Aad)}$ R2 = $0.9389$ TSad = $-0.002*Aad2 + 0.0284*Aad + 0.4361$ R <sup>2</sup> = $0.9389$ TGad = $0.0001 * Aad^{-2} + 0.0011 * Aad + 1.4156$ R2 = $0.8494$ Mt = $0.1446*Mad2 + 1.2154*Mad + 1.5441$ R <sup>2</sup> = $0.7464$	$TSad = -0.0006 * Aad^2 + 0.0661 * Aad + 0.1374$	$R^2 = 0.0427$
John 10R2 = 0.8952MT RDad = 1.2284 * $e^{(0.0083 * Aad)}$ R2 = 0.8952Mt = 2.2961*Mad + 1.9626R <sup>2</sup> = 0.2385Mad = 0.5417 * Mt^{(0.3225)}R2 = 0.2073VMad = 30.602 * $e^{(-0.013 * Aad)}$ R2 = 0.6906CVad = 0.0634*Aad2 - 107.12*Aad + 8756.6R <sup>2</sup> = 0.9265TSad = -0.0005 * Aad^2 + 0.0513 * Aad + 0.0736R <sup>2</sup> = 0.0174Seam 4A10-20TRDad = 1.2349 * $e^{(0.0082 * Aad)}$ R2 = 0.9087Mt = 2.8961*Mad + 1.7284R <sup>2</sup> = 0.1118Mad = 0.5505 * Mt^{(0.2874)}R2 = 0.1936VMad = 31.476 * $e^{(-0.014 * Aad)}$ R2 = 0.7468CVad = -103.2*Aad + 8808.1R <sup>2</sup> = 0.9642TSad = 0.8067 * $e^{(-0.014 * Aad)}$ R2 = 0.8744Mt = 2.0151*Mad + 2.3097R <sup>2</sup> = 0.302Mad = -0.0023 * Mt^{2} + 0.1502 * Mt + 0.3453R2 = 0.8744Mt = 2.0151*Mad + 2.3097R <sup>2</sup> = 0.302Mad = -0.0011 * Aad^2 - 0.0596 * Aad + 23.43R2 = 0.9679CVad = -100.67*Aad + 8651.9R <sup>2</sup> = 0.9379TSad = -0.002*Aad2 + 0.0357*Aad + 0.3264R <sup>2</sup> = 0.9379TSad = -0.002*Aad2 + 0.0397 * Mad + 0.3264R <sup>2</sup> = 0.9379TGad = 1.2454 * $e^{(0.0081 * Aad)}$ R2 = 0.9152Mt = 1.617*Mad + 2.0273R <sup>2</sup> = 0.1746Mad = 0.0099 * Mt^2 - 0.0309 * Mt + 0.7219R2 = 0.9389TSad = -0.0002*Aad2 + 0.0284*Aad + 0.4361R <sup>2</sup> = 0.9389TSad = -0.0002*Aad2 + 0.0284*Aad + 0.4361R <sup>2</sup> = 0.9389TSad = -0.0002*Aad2 + 0.0284*Aad + 0.4361R <sup>2</sup> = 0.9389TSad = -0.0001 * Aad^2 + 0.0011 * Aad + 1.4156R2 = 0.8494Mt = 0.1446*Mad2	Seam 4B	10 0.0 127
IncludeInclusionInclusionInclusionMt = 2.2961*Mad + 1.9626R² = 0.2385Mad = 0.5417 * Mt^(0.3225)R2 = 0.6906CVad = 0.0634*Aad2 - 107.12*Aad + 8756.6R² = 0.9265TSad = -0.0005 * Aad^2 + 0.0513 * Aad + 0.0736R² = 0.0174Seam 4A10-20TTRDad = 1.2349 *e^(0.0082 * Aad)R2 = 0.9087Mt = 2.8961*Mad + 1.7284R² = 0.1118Mad = 0.5505 * Mt^(0.2874)R2 = 0.1936VMad = 31.476 * e^(-0.014 * Aad)R2 = 0.7468CVad = -103.2*Aad + 8808.1R² = 0.1458Seam 4AR² = 0.1458TRDad = 1.2386 * e^(0.0084 * Aad)R² = 0.1458Seam 4AR2 = 0.0597TRDad = 1.2386 * e^(0.0084 * Aad)R2 = 0.8067Mt = 2.0151*Mad + 2.3097R² = 0.302Mad = - 0.0023 * Mt^2 + 0.1502 * Mt + 0.3453R2 = 0.1712VMad = - 0.0011 * Aad^2 - 0.0596 * Aad + 23.43R2 = 0.9369CVad = -100.67*Aad + 8651.9R² = 0.9379TSad = -0.0002*Aad2 + 0.0357*Aad + 0.3264R² = 0.9379TRDad = 1.2454 * e^(0.0081 * Aad)R2 = 0.9152Mt = 1.617*Mad + 2.0273R² = 0.1746Mad = 0.0099 * Mt^2 - 0.0309 * Mt + 0.7219R2 = 0.4422VMad = 25.875 * e^(-0.011 * Aad)R2 = 0.9389TSad = -0.0002*Aad2 + 0.0284*Aad + 0.4361R² = 0.9389TSad = -0.0002*Aad2 + 0.0284*Aad + 0.4361R² = 0.0388Seam 25-0DTTTRDad = 0.0001 * Aad^2 + 0.0011 * Aad + 1.4156R2 = 0.8494Mt = 0.1446*Mad2 + 1.2154*Mad + 1.5441R² = 0.7464	$TRDad = 1.2284 * e^{(0.0083 * Aad)}$	$R_2 = 0.8952$
$\begin{array}{c} \mathrm{Ma} = 2.2\mathrm{y}\mathrm{ol}\mathrm{Ma}\mathrm{d} + 1.9026 & \mathrm{R}^2 = 0.2238 \\ \mathrm{Ma} = 0.5417 * \mathrm{Mt}^2(0.3225) & \mathrm{R}^2 = 0.2073 \\ \mathrm{VMad} = 30.602 * \mathrm{e}^2(-0.013 * \mathrm{Aad}) & \mathrm{R}^2 = 0.2073 \\ \mathrm{CVad} = 0.0634^* \mathrm{Aad}_2 - 107.12^* \mathrm{Aad} + 8756.6 & \mathrm{R}^2 = 0.9265 \\ \mathrm{TSad} = -0.0005 * \mathrm{Aad}^2 + 0.0513 * \mathrm{Aad} + 0.0736 & \mathrm{R}^2 = 0.0174 \\ \\ \hline \mathbf{Seam}\mathbf{4A10-20} & \mathrm{R}^2 = 0.0005 & \mathrm{Aad}^2 + 0.0013 * \mathrm{Aad} + 0.0736 & \mathrm{R}^2 = 0.0174 \\ \hline \mathbf{Seam}\mathbf{4A10-20} & \mathrm{R}^2 = 0.0005 & \mathrm{Aad}^2 + 0.0028 * \mathrm{Aad}) & \mathrm{R}^2 = 0.00087 \\ \mathrm{Mt} = 2.8961^* \mathrm{Mad} + 1.7284 & \mathrm{R}^2 = 0.0118 \\ \mathrm{Mad} = 0.5505 * \mathrm{Mt}^2(0.2874) & \mathrm{R}^2 = 0.0136 \\ \mathrm{VMad} = 31.476 * \mathrm{e}^2(-0.014 * \mathrm{Aad}) & \mathrm{R}^2 = 0.01936 \\ \mathrm{VMad} = 31.476 * \mathrm{e}^2(-0.014 * \mathrm{Aad}) & \mathrm{R}^2 = 0.0148 \\ \mathrm{CVad} = -103.2^* \mathrm{Aad} + 8808.1 & \mathrm{R}^2 = 0.0148 \\ \mathrm{CVad} = -103.2^* \mathrm{Aad} + 8808.1 & \mathrm{R}^2 = 0.0148 \\ \mathrm{TRDad} = 1.2386 * \mathrm{e}^2(0.0084 * \mathrm{Aad}) & \mathrm{R}^2 = 0.0148 \\ \mathrm{Mt} = 2.0151^* \mathrm{Mad} + 2.3097 & \mathrm{R}^2 = 0.302 \\ \mathrm{Mad} = -0.0023 * \mathrm{Mt}^2 + 0.1502 * \mathrm{Mt} + 0.3453 & \mathrm{R}2 = 0.1712 \\ \mathrm{VMad} = -0.0011 * \mathrm{Aad}^2 - 0.0596 * \mathrm{Aad} + 23.43 & \mathrm{R}2 = 0.5668 \\ \mathrm{CVad} = -100.67^* \mathrm{Aad} + 8651.9 & \mathrm{R}^2 = 0.03297 \\ \mathrm{TRDad} = 1.2454 * \mathrm{e}^2(0.0081 * \mathrm{Aad}) & \mathrm{R}2 = 0.9152 \\ \mathrm{Mt} = 1.617^* \mathrm{Mad} + 2.0273 & \mathrm{R}^2 = 0.01746 \\ \mathrm{Mad} = 0.0009 * \mathrm{Mt}^2 - 0.0309 * \mathrm{Mt} + 0.7219 & \mathrm{R}2 = 0.4422 \\ \mathrm{VMad} = 25.875 * \mathrm{e}^2(-0.011 * \mathrm{Aad}) & \mathrm{R}2 = 0.66699 \\ \mathrm{CVad} = -101.66^* \mathrm{Aad} + 8703.4 & \mathrm{R}^2 = 0.0388 \\ \mathrm{Seam}35 = -0.0002^* \mathrm{Aad}^2 + 0.0284^* \mathrm{Aad} + 0.4361 & \mathrm{R}^2 = 0.0388 \\ \mathrm{Seam}35 = -0.0001 * \mathrm{Aad}^2 + 0.0084 * \mathrm{Aad} + 0.4361 & \mathrm{R}^2 = 0.0388 \\ \mathrm{Seam}35 = -0.0002^* \mathrm{Aad}^2 + 0.00284^* \mathrm{Aad} + 0.4361 & \mathrm{R}^2 = 0.0238 \\ \mathrm{Seam}35 = -0.0001 * \mathrm{Aad}^2 + 0.0011 * \mathrm{Aad} + 1.4156 & \mathrm{R}2 = 0.8494 \\ \mathrm{Mt} = 0.1446^* \mathrm{Mad}^2 + 1.2154^* \mathrm{Mad} + 1.5441 & \mathrm{R}^2 = 0.7464 \\ \end{array}$	$Mt = 2.2061*Mod \pm 1.0626$	$R_2 = 0.375$ $P_2 = 0.2285$
Mad = 0.3417MR (0.3223)R2 = 0.2073VMad = 30.602 * e^(-0.013 * Aad)R2 = 0.6906CVad = 0.0634*Aad2 - 107.12*Aad + 8756.6R² = 0.9265TSad = -0.0005 * Aad^2 + 0.0513 * Aad + 0.0736R² = 0.0174Seam 4A10-20TTRDad = 1.2349 *e^(0.0082 * Aad)R2 = 0.9087Mt = 2.8961*Mad + 1.7284R² = 0.1118Mad = 0.5505 * Mt^(0.2874)R2 = 0.1936VMad = 31.476 * e^(- 0.014 * Aad)R2 = 0.7468CVad = -103.2*Aad + 8808.1R² = 0.01458Seam 4AR² = 0.1458Seam 4AR² = 0.1458TRDad = 1.2386 * e^(0.0084 * Aad)R² = 0.1458Seam 4AR² = 0.0023 * Mt^2 + 0.1502 * Mt + 0.3453R2 = 0.0011 * Aad^2 - 0.0596 * Aad + 23.43R2 = 0.5668CVad = -0.0023 * Mt^2 - 0.0596 * Aad + 23.43R2 = 0.9379TSad = -0.002*Aad2 + 0.0357*Aad + 0.3264R² = 0.0472Seam 3ATRDad = 1.2454 * e^(0.0081 * Aad)R2 = 0.9152Mt = 1.617*Mad + 2.0273R² = 0.1746Mad = 0.099 * Mt'2 - 0.0309 * Mt + 0.7219R2 = 0.4422VMad = 25.875 * e^(-0.011 * Aad)R2 = 0.6669CVad = -101.66*Aad + 8703.4R² = 0.0238Seam 25-0DTTRDad = 0.0001 * Aad^2 + 0.0284*Aad + 0.4361R² = 0.0238Seam 25-0DTTRDad = 0.0001 * Aad^2 + 0.0011 * Aad + 1.4156R2 = 0.8494Mt = 0.1446*Mad2 + 1.2154*Mad + 1.5441R² = 0.7464	$M_{11} = 2.2901^{-1} \text{ Wid} \pm 1.9020$ $M_{22} = 0.5417 * \text{ Mt} \land (0.2225)$	R = 0.2383 R = 0.2073
Wind = $30.002^{-4}$ e <sup>-</sup> (= $0.013^{-5}$ Aad)R2 = $0.0005^{-4}$ CVad = $0.0634^{+}Aad2 - 107.12^{+}Aad + 8756.6$ R <sup>2</sup> = $0.9265$ TSad = $-0.0005^{+}Aad^{-2} + 0.0513^{+}Aad + 0.0736$ R <sup>2</sup> = $0.0174$ Seam 4A10-20TRDad = $1.2349^{+}e^{(}(0.0082^{+}Aad)$ R2 = $0.9087$ Mt = $2.8961^{+}Mad + 1.7284$ R <sup>2</sup> = $0.1118$ 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 <sup>2</sup> = $0.9642$ TSad = $0.8067^{+}e^{(}-0.014^{+}Aad)$ R <sup>2</sup> = $0.1458$ Seam 4AR <sup>2</sup> = $0.1458$ TRDad = $1.2386^{+}e^{(}(0.0084^{+}Aad)$ R <sup>2</sup> = $0.8744$ Mt = $2.0151^{+}Mad + 2.3097$ R <sup>2</sup> = $0.302$ Mad = $-0.0023^{+}Mt^{2} + 0.1502^{+}Mt + 0.3453$ R2 = $0.7112$ VMad = $-0.0011^{+}Aad^{-}2 - 0.0596^{+}Aad + 23.43$ R2 = $0.9379$ TSad = $-0.0002^{+}Aad2 + 0.0357^{+}Aad + 0.3264$ R <sup>2</sup> = $0.0472$ Seam 3AR2 = $0.0172$ TRDad = $1.2454^{+}e^{(}(0.0081^{+}Aad)$ R2 = $0.9152$ Mt = $1.617^{+}Mad + 2.0273$ R <sup>2</sup> = $0.1746$ Mad = $0.009^{+}Mt^{-}2 - 0.0309^{+}Mt + 0.7219$ R2 = $0.9389$ TSad = $-0.0002^{+}Aad2 + 0.0284^{+}Aad + 0.4361$ R <sup>2</sup> = $0.9389$ TSad = $-0.0002^{+}Aad2 + 0.0284^{+}Aad + 0.4361$ R <sup>2</sup> = $0.0238$ Seam 25-0DTRDad = $0.0001^{+}Aad^{-}2 + 0.0011^{+}Aad + 1.4156$ R2 = $0.8494$ Mt = $0.1446^{+}Mad2 + 1.2154^{+}Mad + 1.5441$ R <sup>2</sup> = $0.7464$	$VM_{cd} = 20.602 * c^{(0)}(0.012 * A_{cd})$	$R_2 = 0.2073$
C Vad = $0.0034^{\circ}$ Aad2 = $107.12^{\circ}$ Aad + $8730.6$ R^ = $0.9263$ TSad = $-0.0005^{\circ}$ Aad^2 + $0.0513^{\circ}$ Aad + $0.0736$ R2 = $0.0174$ Seam 4A10-20R2 = $0.0174$ TRDad = $1.2349^{\circ}$ e^( $0.0082^{\circ}$ Aad)R2 = $0.9087$ Mt = $2.8961^{\circ}$ Mad + $1.7284$ R <sup>2</sup> = $0.1118$ Mad = $0.5505^{\circ}$ Mt^( $0.2874$ )R2 = $0.1936$ VMad = $31.476^{\circ}$ e^(- $0.014^{\circ}$ Aad)R2 = $0.7468$ CVad = $-103.2^{\circ}$ Aad + $8808.1$ R <sup>2</sup> = $0.9642$ TSad = $0.8067^{\circ}$ e^(- $(-0.014^{\circ}$ Aad)R <sup>2</sup> = $0.1458$ Seam 4ATRDad = $1.2386^{\circ}$ e^( $(0.0084^{\circ}$ Aad)R2 = $0.8744$ Mt = $2.0151^{\circ}$ Mad + $2.3097$ R <sup>2</sup> = $0.302$ Mad = $-0.0023^{\circ}$ Mt^2 + $0.1502^{\circ}$ Mt + $0.3453$ R2 = $0.1712$ VMad = $-0.0011^{\circ}$ Aad^2 - $0.0596^{\circ}$ Aad + $23.43$ R2 = $0.5668$ CVad = $-100.67^{\circ}$ Aad + $8651.9$ R <sup>2</sup> = $0.9379$ TSad = $-0.0002^{\circ}$ Aad2 + $0.0357^{\circ}$ Aad + $0.3264$ R <sup>2</sup> = $0.0472$ Seam 3ATTRDad = $1.2454^{\circ}$ e^( $(0.0081^{\circ}$ Aad))R2 = $0.6699$ CVad = $-101.66^{\circ}$ Aad + $8703.4$ R <sup>2</sup> = $0.9389$ TSad = $-0.0002^{\circ}$ Aad2 + $0.0284^{\circ}$ Aad + $0.4361$ R <sup>2</sup> = $0.0389$ TSad = $-0.0002^{\circ}$ Aad2 + $0.0284^{\circ}$ Aad + $0.4361$ R <sup>2</sup> = $0.0238$ Seam 25-0DTTTRDad = $0.0001^{\circ}$ Aad2 + $0.0011^{\circ}$ Aad + $1.4156$ R2 = $0.8494$ Mt = $0.1446^{\circ}$ Mad2 + $1.2154^{\circ}$ Mad + $1.5441$ R <sup>2</sup> = $0.7464$	$V$ Mad = $50.002 + e^{-0.015} + Aad$	$R_2 = 0.0900$ $R_2 = 0.0265$
Isad = -0.0005 * Aad 2 + 0.0315 * Aad + 0.0736 $R^2 = 0.0174$ Seam 4A10-20R2 = 0.9087Mt = 2.8961*Mad + 1.7284R2 = 0.1118Mad = 0.5505 * Mt^(0.2874)R2 = 0.1936VMad = 31.476 * e^(-0.014 * Aad)R2 = 0.7468CVad = -103.2*Aad + 8808.1R2 = 0.9642TSad = 0.8067 * e^(-0.014 * Aad)R2 = 0.9642TSad = 0.8067 * e^(-0.014 * Aad)R2 = 0.8744Mt = 2.0151*Mad + 2.3097R2 = 0.8744Mad = - 0.0023 * Mt^2 + 0.1502 * Mt + 0.3453R2 = 0.1712VMad = - 0.0011 * Aad^2 - 0.0596 * Aad + 23.43R2 = 0.9379TSad = -0.002*Aad2 + 0.0357*Aad + 0.3264R2 = 0.9379TSad = -0.002*Aad2 + 0.0357*Aad + 0.3264R2 = 0.9152Mt = 1.617*Mad + 2.0273R2 = 0.9152Mt = 1.617*Mad + 2.0273R2 = 0.9152Mt = 1.617*Mad + 2.0273R2 = 0.0114TRDad = 1.2454 * e^(0.0081 * Aad)R2 = 0.9389TSad = -0.0002*Aad2 + 0.0284*Aad + 0.4361R2 = 0.0238Seam 25-0DTRDad = 0.0001 * Aad^2 + 0.0011 * Aad + 1.4156R2 = 0.8494Mt = 0.1446*Mad2 + 1.2154*Mad + 1.5441R2 = 0.7464	$C Val = 0.0034^{\circ} Aad 2 - 107.12^{\circ} Aad \pm 8750.0$	$R^2 = 0.9203$ $R^2 = 0.0174$
Seam 4A10-20R2 = 0.9087TRDad = 1.2349 *e^(0.0082 * Aad)R2 = 0.9087Mt = 2.8961*Mad + 1.7284R² = 0.1118Mad = 0.5505 * Mt^(0.2874)R2 = 0.1936VMad = 31.476 * e^(-0.014 * Aad)R2 = 0.7468CVad = -103.2*Aad + 8808.1R² = 0.9642TSad = 0.8067 * e^(-0.014 * Aad)R² = 0.1458Seam 4ATTRDad = 1.2386 * e^(0.0084 * Aad)R² = 0.1458Seam 4AR2 = 0.8744Mt = 2.0151*Mad + 2.3097R² = 0.302Mad = - 0.0023 * Mt^2 + 0.1502 * Mt +0.3453R2 = 0.1712VMad = - 0.0011 * Aad^2 - 0.0596 * Aad +23.43R2 = 0.5668CVad = -100.67*Aad + 8651.9R² = 0.9379TSad = -0.0002*Aad2 + 0.0357*Aad + 0.3264R² = 0.0472Seam 3ATTRDad = 1.2454 * e^(0.0081 * Aad)R2 = 0.9152Mt = 1.617*Mad + 2.0273R² = 0.1746Mad = 0.0099 * Mt^2 - 0.0309 * Mt + 0.7219R2 = 0.6699CVad = -101.66*Aad + 8703.4R² = 0.9389TSad = -0.0002*Aad2 + 0.028*Aad + 0.4361R² = 0.0389TSad = -0.0002*Aad2 + 0.028*Aad + 0.4361R² = 0.9389TSad = -0.0002*Aad2 + 0.028*Aad + 0.4361R² = 0.9389TSad = -0.0002*Aad2 + 0.028*Aad + 0.4361R² = 0.9389TSad = -0.0002*Aad2 + 0.028*Aad + 0.4361R² = 0.0238Seam 25-0DTTRDad = 0.0001 * Aad^2 + 0.0011 * Aad + 1.4156R2 = 0.8494Mt = 0.1446*Mad2 + 1.2154*Mad + 1.5441R² = 0.7464	15au 0.0003 · Aau 2 + 0.0515 · Aau + 0.0750	$K^2 = 0.01/4$
IRDad = $1.2349$ *e' (0.0062 * Add)R2 = 0.9087Mt = $2.8961*Mad + 1.7284$ R <sup>2</sup> = 0.1118Mad = $0.5505*Mt^{\circ}(0.2874)$ R2 = 0.1936VMad = $31.476*e^{\circ}(-0.014*Aad)$ R2 = 0.7468CVad = $-103.2*Aad + 8808.1$ R <sup>2</sup> = 0.9642TSad = $0.8067*e^{\circ}(-0.014*Aad)$ R <sup>2</sup> = 0.1458Seam 4AR <sup>2</sup> = 0.1458TRDad = $1.2386*e^{\circ}(0.0084*Aad)$ R2 = 0.8744Mt = $2.0151*Mad + 2.3097$ R <sup>2</sup> = 0.302Mad = $-0.0023*Mt^{\circ}2 + 0.1502*Mt + 0.3453$ R2 = 0.1712VMad = $-0.0011*Aad^{\circ}2 - 0.0596*Aad + 23.43$ R2 = 0.5668CVad = $-100.67*Aad + 8651.9$ R <sup>2</sup> = 0.9379TSad = $-0.0002*Aad2 + 0.0357*Aad + 0.3264$ R <sup>2</sup> = 0.0472Seam 3AR2Seam 3ATRDad = $1.2454*e^{\circ}(0.0081*Aad)$ R2 = 0.1746Mad = $0.0099*Mt^{\circ}2 - 0.0309*Mt + 0.7219$ R2 = 0.1746Mad = $0.0099*Mt^{\circ}2 - 0.0309*Mt + 0.7219$ R2 = 0.9389TSad = $-0.0002*Aad2 + 0.0284*Aad + 0.4361$ R <sup>2</sup> = 0.0238Seam 25-0DR2R2TRDad = $0.0001*Aad^{\circ}2 + 0.0011*Aad + 1.4156$ R2 = 0.8494Mt = $0.1446*Mad2 + 1.2154*Mad + 1.5441$ R <sup>2</sup> = 0.7464	Scall $4A10-20$	D2 0.0097
Mt = 2.8961*Mad + 1.7284R² = 0.1118Mad = 0.5505 * Mt^(0.2874)R2 = 0.1936VMad = 31.476 * e^(-0.014 * Aad)R2 = 0.7468CVad = -103.2*Aad + 8808.1R² = 0.9642TSad = 0.8067 * e^(-0.014 * Aad)R² = 0.1458Seam 4AR2 = 0.8744Mt = 2.0151*Mad + 2.3097R² = 0.302Mad = - 0.0023 * Mt^2 + 0.1502 * Mt + 0.3453R2 = 0.1712VMad = - 0.0011 * Aad^2 - 0.0596 * Aad +23.43R2 = 0.5668CVad = -100.67*Aad + 8651.9R² = 0.9379TSad = -0.0002*Aad2 + 0.0357*Aad + 0.3264R² = 0.0472Seam 3AR2 = 0.1746Mt = 1.617*Mad + 2.0273R² = 0.1746Mad = 0.0099 * Mt^2 - 0.0309 * Mt + 0.7219R2 = 0.4422VMad = 25.875 * e^(-0.011 * Aad)R2 = 0.6699CVad = -101.66*Aad + 8703.4R² = 0.9389TSad = -0.0002*Aad2 + 0.0284*Aad + 0.4361R² = 0.0238Seam 25-0DR2 = 0.0218TRDad = 0.0001 * Aad^2 + 0.0011 * Aad + 1.4156R2 = 0.8494Mt = 0.1446*Mad2 + 1.2154*Mad + 1.5441R² = 0.7464	$1 \text{ RDad} = 1.2349 \text{ *e}^{\circ}(0.0082 \text{ * Aad})$	$R_2 = 0.908 /$
Mad = $0.5505 * Mt^{\circ}(0.28/4)$ R2 = $0.1936$ VMad = $31.476 * e^{\circ}(-0.014 * Aad)$ R2 = $0.7468$ CVad = $-103.2*Aad + 8808.1$ R <sup>2</sup> = $0.9642$ TSad = $0.8067 * e^{\circ}(-0.014 * Aad)$ R <sup>2</sup> = $0.1458$ Seam 4AR2 = $0.8744$ Mt = $2.0151*Mad + 2.3097$ R <sup>2</sup> = $0.302$ Mad = $-0.0023 * Mt^{\circ}2 + 0.1502 * Mt + 0.3453$ R2 = $0.1712$ VMad = $-0.0011 * Aad^{\circ}2 - 0.0596 * Aad + 23.43$ R2 = $0.5668$ CVad = $-100.67*Aad + 8651.9$ R <sup>2</sup> = $0.9379$ TSad = $-0.0002*Aad2 + 0.0357*Aad + 0.3264$ R <sup>2</sup> = $0.0472$ Seam 3AR2 = $0.1746$ TRDad = $1.2454 * e^{\circ}(0.0081 * Aad)$ R2 = $0.9152$ Mt = $1.617*Mad + 2.0273$ R <sup>2</sup> = $0.1746$ Mad = $0.0099 * Mt^{\circ}2 - 0.0309 * Mt + 0.7219$ R2 = $0.4422$ VMad = $25.875 * e^{\circ}(-0.011 * Aad)$ R2 = $0.9389$ TSad = $-0.0002*Aad2 + 0.0284*Aad + 0.4361$ R <sup>2</sup> = $0.0238$ Seam 25-0DTRDad = $0.0001 * Aad^{\circ}2 + 0.0011 * Aad + 1.4156$ R2 = $0.8494$ Mt = $0.1446*Mad2 + 1.2154*Mad + 1.5441$ R <sup>2</sup> = $0.7464$	$Mt = 2.8961^{*}Mad + 1.7284$	$R^2 = 0.1118$
VMad = $31.4/6 * e^{-(-0.014 * Aad)}$ R2 = 0.7468CVad = $-103.2*Aad + 8808.1$ R <sup>2</sup> = 0.9642TSad = $0.8067 * e^{-(-0.014 * Aad)}$ R <sup>2</sup> = 0.1458Seam 4AR2 = 0.8744Mt = $2.0151*Mad + 2.3097$ R <sup>2</sup> = 0.302Mad = $-0.0023 * Mt^{-2} + 0.1502 * Mt + 0.3453$ R2 = 0.1712VMad = $-0.0011 * Aad^{-2} - 0.0596 * Aad + 23.43$ R2 = 0.5668CVad = $-100.67*Aad + 8651.9$ R <sup>2</sup> = 0.9379TSad = $-0.0002*Aad2 + 0.0357*Aad + 0.3264$ R <sup>2</sup> = 0.0472Seam 3AR2 = 0.9152Mt = $1.617*Mad + 2.0273$ R <sup>2</sup> = 0.1746Mad = $0.0099 * Mt^{-2} - 0.0309 * Mt + 0.7219$ R2 = 0.4422VMad = $25.875 * e^{-(-0.011 * Aad)}$ R2 = 0.6699CVad = $-101.66*Aad + 8703.4$ R <sup>2</sup> = 0.0238Seam 25-0DTRDad = $0.0001 * Aad^{-2} + 0.0011 * Aad + 1.4156$ R2 = $0.8494$ Mt = $0.1446*Mad2 + 1.2154*Mad + 1.5441$ R <sup>2</sup> = $0.7464$	$Mad = 0.5505 * Mt^{(0.28/4)}$	R2 = 0.1936
$CVad = -103.2*Aad + 8808.1$ $R^2 = 0.9642$ $TSad = 0.8067 * e^{(-0.014 * Aad)}$ $R^2 = 0.1458$ Seam 4ATRDad = 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 3ATRDad = 1.2454 * e^{(0.0081 * Aad)} $R2 = 0.9152$ $Mt = 1.617*Mad + 2.0273$ $R^2 = 0.1746$ $Mad = 0.0099 * Mt^2 - 0.0309 * Mt + 0.7219$ $R2 = 0.4422$ $VMad = 25.875 * e^{(-0.011 * Aad)}$ $R2 = 0.9389$ $TSad = -0.0002*Aad2 + 0.0284*Aad + 0.4361$ $R^2 = 0.0238$ Seam 25-0DTRDad = 0.0001 * Aad^2 + 0.0011 * Aad + 1.4156 $R2 = 0.8494$ $Mt = 0.1446*Mad2 + 1.2154*Mad + 1.5441$ $R^2 = 0.7464$	$VMad = 31.476 * e^{-(-0.014 * Aad)}$	R2 = 0.7468
TSad = $0.8067 * e^{(-0.014 * Aad)}$ $R^2 = 0.1458$ Seam 4AR2 = $0.8744$ 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 3AR2TRDad = $1.2454 * e^{(}0.0081 * Aad)$ $R2 = 0.9152$ 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 = $-101.66*Aad + 8703.4$ $R^2 = 0.0238$ Seam 25-0DTRDad = $0.0001 * Aad^2 + 0.0011 * Aad + 1.4156$ $R2 = 0.8494$ Mt = $0.1446*Mad2 + 1.2154*Mad + 1.5441$ $R^2 = 0.7464$	CVad = -103.2*Aad + 8808.1	$R^2 = 0.9642$
Seam 4AR2 = $0.8744$ TRDad = $1.2386 * e^{(0.0084 * Aad)}$ R2 = $0.8744$ Mt = $2.0151*Mad + 2.3097$ R <sup>2</sup> = $0.302$ 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 <sup>2</sup> = $0.9379$ TSad = $-0.0002*Aad2 + 0.0357*Aad + 0.3264$ R <sup>2</sup> = $0.0472$ Seam 3ATRDad = $1.2454 * e^{(0.0081 * Aad)}$ R2 = $0.9152$ Mt = $1.617*Mad + 2.0273$ R <sup>2</sup> = $0.1746$ 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 <sup>2</sup> = $0.0238$ Seam 25-0DTRDad = $0.0001 * Aad^{2} + 0.0011 * Aad + 1.4156$ R2 = $0.8494$ Mt = $0.1446*Mad2 + 1.2154*Mad + 1.5441$ R <sup>2</sup> = $0.7464$	$TSad = 0.8067 * e^{(-0.014 * Aad)}$	$R^2 = 0.1458$
$\begin{array}{llllllllllllllllllllllllllllllllllll$	Seam 4A	
$Mt = 2.0151*Mad + 2.3097$ $R^2 = 0.302$ $Mad = -0.0023 * Mt^2 + 0.1502 * Mt + 0.3453$ $R2 = 0.1712$ $VMad = -0.0011 * Aad^2 - 0.0596 * Aad + 23.43$ $R2 = 0.5668$ $CVad = -100.67*Aad + 8651.9$ $R^2 = 0.9379$ $TSad = -0.0002*Aad2 + 0.0357*Aad + 0.3264$ $R^2 = 0.0472$ Seam 3ATRDad = 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 25-0DTRDad = 0.0001 * Aad^2 + 0.0011 * Aad + 1.4156 $R2 = 0.8494$ $Mt = 0.1446*Mad2 + 1.2154*Mad + 1.5441$ $R^2 = 0.7464$	$TRDad = 1.2386 * e^{(0.0084 * Aad)}$	R2 = 0.8744
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 <sup>2</sup> = $0.9379$ TSad = $-0.0002*Aad2 + 0.0357*Aad + 0.3264$ R <sup>2</sup> = $0.0472$ Seam 3ATRDad = $1.2454 * e^{(0.0081 * Aad)}$ R2 = $0.9152$ Mt = $1.617*Mad + 2.0273$ R <sup>2</sup> = $0.1746$ Mad = $0.0099 * Mt^2 - 0.0399 * Mt + 0.7219$ R2 = $0.4422$ VMad = $25.875 * e^{(-0.011 * Aad)}$ R2 = $0.6699$ CVad = $-101.66*Aad + 8703.4$ R <sup>2</sup> = $0.9389$ TSad = $-0.0002*Aad2 + 0.0284*Aad + 0.4361$ R <sup>2</sup> = $0.0238$ Seam 25-0DTRDad = $0.0001 * Aad^2 + 0.0011 * Aad + 1.4156$ R2 = $0.8494$ Mt = $0.1446*Mad2 + 1.2154*Mad + 1.5441$ R <sup>2</sup> = $0.7464$	Mt = 2.0151*Mad + 2.3097	$R^2 = 0.302$
VMad = $-0.0011 * Aad^2 - 0.0596 * Aad + 23.43$ R2 = $0.5668$ CVad = $-100.67*Aad + 8651.9$ R <sup>2</sup> = $0.9379$ TSad = $-0.0002*Aad2 + 0.0357*Aad + 0.3264$ R <sup>2</sup> = $0.0472$ Seam 3AR2TRDad = $1.2454 * e^{(0.0081 * Aad)}$ R2 = $0.9152$ Mt = $1.617*Mad + 2.0273$ R <sup>2</sup> = $0.1746$ 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 <sup>2</sup> = $0.9389$ TSad = $-0.0002*Aad2 + 0.0284*Aad + 0.4361$ R <sup>2</sup> = $0.0238$ Seam 25-0DTRDad = $0.0001 * Aad^2 + 0.0011 * Aad + 1.4156$ R2 = $0.8494$ Mt = $0.1446*Mad2 + 1.2154*Mad + 1.5441$ R <sup>2</sup> = $0.7464$	$Mad = -0.0023 * Mt^{2} + 0.1502 * Mt + 0.3453$	R2 = 0.1712
$\begin{array}{llllllllllllllllllllllllllllllllllll$	$VMad = -0.0011 * Aad^2 - 0.0596 * Aad + 23.43$	R2 = 0.5668
$\begin{array}{ll} TSad = -0.0002*Aad2 + 0.0357*Aad + 0.3264 & R^2 = 0.0472 \\ \hline \mathbf{Seam 3A} & & \\ \hline TRDad = 1.2454*e^{(}0.0081*Aad) & R2 = 0.9152 \\ \hline Mt = 1.617*Mad + 2.0273 & R^2 = 0.1746 \\ \hline Mad = 0.0099*Mt^{2} - 0.0309*Mt + 0.7219 & R2 = 0.4422 \\ \hline VMad = 25.875*e^{(}-0.011*Aad) & R2 = 0.6699 \\ \hline CVad = -101.66*Aad + 8703.4 & R^2 = 0.9389 \\ \hline TSad = -0.0002*Aad2 + 0.0284*Aad + 0.4361 & R^2 = 0.0238 \\ \hline \mathbf{Seam 25-0D} & & \\ \hline TRDad = 0.0001*Aad^{2} + 0.0011*Aad + 1.4156 & R2 = 0.8494 \\ \hline Mt = 0.1446*Mad2 + 1.2154*Mad + 1.5441 & R^2 = 0.7464 \\ \hline \end{array}$	CVad = -100.67*Aad + 8651.9	$R^2 = 0.9379$
Seam 3AR2 = 0.9152 $TRDad = 1.2454 * e^{(0.0081 * Aad)}$ $R2 = 0.9152$ $Mt = 1.617*Mad + 2.0273$ $R^2 = 0.1746$ $Mad = 0.0099 * Mt^2 - 0.0309 * Mt + 0.7219$ $R2 = 0.4422$ $VMad = 25.875 * e^{(-0.011 * Aad)}$ $R2 = 0.6699$ $CVad = -101.66*Aad + 8703.4$ $R^2 = 0.9389$ $TSad = -0.0002*Aad2 + 0.0284*Aad + 0.4361$ $R^2 = 0.0238$ Seam 25-0DTRDad = 0.0001 * Aad^2 + 0.0011 * Aad + 1.4156 $R2 = 0.8494$ $Mt = 0.1446*Mad2 + 1.2154*Mad + 1.5441$ $R^2 = 0.7464$	TSad = -0.0002*Aad2 + 0.0357*Aad + 0.3264	$R^2 = 0.0472$
$\begin{array}{ll} \mbox{TRDad} = 1.2454 * e^{(}0.0081 * \mbox{Aad}) & \mbox{R2} = 0.9152 \\ \mbox{Mt} = 1.617*\mbox{Mad} + 2.0273 & \mbox{R}^2 = 0.1746 \\ \mbox{Mad} = 0.0099 * \mbox{Mt}^2 - 0.0309 * \mbox{Mt} + 0.7219 & \mbox{R2} = 0.4422 \\ \mbox{VMad} = 25.875 * e^{(}-0.011 * \mbox{Aad}) & \mbox{R2} = 0.6699 \\ \mbox{CVad} = -101.66*\mbox{Aad} + 8703.4 & \mbox{R}^2 = 0.9389 \\ \mbox{TSad} = -0.0002*\mbox{Aad}2 + 0.0284*\mbox{Aad} + 0.4361 & \mbox{R}^2 = 0.0238 \\ \mbox{Seam} \mbox{25-0D} & & \mbox{TRDad} = 0.0001 * \mbox{Aad}^2 + 0.0011 * \mbox{Aad} + 1.4156 & \mbox{R2} = 0.8494 \\ \mbox{Mt} = 0.1446*\mbox{Mad}2 + 1.2154*\mbox{Mad} + 1.5441 & \mbox{R}^2 = 0.7464 \\ \end{array}$	Seam 3A	
$\begin{array}{ll} Mt = 1.617*Mad + 2.0273 & R^2 = 0.1746 \\ Mad = 0.0099*Mt^2 - 0.0309*Mt + 0.7219 & R2 = 0.4422 \\ VMad = 25.875*e^{(-0.011*Aad)} & R2 = 0.6699 \\ CVad = -101.66*Aad + 8703.4 & R^2 = 0.9389 \\ TSad = -0.0002*Aad2 + 0.0284*Aad + 0.4361 & R^2 = 0.0238 \\ \hline \end{tabular}$	$TRDad = 1.2454 * e^{(0.0081 * Aad)}$	R2 = 0.9152
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 <sup>2</sup> = $0.9389$ TSad = $-0.0002*Aad2 + 0.0284*Aad + 0.4361$ R <sup>2</sup> = $0.0238$ Seam 25-0DTRDad = $0.0001 * Aad^2 + 0.0011 * Aad + 1.4156$ R2 = $0.8494$ Mt = $0.1446*Mad2 + 1.2154*Mad + 1.5441$ R <sup>2</sup> = $0.7464$	Mt = 1.617*Mad + 2.0273	$R^2 = 0.1746$
VMad = $25.875 * e^{(-0.011 * Aad)}$ R2 = $0.6699$ CVad = $-101.66*Aad + 8703.4$ R <sup>2</sup> = $0.9389$ TSad = $-0.0002*Aad2 + 0.0284*Aad + 0.4361$ R <sup>2</sup> = $0.0238$ Seam 25-0DTRDad = $0.0001 * Aad^2 + 0.0011 * Aad + 1.4156$ R2 = $0.8494$ Mt = $0.1446*Mad2 + 1.2154*Mad + 1.5441$ R <sup>2</sup> = $0.7464$	Mad = 0.0099 * Mt^2 - 0.0309 * Mt + 0.7219	R2 = 0.4422
$\begin{tabular}{lllllllllllllllllllllllllllllllllll$	VMad = 25.875 * e^(-0.011 * Aad)	R2 = 0.6699
$\begin{tabular}{lllllllllllllllllllllllllllllllllll$	CVad = -101.66*Aad + 8703.4	$R^2 = 0.9389$
Seam 25-0DR2 = $0.8494$ TRDad = $0.0001 * Aad^2 + 0.0011 * Aad + 1.4156$ R2 = $0.8494$ Mt = $0.1446*Mad2 + 1.2154*Mad + 1.5441$ R <sup>2</sup> = $0.7464$	TSad = -0.0002*Aad2 + 0.0284*Aad + 0.4361	$R^2 = 0.0238$
$\begin{array}{ll} TRDad = 0.0001 * Aad^2 + 0.0011 * Aad + 1.4156 & R2 = 0.8494 \\ Mt = 0.1446*Mad2 + 1.2154*Mad + 1.5441 & R^2 = 0.7464 \end{array}$	Seam 25-0D	
$Mt = 0.1446*Mad2 + 1.2154*Mad + 1.5441 \qquad R^2 = 0.7464$	TRDad = 0.0001 * Aad^2 + 0.0011 * Aad + 1.4156	R2 = 0.8494
	Mt = 0.1446*Mad2 + 1.2154*Mad + 1.5441	$R^2 = 0.7464$

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$Mad = 0.0031 * Mt^{2} + 0.193 * Mt + 0.2749$	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	$R^2 = 0.9487$
$TS_{ad} = 0.0005 * A_{ad}2 + 0.052 * A_{ad} + 0.1442$	$R^2 = 0.0209$

(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.

CSN	Seam 0A	Seam 0B	Seam OBR	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

Table 5-7: Distribution of CSN values by coal seam.

(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.

CSN	Seam 0A	Seam 0B	Seam OBR	Seam 0CL	Seam 0CU	Seam 25-0D	Seam 3A	Seam 4A	Seam 4A10-	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

Table 5-8: Cumulative percentage distribution of CSN values.

(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.

SEAM		Norw	est, March	2010			ER, Aug	ust 2012	
SEAM	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				

Table 5-9: Comparison of Bulk sample Coke Tests

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.

Seam	Product	Yield (%)	CSN	Gindex	Mt ar, %	Mad, %	Aad, %	VM ad, %	Vdaf, %	St, ad	Qgr, ad
	Feed CQ		2.5	42	4.14	0.67	23.70	18.86	24.98	1.18	6461
0C	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
	Feed CQ		7.0	77	4.91	0.67	18.34	21.02	26.01	1.30	6928
3A	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
	Feed CQ		7.0	78	4.70	0.70	16.75	22.14	27.39	0.70	6984
4A	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

Table 5-10: Typical average CHPP washed coal product results

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.

Coal type	Company	Tested Lab	Gindex	Y	Mt	Ad	Vdaf	Sd	CSR
НСС	Customer requ	irement	≥80	16	≤8	≤10.5	≤26	≤0.7	
нсс	Tianjin Tiantie	TT lab	86	16	6.5	10.5	24.69	0.57	NT
НСС	Customer requ	irement	≥80	≥15	≤10	≤11	≤26	≤0.7	
псс	JV(Jian Long)	JL lab	87	16	8.5	10.48	24.4	0.58	NT
	Customer requ	irement	≥80	≥15	≤10	≤11	≤26	≤0.7	
HLL	JV(Jiujiang)	JJ lab	83	16	7.5	10.85	24.49	0.58	67.04

Table 5-11: Typical product testing prior to acceptance

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  $3^{\circ}$  and  $17^{\circ}$  6 although dips less than  $6^{\circ}$  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  $5^{\circ}$  (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  $15^{\circ}$  and  $40^{\circ}$  but the predominant seam dip is between  $20^{\circ}$  and  $30^{\circ}$  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  $5^{\circ}$  to  $10^{\circ}$  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  $14^{\circ}$ .

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)

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

 Table 5-12: Preliminary shear strength properties – South Wall re-mining analyses

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  $10^{\circ}$  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  $25^{\circ}$  to  $30^{\circ}$  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  $\sim$ 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 crosssection 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 pickups and the  $5^{\circ}$  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.

Manorement	Nupe A	Hispa B.	Mapel
Nispe beight (m)	-48a	-510	-5402
From areast and the survey (GAP plan)	(AP)	.#1*	A1+
Corrubal slope mgla (GAP+57)	.421	40'	
Estimated lives plottography	37 56 562	\$7.55 70*	40 to 55°
Shqir iniditine	Large moment of score - initial slope might would be steeper than it would septem in correct photographs	Monthy solid pock with some serve has at thes of bahary	Class - goody solid material

Table 5-13: Estimated slope heights and angles for slopes A, B and C

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  $70^{\circ}$  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  $5^{\circ}$  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.





#### 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** efference source not found.. For example, a slope may need to be just less than  $23^{\circ}$  where no dewatering is done but could be steepened to over  $30^{\circ}$  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 inpit 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 ( $30^{\circ}$  dump face angle) are expected to be stable under static conditions, meeting the design acceptance criteria (FoS  $\geq 1.23$ ), especially where founded on the flatter dipping sections of the pit floor (6 to  $12^{\circ}$ ). Seismic loading analysis of such dumps also shows stability that meets design acceptance criteria FoS ( $\geq 1.14$ ). 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 extensioneter 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.

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# Table 5-14: UHG Mine slope design table updated Sep 2015

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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
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#### 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  $0.83-32.8 \text{ m}^2/\text{day}$ , an average of  $10.35 \text{ m}^2/\text{day}$  and an average storativity of  $3.88*104 \text{ m}^2/\text{day}$ . According to the hydrodynamic calculations, the hydraulic conductivity of the groundwater entering the open pit is 247.9 m<sup>3</sup>/day or 2.87 l/s. The maximum daily precipitation will not exceed 3135 m<sup>3</sup>/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 15<sup>th</sup> 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 resupplied including hard copies. The gamma LAS for U60R should be resupplied 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.

Dhala	Co	ollar survey			GPS check		Absolu	ite variation	l
Bhole	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

#### Table 6-1- Survey Audit on Collar surveys

(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, line ar m		Ditches and	Distance between, m	
		Core-type	Auger-type	back-fill	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 ( $\pm$  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.

Drilling type	Number of Boreholes	Total Depth
Core drilling	17	3325
Open hole drilling	115	11444
Total for deposit	132	14769

# Table 7-2: Norwest borehole data summary

(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.

	Core dr	illing	Open hole drilling		
Period	Number Boreholes Total depth (m)		Number Boreholes	Total depth (m)	
2009-2011	443	81959	992	84425	
TOTAL	Boreho	oles	Total dep	th (m)	
	1435	5	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 <u>95</u> years achieved to its credit. In addition, the below email was

received on the 31<sup>st</sup> 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).



# 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.

	Core dr	illing	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		

# Table 7-4: Borehole data summary for 2012-2014

(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.

	Core dr	illing	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		

Table 7-5: Borehole data summary for 2018, 2020

(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<sup>2</sup> 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: ashcontents, volatiles, and thickness of plastic rock beds for simple samples for all seamintersections 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.





# 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:

٠	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 580:2003

	•	
•	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.



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 12<sup>th</sup> and 14<sup>th</sup> 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 12<sup>th</sup> and 13<sup>th</sup> 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.

Analyzia tema	ER Centra	SGS				
Analysis type	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

#### Table 8-1: ERCCL Laboratory and SGS Laboratory compared.

\*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 differen	nce = 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).

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	_

Table 8-3: Reproducibility limits between laboratories.

\*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.

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%	-

# Table 8-4: Reproducibility of results between ER Central Chemical Laboratory and SGS Laboratory

\*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.



Figure 8-8: Comparison of volatile matter determinations.

(Source: Adiya)



Figure 8-9: Comparison of total sulphur determinations.



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.

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

Table 8-5: Core recovery limit per seam

(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 95<sup>th</sup> 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'seye 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).

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

Table 9-1: Summary of Points of Observation File

(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.

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

 Table 9-2: Summary of data used for Resource Estimate

(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.

As-Received	RD	ТМ	Ash	VM	FC	Gross CV	S
STATISTCS	(g/cc)	%	%	%	%	(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
					(1	Source: Energy Reso	ources LLC)

Table 9-3: Summary statistics for As-Received Coal Quality

Table 9-4: Summary statistics for Air-Dry Coal Quality

Air-Drv	RD	IM	Ash	VM	FC	Gross CV	S
STATISTCS	(g/cc)	% %		%	%	(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



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 31<sup>st</sup> December 2021. Figure 9-6 shows the limits of all seam.



Figure 9-6: Model limits for all seam

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.

<sup>(</sup>Source: Energy Resources LLC)



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.



(Source: Energy Resources LLC)

The resulting final block model (depleted by pit of 31<sup>st</sup> 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 airdry and as-received basis are shown in Table 9-5.

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		

Table 9-5: Default coal quality values for partings

(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.

Volume	Tonnes	Relative	Ash (%)	Total	Volatile	Gross Calorific	Sulphur (%)	Fixed	Classification
BUOA-BHWE	(X1,000,000)	Density (g/cc)		worstore (76)	Matter (76)	Value (Kcal/Kg)		Carbon (78)	
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, clau	se 25, Rounding								

#### Table 10-1: Total Resources on an As-Received (AR) Basis

(Source: Energy Resources LLC)

Volume	Tonnes	Relative	Ash (%)	Inherrent	Volatile	Gross Calorific	Sulphur (%)	Fixed	Classification
(x1,000,000 m <sup>3</sup> )	(x1,000,000)	Density (g/cc)		Moisture (%)	Matter (%)	Value (Kcal/kg)	··· [· ·· (· /	Carbon (%)	
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, clau	JORC Code, clause 25, Rounding.								

#### Table 10-2: Total Resources on an Air-Dry (AD) Basis

(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  $(2004) - 31^{st}$  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.

MMC 31st December 20	14 - non JORC	(2012)			
Total Coal Resources		Resourc	es 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 20	21 - non JORC	(2012)			
Total Coal Resources		Resourc	es 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	4 - JORC (2012)	vs MMC 31st D	ecember 2021 -	JORC (2012)
Total Coal Resources		Resources C	Category (as reco	eived) 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 C	ategory (as rece	ived) 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%

# Table 10-3: Comparison of unadjusted New with Previous JORC Resource estimates – Non JORC

(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 23<sup>rd</sup> 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.

Volume	Tonnes	Relative	Ach (%)	Total	Volatile	Gross Calorific	Sulphur (%)	Fixed	Classification
(x1,000,000 m <sup>3</sup> )	(x1,000,000)	Density (g/cc)	ASIT (70)	Moisture (%)	Matter (%)	Value (Kcal/kg)	Surpriur (78)	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, clau	ise 25, Rounding								

#### Table 11-1: Total Resources on an As Received (AR) Basis

(Source: Energy Resources LLC)

Volume	Tonnes	Relative	Ash (%)	Inherrent	Volatile	Gross Calorific	Sulphur (%)	Fixed	Classification
(x1,000,000 m <sup>3</sup> )	(x1,000,000)	Density (g/cc)		Moisture (%)	Matter (%)	Value (Kcal/kg)		Carbon (%)	
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, clau	ise 25, Rounding					1			
	.,								

#### Table 11-2: Total Resources on an Air Dry (AD) Basis

(Source: Energy Resources LLC)

In comparing the previous Resource estimate and the current Resource estimate, unadjusted 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

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## **13** Date and Signature

Byambaa Barkhas

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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.

#### 16 References

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# 17 Glossary of technical terms

3D	Three-dimensional.
0⁄0	Percent.
° 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.
СР	'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
М	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 <sup>3</sup>	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 (asreceived) 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: 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

(Please see CD or Hard copies that accompany this report)

# Appendix 25: JORC (2012) Table 1

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Criteria	JORC Code explanation	Commentary
Sampling techniques	Nature and quality of sampling	<ul> <li>Confinentary</li> <li>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.</li> <li>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.</li> <li>Chip samples from open holes and trench samples were used for continuity purposes and were not used for resource calculations.</li> <li>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.</li> <li>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</li> </ul>
		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	<ul> <li>For cored boreholes, coal plies were fully cored and sampled.</li> <li>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.</li> <li>In 2020, One calibration borehole</li> </ul>

#### Section 1: Sampling Techniques and Data

Criteria	JORC Code explanation	Commentary
		<ul> <li>(G02637) were setup to regularly test all logging tools as they came onto the site and at regular periods whilst onsite.</li> <li>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.</li> </ul>
	Aspects of the determination of mineralisation that are Material to the Public Report	<ul> <li>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 = &gt;90% bright, C2= 60-90% bright, C3=40-60% bright, C4=10-40% bright, C5=1-10% bright and C6=&lt;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.</li> <li>The core coal interval observations were confirmed with down-hole geophysics.</li> </ul>
Drilling techniques	<ul> <li>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.).</li> </ul>	<ul> <li>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.</li> <li>Core was mostly HQ3 size with some PQ3</li> </ul>

Criteria	JORC Code explanation	Commentary
		<ul> <li>size.</li> <li>Core bits were diamond impregnated and surface set to maximise recovery and minimise shattering of core.</li> <li>Generally boreholes were drilled vertically with most having a down-hole verticality Log run.</li> <li>A small number of angle boreholes were drilled in the fault zone to determine the structure</li> </ul>
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	<ul> <li>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.</li> <li>Downhole geophysics was used to further assess the amount and location of linear core loss.</li> <li>Core photography in boxes also assisted later evaluation of loss.</li> <li>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.</li> <li>Samples were measured for weight but this mainly served as a cross check with the laboratory.</li> <li>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.</li> </ul>
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	<ul> <li>Modern drilling equipment and trained coal drillers was utilised.</li> <li>High quality drilling pipe, coring and drilling bits used.</li> <li>Expected high core recovery particularly in coal plies enforced with drilling</li> </ul>

Criteria	JORC Code explanation	Commentary
		<ul> <li>contractor where ply sections with less than ≥95% were redrilled.</li> <li>Chip samples collected on a 1m basis and displayed clearly for rig geologist observation.</li> </ul>
	• 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.	<ul> <li>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.</li> </ul>
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.	<ul> <li>All core was logged geologically and geotechnically and recorded in hard copy and electronic format to COALLOG standard.</li> </ul>
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.	<ul> <li>Geological and geotechnical logging was qualitative with codes used to describe the different geological and geotechnical aspects of the core as per COALLOG standard.</li> <li>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.</li> </ul>
	The total length and percentage of the relevant intersections logged.	<ul> <li>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.</li> </ul>
Sub-sampling techniques and sample	• If core, whether cut or sawn and whether quarter, half or all core taken.	• The whole core was sampled for coal analysis.
preparation	<ul> <li>If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.</li> </ul>	Not applicable for coal.
	• For all sample types, the nature,	Coal cores at the rig site, were measured

Criteria	JORC Code explanation	Commentary
Criteria	JORC Code explanation  quality and appropriateness of the sample preparation technique.	<ul> <li>Commentary</li> <li>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.</li> <li>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 remeasured 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</li> </ul>
		sample bag mass.

Criteria	JORC Code explanation	Commentary
		<ul> <li>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'.</li> </ul>
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	<ul> <li>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.</li> <li>The ERCCL was accredited to ISO/IEC 17025:2017(MNS ISO/IEC 17025:2018) standard in November 2020 and expires in July 2023.</li> </ul>
	<ul> <li>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.</li> </ul>	<ul> <li>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.</li> <li>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.</li> <li>For work previously completed before 2009, it is unknown if a similar comparison exercise was done.</li> <li>In 2020, ER Central Chemical Laboratory</li> </ul>

Criteria	JORC Code explanation	Commentary
		<ul> <li>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.</li> <li>The ER Central Chemical Laboratory generally reported the coal quality parameters higher than the SGS Laboratory with varying degrees of reproducibility between laboratories.</li> </ul>
	• Whether sample sizes are appropriate to the grain size of the material being sampled.	<ul> <li>Bulk samples were taken for dry and wet tumbler sizing analysis in 2008 and 2012.</li> <li>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.</li> <li>The 2012 work was completed for seams (0C, 3A, 4A and 4C) and the work was analysed at the ALS – Ulaanbaatar, Mongolia laboratory.</li> <li>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.</li> <li>The results of this work were for the design of the CHPP and Reserves. It did not have an impact on the Resource estimate.</li> <li>For work previously completed before 2008, it is unknown if a similar exercise was done.</li> </ul>

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.	<ul> <li>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 311:2009), 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 501:2003) and Caking index (MNS ISO 335:2005).</li> <li>In addition, bulk samples were taken in 2008 and 2012 for coke testing.</li> <li>In 2020, Coal samples were analysed for, True relative density (GB/T 217:2015), Total moisture (MNS GB/T 212:2015), Ash (MNS GB/T 212:2015), Calorific value (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 501:2003) and Caking index (MNS ISO 15585:2014).</li> <li>The coal analyses are sufficient to determine a Resource estimate and determine the potential coal products and support the marketability of the coal products.</li> <li>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 constructed for internal checks. When samples deviated from the procedure tolerance the samples were re-analysed from new.</li> </ul>

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.	<ul> <li>(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.</li> <li>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.</li> </ul>
	<ul> <li>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.</li> </ul>	<ul> <li>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.</li> <li>Laboratory certificates were supplied by ERCCL, ALS the Russian lab and SGS lab.</li> <li>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.</li> <li>In 2020, ER Central Chemical Laboratory prepared and analysed a number of samples of these samples for analysis at the SGS Laboratory (712 samples) Mongolia branch in Ulaanbaatar. The ER Central Chemical Laboratory by means of cross plots and basic statistical parameters of these samples for analysed a number of samples and submitted duplicates of these samples for analysed a number of samples and submitted duplicates of these samples for analysed a number of samples and submitted duplicates of these samples for analysed a number of samples and submitted duplicates of these samples for analysed a number of samples and submitted duplicates of these samples for analyse and submitted duplicates of these s</li></ul>

Criteria	JORC Code explanation	Commentary
		<ul> <li>parameters.</li> <li>The ER Central Chemical Laboratory generally reported the coal quality parameters higher than the SGS Laboratory with varying degrees of reproducibility between laboratories.</li> </ul>
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel.	<ul> <li>A number of pre-2008 boreholes were twinned by the Norwest and ER drilling programs.</li> <li>Coal thickness intervals were check with a high level of agreement.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>Hard copy data from the pre-2008 programs were translated and coded and uploaded into the LogCheck data management software. All hard copy coal quality results were entered into Excel</li> </ul>

Criteria	JORC Code explanation	Commentary
		<ul> <li>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.</li> <li>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.</li> </ul>
	The use of twinned holes.	<ul> <li>A number of pre 2008 boreholes were twinned by the Norwest and ER drilling programs.</li> <li>Coal thickness intervals were check with a high level of agreement.</li> <li>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.</li> <li>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.</li> <li>A few numbers of boreholes from the 2008 program were twinned. In these cases the coal thickness intervals and coal</li> </ul>

Criteria	JORC Code explanation	Commentary
		<ul> <li>quality had good agreement. All boreholes in this program where they meet point of observation guidelines were used for the Resource estimate.</li> <li>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.</li> </ul>
	<ul> <li>Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</li> </ul>	<ul> <li>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.</li> <li>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. 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 top the survey.</li> </ul>

Criteria	JORC Code explanation	Commentary
		<ul> <li>LogCheck data management software.</li> <li>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.</li> <li>All data from all exploration either historical or current has been coded and form system and resides as one database.</li> </ul>
	Discuss any adjustment to assay data.	<ul> <li>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.</li> <li>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 interval interval interval between observed partings and wire-line rock responses. If the loss occurred within a sample the sample thickness was</li> </ul>

Criteria	JORC Code explanation	Commentary
		<ul> <li>adjusted to reflect the loss.</li> <li>All samples once collected at the central logging facility were weighed for mass and this mass was matched with laboratory sample mass.</li> <li>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.</li> <li>All sample data and composite data are recorded in the LogCheck data management software and GeoBANK database.</li> </ul>
Location of data points	<ul> <li>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.</li> </ul>	<ul> <li>The topographic and borehole collar survey was carried out by ER's own survey team using Trimble equipment.</li> <li>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</li> <li>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.</li> </ul>
	• 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.	<ul> <li>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</li> </ul>

Criteria	JORC Code explanation	Commentary
		<ul> <li>+0.1ppm RMS and a RTK vertical measurement ±3.5mm +0.4ppm RMS in 2008.</li> <li>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.</li> </ul>
Data spacing and distribution	Data spacing for reporting of Exploration Results.	<ul> <li>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.</li> <li>The 2008 program was an infill drilling program that appeared to have an irregular design and spacing.</li> <li>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.</li> <li>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.</li> <li>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 deposit area in front of the mining face. This program was aligned to 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.</li> </ul>

Criteria	JORC Code explanation	Commentary
		<ul> <li>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.</li> <li>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.</li> </ul>
	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.	<ul> <li>The data spacing is sufficient to establish a high degree of geological and grade continuity appropriate for the Mineral Resource and classifications applied.</li> <li>An exercise in geostatistics to calculate estimated error on the estimate was completed which confirms high degree of geological and grade continuity.</li> </ul>
	• Whether sample compositing has been applied.	<ul> <li>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.</li> </ul>
Orientation of data in relation to geological structure	<ul> <li>Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.</li> </ul>	<ul> <li>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.</li> <li>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.</li> <li>No evidence of bias due to borehole orientation has been observed.</li> </ul>

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.	<ul> <li>No evidence of bias due to borehole orientation has been observed.</li> <li>As part of the geostatistical review on estimated error a check for anisotropy was made with no evidence that there was one.</li> </ul>
Sample security	The measures taken to ensure sample security.	<ul> <li>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</li> </ul>
Criteria	JORC Code explanation	Commentary
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		<ul> <li>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.</li> <li>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, 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.</li> <li>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 with no coal remaining. The boxes were wrapped securely in plastic for transport to the central logging facility. The core boxes with no coal remaining. The boxes were wrapped securely in plastic for transport to the central logging facility at the end of each 10 hour shift. The central logging facility at the end of each 10 hour shift. The central logging facility at the end of each 10 hour shift. The central logging facility at the end of each 10 hour shift. The central logging facility at the end of each 10 hour shift. The central logging facility at the end of each 10 hour shift. The central logging facility at the end of each 10 hour shift. The central loggin</li></ul>

	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,
	<ul> <li>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 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.</li> <li>Analytical data was entered into the GeoBANK database by the laboratory.</li> </ul>
	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

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.	<ul> <li>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 &amp; 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.</li> <li>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</li> </ul>

enterna -	JORC Code explanation	Commentary
	JORC Code explanation	<ul> <li>Commentary</li> <li>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 &amp; 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.</li> <li>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.</li> <li>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</li> </ul>
		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
		<ul> <li>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.</li> <li>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 with requirements of the JORC Code (2012).</li> </ul>

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	<ul> <li>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.</li> </ul>	<ul> <li>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.</li> </ul>
	• 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.	<ul> <li>The TT deposits of fossilized coal was discovered and exploited by the local people since early 19th century.</li> <li>The first official information on the deposit appears in reports by geologist K.D.Pomazkov, who</li> </ul>
		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.
		<ul> <li>In 1973, from sharts sufk 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.</li> <li>In 1977 at the request of the Government, MPR (Mongolian People's Republic), (ENCIPROCIDENT)</li> </ul>
		technical and economic

**Section 2: Reporting Exploration Results** 

Criteria	JORC Code explanation	Commentary
Criteria	JORC Code explanation	<ul> <li>Commentary         <ul> <li>assessment for detailed exploration, upon the condition that the coal of all seams is coking, relying on the results of incomplete exploration works.</li> <li>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.</li> <li>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 &amp; preliminary reports of the coal from Ukhaa Khudag and Tavan Tolgoi South.</li> <li>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</li> </ul> </li> </ul>
		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
		<ul> <li>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.</li> <li>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.</li> </ul>
Geology	Deposit type, geological setting and style of mineralisation.	<ul> <li>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.</li> <li>Island arc geometry, similar to how the Bowen Basin was</li> </ul>

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	<ul> <li>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:         <ul> <li>easting and northing of the drill hole collar</li> <li>elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar</li> <li>dip and azimuth of the hole</li> <li>down hole length and interception depth</li> <li>hole length.</li> </ul> </li> </ul>	<ul> <li>No exploration results are reported.</li> <li>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.</li> <li>Points of observation derived from this data are in Appendix 4A and 4B of this report.</li> </ul>
	• 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	<ul> <li>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.</li> </ul>	<ul> <li>No exploration results are reported.</li> </ul>
	• 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.	<ul> <li>No exploration results are reported.</li> </ul>
	• 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.
widths and intercept lengths	• 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').	<ul> <li>No exploration results are reported.</li> </ul>
Diagrams	<ul> <li>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.</li> </ul>	<ul> <li>No exploration results are reported.</li> </ul>
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
Other substantive exploration data	misleading reporting of Exploration Results. • 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.	<ul> <li>No exploration results are reported.</li> <li>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.</li> <li>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</li> </ul>
Further work	<ul> <li>The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).</li> <li>Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.</li> </ul>	<ul> <li>No exploration results are reported.</li> <li>No exploration results are reported.</li> </ul>

Criteria	JORC Code explanation	Commentary
Database integrity	<ul> <li>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.</li> </ul>	<ul> <li>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.</li> <li>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 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 are produced by the LogCheck data management software by way of csv files and these files are uploaded</li> </ul>

Section 3: Estimation and Reporting of Mineral Resources

Criteria	JORC Code explanation	Commentary
		<ul> <li>to the Micromine modelling software.</li> <li>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.</li> </ul>
	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.
		<ul> <li>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.</li> <li>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 into the Micromine modelling software was done by passing csv files seamlessly.</li> </ul>
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.
		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
Criteria	JORC Code explanation	<ul> <li>Commentary</li> <li>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.</li> <li>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.</li> <li>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</li> </ul>
		<ul> <li>to UHG in mid-November 2014 audited the collar survey for boreholes drilled in the period 2012-2014 with a hand held GPS device.</li> <li>All GPS coordinates of boreholes and</li> </ul>
		boundary pegs checked were within the

Criteria	JORC Code explanation	Commentary
		<ul> <li>tolerance of the GPS device.</li> <li>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).</li> </ul>
	If no site visits have been	Not applicable, see above section.
Geological	this is the case.     Confidence in (or	<ul> <li>Detailed mapping from the various</li> </ul>
interpretation	conversely, the uncertainty of) the geological interpretation of the mineral deposit.	<ul> <li>campaigns from the 1940's.</li> <li>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.</li> <li>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.</li> <li>Seismic results on structure have been confirmed and updated by mine geology team detailed in-pit and face-wall mapping.</li> <li>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.</li> <li>The 'limit of oxidation' was determined by mapping and sampling from mine geology</li> </ul>

Criteria	JORC Code explanation	Commentary
		<ul> <li>team.</li> <li>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.</li> </ul>
		<ul> <li>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.</li> <li>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.</li> <li>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.</li> </ul>
	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.
		<ul> <li>No assumption with a material effect to the estimate was made. Notwithstanding, missing or non-analysed coal quality data</li> </ul>

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.
		<ul> <li>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.</li> <li>The western boundary was limited by the license boundary but the seams are continuous beyond this point.</li> <li>Within the deposit, major structural zones effected coal seam continuity and coal quality. Rank increases due to the major structures effected coal quality.</li> </ul>
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.	<ul> <li>The coal resource area is oriented generally in an east-west direction and is some 7.5m long and 3 km wide.</li> <li>The area of the license is 2960.23 hectare</li> <li>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.</li> <li>Drilling in the western area went to 700m depth and it is estimated the coal measures still extend another 300m past the drilling.</li> <li>The model extension is less than 100m deeper than the deepest borehole.</li> </ul>

Criteria	JORC Code explanation	Commentary
		<ul> <li>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.</li> <li>No resource has been estimates outside of the Lease boundaries.</li> </ul>
Estimation and modelling techniques	<ul> <li>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.</li> </ul>	<ul> <li>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.</li> <li>The method used for estimating Resources at UHG involved modelling an elevation grid for the major ply, OAL, 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.</li> <li>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 OAL was used for geostatistical analysis as it was intersected by the largest number of boreholes and is the most consistent ply across the area.</li> <li>To create the block model an elevation grid was created for the major lower ply OAL 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</li> </ul>

Criteria	JORC Code explanation	Commentary
		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
		<ul> <li>was zero.</li> <li>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 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.</li> <li>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.</li> <li>The Extremely weathering grid was produced using IDW with a power of two search radius of 500m with maximum of 4 points per sector.</li> </ul>

Criteria	JORC Code explanation	Commentary
		<ul> <li>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.</li> <li>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.</li> </ul>
		<ul> <li>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.</li> <li>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 interpolation was conducted for each ply separately. One search run at 7,000m radius</li> </ul>
		<ul> <li>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.</li> <li>Partings within the model limits but without coal quality were given default coal quality</li> </ul>

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.	<ul> <li>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.</li> <li>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).</li> <li>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.</li> </ul>
	• The assumptions made regarding recovery of by- products.	<ul> <li>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.</li> </ul>
	• Estimation of deleterious elements or other non- grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	<ul> <li>Norwest in their JORC (2004) estimate in 2010 mentions that samples were collected for Acid Generating Potential in 2008.</li> <li>Further rock and in seam parting samples were collected by the ER geology team for</li> </ul>

Criteria	JORC Code explanation	Commentary
		<ul> <li>further work by EGI on Acid Generating Potential.</li> <li>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.</li> <li>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.</li> <li>This work lead to the design and disposal of high sulphur reject material from the CHPP in the waste dumps.</li> </ul>
	• In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	<ul> <li>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</li> </ul>

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.	<ul> <li>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.</li> </ul>
	Any assumptions about correlation between variables.	<ul> <li>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.</li> </ul>
	• Description of how the geological interpretation was used to control the resource estimates.	<ul> <li>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.</li> <li>The northern and southern fault boundaries</li> </ul>

Criteria	JORC Code explanation	Commentary
	Discussion of basis for using	<ul> <li>coal/basement contact has been confirmed by face-wall mapping by the geology mine team and angled geotechnical drilling along strike to confirm continuity.</li> <li>The 'limit of oxidation' was determined by close spaced drilling and confirmed by mapping and sampling from mine geology team.</li> <li>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.</li> </ul>
	• Discussion of basis for using or not using grade cutting or capping.	• A greater than 50% ash (DRY basis) cut-on was used to determine what coal was and what rock was.
	<ul> <li>The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.</li> </ul>	<ul> <li>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.</li> <li>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.</li> </ul>
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.	<ul> <li>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.</li> <li>The estimated Resource is reported on 'as received' basis and 'air dried' basis</li> </ul>
Cut-off parameters	• The basis of the adopted cut-off grade(s) or quality parameters applied.	<ul> <li>No maximum seam thickness.</li> <li>Minimum seam thickness to be included in the Resource of 0.5m to 400m depth and then 1.5m below 400m.</li> <li>Maximum parting thickness to be included in the Resource of 0.5m.</li> <li>Coal Quality limit with Ash content greater than 50% (DRY basis) being excluded from the Resource Estimate.</li> </ul>
Mining factors or assumptions	<ul> <li>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.</li> </ul>	<ul> <li>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.</li> </ul>
Metallurgical factors or assumptions	The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as	<ul> <li>The report in section 4.7.2.6 shows typical production figures from the CHPP.</li> <li>Depending on which seam is being washed and what blends are being appointed three</li> </ul>
	part of the process of	

Criteria	JORC Code explanation	Commentary
	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.	<ul> <li>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.</li> <li>The Resource estimate for this report has had no assumptions made on the estimate for beneficiation.</li> </ul>
Environmen- tal factors or assumptions	<ul> <li>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.</li> </ul>	<ul> <li>All environmental issues are managed by the company's environmental department which has operated since the start of mining.</li> <li>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.</li> <li>During all site visits there have been no obvious environmental issues of leachates emanating from spoil piles or from coal stockpiles.</li> </ul>
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

Criteria	JORC Code explanation	Commentary
	measurements, the nature, size and representativeness of the samples.	<ul> <li>ASH for air dried and as-received samples.</li> <li>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.</li> </ul>
	• 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.	<ul> <li>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.</li> </ul>
Classification	• The basis for the classification of the Mineral Resources into varying confidence categories.	<ul> <li>The basis for the classification for the Resource estimate is taken from guidance from the Australian Coal Guidelines (2014).</li> <li>The basis of the classification confidence categories is from the results of an investigation of expected error for the 95<sup>th</sup> percentile through the use of Conditional Simulation Geostatistics.</li> </ul>
	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).	<ul> <li>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.</li> <li>Since 2009 having a highly trained team to international and Australian standards, modern drilling methods and equipment, good downhole geophysics, high quality 2D</li> </ul>

Criteria	JORC Code explanation	Commentary
		<ul> <li>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.</li> <li>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.</li> </ul>
	• 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.	<ul> <li>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 &amp; 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 interburden units between the seams is also</li> </ul>

Criteria	JORC Code explanation	Commentary
		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
		<ul> <li>report- June 2012 so the independent peer review by Mr Sercombe is still relevant.</li> <li>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 year birth compliance with the</li> </ul>
		team's results and JORC standards. In addition, Mr Ballantine has completed an oral review and internal audit with the
		<ul> <li>Competent Person for every step of the data preparation of the points of observation and the modelling stages to the final estimate.</li> <li>Internal peer review of exploration work 2018, 2020 was conducted by Mr. Lkhagva-</li> </ul>

Criteria	JORC Code explanation	Commentary
		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	<ul> <li>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.</li> </ul>	<ul> <li>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.</li> <li>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.</li> <li>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</li> </ul>

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.	<ul> <li>The Resource estimate for this report is a global estimate to international standards and meets all JORC 2012 requirements.</li> <li>All assumptions and procedures for the Resource estimate are documented within the report sections or as Appendices.</li> </ul>
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	<ul> <li>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.</li> </ul>

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