



# Valuation Report on the Kharmagtai Project, Mongolia



Prepared by Mining Associates Pty Ltd for

Grant Thornton

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# **TABLE OF ACRONYMS**

ASL Above sea level
AUD Australian Dollar

B.App.Sc. Bachelor of Applied Science degree

B.Sc. Bachelor of Science degree

CAD Canadian Dollar

CEO Chief Executive Officer

CIMVal Standards and Guidelines for Valuation of Mineral Properties set down by the

Special Committee of the Canadian Institute of Mining, Metallurgy and Petroleum on

Valuation of Mineral Properties

DDH Diamond drill hole
EL Exploration Licence

ERA Environmental Risk Assessment

F.AusIMM Fellow of the Australasian Institute of Mining and Metallurgy F.I.M.M.M. Fellow of the Institute of Materials, Mining and Metallurgy

IP Induced Polarization

JV Joint Venture

LME London Metal Exchange

M Million

MA Mining Associates Pty Ltd

M.SEG. Member of the Society of Economic Geologists

M.Sc. Master of Science degreeNI43-101 National Instrument 43-101

QA/QC Quality Assurance/Quality Control

RC Reverse Circulation

SEDAR System for Electronic Document Analysis and Retrieval

SG Specific Gravity tpd Tonnes per day USD United States Dollar

UTM Universal Transverse Mercator

VALMIN Code Code for the Technical Assessment and Valuation of Mineral and Petroleum Assets

and Securities for Independent Expert Reports

WGS84 World Geodetic System 1984



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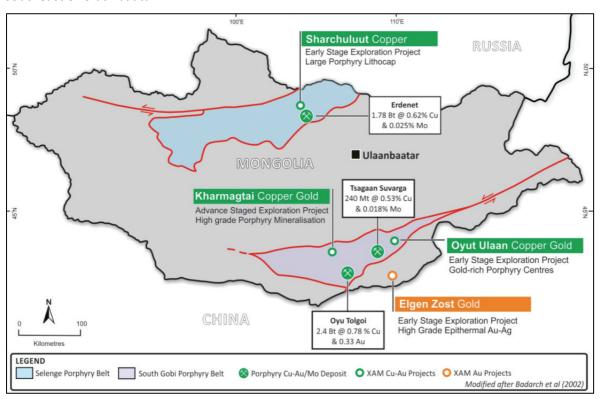


#### 1 SUMMARY

This report is an independent technical review prepared at the request of Grant Thornton Australia to provide an opinion as to the present value of the Kharmagtai exploration project owned 100% by Oyut Ulaan LLC. Grant Thornton Australia has been engaged by Xanadu Mines Ltd ("Xanadu") to prepare an Independent Experts Report ("IER") in relation to Xanadu's acquisition of a 90% interest in Oyut Ulaan LLC from a subsidiary of Turquoise Hill Resources Ltd.

The Kharmagtai Mining Licence MV-17387A covers approximately 66 km<sup>2</sup>. It is currently held by Oyut Ulaan LLC, which is 90% owned by THR Oyu Tolgoi Ltd, with the remaining 10% owned by Quincux Ltd.

The Kharmagtai project is located within the South Gobi porphyry copper province, which hosts most of the known porphyry deposits in the South Gobi region of Mongolia, including the giant Oyu Tolgoi copper-gold operations (120 km south), the Tsagaan Suvarga porphyry copper-molybdenum development (170 km east) and Xanadu's Oyut Ulaan porphyry copper-gold exploration project (260 km northeast). The project is located within the Omnogovi Province, approximately 420 km southeast of Ulaanbaatar.



At the request of Mr Andrea de Cian of Grant Thornton Corporate Finance Pty Ltd ("GT") Mining Associates Pty Ltd ("MA") was commissioned in February 2014 to prepare an Independent Technical Report for inclusion in an Independent Expert's Report to accompany a Notice of Meeting in relation to the proposed acquisition of a 90% interest in Oyut Ulaan LLC ("OU") which in turn is the 100% owner of the Kharmagtai Mining Licence registed in Mongolia (the "Project").

The scope of this work is to conduct an independent geological and valuation assessment of the fair market value of the Project.

MA has conducted the technical review and valuation assessment in accordance with the VALMIN code. MA is providing the technical review and valuation report to GT to assist in evaluating whether the Proposed Transaction is fair and reasonable to the shareholders of Xanadu. This Technical Report



will be included in the Independent Expert's Report to accompany a Notice of Meeting which will be circulated to the shareholders of Xanadu.

Kharmagtai is an advanced stage porphyry copper-gold exploration project with significant defined mineralisation and substantial potential. Multiple gold-rich porphyry copper centres and tourmaline breccia pipes are associated with the Kharmagtai Igneous Complex, a Lower Carboniferous age suite of dioritic intrusive rocks. Extensive exploration from 2002-2012, including geochemistry, geophysics, trenching and diamond drilling, defined three main zones of mineralisation at Altan Tolgoi, Tsgaaan Sudal and Zesen Uul.

Xanadu reviewed all previous exploration data and completed a geological model covering Altan Tolgoi, Tsagaan Sudal and Zesen Uul prospects, which resulted in definition of an initial Exploration Target of between 250 Mt to 400 Mt at an average grade of 0.25 % to 0.30 % Cu and 0.25 g/t to 0.30 g/t Au. Contained within this is a higher grade target zone of 50 Mt to 80 Mt at an average grade of 0.4 % to 0.5 % Cu and 0.6 g/t to 0.8 g/t Au.

The potential quantity and grade of the Exploration Target is conceptual in nature. Historic mineral resource estimates summarised in section 5.2 have not been publicly reported in compliance with the JORC 2012 Code and it is uncertain if further exploration will result in the estimation of a Mineral Resource.

MA considers the value of 100% of the Kharmagtai project to be in the range USD9 M to USD29 M (AUD10 M to AUD32 M) with a preferred value of USD15 M (AUD16.5 M), as summarised in the table below. Value was determined using the Market Approach of recent comparable transactions and an Empirical Yardstick methodology. A Cost Approach using multiples of past exploration expenditure was also utilised to confirm the Market and Yardstick valuation. The preferred value reflects the advanced nature of the project, the amount of exploration work undertaken, the exploration potential and its location in relationship to developing infrastructure.

	outlinary of valuation									
Project	roject  Market Approach  Comparable Transactions  Low High USDM USDM		Approach Ap			Cost Approach		Preferred		
					Expenditure					
			Low	High	Low	High	Low	Preferred	High	
			USDM	USDM	USDM	USDM	USDM	USDM	USDM	
Kharmagtai	\$16.7	\$19	\$9	\$17	\$14	\$29	\$9	\$15	\$29	

**Summary of Valuation** 

MA has reviewed Xanadu's plan for the first year of work following acquisition of the project. 15,000-20,000 m of drilling is proposed to further define the initial Exploration Target and provide data for an initial Resource Estimate. MA considers that the amount budgeted and the proposed timeframes are reasonable for a project of this size and mineralisation style.

Andrew J Vigar Brisbane, Australia 25 March 2014

25 March 2014



#### 2 INTRODUCTION AND TERMS OF REFERENCE

#### 2.1 COMMISSIONING ENTITY AND SCOPE

At the request of Mr Andrea de Cian of Grant Thornton Corporate Finance Pty Ltd ("GT") Mining Associates Pty Ltd ("MA") was commissioned in February 2014 to prepare an Independent Technical Report for inclusion in an Independent Expert's Report to accompany a Notice of Meeting in relation to the proposed acquisition of a 90% interest in Oyut Ulaan LLC ("OU") which in turn is the 100% owner of the Kharmagtai Mining Licence registed in Mongolia (the "Project").

MA has conducted the technical review and valuation assessment in accordance with the VALMIN code. MA is providing the technical review and valuation report to GT to assist in evaluating whether the Proposed Transaction is fair and reasonable to the shareholders of Xanadu. This Technical Report will be included in the Independent Expert's Report to accompany a Notice of Meeting which will be carried to the shareholders of Xanadu.

The scope of the Valuation included the following:

- Review of the Kharmagtai Project, including but not limited to historical exploration expenditure, prospectivity, resources, exploration targets and good standing of the tenements.
- Assessment of the market value of the Project based on valuation methodologies appropriate for an early stage asset.
- Report to be prepared in accordance with the VALMIN Code and for the specific purpose of assisting Grant Thornton in the preparation of an Independent Experts Report.

MA was not requested to comment on the Fairness or Reasonableness of any vendor or promoter considerations, and therefore no opinion on these matters has been offered.

# 2.2 VALUATION MANDATE

MA was requested to provide an Independent Valuation of the Kharmagtai project in Mongolia, comprising Mining Licence MV-17387A, held by Oyut Ulaan LLC.

#### 2.3 PURPOSE

Grant Thornton intends that this report be used as part of an Independent Expert's Report to accompany a Notice of Meeting which will be carried to the shareholders of Xanadu.

#### 2.4 VALUATION DATE

All time-sensitive data used in this Valuation, including metal prices, exchange rates, cost-of-living indices etc. were taken as at 5pm Sydney time on Friday, 14th February 2014. Accordingly, this valuation is valid as of 14th February 2014 and refers to the writer's opinion of the value of the Projects at this date.

This valuation can be expected to change over time having regard to political, economic, market and legal factors. The valuation can also vary due to the success or otherwise of any mineral exploration that is conducted either on the properties concerned or by other explorers on prospects in the near environs. The valuation could also be affected by the consideration of other exploration data, not in the public domain, affecting the properties which have not been made available to the author.



#### 2.5 QUALIFIED VALUATOR AND QUALIFIED PERSON

This Valuation was prepared by Mr Andrew Vigar. Mr Vigar has no direct or indirect interest in the properties which are the subject of this Valuation, nor does he hold, directly or indirectly, any shares in Xanadu or any associated company, or any direct interest in any mineral tenements in Mongolia.

The technical review and valuation of the Exploration Projects was conducted by Mr Andrew Vigar. Mr Vigar has sufficient experience which is relevant to the porphyry copper-gold style of mineralisation and deposits under consideration and to their valuation to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' (Australia) and is a Qualified Person as defined in NI43-101 (Canada). He is a Fellow of The Australasian Institute of Mining and Metallurgy (Melbourne) and a Member of the Society of Economic Geologists (Denver). Mr Vigar is employed by Mining Associates Pty Ltd of Brisbane, Australia.

#### 2.6 DEFINITION OF VALUATION TYPES

The three generally accepted Valuation approaches under VALMIN are:

- Income Approach.
- Market Approach.
- Cost Approach.

The *Income Approach* is based on the principle of anticipation of benefits and includes all methods that are based on the income or cash flow generation potential of the Mineral Property. This method provides an indication of the value of a property with identified reserves. It utilises an economic model based upon known resources, capital and operating costs, commodity prices and a discount for risk estimated to be inherent in the project. Alternatively a value can be assigned on a royalty basis commensurate with the in situ contained metal value. The Exploration Projects do not contain mineral reserves that meet the standards of the JORC 2012 Code so the Income Approach is not appropriate for this project.

The *Market Approach* is based primarily on the principle of substitution and is also called the Sales Comparison Approach. The Mineral Property being valued is compared with the transaction value of similar Mineral Properties, transacted in an open market. Methods include comparable transactions and option or farm-in agreement terms analysis. The terms of a proposed joint venture agreement may be used to provide a market value based upon the amount an incoming partner is prepared to spend to earn an interest in part or all of the property. This pre-supposes some form of subjectivity on the part of the incoming party when grass roots properties are involved.

The *Cost Approach* is based on the principle of contribution to value. The appraised value method is one commonly used method where exploration expenditures are analysed for their contribution to the exploration potential of the Mineral Property. The multiple of exploration expenditure method ('MEE') is used whereby a subjective factor (also called the prospectivity enhancement multiplier or 'PEM') is based on previous expenditure on a tenement with or without future committed exploration expenditure and is used to establish a base value from which the effectiveness of exploration can be assessed. Where exploration has produced documented positive results a MEE multiplier can be selected that takes into account the valuer's judgment of the prospectivity of the tenement and the value of the database. MEE factors can typically range from 0 to 3.0 and occasionally up to 5.0 applied to previous exploration expenditure to derive a dollar value.

The Kilburn Geological Engineering/Geoscience Method is a rating method that values a project based on an assessment of its technical attributes to define prospectivity. A basic acquisition cost



('BAC') is determined, which represents the baseline costs of applying for and maintaining a tenement for a period of 12 months. Four key technical factors are then assessed and assigned a numeric value, each of which enhance, downgrade or have no impact on the value of the property. The factors are then applied serially to the BAC of each tenement in order to derive a value for the property. The factors used are: off-property attributes, on-property attributes, anomalies and geology. A fifth factor that may be applied is the current state of the market. The Kilburn method is highly subjective since it relies on technical considerations and the opinion of the valuer, it can serve as a useful validation of the Market and Cost approaches.

Empirical Methods can also be employed, which involve determining a market value according to the independent expert's knowledge of the particular property. This can include a discount applied to values arrived at by considering conceptual target models for the area. The market value may also be rated in terms of a dollar value per unit area or dollar value per unit of resource in the ground. This includes the range of values that can be estimated for an exploration property based on current market prices for equivalent properties, existing or previous joint venture and sale agreements, the geological potential of the properties, regarding possible potential resources, and the probability of present value being derived from individual recognised areas of mineralisation. This method is termed a "Yardstick" or a "Real Estate" approach. As with the Kilburn method, this approach is generally considered to highly subjective and is not normally utilised by MA. However, in the case of Kharmagtai there are historic non-compliant resource estimates that have been used to derive an Exploration Target that provides a reasonable indication of expected in situ resources. MA decided to utilise the Yardstick method based on a value per tonne of contained Cu equivalent metal in resources as a means of verifying Market Approach value.

MA has adopted the Market Approach, Empirical (Yardstick) Approach and the Cost Approach as the principal bases for the exploration properties included in this Valuation. The Kilburn Geoscience Method value was also included for completeness.

Valuation methodology of mineral properties is exceptionally subjective. If an economic reserve or resource is subsequently identified then there is likely to be a substantial increase in the Project's value and this valuation will be dramatically low relative to any later valuations. Alternatively, if further exploration is unsuccessful it is likely that the Project's value will decrease and this valuation will be higher than later valuations.

Values obtained are estimates of the amount of money, or cash equivalent, which would be likely to change hands between a willing buyer and a willing seller in an arms-length transaction, wherein each party had acted knowledgeably, prudently and without compulsion. This is the required basis for the estimation to be in accordance with the provisions of VALMIN.

There are a number of generally accepted procedures for establishing the value of mineral properties with the method employed depending upon the circumstances of the property. When relevant, MA uses the appropriate methods to enable a balanced analysis. Values are presented as a range and the preferred value is identified.

The readers should therefore form their own opinion as to the reasonableness of the assumptions made and the consequent likelihood of the values being achieved.

# 2.7 OTHER DEFINITIONS USED IN THE REPORT

**Commissioning Entity** means the organization, company or person commissioning a Valuation.

Competence or Competent means having relevant qualifications and relevant experience.

*Current* means current with respect to, and relative to, the Valuation Date.



**Data Verification** means the process of confirming that data has been generated with appropriate procedures, has been accurately transcribed from the original source and is suitable to be used.

**Development Property** means a Mineral Property that is being prepared for mineral production and for which economic viability has been demonstrated by a Feasibility Study or Prefeasibility Study and includes a Mineral Property which has a Current positive Feasibility Study or Prefeasibility Study but which is not yet financed or under construction.

**Exploration Property** means a Mineral Property that has been acquired, or is being explored, for mineral deposits but for which economic viability has not been demonstrated.

**Fair Market Value** means the highest price, expressed in terms of money or money's worth, obtainable in an open and unrestricted market between knowledgeable, informed and prudent parties, acting at arm's length, neither party being under any compulsion to transact.

**Feasibility Study** means a comprehensive study of a deposit in which all geological, engineering, operating, economic and other relevant factors are considered in sufficient detail that it could reasonably serve as the basis for a final decision by a financial institution to finance the development of the deposit for mineral production.

*Guideline* means a best practices recommendation, which, while not mandatory in the Valuation of Mineral Properties, is highly recommended.

Independence or Independent means that, other than professional fees and disbursements received or to be received in connection with the Valuation concerned, the Qualified Valuator or Qualified Person (as the case requires) has no pecuniary or beneficial (present or contingent) interest in any of the Mineral Properties being valued, nor has any association with the Commissioning Entity or any holder(s) of any rights in Mineral Properties which are the subject of the Valuation, which is likely to create an apprehension of bias. The concepts of "Independence" and "Independent" are questions of fact. For example, where a Qualified Valuator's fees depend in whole or in part on an understanding or arrangement that an incentive will be paid based on a certain value being obtained, such Qualified Valuator is not Independent.

**Materiality and Material** refer to data or information which contribute to the determination of the Mineral Property value, such that the inclusion or omission of such data or information might result in the reader of a Valuation Report coming to a substantially different conclusion as to the value of the Mineral Property. Material data and information are those which would reasonably be required to make an informed assessment of the value of the subject Mineral Property.

Mineral Property means any right, title or interest to property held or acquired in connection with the exploration, development, extraction or processing of minerals which may be located on or under the surface of such property, together with all fixed plant, equipment, and infrastructure owned or acquired for the exploration, development, extraction and processing of minerals in connection with such properties. Such properties shall include, but not be limited to, real property, unpatented mining claims, prospecting permits, prospecting licences, reconnaissance permits, reconnaissance licences, exploration permits, exploration licences, development permits, development licences, mining licences, mining leases, leasehold patents, crown grants, licences of occupation, patented mining claims, and royalty interests

*Mineral Reserves and Mineral Resources.* The terms Mineral Reserve, Proven Mineral Reserve, Probable Mineral Reserve, Mineral Resource, Measured Mineral Resource, Indicated Mineral Resource, and Inferred Mineral Resource and their usage have the meaning ascribed by the JORC Code (2004).



**Mineral Resource Property** means a Mineral Property which contains a Mineral Resource that has not been demonstrated to be economically viable by a Feasibility Study or Prefeasibility Study. Mineral Resource Properties may include past producing mines, mines temporarily closed or on care-and-maintenance status, advanced exploration properties, projects with Prefeasibility or Feasibility Studies in progress, and properties with Mineral Resources which need improved circumstances to be economically viable.

**Prefeasibility Study and Preliminary Feasibility Study** mean a comprehensive study of the viability of a mineral project that has advanced to a stage where the mining method, in the case of underground mining, or the pit configuration, in the case of an open pit, has been established, and which, if an effective method of mineral processing has been determined, includes a financial analysis based on reasonable assumptions of technical, engineering, operating, economic factors and the assessment of other relevant factors which are sufficient for a Qualified Person, acting reasonably, to determine if all or part of the Mineral Resource may be classified as a Mineral Reserve. A Prefeasibility Study is at a lower confidence level than a Feasibility Study.

**Preliminary Assessment** means a preliminary economic study by a Qualified Person that includes Inferred Mineral Resources. The Preliminary Assessment must include a statement that the Inferred Mineral Resources are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, outlines the basis for the Preliminary Assessment and any qualifications and assumptions made, and specifies that there is no certainty that the Preliminary Assessment will be realized.

**Production Property** is a Mineral Property with an operating mine, with or without processing plant, which has been fully commissioned and is in production.

**Professional Association** is a self-regulatory organization of engineers, geoscientists or both engineers and geoscientists that (a) has been given authority or recognition by law; (b) admits members primarily on the basis of their academic qualifications and experience; (c) requires compliance with the professional standards of competence and the code of ethics established by the organization; and (d) has disciplinary powers, including the power to suspend or expel a member.

**Qualified Person** is an individual who (a) is an engineer or geoscientist with at least five years of experience in mineral exploration, mine development or operations 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 in good standing of a Professional Association

**Qualified Valuator** is an individual who (a) is a professional with demonstrated extensive experience in the Valuation of Mineral Properties, (b) has experience relevant to the subject Mineral Property or has relied on a Current Technical Report on the subject Mineral Property by a Qualified Person, and (c) is regulated by or is a member in good standing of a Professional Association or a Self-Regulatory Professional Organization.

**Reasonableness**, in reference to the Valuation of a Mineral Property, means that other appropriately qualified and experienced valuators with access to the same information would value the property at approximately the same range. A Reasonableness test serves to identify Valuations which may be out of step with industry standards and industry norms. It is not sufficient for a Qualified Valuator to determine that he or she personally believes the value determined is appropriate without satisfying an objective standard of proof.

Report Date means the date upon which the Valuation Report is signed and dated.

**Self-Regulatory Professional Organization** means a self-regulatory organization of professionals that (a) admits members or registers employees of members primarily on the basis of their educational



qualifications, knowledge and experience; (b) requires compliance with the professional standards of competence and code of ethics established by the organization; and (c) has disciplinary powers, including the power to suspend or expel a member or an employee of the member.

Standard means a general rule which is mandatory in the Valuation of Mineral Properties.

**Technical Report** means a report prepared, filed and certified in accordance with NI 43-101 and Form 43-101F1 Technical Report.

**Transparent** means that the Material data and information used in (or excluded from) the Valuation of a Mineral Property, the assumptions, the Valuation approaches and methods, and the Valuation itself must be set out clearly in the Valuation Report, along with the rationale for the choices and conclusions of the Qualified Valuator.

Valuation is the process of estimating or determining the value of a Mineral Property.

**Valuation Date** means the effective date of the Valuation, which may be different from the Report Date or from the cut-off date for the data used in the Valuation.

Valuation Report means a report prepared in accordance with the CIMVal Standards and Guidelines.

#### 2.8 INFORMATION USED

This report is based on technical data provided by Xanadu to MA. Xanadu provided open access to all the records necessary, in the opinion of MA, to enable a proper assessment of the project. Readers of this report must appreciate that there is an inherent risk of error in the acquisition, processing and interpretation of geological and geophysical data, and MA takes no responsibility for such errors.

Additional relevant material was acquired independently by MA from a variety of sources. The list of references at the end of this report lists the sources consulted. This material was used to expand on the information provided by Xanadu and, where appropriate, confirm or provide alternative assumptions to those made by Xanadu

# 2.9 SITE VISIT BY QUALIFIED PERSON

MA did not undertake a site visit to the Kharmagtai project. In MA's opinion, a site visit was not deemed necessary due to the Project still being at the exploration stage and the general lack of surface exposure of mineralisation.

#### 3 COMPLIANCE WITH THE VALMIN CODE

This Valuation complies with the VALMIN Code (2005 Edition) in its entirety. The author has taken due note of Regulatory Guide ("RG") 111 "Content of Expert Reports" (October 2007 & March 2011) and RG 112 "Independence of Experts" (March 2011 update) promulgated by the Australian Securities and Investments Commission ("ASIC") and this report meets the guidelines set out in RG 111 and RG 112.

#### 4 PROPERTY DESCRIPTION

#### 4.1 LOCATION AND ACCESS

The Kharmagtai project is located in the Omnogovi soum (district) of Mongolia approximately 430 km south of the capital city, Ulaanbaatar, and 200 km north of the Chinese border (Figure 1). Access is possible by four-wheel drive along unpaved roads from regional airports at Dalanzadgad and Mandalgovi.



The project is near the major Tavan Tolgoi coal deposit and Oyu Tolgoi copper-gold deposit being developed by Turquoise Hill Resources Ltd, whose largest shareholder is Rio Tinto, and MA expects that access to infrastructure related to these projects will be negotiable.

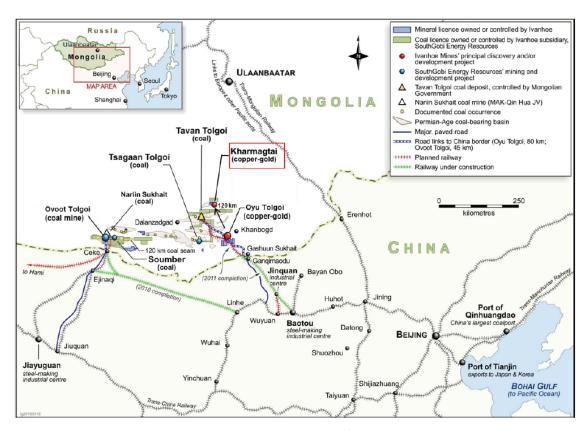


Figure 1. Project Location and Access. (Source: C Orrsich, 2012)

#### 4.2 PHYSIOGRAPHY

Kharmagtai lies on a low east-west trending rise within an area of generally very low relief in the northern part of the Gobi Desert. Minor outcropping bedrock is covered by a generally thin veneer of colluvium, with broad dry valleys situated to the north and south. Elevations on the licence range between 1260 m and 1360 m.

#### 4.3 CLIMATE

Climate is typically continental, with hot, dry summers and very cold winters. Monthly precipitation is generally very low throughout the year, peaking in July and August to around 30 mm. Snow fall in winter is rare, usually less than 5 cm. Summer temperatures range between 10°C and 37°C, and winter between -34°C and -5°C.

#### 4.4 TENURE OWNERSHIP

The Kharmagtai project comprises one mining licence, MV-17387A, which is 100% owned by Oyut Ulaan LLC. Oyut Ulaan is in turn owned 90% by THR Oyu Tolgoi (a wholly owned subsidiary of Turquoise Hill Resources Limited), and 10% by Quincunx Ltd ("QGX"). Details of the Kharmagtai licence are given in Table 1 and Table 2, with a map of the licence area shown in Figure 2.

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Table 1. Details of Kharmagtai Project Licence.

Licence ID	Name of area	Area (Hectares)	Owner	Issued
MV-017387	Kharmagtai	6647.05	Oyut Ulaan LLC	2013.09.23

Easting (UTM Northing (UTM Latitude (WGS84) Longitude (WGS84) **Point** WGS84, Zone 48N) WGS84, Zone 48N) 1 44.070833 106.117778 589510.4 4880347.5 2 44.070833 106.241667 599431.3 4880489.6 44.010556 106.241667 4873794.7 3 599532.2

589601.2

106.117778

Table 2. Kharmagtai Licence Boundary Coordinates.

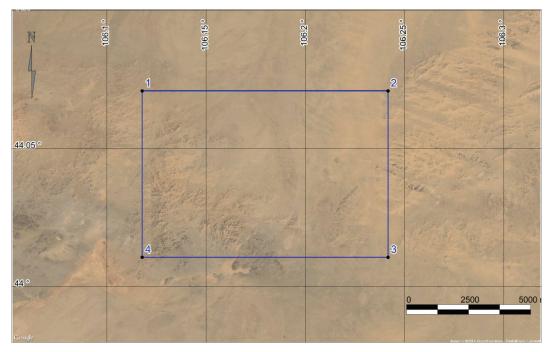


Figure 2. Kharmagtai Licence Map.

#### **5 HISTORY OF EXPLORATION**

#### 5.1 DISCOVERY AND EXPLORATION HISTORY

44.010556

Exploration at Kharmagtai commenced in the 1960s, with joint Russian-Mongolian teams undertaking regional assessment of the South Gobi. Discovery of outcropping mineralisation is credited to this work.

In 1995, QGX Ltd acquired exploration rights and from 1995-1998 undertook rock chip sampling, mapping, geophysics and drilling. This work defined mineralised zones at Altan Tolgoi and Zesen Uul.

Ivanhoe Mines Mongolia Inc (IMMI) opted into the Kharmagtai project in 2002 as part of a package including two other licences. From 2002 to 2006, IMMI undertook an aggressive campaign of geophysics, mapping and drilling, with internal resource estimates completed in 2005 and 2007. In 2007, the project was handed to Asia Gold, a wholly owned subsidiary of IMMI. Between 2007 and 2011, Asia Gold undertook further drilling to follow up possible resource extensions and secondary targets on the licences.

A full summary of exploration carried out on the licence is given in Table 3.



Table 3. Summary of Exploration History for Kharmagtai Licence.

Company /	Period	Description of Work Completed				
organisation	1 01104	bescription of Work completed				
Joint Eastern Block – Mongolian- Russian JV	1960-1975	Regional geological mapping, geochemistry, ground magnetics, induced polarisation (chargeability and resistivity) and airborne magnetic/radiometric surveys  Diamond drilling (17 vertical holes)				
Japan International Cooperation Agency	1991-1995	Regional reconnaissance, airborne magnetic & radiometric surveys.  Kharmagtai re-identified as an area of porphyry related alteration & mineralisation				
		Regional geological mapping				
		Geochemistry (1500 rock-chip and 4000 soil samples)				
		Trenching (19 km)				
QGX	1996-1998	Geophysics (240 km IP).				
		Diamond drilling (5 holes; 1,060 m) - sediment-hosted mineralisation at Ovoot Khyar discovered				
		Diamond drilling (19 shallow widely spaced holes) – defined widespread porphyry alteration and mineralisation Kharmagati.				
		Detailed geological mapping				
		Geochemistry (2960 rock chips)				
		119 trenches (65,636 km)				
Ivanhoe Mines		Geophysics included gradient array IP (289 km2), ground magnetics (589 km2), ground gravity (39 km2) and aerial magnetics and aerial gravity.				
Mongolia Inc (IMMI)	2001-2006	RC drilling (208 holes; 27,747 m)				
(,		Diamond drilling (172 holes; 54,269 m)				
		Drilling focused on testing and defining the Altan Tolgoi, Zesen Uul, Tsagaan Sudal, Chun, Burged and OV3 prospects.				
		Combined resource at Altan Tolgoi, Zesen Uul and Tsagaan Sudal of 174 Mt at 0.50 % Cueq (non-compliant)				
Asia Gold		Deep diamond drilling (5170.60 m) testing deeply seated geophysical anomalies;				
(IMMI subsidiary)	2007-2011	Detailed 3D IP survey completed in 2011 and 19 diamond holes (15,345.30 m).				

# 5.2 HISTORIC MINERAL RESOURCE ESTIMATES

Three resource estimates have been carried out on the deposit, the first in 2005 by IMMI, again in 2007 by IMMI and lastly by AMC Consultants Pty Ltd ("AMC") in 2012. None of these resource estimates were publicly released, and neither IMMI estimates comply with the current Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves ("JORC 2012 Code"). In view of the fact that these resource estimates are not publicly available, MA does not consider that they can be directly used to value the Project. A summary of the estimates is included however, to provide support to the definition of an Exploration Target for the licence.



#### 5.2.1 2005 – IMMI Internal

Neville Price of IMMI produced a resource estimate for internal use, based on the drilling completed to end August 2005. Results are shown in Table 4, which uses drill hole spacing ("D" in column 2 of the table) as a proxy for confidence of estimation. Total resources were 175 Mt grading 0.33% Cu and 0.32 g/t Au.

Table 4. Kharmagtai Mineral Resources, August 2005 (internal IMMI).

		Cut-off	Tonnes	gra	de
Mine	al Resource Category	Cueq (%)	1000's	Au (g/t)	Cu (%)
А	ltan Tolgoi North				
1st	D<50m	0.3	11,169	0.34	0.32
2nd	50m <d<75m< td=""><td>0.3</td><td>3,678</td><td>0.36</td><td>0.24</td></d<75m<>	0.3	3,678	0.36	0.24
3rd	75m <d<150m< td=""><td>0.3</td><td>2,532</td><td>0.27</td><td>0.25</td></d<150m<>	0.3	2,532	0.27	0.25
Alta	n Tolgoi South West				
1st	D<50m	0.3	7,818	0.95	0.4
2nd	50m <d<75m< td=""><td>0.3</td><td>1,822</td><td>0.67</td><td>0.32</td></d<75m<>	0.3	1,822	0.67	0.32
3rd	75m <d<150m< td=""><td>0.3</td><td>1,414</td><td>0.44</td><td>0.35</td></d<150m<>	0.3	1,414	0.44	0.35
Alta	ın Tolgoi South East				
1st	D<50m	0.3	11,222	0.37	0.44
2nd	50m <d<75m< td=""><td>0.3</td><td>9,382</td><td>0.37</td><td>0.43</td></d<75m<>	0.3	9,382	0.37	0.43
3rd	75m <d<150m< td=""><td>0.3</td><td>21,992</td><td>0.25</td><td>0.42</td></d<150m<>	0.3	21,992	0.25	0.42
	Tsagan Sudal				
1st	D<35m	0.3	32,741	0.25	0.28
2nd	35m <d<50m< td=""><td>0.3</td><td>25,143</td><td>0.26</td><td>0.27</td></d<50m<>	0.3	25,143	0.26	0.27
3rd	50m <d<75m< td=""><td>0.3</td><td>32,152</td><td>0.26</td><td>0.27</td></d<75m<>	0.3	32,152	0.26	0.27
	Zesen Uul				
1st	D<40m	0.3	9,835	0.52	0.46
2nd	40m <d<80m< td=""><td>0.3</td><td>2,574</td><td>0.19</td><td>0.33</td></d<80m<>	0.3	2,574	0.19	0.33
3rd	80m <d<120m< td=""><td>0.3</td><td>1,140</td><td>0.16</td><td>0.3</td></d<120m<>	0.3	1,140	0.16	0.3
	Total				
1st	-	0.3	72,785	0.39	0.35
2nd	-	0.3	42,599	0.3	0.31
3rd	-	0.3	59,230	0.26	0.33
	Total		174,614	0.32	0.33

#### 5.2.2 2007 – IMMI internal

In 2007, Neville Price re-estimated resources at Kharmagtai based on the large amount of drilling completed since the previous estimate in 2005. Resources were reported using more conventional categories in accordance with NI43-101 guidelines, as shown in Table 5. Total resources were estimated at 185 Mt with an average grade of 0.33 % Cu and 0.23 g/t Au. As with the 2005 estimate, no depth limit was placed on the resource that might constrain it to potential open-pittable material



Table 5. Kharmagtai Mineral Resources, 2007 (internal IMMI), CuEq cut-off 0.3%.

	Tonnes	Au	Cu				
	1000's	g/t	%				
Altan Tolgoi							
Measured	6,818	0.67	0.38				
Indicated	20,637	0.40	0.30				
Measured + Indicated	27,456	0.46	0.32				
Inferred	30,055	0.50	0.43				
Zesen Uul							
Measured	7,133	0.64	0.52				
Indicated	2,811	0.28	0.34				
Measured + Indicated	9,945	0.54	0.47				
Inferred	635	0.16	0.24				
Tsagaan Sudal							
Measured	-	-	-				
Indicated	-	-	-				
Measured + Indicated	-	-	-				
Inferred	116,996	0.21	0.29				
Total							
Measured	13,952	0.66	0.45				
Indicated	23,449	0.35	0.31				
Inferred	147,686	0.17	0.32				
Total	18,5087	0.23	0.33				

# 5.2.3 2012 – AMC Independent Resource Estimate

In late 2012, AMC undertook an independent Mineral Resource Estimate and produced a Technical Report on behalf of Ivanhoe. The Technical Report was never made public, but was prepared in accordance with NI43-101 guidelines. Results are shown in Table 6. Total resources were 133 Mt with an average grade of 0.36 % Cu and 0.37 g/t Au.



Table 6. Kharmagtai Mineral Resources, December 2012, AMC.

Cut off 0.3% Cu Eq > 1000m RL, 0.6% <1000m RL								
	Tonnes	Au	Cu					
	1000's	g/t	%					
	Altan Tolgo	i						
Measured	29,463	0.58	0.45					
Indicated	15,291	0.49	0.48					
Measured + Indicated	44,753	0.55	0.46					
Inferred	4,640	0.40	0.46					
	Zesen Uul							
Measured	4,109	0.97	0.72					
Indicated	2,302	0.28	0.42					
Measured + Indicated	6,412 0.72		0.61					
Inferred	137	0.23						
	Tsagaan Sud	al						
Measured	-	-	-					
Indicated	-	-	-					
Measured + Indicated	-	-	-					
Inferred	77,155	0.23	0.28					
	TOTAL							
Measured	33,572	0.63	0.48					
Indicated	17,593	0.46	0.48					
Inferred	81,933	0.24	0.29					
Total	133,098	0.37	0.36					

Figure 3 shows a comparison of the three resource estimates by category, and highlights the apparent decrease in resource tonnes from 2007 to 2012. MA notes that the decrease is attributable to the removal of a large portion of the 2007 IMMI resource at Tsagaan Sudal from the 2012 AMC estimate. This reflects differing opinions on the confidence in classification rather than a change in the broad boundaries of defined mineralisation from 2007 to 2012. MA also notes that the AMC estimate did not include some deep drill holes in Tsagaan Sudal, which were completed after their reporting cut-off date of 1 November 2011.



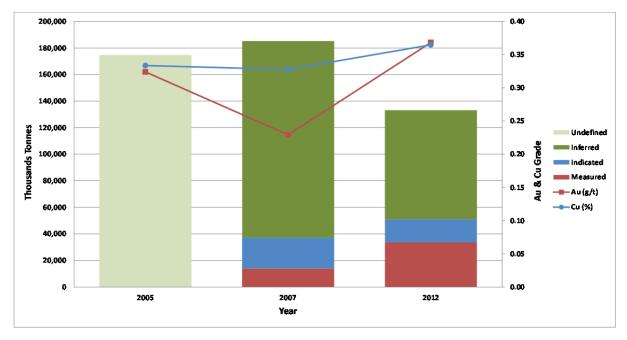


Figure 3. Comparison of Kharmagtai Total Resource Estimates by Classification.

#### **6 GEOLOGY AND MINERALISATION**

#### 6.1 REGIONAL GEOLOGY

Regional geology is described in various reports by IMMI and is summarised below:

"Kharmagtai Cu-Au mineral deposits occur within the southern Mongolia part of the Transbaikal-Mongolian orogenic belt. The deposits are located within the Gurvansayhan island arc terrane of the southern Mongolian orogenic belt, consisting of volcanic and sedimentary rocks ranging from Ordovician to Carboniferous in age. During the Ordovician to Silurian the area occupied an oceanic setting receiving mature sedimentation from a continental source or the eroded roots of an arc to the north. The Devonian to Carboniferous periods were dominated by island arc volcanism. The Paleo Asian Ocean closed with arc collision during the Carboniferous. All terranes were welded by late Carboniferous to Permian continental granitic plutons indicating that amalgamation took place not later than the Carboniferous time. Porphyry style mineral deposits hosted within the Gurvansaikhan terrane formed in two distinct tectonic settings, corresponding to:

- 1. Late Devonian deposits formed early in the history of the island arc terrane (e.g. Oyu Tolgoi, Tsagaan Suvarga), and
- 2. Early Carboniferous deposits formed in a collision-subduction setting (e.g. Kharmagtai, Shuteen and Oyut Ulaan)"

An overview of the regional tectonic setting is shown in Figure 4.



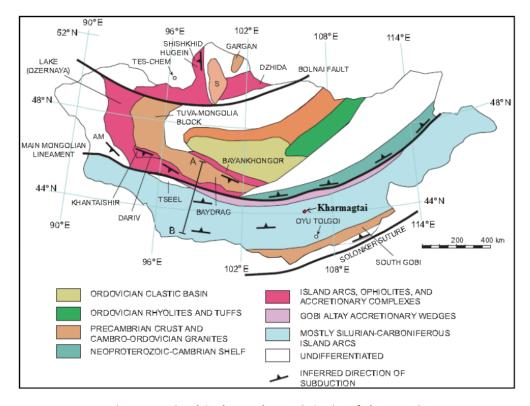


Figure 4. Regional Geology and Tectonic Setting of Kharmagtai.

#### 6.2 LOCAL GEOLOGY

Surface outcrop is limited so much of the understanding of the local geology is based on drilling data and interpretation of geophysical data and is summarised from IMMI reports.

#### 6.2.1 Lithology

Mineralisation is associated with the Kharmagatai Igneous Complex ("KIC"), a group of Late Carboniferous (approx. 297 Ma) age high-K calc-alkaline intrusions associated with island arc formation. Rocks of the KIC are largely dioritic in composition, comprising diorite, quartz diorite, monzodiorite, minor granodiorite and syenite. The KIC is sub-elliptical in plan view, 6 km long and 2 km wide trending east-west, extending from Tsagaan Sudal in the west to Chun in the east (Figure 5). The KIC was emplaced into a volcano-sedimentary succession of ash siltstone, volcaniclastic sandstone, chert, andesite lava and andesitic volcanic breccia of Devonian-Lower Carboniferous age.



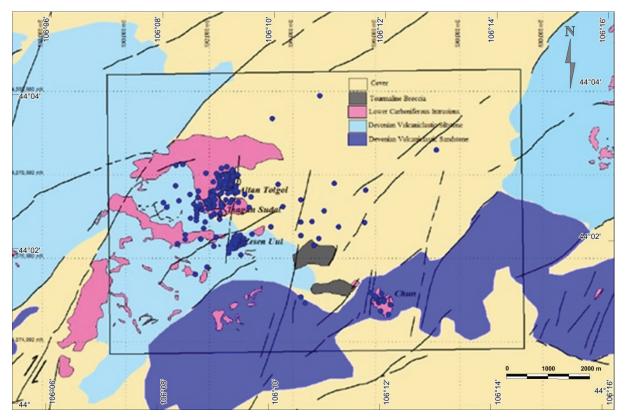


Figure 5. Kharmagtai Project Local Geology.

Drill hole collars shown in blue.

#### 6.2.2 Structure

Northeast to east-northeast and northwest to west-northwest structures dominate regional to prospect scale satellite imagery and magnetics interpretations. Regional structural history appears to involve complex re-activation of both sets of structures at various times. Post-mineralisation movement occurred on both sets of structures: apparent sinistral strike-slip movement on northeast structures and dextral movement on northwest structures.

Mineralisation trends broadly from west-southwest at Zesen Uul to west or west-northwest at Altan Tolgoi and Tsagaan Sudal. Mapped zones of quartz-tourmaline breccias also follow the same broad trends. These structures are recognisable in ground magnetics images and correspond with regional fault and fracture array orientations described from satellite image interpretation (Figure 6, Baker, 2004).

A report by an external consultant (Baker, 2004) proposed that igneous centres associated with mineralisation were emplaced into west to northwest trending transtensional zones developed during sinistral movement on northeast trending structures. Northeast trending structures were reactivated as normal dip-slip faults. Late dip slip movement was inferred from the juxtaposition of different structural levels across the northeast faults.

Baker's (2004) interpretation of sinistral strike slip movement on northeast faults controlling emplacement of the KIC is inconsistent with the general east-west trend of intrusives and mineralisation. East-west trending dilation implies transtension during dextral movement on northeast faults. Further work is required to constrain the regional structural setting and local structural controls on mineralisation.



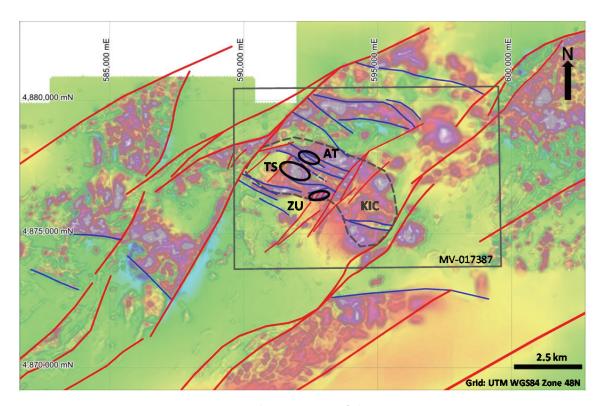


Figure 6. Structural Interpretation of Kharmagtai Area.

Red lines: northeast structures, blue line: east-west structures, KIC: approximate limits of Kharmagtai Igneous Complex, AT: Altain Tolgoi, TS: Tsagaan Sudal, ZU: Zesen Uul. Background: Reduced to pole magnetics (Source: MA)

#### 6.3 MINERALISATION

Mineralisation at Kharmagtai consists of early porphyry-style veins and stockworks overprinted by later tourmaline breccias. Alteration generally grades from biotite-magnetite-albite to chlorite-epidote-magnetite and then to quartz-sericite. Alteration assemblages are complex, reflecting the multiphase nature of the mineralising system. Porphyry-style veins carry quartz, chalcopyrite, pyrite and magnetite with varying amounts of gold. Tourmaline breccias are locally mineralised with good copper grades, but generally cross-cut and dilute porphyry mineralisation.

Three main mineralised zones have been recognised at Kharmagtai and are briefly described in the following sections: Zesen Uul, Altan Tolgoi and Tsagaan Sudal.

#### 6.3.1 Zesen Uul

Interpreted as a single, irregular shaped, east-west trending body of intense quartz-sulphide vein stockwork mineralisation 350 m long and 100 m wide in plan view. Initial potassic alteration and veining was overprinted by phyllic-propylitic, which may indicate thermal collapse of an initial high temperature system (Kirwin, Wilson, Turmagnai, & Wolfe, 2005). Mineralisation strikes east-northeast and dips moderately-steeply to the south (55°-60°). A core of higher grade mineralisation (1-3% Cu and 1-7 g/t Au) exists, plunging to the southwest.

Mineralisation appears to die out very abruptly along strike in both directions and down-dip at shallow depths, although MA believes the body may have a plunge extension to the south west that is untested. Mineralisation is stated as being associated with a monzodiorite/microdiorite body that



intruded volcaniclastic siltstone/sandstone. Although the host diorite is logged as continuing downdip and along strike, it is only sporadically mineralised.

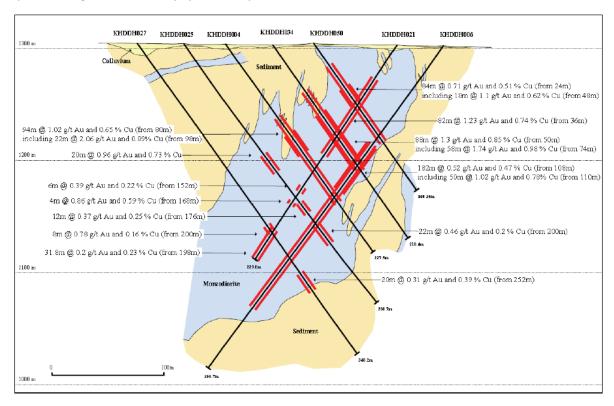


Figure 7: Cross Section 592600mE through Zesen Uul Looking West. (source IMMI, 2012)

#### 6.3.2 Altan Tolgoi

Altan Tolgoi (AT) was the focus of exploration and also a large amount of research style work on geology, mineralisation and alteration. Two main mineralised zones were recognised, northern and southern zones (NSZ and SSZ; Figure 8, Figure 9), separated by a largely barren area. Mineralisation strikes west-northwest to northwest and dips steeply south in both zones. The NSZ is a cylindrical zone plunging steeply southeast 250 m by 150 m in plan view, with grades 0.1% - 0.5% Cu and  $0.3\ g/t - 0.5\ g/t$  Au. The SSZ is tabular in shape, 600 m long and 20-60 m wide and is offset by a northwest trending fault and coincident andesite dyke. Grades in the SSZ vary from 0.3% to 1% Cu and  $0.6\ g/t$  Au to >5 g/t Au. High gold grades occur in a narrow central core.

Tourmaline breccia bodies occur within Altan Tolgoi, and are mineralised in parts. Wolfe (2004) postulated that the tourmaline breccias may coalesce at depth and a series of drill holes were proposed to test the idea. He also considered good regional potential along strike of the main controlling structure, citing analogies to North Parkes.

Four holes were drilled in late 2011 targeted at the deep extents of Altan Tolgoi. Two holes also tested the northwest and southeast extents of mineralisation and were based on geophysical (IP and magnetics) targets. Holes targeting depth extents intersected tourmaline breccias, but only weak mineralisation (lower grades than up-dip). However, these holes may not have considered a plunge component to mineralisation at depth in a similar fashion to ZU. Along-strike drilling intersected some narrow zones of weak Cu-Au mineralisation, but results were not encouraging enough to warrant follow-up drilling.



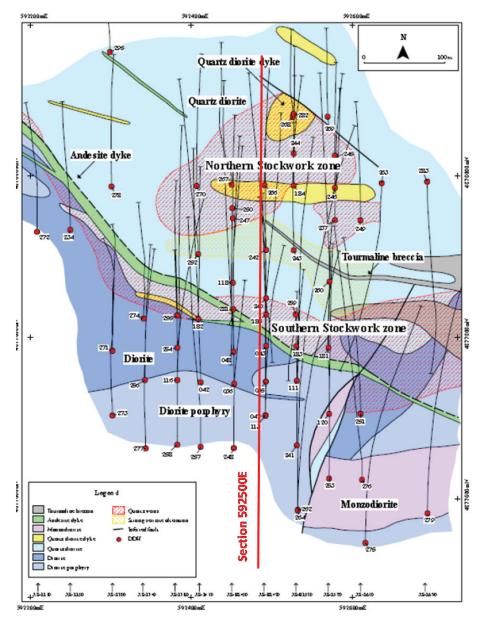


Figure 8. Schematic Geological Plan of Altan Tolgoi Showing Drilling.



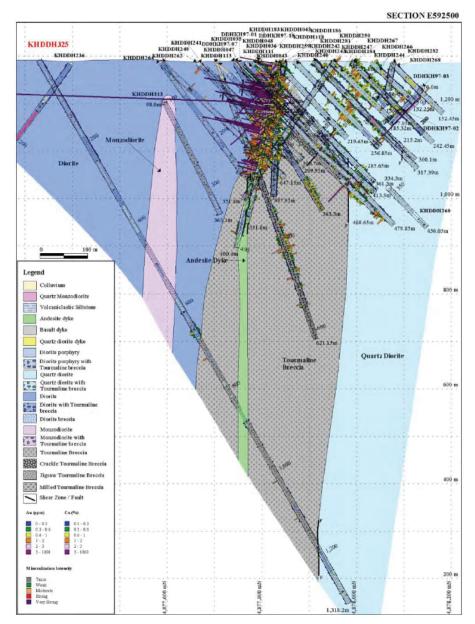


Figure 9 Cross Section 592500 E through Altan Tolgoi, Looking West.

#### 6.3.3 Tsagaan Sudal

Located 300 m south of Altan Tolgoi, mineralisation at Tsagaan Sudal (TS) occurs as stockworks and breccia bodies hosted by diorite porphyry over an area of 500 m by 700 m. Grades at TS are lower than AT and ZU ( $0.3\,\%$  -  $1\,\%$  Cu and  $0.4\,g/t$  -  $1.3\,g/t$  Au). The main host at TS is described as porphyritic diorite that intruded volcaniclastic siltstone, strongly altered with magnetite largely converted to hematite (Wolfe, Carew, & Ketaren, 2004). Fine-grained late-stage diorite dykes crosscut mineralisation. TS is the least well drilled of the three deposits, with the most potential for extending mineralisation through further drilling.

Drilling at TS was more widely spaced than the other deposits, with collars on an approximate 100 m grid spacing with inconsistent drill directions. TS has received less attention due to generally lower grades to date. However, two holes drilled in 2011 beneath the defined resource intersected wide



zones of mineralisation and the deposit remains open at depth and not adequately closed off along strike, especially to the east.

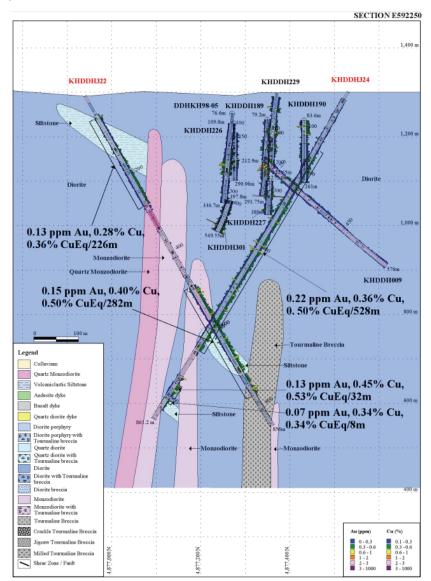


Figure 10 Cross Section 592250 E Through Tsagaan Sudal, Looking West.

#### 6.3.4 Summary

Three styles of mineralisation are seen within the project area, the first two being of immediate economic interest:

- 1. High grade: steeply dipping, structurally controlled breccia zones with high grades of gold ( $0.6 \, \text{g/t} 5.0 \, \text{g/t}$ ) and copper ( $0.3 \, \% 1.0 \, \%$ ), examples being AT South and ZU. Gold to copper ratio of 3:1 or higher;
- 2. Low-moderate grade: broader lower grade zones of more complex shapes associated with more typical porphyry style quartz veins and moderate grades of copper (0.2 % 0.6 %) and gold (0.3 g/t 0.5 g/t), like TS and AT North. Gold to copper ratio of about 1:1;



3. Tourmaline Breccia: as seen at depth and in the east of the area. This mineralisation is characterized by moderate grades  $(0.1 \, \text{g/t} - 0.3 \, \text{g/t})$  Au, 0.2 % to 0.5 % Cu) and gold to copper ratios around 1:2.

The three types are considered to be related to the same overall mineralisation system (which is large and complex in detail), although probably slightly different in age, with the higher grade zones being later.

#### 7 DEPOSIT TYPES

#### 7.1 GEOLOGICAL MODEL

The Kharmagtai deposits are porphyry copper-gold style, related to dioritic intrusive rocks of the Kharmagtai Igneous Complex. Porphyry mineralisation is overprinted by younger tourmaline breccia bodies, which are in parts also mineralised.

Porphyry copper-gold style deposits are formed from magmatic hydrothermal fluids associated with intermediate to felsic intrusive stocks in island and continental arc terranes. Quartz stockwork veining is typically associated with sulphides occurring within veinlets and as disseminations in the host rock. Alteration assemblages are zoned, but more complex overprinting occurs due to multiple intrusive phases and 'telescoping' of the system during tectonic uplift.

#### 8 EXPLORATION RESULTS AND POTENTIAL

The following was reported in the Xanadu press release of 3 February 2014:

"Xanadu has reviewed the historical drilling data and completed a geological model (Figure 11) which has resulted in an initial Exploration Target covering the Altan Tolgoi, Tsagaan Sudal and Zesen Uul prospects. Additional information used to define the Exploration Target included surface mapping, trenching and extensive geophysics.

An Exploration Target of between 250 to 400Mt at an average grade of 0.25 to 0.30% Cu & 0.25 to 0.30 g/t Au has been estimated for the Kharmagtai project. Contained within this target is a higher grade target of 50 to 80Mt at an average grade of 0.4 to 0.5% Cu & 0.6 to 0.8 g/t Au.

The potential quantity and grade of the Exploration Target is conceptual in nature. There has been insufficient exploration to estimate a Mineral Resource under the JORC 2012 code and it is uncertain if further exploration will result in the estimation of a Mineral Resource."



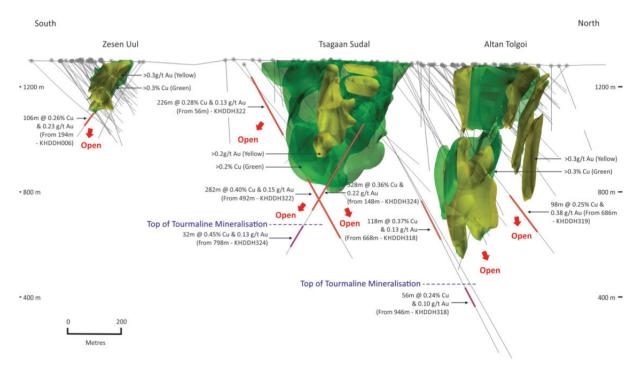


Figure 11 Long Section through Kharmagtai Looking West Showing Mineralisation Wireframes and Targets.

#### 9 KEY ASSUMPTIONS, RISKS & LIMITATIONS

#### 9.1 ASSUMPTIONS

The Project has a long history of assessment and exploration. Some early historical work was not documented to the current standards demanded by modern disclosure requirements. Hence a judgement has had to be made as to the weighting given to each element of the data available.

#### 9.2 MATERIAL RISKS

The material risks faced by any future development of the Project are no different from those faced by other mining and processing operations in Mongolia. The location is remote without significant population nearby. However, significant power and transport infrastructure associated with nearby large mining projects is being developed.

# 9.3 FINANCIAL RISKS

#### 9.3.1 Government royalties

Mongolia's mining ministry imposes a 5% royalty on all minerals other than coal that are sold, shipped for sale, or used. In 2010, the Mongolian parliament introduced a new surtax royalty, effective from 1 January 2011. Under the new two-tier system, a surtax royalty is imposed on the total sales value of 23 minerals in addition to the standard flat rate. The royalty amount varies depending on the mineral, its market price and the degree of processing. Surtax rates for copper and gold are shown in Table 7.



Table 7. Mongolian Government Surtax Royalty Rates for Copper and Gold.

Source: Ernst & Young Mongolia Mining and Tax Guide 2012/13

Ddinoual	Huit of Managemen	Future Market	S	Surtax Royalty rates (%)				
Mineral	Unit of Measure	Price (USD)	Ore	Concentrate	Product			
		0-5000	0	0	0			
		5000-6000	22	11	1			
Connor	Tonno	6000-7000	24	12	2			
Copper	Tonne	7000-8000	26	13	3			
		8000-9000	28	14	4			
		9000 and above	30	15	5			
		0-900			0			
		900-1000			1			
Gold	Ounco	1000-1100			2			
Gold	Ounce	1000-1200			3			
		1200-1300			4			
		1300 and above			5			

#### 9.3.2 Metal Price Volatility

The financial performance of any mine is heavily dependent on the price of the commodity produced, which is affected by many factors beyond the control of the mining company. The price of commodities as reported publicly is influenced significantly by numerous factors, including:

- 1. The worldwide balance of demand and supply.
- 2. Rates of global economic growth and trends in energy consumption, both of which correlate with demand for minerals.
- 3. Economic growth and political conditions in China, which has become the most rapidly-expanding minerals consumer in the world, and other major developing economies such as India.
- 4. The decline in availability of secondary sources of minerals, e.g. scrap copper.
- 5. Technical or regulatory problems could reduce mine supply.
- 6. Material owned by speculators and investors could temporarily flood the market.
- 7. Currency exchange fluctuations.

In addition, sustained low metal prices could:

- Reduce revenues as a result of production cutbacks due to curtailment of operations or temporary or permanent closure of mines or portions of deposits that have become uneconomical at the then prevailing copper prices.
- Delay or halt exploration or the development of new process technology or projects.
- Reduce funds available for exploration and the building of ore reserves.

# 9.3.3 Energy Costs

Energy represents a significant portion of the production costs of mining operations. If miners are unable to procure sufficient energy at reasonable prices in the future, it could adversely affect profits and cash flow.





#### 9.3.4 Environmental Risks

Exploration activities must be conducted in accordance with environmental protection obligations established in the Environmental Protection Law of Mongolia, the Law of Environmental Impact Assessment and the Minerals Law. All work undertaken by IMMI and Asia Gold met the requirements of Mongolian environmental protection laws. No unusual environmental risks have been noted in exploration reports pertaining to the Kharmagtai licence.

# 9.3.5 Permitting Risks

Mining operations and exploration activities are subject to extensive laws and regulations governing exploration, development, production, exports, taxes, labour standards, occupational health, waste disposal, protection and remediation of the environment, protection of endangered and protected species, mine safety, toxic substances and other matters. Mining also is subject to risks and liabilities associated with pollution of the environment and disposal of waste products occurring as a result of mineral exploration and production. Compliance with these laws and regulations imposes substantial costs and subjects mining companies to significant potential liabilities.

The laws and regulations that apply in Mongolia are complex and are continuously evolving. Costs associated with environmental and regulatory compliance have increased over time, and it is expected that these costs will continue to increase in the future. In addition, the laws and regulations that apply may change in ways that could otherwise have an adverse effect on operations or financial results. The costs of environmental obligations may exceed the reserves established for such liabilities.

Mining operations are subject to various stringent environmental laws and regulations related to improving or maintaining environmental quality. Environmental laws often require parties to pay for remedial action or to pay damages regardless of fault and may also often impose liability with respect to divested or terminated operations, even if the operations were terminated or divested many years ago.

# **10 VALUATION**

The three generally accepted Valuation approaches are:

- Income Approach.
- Market Approach.
- Cost Approach.

The *Income Approach* is based on the principle of anticipation of benefits and includes all methods that are based on the income or cash flow generation potential of the Mineral Property, most commonly Discounted Cash Flow or DCF. This approach is not applicable to Kharmagtai as it does not contain measured resources or reserves that comply with the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves ("JORC Code") established by the Joint Ore Reserves Committee, and so a different approach is required for those Projects.

The primary methods used in this Valuation are the Market Approach, the Empirical Yardstick Approach and the Cost Approach.

The *Market Approach* is based primarily on the principle of substitution and is also called the Sales Comparison Approach. The Mineral Property being valued is compared with the transaction value of similar Mineral Properties, transacted in an open market. Methods include comparable transactions and option or farm-in agreement terms analysis.



The *Empirical Yardstick Approach* uses recent comparable transactions to derive a dollar value per unit of in situ resources, which is then applied to the property being valued. The method is normally considered highly subjective due to the need to choose a potential resource size. However, for Kharmagtai the defined Exploration Target is based on a considerable amount of exploration work and in MA's opinion provides a reasonable estimate of value.

The *Cost Approach* is based on the principle of contribution to value. The method is one commonly used where exploration expenditures are analysed for their contribution to the exploration potential of the Mineral Property.

#### 10.1 CURRENCY AND EXCHANGE RATES

The currency used in this Valuation is the Australian dollar ("AUD\$"). For the purposes of comparing transactions for other projects, US dollars ("USD") are quoted in tables. The exchange rates utilized are the Monthly and Annual Noon Exchange Rate Averages published by the Reserve Bank of Australia (http://www.rba.gov.au/statistics/frequency/exchange-rates.html). The price index used is the historical Consumer Price Index published by the Reserve Bank of Australia (http://www.rba.gov.au/inflation/measures-cpi.html).

#### 10.2 DATABASE

The database used for the valuations comprises mainly public company announcements, annual reports, annual information forms, management discussions and analysis, news releases and statutory technical reports.

# 10.3 MARKET AND EMPIRICAL APPROACHES – COMPARABLE TRANSACTIONS, PORPHYRY COPPER PROJECTS

MA researched transactions that occurred over the past five years involving the acquisition of porphyry copper-gold projects at similar levels of development to Kharmagtai and in a similar political and geological setting. Details of the properties and acquisition deals examined are given below, and summarised in Table 8. For those transactions with Resource Estimates, or easily definable Exploration Targets, a USD per tonne of contained Cu equivalent (\$/t Cueq) was also derived for use in the Empirical Yardstick approach valuation by taking the total purchase cost divided by contained Cueq metal in resources. Cu equivalent tonnes were calculated using a copper price of USD6500/tonne and a gold price of USD1200/ounce.

# 10.3.1 Kincora Copper – Golden Grouse, Mongolia

On April 13, 2012 Kincora Copper Limited (TSXV: KCC) announced the closing of an agreement to acquire 100% of Golden Grouse LLC from Temujin Mining Corp. Terms of the transaction involved the issue of 20 million shares in Kincora, to be distributed to Temujin shareholders. In addition, upon discovery of a minimum of 1 Moz of gold equivalent resources within four years, Kincora agreed to issue a further 15 million "bonus shares" to Temujin. Kincora would spend no less than USD2 M on exploration over the next 2 years. The total value of the 20 million shares issued was USD5 M.

Golden Grouse LLC held two exploration licences totalling 39,878 Ha adjacent to the western and northern boundaries of an existing Kincora project area known as Bronze Fox. The licences contain two main prospects, Bronze Fox and Tourmaline Hills, which are underlain by separate intrusive complexes. Porphyry style mineralisation was recognised during earlier exploration by Ivanhoe Mines Mongolia, which carried out extensive exploration on the licences, including mapping, geochemistry, ground geophysics and diamond drilling.

No resources were defined on the Golden Grouse licences, and Kincora did not report an Exploration Target, so an implied value per tonne of Cueq cannot be assigned.



#### 10.3.2 Galielo Resources - Gabbs, USA

On February 4, 2014, Galielo Resources Plc (AIM: GLR) announced an agreement to acquire the entire share capital of Toronto incorporated St Vincent Minerals (SVM). The acquisition is by way of a share exchange whereby Galielo will issue 21,650,000 new shares for the entire share capital of SVM. SVM shareholders will hold approximately 19% of Galielo following the transaction. The agreed transactional value is CDN\$4.3 M (approximately USD3.9 M).

The Gabbs property is located in Nye County, Nevada, USA and comprises 355 unpatented claim blocks and 1 patented lode claim covering a contiguous 28 km² area. The property is underlain by a succession of intermediate volcanic rocks and shallow marine sediments of Triassic age, which were intruded by a ultramafic-mafic intrusive complex. Monzonite bodies that intruded these rocks are associated with porphyry-style Au-Cu mineralisation found in three main areas: Sullivan, Lucky Strike and Gold Ledge. Gold mineralisation the Car Body prospect is considered epithermal in nature.

A Mineral Resource Estimate undertaken on the Gabbs property was based on 397 historic holes, 87 holes drill by Newcrest and 10 holes drilled by SVM. All resources were classified as Inferred and reported in accordance with NI43-101 guidelines. Total resources in three deposits were 57.2 Mt at an average grade of 0.56 g/t Au and 0.23 % Cu, containing 1.029 Moz gold and 133,848 t copper (323,975 t Cueq)

Using the total purchase price of USD3.9 M, the implied cost per tonne of contained Cu equivalent is USD12.07

#### 10.3.3 Robust Resources – Andash, Kyrgyzstan

On June 4, 2013, Robust Resources (ASX: ROL) announced it had completed acquisition of 80% of the Andash gold-copper project from Kentor Gold Ltd (KGL). Andash was acquired for a total cash consideration of A\$15 M (USD14.6 M), including a deposit of A\$1 M.

Andash is located in northern Kyrgyzstan, within the same orogenic belt that hosts several world-class gold and gold-copper deposits, including Oyu Tolgoi and Kharmagtai in Mongolia. Mineralisation occurs in a flat dipping stockwork zone hosted by a granodiorite to diorite porphyry host rock. A definitive feasibility study (DFS) was completed by KGL, which defined reserves of 16 Mt with an average grade of 1.05 g/t Au and 0.4 % Cu, within resources of 19.2 Mt grading 1.10 g/t Au and 0.40 % Cu. Total resource metal is 679 Koz Au and 77,300 t Cu (202,158 t Cu eq). NPV for the project was estimated at USD241 M, with a 6 year mine life and projected cash costs of USD30/oz (after copper credits).

Using the total purchase price of USD14.6 M, the implied cost per resource tonne of contained Cu equivalent is USD90.28.

# 10.3.4 Candente Copper – Arikepay, Peru

On December 12, 2013, Cadente Copper Corp (TSX: DNT) announced it had entered into an option agreement to earn a 75% interest in the Arikepay project owned by Cobriza Metals Peru. Candente can earn 75% interest in the project by paying USD4 M in cash payments and committing to exploration expenditure of USD5 M on the property (first option). The additional 25% interest can be earned after completion of the first option by payment of USD10 M (leaving Cobriza with a 2% NSR).

Arikepay is located in southern Peru and comprises two claim blocks totalling 4,000 Ha. Cobriza discovered anomalous copper, gold and molybdenum values in rock chip samples during reconnaissance exploration in 2011. Drilling under gravel cover to the north of the initial rock chip results commenced in 2012. Six of fourteen RC holes intersected >140 m of porphyry-style mineralisation at grades between 0.3% and 0.5% Cu eq. All six holes terminated in mineralisation at



300 m depth limit of the RC rig). Mineralisation is defined over an area of approximately 2,200 m by 700-1,200 m.

From the initial drilling results, a lower range for an Exploration Target of 500 Mt at 0.4 % Cu eq can be defined. Using a total price of USD19 M (including the exploration expenditure commitment), an implied cost per tonne of Cu equivalent would be approximately USD9.54.

#### 10.3.5 Coro Mining Corporation – Payen, Chile

On October 17 2012, Coro Mining Corp (TSX: COP) announced it had entered into an option agreement to acquire the Payen property from CM Viento Norte (CMVN), a local privately owned Chilean company. Option terms were the payment of USD17 M in five stages over 4 years.

Payen is a 1,225 Ha property located in central Chile, 15 km southwest of the operating Dos Amigos copper mine. CMVN drilled 11 diamond drill holes in 2011, following up on historic indications of mineralisation and alteration. Highlights of the drill program included 138 M @ 0.38% Cu and 0.17 g/t Au, and 104 m at 0.37 % Cu and 0.242 g/t Au. Mineralisation is associated with high magnetic anomalies, and several other similar anomalies are present on the property, which remain untested. Extensive phyllic alteration is present over the property, with a high sulphidation alteration zone exposed at high elevations.

Insufficient information is presented to derive an approximate exploration target size. In October 2013, Coro entered into an option agreement with Freeport McMoRan to fund exploration on the project.

#### 10.3.6 Crazy Horse Resources – Taysan, Philippines

On December 12, 2010, Crazy Horse Resources (TSXV: CZH) announced completion of the acquisition of the Taysan project. The agreement terms were to acquire 100% of the project from Taysan Copper in return for 20 million shares, a payment of USD1.7 M and grant of a 1.5% NSR.

Taysan is located in southern Luzon, Philippines and comprised three exploration and three mining permits covering a total of 11,309 Ha. Porphyry Cu-Au mineralisation at Taysan is hosted in potassic altered hornblende diorite and hornblende dacite porphyry. The area of the mineralised zone defined by historic drilling extended 1500 m along strike, 500 m wide and 400 m down-dip. The property had been drilled by several different companies since 1968, including Newmont, Benguet Corporation, Chase Resources, Magma Copper, Phelps Dodge and Kumakata Mining. A total of 144 drill holes for 36,560 m were drilled in the deposit itself, and four historic resource estimates were available. The most recent Resource Estimate prior to the acquisition was by Chase Resources in 1995, which defined 391 Mt grading 0.3% Cu and 0.21 g/t Au.

Using the total purchase price of USD16.7 M and the 1995 resource estimate gives an implied cost per resource tonne of contained Cu equivalent of USD10.06.

# 10.3.7 Pan Australian Resources – Freida River, PNG

On November 1 2013, Panaust Limited (ASX: PNA) announced it had entered into an agreement to purchase 80% of the Frieda River Project from Glencore Xstrata. The initial consideration comprises USD75 M in two instalments. The first instalment of USD25 M is payable upon transaction close, with the second instalment of USD50 M payable on 31 December 2015. Glencore will maintain a 2% NSR on any operation at Frieda River, up to an aggregate total of USD50 M.

The Frieda River Project is located on the border of the Sandaun (formerly West Sepik) and East Sepik provinces in Papua New Guinea, and is one of the largest undeveloped copper-gold projects in



the world. The Project site is located in the foothills of the Schattenberg Range at elevations ranging from 300 mRL to 800 mRL.

Frieda River comprises a number of porphyry style deposits, including Horse-Ivaal-Tukai, Koki and the high grade gold-rich Nena deposit. All deposits are hosted in Miocene age intermediate volcanics and intrusives of the Frieda River Igneous Complex.

Extensive drilling has defined resources in Horse-Ivaal and Nina porphyry zones totalled 2,135 Mt at 0.49% Cu and 0.24 g/t Au. A scoping study carried out by Panaust indicated an 18 year mine life extracting 430 Mt at 0.54% Cu and 0.3 g/t Au.

Using the total purchase price of USD75 M and total resources gives an implied cost per resource tonne of contained Cu equivalent of USD6.94.

#### 10.3.8 Discussion

Of the acquisitions researched, MA consider four (Andash, Ariekpay, Payen and Taysan) as being comparable with Kharmagtai on a total purchase price basis in terms of exploration target style and grade. These provide a Market Approach value for 100 % of the project between USD 16.7 M and USD 19 M with a preferred value at the midpoint of the range of USD18 M.

For the Empirical Yardstick Approach, Table 8 shows that implied \$/t Cueq values for the compared projects range from USD6.94 to USD90.28. Ignoring the obvious outlier (Andash) gives a median value of USD9.8.

Using a \$/t Cueq value of USD9.8 as the Yardstick and applying it to the Exploration Target defined at Kharmagtai of between 250 Mt and 400 Mt grading 0.25-0.30 % Cu and 0.25-0.3 g/t Au gives values between USD 9 M and USD 17 M (approximately AUD10 M to AUD19 M), with the range midpoint at USD13 M.

Combining the Market and Empirical Approach methodologies gives a preferred value of USD15 M for 100 % of the Project.



**Table 8. Summary of Comparable Transactions.** 

								Implied	
Project	Location	Project Stage	Purchaser	Acquisition date	% Purchased	Purchase price (USDM)*	Purchase price (AUDM)	USD/t Cu eq** Resources***	Comment
Golden Grouse	Mongolia	Exploration	Kincora Copper	23/04/2012	100%	4.1	4.6	-	Not used – too early stage so no resource
Gabbs	USA	Resources	Galielo Resources	02/02/2013	100%	3.88	4.28	12.07	Not used, USD/t is OK but small area
Andash	Kyrgyzstan	DFS completed	Robust Resources	01/02/2013	80%	14.6 [18.25]	15.0 [18.75]	90.28	Comparable project but at DFS stage so USD/t is high
Arikepay	Peru	Exploration Target	Candente Copper	12/12/2013	100%	19.0	20.9	9.54	MA defined target USD/t
Payen	Chile	Exploration target	Coro Mining Corp	17/10/2012	100%	17.0	18.7	-	Early stage, very little drilling so no Target size
Taysan	Philippines	Resources	Crazy Horse Resources	12/11/2010	100%	16.7	18.3	10.06	Closest in stage and resource size
Frieda River	Papua New Guinea	Scoping study completed	Pan Australian Resources	01/11/2013	80%	75.0 [93.75]	82.5 [103.12]	6.94	Not used in purchase price as very large resource size
Kharmagtai	Mongolia	Advanced Exploration	Xanadu	Current	90%			9.8	

<sup>\*</sup>Numbers in square brackets [] indicate equivalent purchase price for 100% of project.

# 10.4 COST APPROACH - MULTIPLES OF EXPLORATION EXPENDITURE

MA was provided with a breakdown of exploration expenditures on the project within each main phase of exploration since QGX acquired the licence in 1996. Costs in 2013 dollars were calculated on the basis of the work completed during each phase multiplied by the following factors:

Rock chip / soil samples: \$25 each

Trenching/sampling/assaying: \$22.50/metre

• RC drilling/sampling/assaying: \$150/metre

Diamond drilling/sampling/assaying: \$250/metre

Ground magnetics geophysics: \$25/line kilometre

Induced polarisation geophysics: \$650/line kilometre

<sup>\*\*</sup>Cu Eq values calculated using a copper price of \$6500/tonne and a gold price of \$1200/ounce

\*\*\*Implied USD/t Cueq prices corrected for % of project purchased



Total expenditure in 2013 dollars by exploration phase is given in Table 9. These expenditures do not include some items, such as licence fees, camp set-up and acquisition of remote sensing data. However, MA considers these to have a negligible impact given the amount of higher value (drilling and ground geophysics) work completed.

**Resource Definition Total Expenditure Exploration Phase** Year **Drilling Only** (2013 costs, USD) QGX 1996-1998 \$1,137,830 \$ 1,786,000 Ivanhoe Mines Mongolia 2002-2006 \$10,326,663 \$20,838,110 Asia Gold 2007-2011 \$2,157,125 \$6,128,975 **Total** \$13,621,618 \$28,753,085

Table 9. Exploration Expenditure for Kharmagtai Licence by Phase.

Total exploration expenditure was focused in two main areas: 1) drilling out the zones of known mineralisation at Altan Tolgoi, Zesun Uul and Tsagaan Sudal, and 2) acquisition of ground geophysical data and drill testing of new target areas arising from this work. Both types of work have incrementally built up the value of the project over time. On the other hand, no resource estimates have been made public, so the project value is difficult for third parties to define. MA would normally include a multiplier based on success as defined by target definition and resource estimates, but as these have not been made public, no multiplier will be applied. MA considers the cost of only resource definition drilling as a lower boundary, and the total exploration expenditure as an upper boundary of the Project's value.

A preferred value of USD14 M to USD30 M (approximately AUD16 M to AUD33 M) is considered reasonable based on this approach.

#### 10.5 KILBURN GEOSCIENCE RATING

Use of the Kilburn geoscience rating method requires the definition of an appropriate Base Acquisition Cost (BAC) for the licence being assessed. BAC's are defined by totalling licence application fees, minimum expenditure requirements and access costs (eg land title negotiation fees). The main assumption is that when a property is acquired it is deemed to be worth at least the cost of holding the licence. There is no allowance for pervious exploration work carried out, as is included in the MEE values.

In Mongolia the only fixed cost requirements for licences are annual licence rental fees: there are no minimum expenditure requirements. Annual fees are applied on a per hectare basis and vary depending on the year since granting of the licence. Exploration licence fees vary from USD 0.05/Ha to USD1.5/Ha, and mining licence fees vary from USD 5.0/Ha to USD 10/Ha. Since the Kharmagtai licence is a mining licence in its first year of granting, fees of USD 5.0/Ha currently apply.

Kilburn Geoscience rating criteria used to assess Kharmagtai are shown in Table 10.



Table 10. Kilburn Geoscience Rating Assessment Criteria.

Rating	Off Property Factor	On Property Factor	Anomaly Factor	Geological Factor
0.1				Unfavourable lithology
0.2				Unfavourable with structures
0.3				Generally favourable lithology (10-20%)
0.5			Extensive previous exploration with poor results	Alluvium covered, generally favourable lithology
0.9			Poor results to date	Generally favourable lithology (50%)
1	No known mineralisation	No known mineralisation	No targets outlined	Generally favourable lithology (70%)
1.5	Minor workings	Minor workings or mineralised zones exposed	Several well-defined targets, initial results promising	
2	Several old workings or exploration targets identified	Several old workings		Generally favourable lithology
2.5				
3	Abundant workings/mines with significant historical production	Abundant workings	Several significant subeconomic intersections	Significant mineralised zones exposed in prospective host rocks
3.5		Abundant workings/mines with significant historical production	Several economic grade intersections on adjacent sections	
4	Along strike from major mine(s)			
4.5				
5	Along strike from world class mine	Significant historic production	Several significant ore grade correlatable intersections	
10		World class mine		

MA has considered the following as part of its assessment of the Kilburn rating criteria:

# • Off Property Factor:

- Kharmagtai lies within a geological terrane known to contain at least one world-class porphyry copper deposit (Oyu Tolgoi). Exploration targets/prospects have been identified throughout the same terrane by several companies
- o Factor: 2.0

#### • On Property Factor:

- Mineralised zones are exposed at surface and were discovered by early exploration in the 1960s
- o No indication of historic workings on the licence
- o Factor: 1.5



# Anomaly Factor:

• Exploration work has identified three main mineralised zones to an extent that preliminary resource estimates can be made.

o Factor: 5.0

# Geological Factor:

- Regional geological setting is arc-related terrane known to host porphyry mineralisation
- Mineralisation related to Kharmagtai Intrusive Complex and tourmaline breccias, encountered at surface and in drilling.

o Factor: 3.0

Factors assigned to Kharmagtai are summarised in Table 11, with the Prospectivity Index derived by successive multiplication of factors.

Table 11. Kilburn Geoscience Ratings For Kharmagtai.

Off Property Factor	On Property Factor	Anomaly Factor	Geological Factor	Prospectivity Index
2.0	1.5	5.0	3.0	45

For Kharmagtai, the Kilburn Geoscience Rating value is given by:

BAC(per Ha) x licence area (Ha) x Prospectivity Index

= USD 5.0/Ha x 6,647 Ha x 45 = USD 1.5M

MA considers USD 1.5M to be the base (minimum) value of the project if no, or very little work had been carried out. This method clearly grossly undervalues a project such as Kharmagtai, which has had considerable work completed. In MA's opinion the Kilburn Geoscience Method does not produce a useful result for the purposes of valuing the Kharmagtai property and will therefore not be included in the final assessment.

#### 10.6 PREFERRED VALUATION

On the basis of an analysis of 7 comparable transactions for the Project, and a review and analysis of previous exploration within the Project, Table 12 has been compiled. The "Preferred" column indicates the most preferable value placed on the Project by MA.

Table 12. Summary of Valuations, Kharmagtai Project.

Project	Market Approach Comparable Transactions			pirical Proach	Cost Approach		Preferred		
			Yardsti	ck t/Cueq	:/Cueq Expenditure				
	Low USDM	High USDM	Low USDM	High USDM	Low USDM	High USDM	Low USDM	Preferred USDM	High USDM
Kharmagtai	\$16.7	\$19	\$9	\$17	\$14	\$29	\$9	\$15	\$29

The Preferred value for 100% of the Kharmagtai Project is USD15 M (AUD16.5 M), which is based on a combination of ranges determined by the Market Approach comparable transactions and Empirical Yardstick Approach. MA considers this value is supported by the lower end of the Cost Approach range, which reflects the expenditure on resource drilling at the Project.





#### 11 PROPOSED WORK PLAN

MA was asked to provide an opinion on the reasonableness of the timeframe and budget for the Kharmagtai Project exploration plan.

Xanadu's exploration plan focuses on increasing Indicated category resources and targeting higher grade zones at Tsagaan Sudal, utilising 20,000 m of drilling. Drill spacing initially at 200 m, then to 100 m or 50 m is considered by MA to be appropriate for resource definition at Indicated and possibly Measured classification in porphyry copper-gold style mineralisation.

For 20,000 m of drilling, an all-in cost (including sampling, assaying, logging etc) of approximately USD150-170 per metre is considered by MA as reasonable, giving a total of USD3 M to USD3.4 M. Diamond drilling rates at Kharmagtai of 60-100 m/day were achieved during IMMI's exploration work and 2 or 3 drill rigs operating simultaneously would allow completion of drilling within 5-6 months, assuming funding is available.

Other direct exploration expenditure during the year is likely to total about USD1 M and includes staff salaries, travel, administration, camp and office expenses. This figure is taken from IMMI's 2011 exploration budget summary and costs are not considered to have changed significantly since then.

External studies that require the services of consultants include a preliminary JORC 2012 compliant resource estimate based on existing drilling, an updated estimate following the drill campaign and possibly a scoping study. MA considers that the allocated timeframes for these activities are adequate, with a total budget requirement between USD0.5-1 M.

In MA's opinion, the activities proposed above could reasonably be completed within 12 months, subject to the availability of funding. Total costs for this work are estimated in the range USD4.5 M - USD5.4 M.

#### 12 REFERENCES

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Wolfe, R., Carew, M., & Ketaren, A. (2004). *Third Phase Altan Tolgoi Drilling, Kharmagtai Project, Mongolia*. Ivanhoe Mines Mongolia.

25 March 2014



#### 13 CERTIFICATE OF QUALIFICATIONS

# ANDREW JAMES VIGAR, F.AusIMM, M.SEG., STATEMENT OF QUALIFICATIONS

I, Andrew James Vigar, B.App.Sc (Geol.), hereby certify that:

- 1. I am an independent Consulting Geologist and Professional Geoscientist residing at 97 Isaac Street, Spring Hill Queensland 4000, Australia with my office at Level 4, 67 St Paul's Terrace, Brisbane, Queensland 4001, Australia (Telephone +61-7-38319154).
- 2. I graduated from the Queensland University of Technology, Brisbane, Australia in 1978 with a Bachelor Degree in Applied Science in the field of Geology.
- 3. I have continuously practised my profession as a Geologist for the past 30 years since graduation, in the fields of Mineral Exploration, Mine Geology and Resource Estimation. I have held senior positions with Emperor Gold, WMC, Costain Australia and CRA (Rio Tinto) prior to commencing full-time consulting in 1996. I have been involved in consulting to the minerals industry both independently (Vigar & Associates and now Mining Associate Pty Ltd) and as an employee of the international consultancy, SRK Consulting.
- 4. My specific experience concerning the Kharmagtai Project is my extensive experience in mineral resource estimation in a number of porphyry-style copper-gold. I have worked in mineral exploration since 1980 when I joined the exploration team at the Vatukoula gold mine in Fiji. This was followed by senior roles at gold mines in Western Australia and Queensland and exploration/evaluation in SE Asia and PNG. I spent 2 years with the WH Bryan Mining Geology Research Centre at the University of Queensland tutoring and studying Geostatistics. I commenced full-time consulting in 1996. I have prepared in-depth reviews and/or resource estimates of a large number of deposits over the last 14 years. I have worked on the identification and estimation of resources for porphyry style mineralisation in similar environments in PNG, Philippines, Indonesia and throughout Australia.
- 5. I was elected a Fellow of the Australasian Institute of Mining and Metallurgy ("The AusIMM") in 1993, having been a member since 1980. My status as a Fellow of The AusIMM is current, and I am recognized by the Australian Securities and Investments Commission and the Australian Stock Exchange as a Qualified Person for the submission of Independent Geologist's Reports.
- 6. I have read the definition of "Independent Individual Expert" set out VALMIN Section 37 and certify that by reason of my education, affiliation with a professional association (as defined in VALMIN) and past relevant work experience, I fulfill the requirement to be an "Expert" for the purposes of VALMIN. I have read the definition of "qualified valuator" set out in CIMVal and certify that by reason of my education, affiliation with a professional association (as defined in CIMVal) and past relevant work experience, I fulfill the requirement to be a "qualified valuator" for the purposes of CIMVal.
- 7. I am author of the Valuation entitled "Valuation Report on the Kharmagtai Project, Mongolia" dated 25th March 2014 ("the Valuation"). I have reviewed all sections of the report for which I am responsible and found them to be accurate and reliable within the limitations of this Valuation.
- 8. I have not previously inspected the property that is the subject of the Valuation.



- 9. I am not aware of any material fact or material change with respect to the subject matter of the Valuation that is not reflected in the Valuation, the omission to disclose which would make the Valuation misleading.
- 10. I am fully independent of the issuer applying all of the tests set out in Sections 24-27 of VALMIN and in section 1.4 of NI43-101 and as defined in S1.0 Definitions of CIMVal.
- 11. I have read the VALMIN Code (2005), NI43-101, Form 43-101F1 and CIMVal. This Valuation is in compliance with that Code instrument, form and standard.
- 12. I consent to the public filing of the Valuation with any stock exchange and any other regulatory authority and any publication by them for regulatory purposes, including filings and electronic publication in the public company files on their websites accessible by the public, of the Valuation and to extracts from, or a summary of, the Valuation in any written disclosure being filed, by Xanadu Mines Limited, in public information documents so being filed including any offering memorandum, preliminary prospectus and final prospectus.
- 13. As of the date of this certificate, to the best of my knowledge, information and belief, the Valuation contains as much scientific and technical information that is available to be disclosed at this time to make the Valuation not misleading.

Andrew James Vigar

B App.Sc.(Geol), F.AusIMM. M.SEG

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**Qualified Person** 

Dated at Brisbane, QLD Australia

25 March 2014