BEHRE DOLBEAR

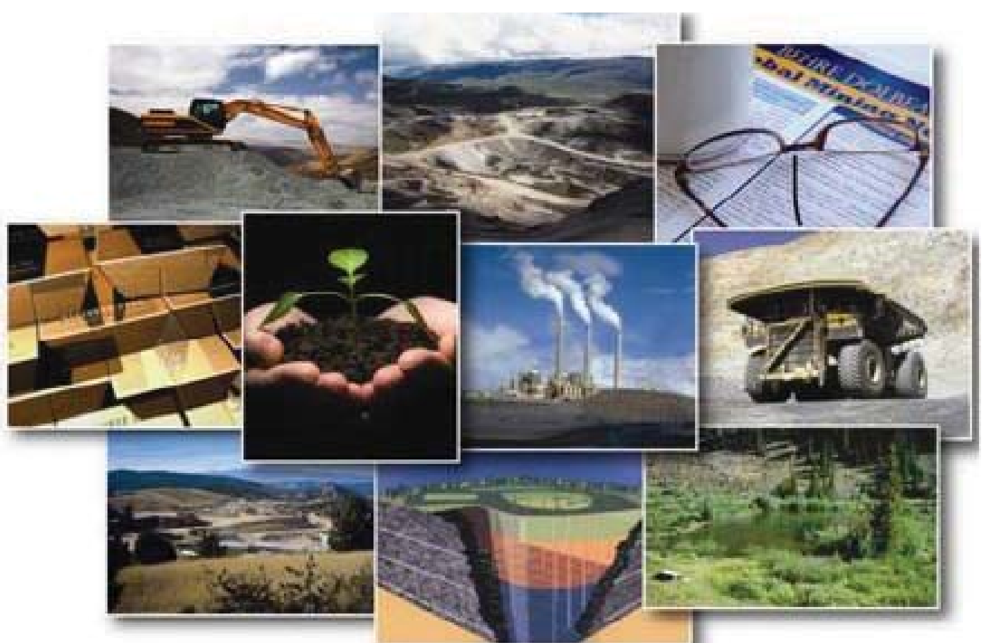
founded 1911 MINERALS INDUSTRY ADVISORS

TOROMOCHO

TOROMOCHO INDEPENDENT TECHNICAL REVIEW UPDATE REPORT

(BEHRE DOLBEAR PROJECT 12-284)

NOVEMBER 2012



PREPARED BY:

BEHRE DOLBEAR ASIA, INC.
30 South Fiddler's Green Circle, Suite 250
Greenwood Village, Colorado 80112
(303) 620-0020

A Member of the Behre Dolbear Group Inc.

BEHRE DOLBEAR

BEHRE DOLBEAR ASIA, INC.
founded 1911 MINERALS INDUSTRY ADVISORS

November 21, 2012

Mr. Charley Du Tsiang
Director
Planning Department
China Copper Corporation Limited
No. 62, North Xizhimen Street
Beijing 100082
China

Email: qiang_du@chalco.com.cn

Re: Behre Dolbear Project 12-284 — Toromocho Independent Technical Review Update Report

Dear Sir,

I refer to the proposed listing (Proposed Listing) of the Group on The Stock Exchange of Hong Kong Limited (HKSE). Unless otherwise specified, terms used herein shall have the same meaning as those defined in the prospectus of the Company dated April 2012 (Prospectus).

I hereby confirm that, in relation to Behre Dolbear's report and advise (the "Expert Advice"):

- All bases and assumptions on which the Expert Advice are founded are fair, reasonable, and complete.
- I and the Behre Dolbear team (we) are appropriately qualified, experienced, and sufficiently resourced to give the Expert Advice.
- The Scope of Work is appropriate to the Expert Advice given and the opinion required to be given in the circumstances.
- We are independent from the Group, its subsidiaries, their respective directors (including directors proposed to be appointed prior to the Proposed Listing), and controlling shareholder(s), and we do not have a direct or indirect material interest in the securities or assets of the Group, its connected persons, or any associate of the Group beyond that allowed by Rule 3A.07 of the Listing Rules.

6430 South Fiddler's Green Circle, Suite 250 Greenwood Village, CO 80112 303-620-0020 fax 303-620-0024
BEIJING CHICAGO DENVER GUADALAJARA HONG KONG LONDON NEW YORK
SANTIAGO SYDNEY TORONTO ULAANBAATAR VANCOUVER
www.dolbear.com

- The Prospectus, based on Behre Dolbear's April 2012 Independent Technical Review and the November 2012 ITR Update, fairly represents our views and contains a fair representation of the conditions set forth in the HKSE's Chapter 18 Equity Securities.

- After making all due and careful inquiries we have reasonable grounds to believe and do believe that all factual information, which we have relied on, including factual information which we have stated that we have relied on, or have been believed to have relied on, and any supplementary or supporting information given by ourselves in relation to the Expert Advice, is true in all respects and that such factual information does not omit any material information.

- Behre Dolbear has provided and has not withdrawn its written consent of this Competent Person's Report (CPR). The CPR is based on the reporting standards set forth in the VALMIN Code and Guidelines for Technical Assessment and Valuation of Mineral Assets and Mineral Securities for Independent Expert Reports, as adopted by the Australasian Institute of Mining and Metallurgy in 1995 and updated in 2005. Mineral resources and reserves defined for the Toromocho Project have been reviewed for conformity with the December 2004 Australasian Code for Reporting Exploration Results, Mineral Resources and Ore Reserves (the "JORC Code") prepared by the Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia.

I will undertake to advise you immediately, if any change of circumstances arises, thereafter, that would render any information contained in this letter misleading in any aspect. Further, we understand that you may rely on confirmations and undertakings provided in this letter in connection with the Proposed Listing.

Sincerely,

BEHRE DOLBEAR ASIA, INC.

K. Marc LeVier
Senior Associate (Qualified Person)

Alastair McIntyre
Senior Managing Director - Asia

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1.0 INTRODUCTION

Behre Dolbear Asia, Inc. (Behre Dolbear) completed an Independent Technical Review (ITR) report on the Toromocho Project in Peru for Chinalco Mining Corporation International (Group). This report is titled "Toromocho Project, Independent Technical Review" (Behre Dolbear Project 11-152) dated April 2012. The Group contacted Behre Dolbear in early October 2012 and requested that an update to the ITR be performed in order to keep the report current and in compliance with the requirements of the Rules Governing the Listing of Securities (Chapter 18) on the Hong Kong Stock Exchange (HKSE).

1.1 BEHRE DOLBEAR'S CONTRACT

Behre Dolbear understands that the Group is considering a public listing for an entity housing the Toromocho Project via the HKSE. The original ITR is dated April 2012 and must be no more than 6 months old in order to meet the requirements of the listing. Behre Dolbear Asia, Inc., a wholly owned subsidiary of Behre Dolbear Group Inc., has been retained by the Group to perform this update. The scope of work for this task is as follows.

- Desktop review to determine the areas of focus for the update
- Develop a list of discussion points for a site visit and Project update review
- Visit to the Group office in Lima and to the Project site
- Discussions with key personnel on the Project status and relevant areas of focus
- Preparation of the ITR update

The ITR update will follow the format of the original report and should be treated as a supplement. The report will provide comment on those areas that have progressed and/or changed since the date of the original report and reassess the risk of that component of the Project. The summation of risk will be restated.

The Group has specified that the ITR update will use an effective date of September 30, 2012 as the basis for all metrics, such as capital expenditures and forecasts and economic analysis. Comments on the progress of the Project and other observations are as of the Project site visit, October 16-20, 2012.

1.2 GENERAL INFORMATION

The Toromocho Project is located in central Peru, approximately 140 kilometers (km) east of Lima, Peru in the Morococha mining district, Yauli Province, Junin Department (Figure 1.1). The paved main highway from Lima passes through Morococha. The region has steep topography with elevations over the deposit ranging from 4,700 meters to over 4,900 meters above sea level. The valleys in the area are of glacial origin.

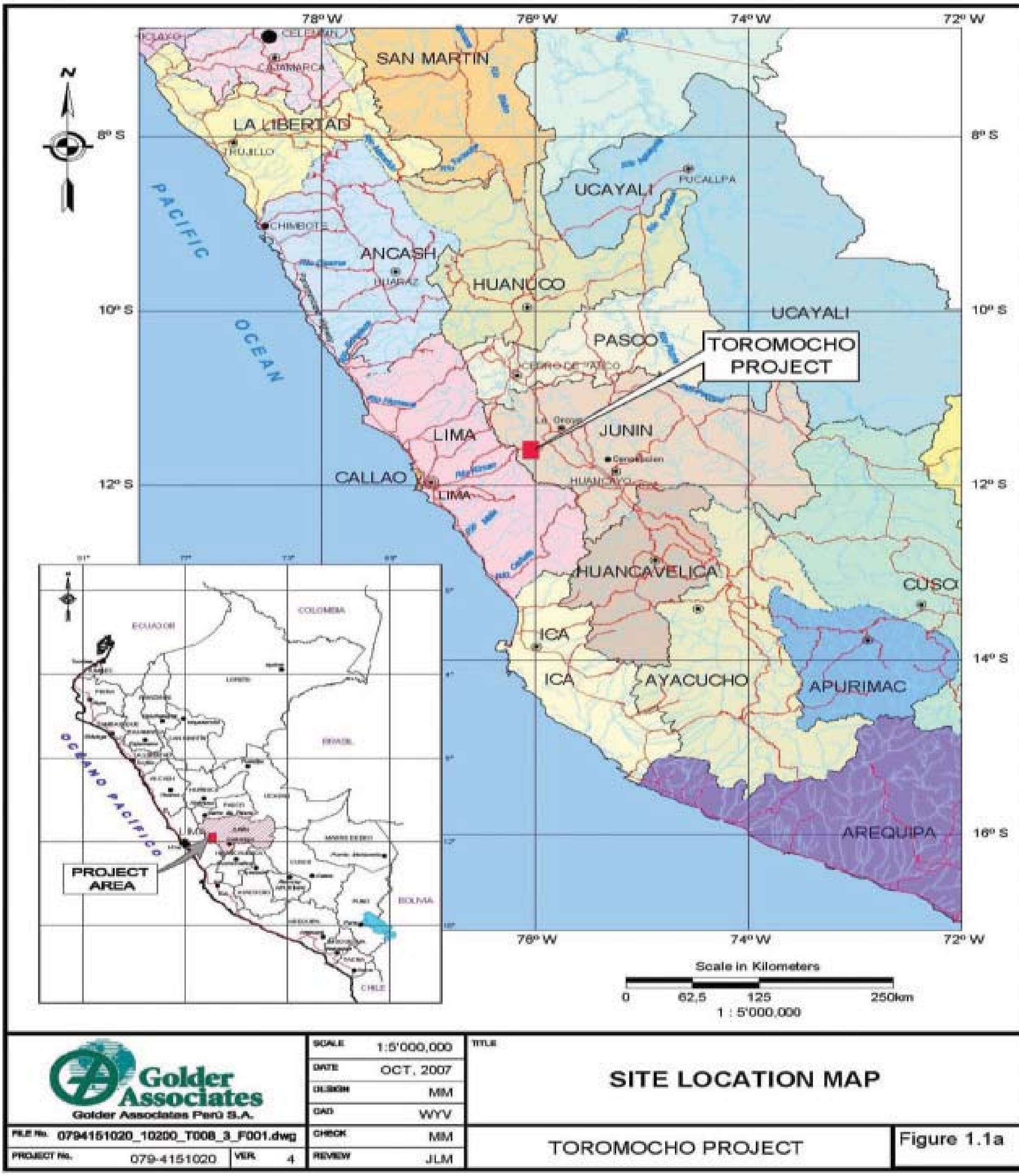

Figure 1.1. **Property location in Peru**
(Source: Toromocho Project Feasibility Report, December 2007, Aker Kvaerner, Original Behre Dolbear ITR Report, April 2012)

The overview of the Project and rich mining history of the area were well reported in the original ITR.

2.0 QUALIFICATIONS OF BEHRE DOLBEAR

2.1 QUALIFICATIONS

Behre Dolbear Asia, Inc. (Behre Dolbear) is an international minerals industry advisory group that has operated continuously in North America and worldwide since 1911. Behre Dolbear and its parent, Behre Dolbear Group Inc., currently have offices in Beijing, Chicago, Denver, Hong Kong, Guadalajara, London, New York, Santiago, Sydney, Toronto, Ulaanbaatar, and Vancouver.

The firm specializes in performing mineral industry studies for mining companies, financial institutions, and natural resource firms, including mineral resource/ore reserve compilations and audits, mineral property evaluations and valuations, due diligence studies and independent expert reviews for acquisition and financing purposes, project feasibility studies, assistance in negotiating mineral agreements, and market analyses. The firm has worked with a broad spectrum of commodities, including base and precious metals, coal, ferrous metals, and industrial minerals on a worldwide basis. Behre Dolbear has acted on behalf of numerous international banks, financial institutions and mining clients and is well regarded worldwide as an independent expert engineering consultant in the minerals industry. Behre Dolbear has prepared numerous Independent Technical Review reports for mining projects worldwide to support securities exchange filings of mining companies in Hong Kong, China, the United States, Canada, Australia, the United Kingdom, and other countries.

Most of Behre Dolbear's associates and consultants have occupied senior corporate management and operational roles, and are well experienced from an operational viewpoint as well as being independent expert consultants.

Behre Dolbear Asia, Inc. was established in 2004 to manage Behre Dolbear Group's projects in China and other Asian countries. Project teams of Behre Dolbear commonly consist of senior-level professionals from Behre Dolbear Group's offices in Denver, Colorado, USA; Sydney, Australia; London, United Kingdom; and other worldwide offices. Since its establishment, Behre Dolbear has conducted over 40 technical studies for mining projects in China or mining projects located outside of China to be acquired by HKSE-listed Chinese companies, including preparing ITRs for the HKSE IPO prospectuses of Hunan Nonferrous Metals Corporation Limited, Zhaojin Mining Industry Company Limited, and Hidili Industry International Development Limited and for the Shanghai Stock Exchange (SSE) IPO listing of Western Mining Company Limited. These four companies were successfully listed on the HKSE/SSE in 2006 and 2007.

Behre Dolbear's primary team for the ITR update consists of a project manager and a community specialist. In addition, the team was supported by the original ITR team members with background information and collaboration.

Project Manager and Process Engineer: Mr. Marc LeVier has over 40 years of experience in engineering and the mining industry. He has worked on numerous mining projects and led multiple discipline teams in the development of processes for precious metals, base metals, industrial minerals, uranium, coal, and iron ore. Mr. LeVier spent 22 years with Newmont Mining Corporation in several professional capacities but most recently as the Senior Global Director of Metallurgical Research & Development. During this time, Marc led the world class metallurgical research team in the development of processes for resources which have become Newmont's primary producing properties today. These include the development of the Gold Quarry refractory ore treatment plant (ROTP), the Batu Hijau porphyry copper-gold mine in Indonesia, the heap leach operations at Minera Yanacocha in Peru, the Ahafo operations in Ghana, the Phoenix operation in Nevada, and the Boddington operation in Australia. Additionally, Mr. LeVier led teams in the development of former operations at Minahasa in Indonesia and the Zarafshan Newmont Joint Venture heap leach operation in Uzbekistan. His credentials include a Bachelor of Science Degree in Metallurgical Engineering and a Master's of Science Degree in Metallurgical Engineering. He is a Mining and Metallurgical Society of America Qualified Person (QP).

Community Relations Specialist: Ms. Carol Odell has an academic background in geology and mining engineering. She has participated in projects that assessed the social management of mining and other natural resource projects in West Africa, throughout Central and South America, South East Asia, and Canada. She is a geologist-turned-social specialist with 12 years of professional and research experience in the mining sector in Canada, Latin America, and Africa and 14 years in the natural resources management area. She has acted in community relations team management and senior advisory roles on two large and several medium scale mining projects, implementing social management systems aligned with international standards and has participated in projects that assessed the social impact of mining. She is the author of a number of papers examining the opportunities for natural resource companies to work in collaboration with local communities. Her expertise includes environmental and social impact and risk assessment, human rights and international standards auditing, natural resources policy development, local hiring and contracting implementation, community relations, and social development strategy design and implementation.

2.2 DISCLAIMER (INDEMNITIES)

Behre Dolbear has conducted an independent technical review of the Group's Toromocho Project mining properties and holdings. A site visit was made to the project sites by Behre Dolbear professionals involved in this study. Behre Dolbear has exercised all due care in reviewing the supplied information and believes that the basic assumptions are factual and correct and the interpretations are reasonable. Behre Dolbear has independently analyzed the Company's data, but the accuracy of the conclusions of the review largely relies on the accuracy of the supplied data.

Behre Dolbear has relied on the work of Aker Solutions (now Jacobs) and its subcontractors and the Group in the preparation of this ITR. Where possible, Behre Dolbear has confirmed the information provided by comparison against other data sources, comparisons with other projects, or by field verification.

Where checks and confirmations were not possible, Behre Dolbear has assumed that all information supplied is complete and reliable within normally accepted limits of error. During the normal course of the review, Behre Dolbear has not discovered any reason to doubt that assumption.

Behre Dolbear has not specifically reviewed or audited the property ownership documents at Toromocho. However, MPC informed Behre Dolbear that they had acquired the mineral claims required for the ore body, and substantial surface holdings for plant, tailing, infrastructure, and support requirements. Information regarding the property situation at Toromocho, within this report, has been provided by MPC, as required under Chapter 18 of the listing rules. Behre Dolbear has not offered a professional opinion regarding the property situation.

The assessment has been conducted in accordance with the Code for the Technical Assessment and Valuation of Mineral and Petroleum Assets and Securities for Independent Expert Reports (Valmin Code) as issued in 1995 and updated in 2005 and in accordance with Chapter 18 of the listing rules. In accordance with the latter requirements, Behre Dolbear has not included any consideration of Inferred resources in determining a value for the technical assets.

The report is provided to the Group for the purpose of assisting them in assessing the technical issues and associated risks of the development in the context of the proposed HKSE listing. This report should not be used or relied upon for any other purpose. The report does not constitute a technical or legal audit. Neither the whole nor any part of this report nor any reference thereto may be included in, or with, or attached to any document or used for any purpose without Behre Dolbear's written consent to the form and context in which it appears.

2.3 GUARANTEE

Consultant guarantees that it shall perform the Services in accordance with the standards of care and diligence normally practiced by recognized consulting firms performing services of a similar nature. All information furnished by Client is a representation or warranty by Client. Client is responsible for the accuracy and completeness of such information and Consultant shall have the right to rely upon such information. If, during the 6 month period following completion of Services it is shown that Consultant has failed to fulfill this guarantee and Client has promptly notified Consultant in writing of such failure, Consultant shall perform, at Consultant's cost, such corrective Services as may be required to remedy such failure. Client shall release, defend, and indemnify Consultant from and against any further liability arising from the Services or this Agreement.

Consultant shall be liable to Client in the event Consultant is guilty of gross negligence and willful misconduct. In no event shall Consultant's aggregate limit of liability to Client exceed the value of the labor fees paid to the Consultant by the Client.

2.4 CONSEQUENTIAL DAMAGES

Neither party shall be responsible or held liable to the other for consequential damages including without limitation, loss of profit, loss of product, loss of investment, or business interruption. The rights and remedies provided herein are exclusive and in lieu of any other rights and remedies otherwise available at law or in equity. Indemnifications against, releases of liability and limitations of liability, damages, and remedies shall apply in the event of the fault, negligence, strict liability, or liability arising by statute of the party indemnified, released, or whose liability is limited, or in whose favor damages or remedies are limited.

2.5 UNITS OF MEASUREMENT AND CURRENCY

Measurement units used in this report are in the metric system. The currency used is United States dollars (US$) unless specifically stated otherwise.

3.0 ABBREVIATIONS, DEFINITIONS, AND RISK DEFINITIONS

3.1 ABBREVIATIONS AND DEFINITIONS

AAS	Atomic Absorption Spectrometry
Ag	Silver
AMR	Andes Mining Research
ARD	Acid Rock Drainage
Au	Gold
Behre Dolbear	Behre Dolbear Asia, Inc.
CNI	Call & Nicholas, Inc.
CSR	Corporate Social Responsibility
Cu	Copper
DDH	Diamond Drill Holes
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMA	Errol L. Montgomery & Associates, Inc.
EPCM	Engineering, Procurement, and Construction Management
ESA	Environmental Site Assessment
g	Gram
Golder	Golder Associates Pty Limited
g/t	Grams per Tonne
ha	Hectare
HKSE	Hong Kong Stock Exchange
hr	Hour
ICAM	Incident Causation Analysis Methodology
IMC	Independent Mining Consultants, Inc.
ITR	Independent Technical Review
JORC	Joint Ore Reserve Committee
km	Kilometer
km^2	Square Kilometer
KMT WTP	Kingsmill Tunnel Water Treatment Plant
KP	Knight Piésold Pty Limited
kV	Kilovolts
kWh/t	Kilowatt Hours per Tonne
L	Liter
LOM	Life of Mine
m	Meter
M	Million
MOE	Ministry of Environment
MoO_3	Molybdic Oxide
Mozs	Million Ounces
MPC	Minera Peru Copper S.A.
m/s^2	Meters per Second Squared
Mt	Million Tonnes
Mtpa	Million Tonnes per Annum
MW	Megawatt
MWh	Megawatt Hour
MWH	Montogmery Watson Harza
NEPA	U.S. National Environmental Policy Act
NPV	Net Present Value

OEFA	Office of Environmental Evaluation and Fiscalization
ozs	Ounces
P80	80% Passing
PAF	Potentially Acid Forming
PCI	Peru Copper Inc.
PGA	Peak Ground Acceleration
ppm	Parts per Million
PTAR	PT Agincourt Resources
RI/FS	Remedial Investigation/Feasibility Study
ROM	Run-of-Mine
RQD	Rock Quality Designation
SAG	Semi Autogenous Grinding
SBN	Peru National Assets Agency
SNC	SNC Lavalin
SX/EW	Solvent Extraction/Electrowinning
t	Tonne
TC/RC	Treatment Charges/Refining Charges
tpa	Tonnes per Annum
TSX	Toronto Stock Exchange
V	Volt
VAT	Value Added Tax
WTP	Water Treatment Plant

3.2 RISK DEFINITIONS

Risk has been classified from low, moderate, to high based on the following definitions.

- **High Risk** — The factor poses an immediate danger of a failure, which if uncorrected, will have a material effect (>15% to 20%) on the project cash flow and performance and could potentially lead to project failure.
- **Moderate Risk** — The factor, if uncorrected, could have a significant effect (10% to 15% or 20%) on the project cash flow and performance unless mitigated by some corrective action.
- **Low Risk** — The factor, if uncorrected, will have little or no effect (<10%) on project cash flow and performance.

The likelihood of a risk must also be considered.

- **Likely** — will probably occur
- **Possible** — may occur
- **Unlikely** — unlikely to occur

The degree or consequence of a risk and its likelihood are combined into an overall risk assessment, as presented in Table 3.1.

TABLE 3.1
OVERALL RISK ASSESSMENT

Likelihood of Risk	Consequence of Risk		
(within 7 years)	Low	Moderate	High
Likely	Medium	High	High
Possible	Low	Medium	High
Unlikely	Low	Low	Medium

4.0 EXECUTIVE SUMMARY

4.1 BACKGROUND

Behre Dolbear has conducted an update for the ITR of the Chinalco Mining Corporation International (Group) Toromocho Project in Peru 140 km east of Lima. The update includes a site visit to Group's office in Lima and interviews with key personnel with the Group, Project's owner representatives, Project management, and a visit to the Project site. The trip was undertaken from October 16-20, 2012. The focus of the discussions were:

- Project Schedule
- Capital Budget
- Land Status
- Procurement and Purchasing
- Lime Plant
- Environmental Permitting
- Community Relations
- Relocation of Morococha
- Power and Water Status
- Safety Orientation and Training
- Recruitment, Hiring and Training

There were no or minimal discussions with regard to resource and reserves, mine plan, process design, geology, and geotechnical.

The Behre Dolbear team consisted of K. Marc LeVier, Project Manager, and Carol Odell, CSR Specialist. The team was accompanied and assisted administratively by the following personnel.

- Dr. Peng Huaisheng, Executive Director and CEO, Chinalco Mining Corp. Intl.
- Mr. Du Qiang, Joint Company Secretary, Chinalco Mining Corp. Intl.
- Mr. Wang Xing, Manager of Budget Division, China Copper Corp. Ltd.
- Mr. Huang Shanfu, President and CEO, Minera Chinalco Peru S.A.

The ITR update will provide comment and update information along the reporting lines of the original ITR report for ease of comparison. The list of risks are updated and summarized as before.

4.2 PROJECT OVERVIEW

The Toromocho Project is under construction and the management of the Project execution is the responsibility of Jacobs. The Behre Dolbear team was not provided with detailed schedules or any refinement of reserves, production plans, or operating cost estimates. MCP is currently in their budgeting cycle for 2013 and beyond. Alternatively, Behre Dolbear was provided with copies of presentations made by key personnel and verbal status details. In summary, the following highlights the Project status reported by the Group, as of October 2012.

- Project is estimated at 35% complete.
- General impression/observation is that the teams of subcontractors are well organized and well managed.
- Area lay down yards are well laid out, established, organized, and working efficiently.
- Project schedule reflects commissioning and start-up to commence December 15, 2013, previously October 15, 2013.
- Capital forecast for Project completion is US$3.5 billion versus US$2.95 billion.
- Relocation of Morococha village began October 29, 2012 and the majority of the residents will be relocated by the end of 2012.
- Mining Plan permit to be submitted by the end of 2012 and approval is expected in March 2013, previously January 2013.
- Lime plant design is complete and major equipment components received or shipped.
- Lime plant is behind schedule.
- Limestone resources have been identified in the immediate area; permitting and development initiated; however, the lime production is a critical path and temporary acquisition of lime from alternative sources is being planned.

4.3 LAND STATUS

Three outstanding land issues were identified in the April 2012 ITR report.

- **Railroad lands** — A government-owned strip of land that had previously been owned by the railroad was in the process of being transferred to MCP and was considered to present low risks that were unlikely to emerge. MCP President & CEO informed Behre Dolbear that a land transfer agreement has been signed with Peru National Assets Agency (SBN). MCP is actively providing information and technical support to the Ministry of Transport and Communication (MTC) so that the final agreement can be completed in December 2012. The risk from this issue is **Low Risk/Unlikely** to occur.
- **Lands occupied by other mining companies** — Small areas of land in the mining concession are still occupied by infrastructure belonging to other mining companies. MCP Legal Affairs Vice President informed Behre Dolbear that agreements are in place for

transfer of all land to MCP on a schedule, which removes infrastructure prior to MCP's need for the land. Relationships with all neighboring companies were reported to be strong by the Environment and Corporate Affairs Vice President. The risk that land access related to neighboring companies will delay the Project schedule; thus, is **Low Risk/Unlikely** to occur.

- **Highway relocation** — The highway will have to be relocated due to the encroachment of the pit operations (blasting) toward the road. However, the safety distance regulations will not become critical until year 5 of production. The efforts to relocate the road will commence well after operations begin and the relocation is not critical at this time to the Project. **Low Risk/Unlikely**.

Additional land issues relate to the ability to access land in Morococha that will be needed later for pit development, easement, and the electricity tower land to enable power supply, and the ability to access land to enable lime supply. These issues are addressed in detail, later in the report as socio-environmental and secondary facility issues. For all three issues, contingency plans render them **Low Risk/Unlikely** to occur in terms of ability to delay or increase costs to the Project.

4.4 GEOLOGY

There is no new information or change to the previous report.

4.5 GEOLOGICAL DATABASE

There is no new information or change to the previous report.

4.6 RESOURCES AND RESERVES

There is no new information or change to the previous report.

4.7 GEOTECHNICAL

There is no new information or change to the previous report.

4.8 MINING

There is no new information or change to the previous report.

4.9 PROCESS

There is no new information or change to the previous report.

4.10 INFRASTRUCTURE AND NON-PROCESS FACILITIES

4.10.1 Electrical Power Supply

The electrical power supply situation remains as before; however, an additional scheduling risk issue has emerged because the Company has not yet achieved agreement with the community of Yauli for access to the land required for the transmission line towers and easement. Because plant operation and water supply to the plant rely on power supply, it will be necessary for MCP to complete the power supply prior to commencing pre-commissioning activities in April 2013. Information provided, to Behre Dolbear by the MCP CEO, the Legal Affairs Vice President and the Environment and Corporate Affairs Vice President, all coincided in the ongoing need to obtain access to land for the 3 transmission towers from the community of Yauli.

Negotiations, which had been stalled due to unreasonable expectations from community, are reopening at the request of the community, which is a positive sign. Should negotiations fail, MCP will take advantage of the government's ability to expropriate land, a function that is exercised relatively frequently in the country for power-related infrastructure. In addition to providing an alternative route to achieve land access, the expropriation process also provides incentives for community leaders to negotiate, because the rates paid under the expropriation provisions are lower than the rates that the Company would pay. The risk with expropriation is that it may damage the company-community relationship, so it will be used only as a last resort. The government process may cause delays; however, government processes are currently proceeding more expediently than they have in the recent times due to several large projects, which have been stalled or terminated. MCP reported that expropriation for electricity lines is a tried and tested process in Peru, which occurs frequently.

The outstanding risks of delayed land access are believed to be **Low Risk/Unlikely** to occur.

4.10.2 Water Supply

The water supply situation remains unchanged, although costing has been incorporated into the CAPEX. The primary source is from the Kingsmill Tunnel Treatment Plant and as soon as the final land issues for right-of-way are resolved, the pipeline will be placed and the pumps installed and commissioned. MCP will operate the water treatment plant at Kingsmill Tunnel for the life of the mine; **Low Risk/Unlikely** to occur.

4.10.3 Office and Administrative Facilities

The office and administration support facilities situation remains unchanged, although costing has been incorporated into the CAPEX. However, an agreement dated June 2, 2012 has been entered into by MCP with Inversiones Granadero S.A.C., owner of the Lima offices facilities, in order to acquire such offices before the end of year 2012 for a sum of US$4.6 million.

4.10.4 Material and Supply Storage and Distribution

Additional material and supply storage and distribution facilities have been built at the Project and the costs have been incorporated into the CAPEX.

4.10.5 Access Roads

Negotiations with the Ministry of Transport and Communications (MTC) and with the concessionary are ongoing for the realignment of the Central Highway so that the final road route is at least 500 meters from the location of any blasting activity. MCP Environment and Corporate Affairs Vice President informed Behre Dolbear that negotiations are proceeding well and that he expects no undue delays in the process. The Project has at least 5 years before the road re-routing would interfere with pit development. Delays for this cause are therefore **Low Risk/Unlikely** to occur.

4.10.6 Railroad Access

Railroad access to the site is nearing completion and the railroad siding at the process plant is under construction. Studies have been initiated to look at use of the railroad for movement of personnel from Lima to the Toromocho Mine Site to eliminate the difficult bus ride.

4.10.7 Camp Facility

Camp facilities for workers are now operational within the Project area with a smaller camp for Sodexho workers close to the Carhuacoto new town site. The Company has committed to building an operations camp in Carhuacoto. Contractor personnel are housed in camps or billeted in rental accommodation in the local communities. There is considerable evidence of recent and ongoing construction in local communities to take advantage of economic opportunities during construction.

4.10.8 Town Site

The cost of the town site has been increased substantially from US$100 million in the original ITR to an estimate of US$260 million. This is a more realistic estimate of cost and construction is approaching completion with 83% of the budget spent. A new drainage system, to prevent the development of damp conditions, played a substantial role in cost increases, as well as more realistic estimates of costs. Significant expansion of institutional and housing infrastructure was completed in some areas, generally at the request of the local community.

4.10.9 Lime Supply

MCP has identified both a long-term plan and short-term contingency plans to address the lime supply issue identified in the April 2012 Behre Dolbear report. The long-term plan involves building a limestone quarry to the North of the Central Highway on land belonging to the community of Paccha and feeding a lime plant (to be constructed) on a site, owned by MCP and 20 km from the concentrator location, with supply from both the MCP-owned quarry and from 2 other privately-owned quarries to the south of the Central Highway. Quarry sites were chosen according to the quality of lime and also to enable supply from different directions to reduce Project risks in case of road closure from community blockade. Lime will be supplied to the Project by rail. MCP has no reason to believe that negotiation of an agreement to buy land for the limestone quarry and plant will create delays in the process, and the Company plans to submit the Environmental Impact Assessment (EIA) by the end of 2012. If the EIA proceeds expediently, construction will begin in March 2013 and the lime plant will be ready as plant commissioning begins in October 2013.

Sufficient lime is available to operate the Kingsmill Tunnel Water Treatment Plant until lime will be available from the lime plant; however, any delays in permitting or construction could mean that lime for the process plant is required earlier than when lime is available. MCP has assessed contingency options for lime supply. There appears to be sufficient limestone of adequate quality available in Peru, although it will need to be transported from Lurin (on the outskirts of Lima), Pacasmayo approximately 600 km North of Lima or Juliaca 1,500 km southeast of Lima. Suppliers would be responsible for transporting the lime to Chosica on the Central Highway on the outskirts of Lima and the Company would transport the lime to the site, either by road or rail. Transportation would double or triple the cost of lime in the interim and this cost is not currently included in the Project estimates. The occurrence of additional lime costs represents a **Low Risk/Unlikely to Possible** to the Project because costs are <10% of the Project costs.

4.10.10 Conclusions

The incorporation of secondary facilities into the CAPEX budget significantly reduces the risks identified in the previous Behre Dolbear report of increased costs.

4.10.11 Risk Analysis

Outstanding risk issues relating to secondary facilities are:

- The risk of Project delays from delayed implementation of electricity to the plant site could happen if the Company is unable to complete an agreement with the community of Yauli or is unable to facilitate government acquisition of these lands through an eminent domain process. The incentives for achieving a negotiated solution and the relative ease of the eminent domain process render residual risks on this issue as **Low Risk/Unlikely** to occur.
- The Project also faces a risk of cost escalation should it need to bring lime to the Toromocho site from other facilities in Lurin, Pacasmayo, or Juliaca for initial use in the mineral processing. This issue is **Low Risk/Possible** to occur.

4.11 ENVIRONMENTAL AND PERMITTING

4.11.1 General

Lists of permits required for the Toromocho Project were provided to the Behre Dolbear team, which documented the progress of permitting since the original ITR report. The permitting activity includes applications submitted, pending approvals, reviews in process, and permits obtained as of October 18, 2012. Review of this activity has shown considerable progress with no significant issues anticipated by the Group.

Since the time of the last ITR, a number of major projects in Peru have been dropped or delayed, leaving the government ministries with more time and people to focus on the Minera Chinalco applications. The Group has noticed a more helpful attitude and more timely responses.

4.11.2 Physical and Biological Environment

The development and start-up of the water treatment plant for the Kingsmill Tunnel water (as received contains high levels of heavy metals) has created favorable credibility for the Group with the local community and the local and national government. The majority of water required on site will come from the treatment plant discharge. The Group anticipates that 50% of the treated water will be pumped to the mine site and the remainder discharged to the river.

The tailings impoundment is under construction and all of the wet soil (bofedal) material (Phase I requirements) has been excavated and removed to the compensation area. The compensation area is another area of bofedal, which had been degraded by peat mining carried out by local residents as an economic activity.

There have been no changes in regulations or requirements since the last ITR. The Company and the standards used are in compliance with the government regulations. Inspections have occurred and there have been no issues or citations, as reported by the Group. MCP has acquired software to help manage the permit reporting requirements and management of data and information.

The biggest delays likely to occur at the Project relate to seasonal rain-induced land and mud slide risk on the route between Lima and the Toromocho Project site. An extreme slide event could block this route, which includes both road and rail access, for up to 10 days. As the Project heads into the peak landslide risk season, the Company has not yet completed the permanent fuel storage facilities on site and currently holds 7 days of fuel in reserve on site. This implies a potential risk of up to 3 days delay in the case of a very significant slide. This could cause an increase in Project costs but the risk is **Low Risk/Unlikely** to occur.

4.11.3 Human (Social and Community) Environment — Current Issues

The Toromocho Project enjoys a relatively low social risk setting compared with many other projects in Peru. Particularly important factors favoring the Project setting are its insertion into a mining area, where most residents have migrated to work directly in mines or provide indirect services to mines. The absence of an important agricultural or herding community and the poor quality of vegetation reduces the importance of water and land issues in the immediate mine vicinity. The political importance of mining in the Province and region also limits the effectiveness of anti-mining activism. Even with these favorable factors, the Company clearly recognizes that effective social management, which enables the achievement of social acceptance at a mining project in Peru, is a critical factor for the Project's success.

The Project has implemented a strong social management system, which is championed by the Company President and CEO. This system is in the hands of a suitably qualified and experienced team with support and collaboration from the entire senior management team. In addition, MCP has invested significant resources to design a resettlement process that aligns with the IFC performance standards, a world class local training program and appropriate investment in community development focused on community priorities.

The community relations team consists of 8 field staff under the supervision of the Environment and Corporate Affairs Vice President. The team is also supported by a team, which averages 20 resettlement consultants from Social Capital Group, a team of lawyers reviewing resettlement property issues from Vargas Pareja, and a team from Swisscontact, focused on business formalization and development for resettled businesses. The Teams appear well qualified and experienced and data is documented using the Boreal-IS community relations software to provide a comprehensive and searchable database.

The Toromocho community relations approach is actively supported by the senior management team and championed by the Company President and CEO. Daily management meetings are held on site and this enables the community relations team to discuss emerging issues and to manage grievances in an efficient manner. The approach includes a budget of approximately US$1.5 million annually that is spent on community development initiatives in the education, health, productive development, and institutional strengthening areas. Meetings with key stakeholders are ongoing and are managed by the resettlement team and community relations staff. Overall, a responsive community relations system appears to exist. Community engagement and analysis are currently managed mainly by consultants on the resettlement team, while the MCP team focuses on higher level negotiations and community development projects.

4.11.3.1 Communications Approach

The Environment and Corporate Affairs Vice President leads the MCP communications approach. The approach builds relationships with leading national press by providing periodic updates on the Project, while maintaining a low media profile, asking journalists not to publish stories about the Project in national media during the sensitive construction phase. In the Project areas of impacts and influence, the communications strategy involves regular meetings with key stakeholder groups, house-to-house visits in the resettlement area, and monthly Project newsletters reporting on Project developments and community benefits.

In light of the national and local political situations, this communications approach appears well designed.

4.11.3.2 Government Relations Approach

MCP employs an active engagement strategy with government officials at both the national and regional levels, across an appropriate range of agencies. MCP Environment and Corporate Affairs Vice President reports that the reduction in the number of mining projects approaching construction phase has greatly improved the responsiveness of the Ministry of Energy and Mines to project-related permits and issues.

The Project negotiated a 15-year taxation stability agreement with the Peruvian government, which limits the Project's potential exposure to changes in the legal regime governing mining for the foreseeable future.

Low levels of trust in the Project area means that the Project initially experienced high levels of opposition, particularly over resettlement and environmental issues. The development and operation of the Kingsmill Tunnel Water Treatment Plant that produces water for the mine and significantly improves water quality to the Mantaro River agricultural area near the regional capital of Huancayo has created significant regional government support for the Project. In addition, intensive community relations efforts and a series of adaptations to the resettlement plan have dramatically improved relations at the local level.

The Mayor of Morococha continues to oppose the Project and to organize sectors of the community against the resettlement process. The Company maintains communication with the mayor and his supporters through informal interaction and through a round table dialogue process involving regional and local government, a broad range of community organizations, and MCP. The dialogue is under the auspices of the Junin ombudsman, which recognizes the situation as a socio-environmental conflict. The main dispute centers on documenting an MCP commitment to provide additional benefits, although a focus on monetary payments is troubling in terms of the potential for corrupt use of funds. The Company aims to avoid committing to monetary benefits for Morococha and also argues that existing contributions in the Kingsmill Tunnel Water Processing Plant and the high quality of the new town facilities in Carhuacoto fully compensate the community for impacts and equal the types of benefits negotiated between mining companies and communities elsewhere in the country. Despite this, it is likely that the Company will need to commit to providing additional benefits to Morococha. However, the amounts are likely to be small. This constitutes a **Low Risk/Possible**.

4.11.3.3 Local Hiring

Local hiring forms a key pillar of the social mitigation approach for any mining project. Employment is typically the most sought after benefit among mine-affected stakeholders and providing priority access and training to enable local community members to access suitable employment creates a pool of mine-supporters in the local community. MCP has earmarked US$4 million in funding for a training program for local community members so that they may access mining employment during the construction and operations phases of the operations. The local hiring program aims to fill 100% of plant operator positions and 85% of mine operator positions with properly trained local workers. The training program also includes maintenance and laboratory positions. For the construction phase, the community team reports that the population of the area, directly impacted by the Project, has been insufficient to fill all appropriate vacancies and employment priority has been extended to the area of indirect impacts. Contractors are currently encouraged to achieve 65% to 70% local hire, depending on the availability of required skills.

In addition, the community team reports stakeholders have agreed to definitions of local and to a transparent distribution and merit-based process for training and employment among local areas. The Company should continue to seek opportunities for local prioritization and training in direct and indirect opportunities throughout the Project life if it is to manage risks effectively.

4.11.3.4 Local Contracting

MCP Contracts Manager informed Behre Dolbear that the procurement team has personnel in the Project area dedicated to identifying opportunities for local contracting. Community stakeholders in the closest community to the Project requested increased assistance with small business development and access to contracts, which the Company believes should be possible as the Project transitions to the operations phase and the results of business development initiatives associated with resettlement bear fruit.

4.11.3.5 Community Development

The Company has dedicated a combined budget of US$1.5 million to community development in the districts of Morococha and Yauli, respectively. We believe that this is adequate for now but ultimately will require increases to maintain the program. Program focus on four development areas: education, health, economic development, and institutional strengthening. The program focuses on community priorities identified by representatives of government institutions. The programs appear to be appreciated by community representatives.

4.11.3.6 Town of Morococha Resettlement

The Morococha town resettlement began on October 29, 2012. The Behre Dolbear team was informed by the Environment and Corporate Affairs Vice President that 92% of households present in Morococha, at the time of community surveys and cut-off dates in 2006, have signed agreements to move to the new town in Carhuacoto or to receive a cash payment from the Company. In accordance with international standards limiting the potential for impoverishment, the cash payment option is only available to households with a primary residence outside the Project impact area. The Company aims to resettle government institutions (schools, clinics, etc.) early on in the resettlement process to encourage holdouts to move to the new community to be closer to the institutions they use daily.

The biggest risks associated with the resettlement stem from the mayor's ongoing opposition, the 8% of the population who have yet to sign resettlement agreements, and from new households and camp residents who have arrived in Morococha, since the resettlement cut-off date in 2006. Together the opposition number approximately 100 households and make up around 10% of the population.

The Environment and Corporate Affairs Vice President informed Behre Dolbear that the Company facilitated a transparent process involving a commission of local leaders to assess each case of new arrivals (totaling about 500 households, many single men in mine camps) on a case-by-case basis, following an updated census in May 2012. During this process, a number of additional households were incorporated into the resettlement process. They will receive a house in the new town, but will not be compensated for construction in Morococha. This is a point of contention; however, the Company does not want to incentivize opportunistic building in the old town.

Other resettlement issues center on fears that the Company may not go ahead with plans to build the operations camp in Carhuacoto and with the potential for damp problems in the new town, because the land was previously marshland. Households planning to be among the first to resettle also cited security concerns. Residents reported that they have been threatened by opponents of the Project.

Community relations staff explained to Behre Dolbear that the initial phases of resettlement will be overseen by a contingent of appropriately trained police officers, that an additional drainage system has been installed to manage damp issues in Carhuacoto, that the operations camp will be built in Carhuacoto, and that appropriate contingency plans exist for Morococha resettlement hold-outs and recent arrivals. Even Project opponents interviewed concurred that, if all of these issues are managed, resettlement will likely be complete by mid-2013. Because Morococha resettlement will not interfere with Project progress for over 7 years, outstanding resettlement risks are principally cost escalation. This is considered **Low Risk/Likely** to occur.

4.11.3.7 Ongoing Negotiations

In addition to the round table negotiations and the resettlement negotiations, the Company is also involved in additional sets of community negotiations. Both of these risk issues are described under the heading of secondary facilities. The Company is in the process of restarting negotiations with the community of Yauli over compensation for easement and 3 electricity pylons and has just begun negotiations with the community of Paccha over purchasing lands for a limestone quarry.

4.11.3.8 Transportation

Transportation safety is one of the highest social and safety risks for the Toromocho Project, with Project access via roads that have utilization rates at approximately double their design capacity and incorporate hair-pin bends, rapid, high-elevation climbs and drops, inclement weather, and a number of other hazard features. On one return trip to the site, the Behre Dolbear team witnessed the outcomes of three accidents. One vehicle was a Project contractor's vehicle. The biggest incremental transportation risks are to road users and to communities in the case of an accident involving hazardous materials. The non-governmental organization (NGO) Luz Ambar has been contracted to assist in raising road safety awareness among drivers and community members. MCP has utilized the services of MIQ to design, plan, and coordinate all logistics movements in an effort to minimize risk and lower impact on traffic flow. Additionally, these efforts are well coordinated with local authorities, specifically for the movement of oversize loads.

Once the rail yard at the plant site is complete and a few outstanding oversized items are delivered, all supplies will be delivered to the mine site by rail. This will significantly reduce the risks to the communities from hazardous materials spills, as the railroad is more distant from houses, except in Lima. The Company aims to switch to rail transport of personnel from La Oroya and from Lima once appropriate railcar technology is identified (described further in the worker health and safety section).

4.11.3.9 Security

MCP has an unarmed contracted security force, which works to secure the Company personnel, facilities, and equipment and appears to use appropriate physical security and procedures. The Project recognizes that security incidents represent an unlikely occurrence but with potentially large reputational and human harm risks, especially during high profile events such as public hearings and the upcoming resettlement process. For the resettlement process, the Company has made an agreement with the Peruvian National Police for a contingent of over 500 police reinforcements to be available should any incidents develop. Risk assessment and incident protocols have been developed for a variety of scenarios. Following minor incidents at the public hearing for the Project, all police officers, who are available for incident management, have participated in sensitization and legal refresher courses to encourage appropriate use of force. No tear gas or weapons will be carried by any of the officers. With security premised on dissuasion, the security force has the potential to outnumber those attempting to disrupt the resettlement process and will utilize a truck with a water cannon, as a last resort to protect property and restore order.

4.11.3.10 Project Impacts and Benefits to the Community

Project stakeholders (including Project opponents) universally recognize the economic growth that the Toromocho Project construction has brought to local communities. They are concerned that this economic activity should continue beyond the construction phase of the Project and have identified the construction of the Toromocho mine camp within or adjacent to the Carhuacoto resettlement site, as a particularly crucial factor that will consolidate economic benefits in the area. The Company has committed to building the camp for the operations phase in Carhuacoto, although the construction camps, which are able to house over 6,000 people, are within the mine area, except for a Sodexho camp in the Carhuacoto area.

Several community leaders recognized that the Company has also made an effort to prioritize employment for female heads-of-houses and has been flexible about employment requirements for particularly vulnerable households. Negative impacts included increased intra-community conflict, related to a division between Project supporters and detractors, and struggling to cope with change related to the Project were mentioned by community leaders.

4.11.3.11 Worker Health and Safety

The Company is in the process of implementing a Mine Safety Health Administration (MSHA) conforming safety management system and aims to complete this process before operations commence, with the assistance of BTS Consulting, a company of behavioral change experts. The system incorporates risk assessment processes, design and implementation of appropriate protocols, and training for general activities and for identifying high risk activities, investigations of incidents (using the ICAM approach), awareness campaigns, monitoring of indicators, and incentives included in bonuses and prizes. Safety training of at least 40 hours per year is a requirement for all direct and indirect employees. In 2011, the Company received a national award for best performance in mine safety in Peru, reporting incidents using Peruvian criteria, despite being in the more risky construction phase when most other companies are exploring or operating.

Road transportation of personnel and goods to the site from Lima, local communities, La Oroya and Huancayo, is the highest worker safety risk on the Project at present and staff reported one fatality during the Behre Dolbear assessment trip[1]. Transportation safety measures include GPS tracking for speeding, defensive driver training for all drivers, additional presence of transport police in the Project vicinity, bans on phone-use while driving, and random drug and alcohol testing for drivers arriving at the site with immediate dismissal for drivers testing positive. The safety manager for MCP is in the process of testing fatigue-monitoring systems. Major haulage and bus contractors are a focus of preventive interventions.

Personnel transportation is currently coordinated by the Company and buses deliver workers to the site from local communities, La Oroya, Huancayo, and Lima. MCP is advancing the personnel rail transportation concept and has purchased 4 self-propelled 2-car passenger units and is carrying out tests to identify appropriate technology to achieve timely ascent and descent. The planned overnight transport of personnel appears as an enlightened approach to remove personnel from the road where accidents have occurred and will continue to happen. Until rail transportation is maximized, the Project has outstanding risks associated with road transportation that are **Moderate risk/Possible** to occur.

Offsite transportation incidents are not currently included in national statistics. Implementation of offsite incident monitoring and near miss incident reporting are being contemplated for the operations phase.

Other health and safety issues include high-risk activity certification, working at high altitude, emergency response, and psychological and nutrition issues related to rotational work in mine camps. The Company has implemented appropriate training and controls in all of these areas.

4.11.3.12 Social Summary

In summary, three discrete social risk issues are identified by the Behre Dolbear team.

- Ongoing negotiation processes through the round table process are likely to result in an agreement whereby the Company will provide funding for additional development initiatives. The likely costs will amount to a **Low Risk/Likely** to occur either within the CAPEX or early operations period.
- Resettlement incorporates **Low Risks/Likely** to result in cost escalation related to contingency plans for resettlement of new arrivals and compensation for new structures.
- Transportation safety risks remain a **Moderate Risk/Possible** to occur while personnel and goods are still transported by road.

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[1] A contactor's assistant (a local contracted by Jacobs) accompanying a heavy equipment load was killed while checking the load during the trip from Lima to the mine site. The victim was reportedly struck by another non-project related vehicle.

In addition, the Project also operates in an environment where expectations of community benefit are high and faces an overall risk that opposition to the Project will escalate. MCP recognizes that high levels of social acceptance are required to mitigate this risk and that this, in turn, requires strong social management programs and systems. Current risks of extended social protest are judged to be **Low Risk/Unlikely** to occur. Although over the next seven years with changes in local government, election campaigns, a reduction in employment during the construction demobilization process, and the arrival of substantial mining canon funds, the Protest represent a **Low Risk (minor protest)/Likely** to occur. More significant the protest is a **Moderate Risk/Unlikely** to occur.

4.11.4 Permitting Status and Schedule

4.11.4.1 EIA and Construction Permits

The main EIA and construction permits were in place for the Project at the time of the April 2012 Behre Dolbear report.

4.11.4.2 Mine Plans, Water Use, and Other Permits and Approvals

The MCP Vice President of Environment and Corporate Affairs informed Behre Dolbear that the permitting situation in Peru has improved substantially under the new government, which took office at the end of July 2011. This appears to be related to the reduction in mine development projects in the country and to a change in attitude by some government departments and to increasing support from the government of the Project. While increased support reduces the risks of permit delays, MCP is managing perceptions carefully and has asked the government to refrain from intervening in several situations where overt government support could lead to community protest.

Major critical path items identified in the April Behre Dolbear report are reviewed in Table 4.1.

TABLE 4.1
CRITICAL PATH ITEMS

Situation as of April 2012 Behre Dolbear Report	Situation as of September 2012
A detailed hydrology and hydrogeological study for the mine area will be an important part of the new pit mine plan to be submitted for approval late 2011.	The Company is in the process of responding to a series of observations made by Ministry representatives on the mine plan. The most significant issue to be resolved is a requirement that the Company demonstrate that resettlement is complete, prior to receiving the permit. MCP can avoid this requirement by submitting a mine plan for a shorter (7-year) term or with the completion of the resettlement, submit the Mine Plan for the full life of mine. MCP is monitoring the progress of resettlement before choosing which Mine Plan option. The updated Mine Plan will be submitted by the end of 2012.
Water use permits for the mine and concentrator are in preparation.	Permits now in process.
Reclamation and closure plan will be detailed further in 2011 (conceptual) and refined as operations progress (Section 14.0)	Closure plan and management of environmental legacies permit in process.
Cultural resources migration permits; a few still in process	3 further permits obtained. 2 outstanding.
New highway alignment yet to be accomplished.	Permits still in process though negotiations are moving forwards. Not required immediately, defer to year 3-5.
New lime source to be secured with environmental approvals.	EIA for lime plant to be submitted by the end of 2012. Consultation re. MCP lime source quarry in process. Contingency lime sources identified for supply until plant comes on line.
EIA for KMT WTP: further technical certifications needed.	In process.

4.11.4.3 Government Changes in Peru — Agency and Community Perceptions

Capacity and resourcing issues continue to limit the role of the Agency of Environmental Evaluation and Fiscalization (OEFA) under the Ministry of the Environment (MOE). MCP Environment and Corporate Relations Vice President informed that oversight for safety recently reverted to Osinergmin, the agency supervising investment in energy and mining projects, apparently due to capacity issues. The Project receives annual audits from OEFA, but because of capacity constraints, these tend to focus on recycling and other low risk issues.

Meanwhile, MCP is implementing telemetric monitoring to enable them to track environmental data in real time and recently implemented legal software to track permit requirements and commitments more systematically and the Vice President Environment and Corporate Relations reports no significant compliance issues.

Behre Dolbear did not interview any ministry staff during this ITR update because of the tight schedule for the site visit. However, MCP's perceptions appeared aligned with observations on government positions on mining in the Peruvian media and among stakeholders.

The social specialist on the team carried out a series of 7 interviews with formal and informal community leaders from Morococha, selected as representing a range of different community perceptions. The specialist also interacted informally with stakeholders encountered in Morococha. Overall, although some opposition to the Project was noted by all interviewees, centering on the Mayor of Morococha, the relationship between MCP and the community appeared cordial with informal communication channels open between the Company and opponents as well as with supporters. Outstanding concerns and issues, raised by Project opponents, are known to the community relations team and contingency plans exist for management. Even Project opponents interviewed concurred that, if outstanding issues are managed, resettlement will likely be complete by mid-2013.

4.12 CONCLUSIONS

Additional favorable aspects noted since the April 2012 Behre Dolbear report include:

- Environmental management of ongoing construction work appeared strong.
- Marshland relocation from the tailings area is complete and apparently progressing well.
- Support for the resettlement process is improving incrementally and MCP has managed many issues and has contingency plans to manage outstanding issues and concerns.
- The local community training programs, implemented by the Company, are world class and demonstrate a commitment to generating social acceptance by the Company.
- The entire senior management team appear dedicated to superior HSEC management and strong performance is championed by the MCP President and CEO.
- Collaboration among departments on HSEC issues is ongoing and producing palpable results.
- The social management team includes experienced individuals and with consultant support that demonstrates adequate staffing and capacity.
- The social management system is well designed and shows a number of strengths including local hiring priorities, progress on local contracting, a responsive grievance management system, benefits to communities through an organized community development approach, and a commitment to collaboration and negotiation to resolve issues.
- MCP incorporates a risk-based management approach and has developed mitigation plans and contingency plans for the most concerning scenarios.

Ongoing and emerging Project aspects that are unfavorable include:

- The dangerous access route to site continues to demonstrate health and safety risks with evidence of multiple accidents and at least one death.
- High altitude working conditions continue to pose worker health and safety risks.
- Opposition to and concern with some aspects of the resettlement program is likely to result in increased costs, although robust contingency plans seem likely to lead to the successful resettlement. Resettlement will not disrupt mine implementation, even if delays extend for several years.
- Project opposition and high expectations of benefit from local stakeholders is likely to lead to increased costs to the Company for community development initiatives.
- Realignment of the Central Highway is still under negotiation between MCP, the Ministry of Transport and Communications, and the concessionary, although this does not become critical path for over 5 years.

4.13 RISK ANALYSIS

- There are risks of delay stemming from inadequate fuel storage capacity and potential delays related to landslides on the main access routes. **Low Risk/Unlikely** during the construction timeframe.
- Health and safety risks from transportation of workers and equipment represent a Moderate Risk/Possible.
- Ongoing negotiations through the round table process are likely to result in increased MCP cost for community development. **Low Risk/Likely** to occur.
- Resettlement cost escalation risks related to new building in old Morococha, after the move, are **Low Risk/Likely** to occur.
- Risk of Project disruption and delays, due to minor social protest, are **Low Risk/Likely** to occur. More significant social protests are **Moderate Risk/Unlikely** to occur.

4.14 RECLAMATION AND CLOSURE

There is no new information or change to the previous report.

4.15 ADMINISTRATION, MANPOWER, AND MANAGEMENT

4.15.1 Management and General Administration

During the site visit, Behre Dolbear interacted with the following MCP managers and administrators:

- Huang Shanfu, CEO and President, MCP
- Dr. Peng Huaisheng, Executive Director and CEO, Chinalco Mining Corp. International.

- Du Qiang, Company Secretary, Chinalco Mining Corp. Intl.
- Juan Jose Mostajo, Vice President, Legal Affairs, MCP
- Manuel Echevarria, Project Manager, MCP
- Dai Xibao, Vice President Finance, MCP
- Hao Xhengyu, Budget Manager, MCP
- Ignacio Zavala, Project Control Manager, MCP
- Ricardo Brazzini, Materials and Contracts Manager, MCP
- David Thomas, Chief Operating Officer, MCP
- Leo Hilsinger, Vice President, Construction, MCP
- Tom Olsen, Vice President, Operations, MCP
- Mario Ramirez, Construction Manager, MCP
- Feride Legaspi, Jacobs Project Manager, MCP
- Ezio Buselli, Vice President, Environment and Corporate Affairs, MCP
- Carlos Cueva, Mining Safety Manager, MCP
- Luis Valdivia, Manager of Electricity, MCP
- Fernando Ferreyros, Vice President, Administration and Human Resources, MCP
- Esteban Bedoya, Human Development Manager, MCP
- Arnaldo Huanca, Community Relations Manager, MCP
- Roger Davila, Community Relations Coordinator, MCP
- Judith Mendoza, Community Relations Liaison, MCP
- Cesar Delgado, Community Relations Coordinator, MCP

4.15.2 Manpower

MCP has implemented a robust human resources system, which aims to build a competitive position for MCP in the Peruvian mining industry as the best place to work. The approach focuses on recruitment and selection, competitive compensation and benefits, training and capacity building, and a performance-based incentive structure. Pressure for experienced mining professionals in Peru has reduced slightly as a number of projects have been put on hold; however, the Project still budgets for 6% to 7% annual increases in salary budgets to remain competitive and some key positions have recently become vacant, notably the mine manager position. The Vice President of Administration and Human Resources reported that loss of key personal is limited and largely relates to working at high altitude or to offers that incorporate promotion or other benefits.

The Company is implementing significant internal training and capacity-building programs focused on local hiring and retention of key personnel. Budgets on the Toro-Boys technical training program and on middle management training programs have been US$4.0 million and US$0.5 million each, respectively, so far. MCP also plans to implement a corporate university, programs with regional universities, and a trainee program for top recent graduates.

4.15.3 Conclusions

- The MCP team is being built from the ground up with the best available workforce. The human resource group has created a strong strategy for hiring, compensation, retention, and development, all key to a large operation.
- Hiring is on schedule with only senior positions with technical specialty experience requiring a broader search and compensation above target, *i.e.*, Hydrometallurgical Superintendent, Mine Superintendent.
- The MCP operation at Toromocho is a desirable location as is only 140 km from Lima and the Company is offering an attractive work schedule of 7 and 7 to the work force.
- The human resource group is maximizing local workforce (Morococha) as well as local national content. Ex-pat projection for operations was estimated between 4 and 6.
- A key vacant position is the molybdenum hydrometallurgy plant superintendent. This is a critical part of the total operation and potentially impacts the copper production and plant throughput. Behre Dolbear believes that this position should be filled as soon as possible with a highly experienced person in this area of technical expertise.

4.15.4 Risk Analysis

Project risks related to availability and ability to access highly qualified technical experts, especially in the mineral processing area, have the potential to impact Project costs, schedules, and production levels. This risk remains **Low to Moderate/Unlikely to Possible.**

4.16 CAPITAL COST ESTIMATE AND IMPLEMENTATION SCHEDULE

4.16.1 Total Capital Cost Estimate

MCP has provided an update to the total capital cost in a recently completed forecast. A comparison is provided in Table 4.2. The main increases in the capital estimate are as follows:

- US$260.0 million in Morococha relocation
- US$193.0 million in secondary projects, including water treatment plant, transmission lines, and payment to Pan American Silver
- Increases in labor for construction due to inflation, *i.e.*, weakened U.S. dollar
- Unfavorable changes in currency exchange, 3%

TABLE 4.2
MINE, CONCENTRATOR, AND INFRASTRUCTURE CAPITAL COST
(US$ × 000)

Operations	Definitive Estimate Third Quarter 2010	Fourth Quarter 2011 Estimate	Third Quarter 2012 Estimate
Mine	303,486	312,640	297,393
Process and Infrastructure	1,543,586	1,673,247	1,839,503
Owner's Cost	413,461	448,191	626,151
Subtotal	**2,260,533**	**2,434,078**	**2,763,047**
Contingency			
Mining	15,169	15,169	6,094
Process and Infrastructure	123,119	133,460	32,411
Owner's Cost	32,030	34,720	21,997
Subtotal	**170,318**	**183,349**	**60,502**
Working Capital Subtotal	**56,000**	**56,000**	**56,000**
Total Estimated Project Cost	**2,486,851**	**2,673,427**	**2,879,549**
Secondary Projects			
Infrastructure[1]	NA	NA	192,561
Relocation of Central Highway	75,000	75,000	70,000
Relocation of Morococha	100,000	100,000	260,000
Construction of Lime Quarry and Plant	75,000	100,000	100,000
Totals	**2,736,851**	**2,948,427**	**3,502,110**

1 Includes: Port Callao, transmission lines, Kingsmill Tunnel Water Treatment Plant, Pan American Silver, contingency and interest.

Jacobs and MCP have demonstrated good management practices in controlling costs while maintaining flexibility in the direction of work effort with unexpected delays in delivery of construction materials.

4.16.2 Construction Schedule

The previous ITR showed mechanical completion and pre-commissioning start-up occurring on October 15, 2013. This schedule has changed to December 15, 2013, a slippage of two months. MCP Vice President Construction, Leo Hilsinger, reported that the Project, as of the visit, was approximately 35% complete. MCP views the Project as essentially on schedule and sees the slippage as more related to obtaining the Mine Plan permit, which is scheduled to be approved in February 2013. This permit will approve the operations and allow the immediate development of the mine with pre-stripping activities. With a low strip ratio <1:1, MCP feels that they can easily have the mine ready for production, on schedule. Impacts/Issues cited were the impact of a weakened dollar. All contracts have adjustment clauses in them to adjust for exchange rate changes, thereby causing labor rates to increase.

MCP reported that all major contracts are in place, including the tailings pipeline placement contract.

MCP emphasized that the hydrometallurgy plant, for the treatment of the molybdenum concentrate, is critical and a priority has been placed on the mechanical completion of this facility, 3 to 4 months ahead of the concentrator. This will allow pre-commissioning and startup testing as well as training of the operators.

With the exception of the lime plant, MCP reported that all major equipment has been arrived in Peru and is either located at the site or at the port in Callao. The months of October and November will be the heaviest transportation movement from Callao to site. After this, the amount of truck transport traffic will steadily decrease, especially when the rail spur and sidings are completed later this year.

The construction of the lime plant is anticipated to begin in March 2013, after approval of permit applications for the plant in February 2013. Components of the kilns have started shipping and all materials and equipment will arrive prior to construction.

As of the October 2012 visit, the Jacobs project management team appears to have good control of the construction activities and is well skilled and versed in the management of large, complex projects. The team has already demonstrated capabilities and flexibility in schedule loss recovery on several occasions where they were forced to quickly acquire structural steel from Peru versus the awarded contractor who was forecasting late delivery. Construction subcontractors' efforts were redirected and the schedule slippage was recovered.

There are many factors in a project effort of this magnitude that can impact the construction schedule. In that the Project is still in the very early days, there is a risk for the Project schedule to slip due to:

- Commencement of rainy season, which has begun one month early
- Landslides across the main supply lines
- Delays in permits
- Stalled negotiations on land acquisition
- High altitude impact on worker productivity
- Social protest
- Workforce protest

As the Project grows in completion, the flexibility to redirect labor forces will be significantly reduced in terms of schedule recovery. This will occur when the construction efforts shift from area focus to trade skill/specialty focus. Behre Dolbear would assess the schedule risk as **Low to Moderate Risk/Likely** to occur.

4.16.3 Conclusions

The construction is advancing rapidly with an experienced team of professionals. Schedule slippage has been recovered and minimized with pre-commissioning, now scheduled for mid-December 2013.

The new forecast for total Project CAPEX, as of September 2012, is US$3.5 billion. The increases are primarily due to secondary projects and better definition of cost for these projects, such as the town relocation, lime plant, and the Kingsmill Tunnel Water Treatment Plant.

The lime plant has been engineered and designed. Equipment is en route and permit applications have been submitted to the Ministry of Production. Construction is scheduled to begin in March 2013.

The construction schedule is highly dependent on continued high worker productivity, proper management and scheduling of activities, and on-time delivery of materials and equipment.

4.16.4 Risks

The costs of the relocation of the town of Morococha are better defined and the total has been escalated; thereby, reducing the risk of further increases in capital cost. There is a risk of further increases but the potential increase would appear to be **Low Risk/Unlikely to Possible.**

There remains uncertainty with several communities on the acquisition of rights to the land around the limestone deposits and the development of these quarries. With the notice of Morococha's relocation and ability to see others improvements, the risk exists for escalation of the capital costs required to complete the acquisition and development of the quarries. Delay will cause increased operating costs in high cost lime and there will be leverage to resolve the issues quickly. The risk of increased capital costs for the lime plant is **Low to Moderate Risk/Likely** to occur.

The schedule slippage to date is low; however, due to the many factors involved, the potential for additional slippage is **Low to Moderate Risk/Unlikely to Possible.**

4.17 OPERATING COSTS

4.17.1 General

The operating costs for Toromocho have not been changed since the April 2012 ITR. Since this time, all major contracts have been completed; however, costs are no better defined than the previous estimates as the pricing is dependent on the time of order in the future with escalation provisions. In general, steel consumables and fuel have reduced in price since April 2012. Therefore, Behre Dolbear believes that the operating cost estimates used previously are still valid and remain unchanged as of September 2012.

MCP stated that they are monitoring the inflation rate in Peru and preparing operations budgets accordingly. The labor rate has the potential to increase after the start of operations. As of September 2012, MCP stated that the budget for labor and strategy for hiring and compensation has been strictly adhered to in the process. Behre Dolbear believes that there is potential for increases in the future.

4.17.2 Mine

No changes were made to the mine operating costs as the primary design parameters have not changed since the original ITR.

4.17.3 Processing, Infrastructure, and General and Administrative (G&A)

No changes were made to the operating costs in this area over the prior estimates of the original ITR.

4.17.4 Conclusions

The generation of the costs by IMC and Aker Solutions remain thorough and professional. The available general escalators have been used by Behre Dolbear to align the estimates for the original ITR and these estimates remain unchanged.

4.17.5 Risks

The projected Toromocho operating costs, as escalated, are based on available escalation factors and the risk is **Low to Moderate/Unlikely to Possible.**

4.18 MARKETING AND SALES

The Group reported that they have secured off-take agreements with traders and smelters for 60% of the copper concentrate production. Terms of the agreements were not made available to Behre Dolbear; however, the Group has provided the freight and treatment charges for the economic analysis. Behre Dolbear believes that the changes in the treatment charges reflect their experiences in the marketing of the Toromocho concentrates.

4.19 ECONOMIC ANALYSIS

Behre Dolbear has prepared an updated economic analysis for the Toromocho Project, using the same model structure as used in the original ITR. No adjustments have been made to production schedules or the grades, recoveries, or impurity assay level of the concentrates. The analysis basis is as of September 2012.

The previous ITR economic analysis was created based on the Aker Solutions Definitive Estimate of February 2011 and updated to fourth quarter 2011 dollars. The capital estimates for this economic model have incorporated the latest forecast of total Project CAPEX prepared by MCP. MCP has developed the forecast based on spent and committed dollars, to date, along with their estimate of funds required to complete the Project based on the Definitive Estimate of 2011 and current Project construction experience and trends.

Metal prices were adjusted based on new data from consensus of brokers obtained in October 2012 by the Group and provided for use in the analysis. Treatment and freight charges for the concentrates were also provided by the Group. All other inputs to the model were unchanged.

Table 4.3 is the metal pricing from a consensus of brokers provided by the Group and are used by Behre Dolbear at the Group's request. Behre Dolbear does not make forecasts of its own, but relies on those of other companies. The forecasts are made by reputable companies, who are in the business of providing forecasts.

For convenience of comparison, Table 4.4 is provided from the April 2012 ITR.

TABLE 4.3
BROKER CONSENSUS — COPPER, MOLYBDENUM, AND SILVER

Copper		US$/tonne					
Broker	Date	2012	2013	2014	2015	2016	LT
Standard Chartered	08/10/12	8,093	8,875	10,500	11,000	9,000	
UBS	11/10/12	7,959	7,496	5,842	6,283	6,283	5,622
Raymond James	27/09/12	7,915	8,267	8,818			6,063
Deutsche Bank	21/09/12	7,866	8,003	7,502			NA
Canaccord	20/09/12	7,915	7,716	7,716	7,165	6,614	6,063
RBC	17/09/12	7,826	8,267	8,267	8,267	9,370	6,063
Morgan Stanley	17/09/12	7,937	8,333	7,826	7,055	6,614	6,107
JP Morgan	17/09/12	8,125	8,850	9,700			5,500
BMO Capital Markets	17/09/12	7,848	7,937	7,716	7,716		6,063
Credit Suisse	13/09/12	7,747	7,950	7,500	7,000		5,500
Macquarie Research	12/09/12	8,333	8,532	7,672	7,562	7,496	6,504
RBS	12/09/12	8,047	8,708	8,378			6,614
TD Newcrest	30/07/12	8,047	8,598	7,716	7,716		6,063
HSBC	17/07/12	8,003	7,496	8,003	7,253		6,173
Societe Generale	05/07/12	8,001	7,800	7,500	7,000		6,173
Average		**7,977**	**8,189**	**8,044**	**7,638**	**7,563**	**6,039**

Molybdenum		US$/tonne					
Broker	Date	2012	2013	2014	2015	2016	LT
Raymond James	27/09/12	30,490	33,069	37,479			30,865
Deutsche Bank	21/09/12	30,754	30,865	35,274			NA
Canaccord	20/09/12	30,049	30,865	33,069	33,069	33,069	33,069
RBC	17/09/12	28,660	33,069	38,581	33,069	24,251	27,558
BMO Capital Markets	17/09/12	29,652	30,865	30,865	30,865		30,865
Macquarie Research	12/09/12	31,967	35,274	35,274	34,172	37,479	33,069
TD Newcrest	30/07/12	30,292	35,274	35,274	35,274		33,069
Average		**30,266**	**32,754**	**35,116**	**33,290**	**31,600**	**31,416**

TABLE 4.3
BROKER CONSENSUS — COPPER, MOLYBDENUM, AND SILVER

Silver		US$/oz					
Broker	**Date**	**2012**	**2013**	**2014**	**2015**	**2016**	**LT**
Standard Chartered	08/10/12	31.0	35.0	39.0	34.0	28.0	
UBS	11/10/12	32.0	36.9	31.0	20.0	19.0	22.0
Raymond James	27/09/12	30.3	34.8	32.0			19.5
Deutsche Bank	21/09/12	33.0	43.0	36.0			NA
Canaccord	20/09/12	31.5	34.0	31.5	29.5	28.5	27.5
RBC	17/09/12	33.0	35.0	30.0	27.5	25.0	25.0
Morgan Stanley	17/09/12	31.5	34.9	33.9	32.7	28.9	22.9
TD Newcrest	17/09/12	30.5	34.0				25.0
BMO Capital Markets	17/09/12	29.8	35.0	32.0	28.0		21.0
Credit Suisse	13/09/12	30.5	29.2	25.4	23.3		21.7
RBS	03/08/12	32.0	29.0				18.0
HSBC	17/07/12	31.0	32.0	28.0	28.0		25.0
Societe Generale	05/07/12	33.0	30.0	28.0	27.0		19.0
Average		**31.5**	**34.1**	**31.5**	**27.8**	**25.9**	**22.4**

TABLE 4.4
METAL PRICES — BEHRE DOLBEAR APRIL 2012 ITR

Metal	2012	2013	2014	2015	Long-Term
Average of Forecasts — Made August 2011 to September 2011					
Copper ($/lb)	$ 4.53	$ 4.18	$ 3.83	$ 3.84	$ 2.57
Molybdenum ($/lb)	$17.78	$18.66	$17.25	$18.50	$15.17
Silver ($/oz)	$37.90	$36.94	$35.28	$32.00	$22.50

Note: Not all metals projected by all forecasters

ACTUAL HISTORICAL

Five-year Average Prices (4Q2006 through 3Q2011)

Copper	$ 3.22
Molybdenum	$21.08
Silver	$18.77

Third Quarter 2011 Average Prices (considered "current prices" for purposes of report, since costs are estimated as of 4Q2011)

Copper	$ 4.09
Molybdenum	$14.69
Silver	$39.06

4.19.1 Results

For the base case, the life of mine cash flow (undiscounted) is US$14.840 billion. This is an increase from April's value of US$13.786 billion. The increased CAPEX forecast was offset by higher long-term copper prices and lower smelter charges (increased NSR).

As demonstrated in the original ITR, mining projects are most sensitive to changes in metal prices. Sensitivities to the base case, ±10%, were performed on metal prices, initial capital and cash operating cost. Sensitivities were not conducted in the ITR update, as the results would parallel the original results. There is potential upside to the life-of-mine net cash flow with continued long-term metal price increases.

The weakening dollar and stronger Sol have contributed to inflation in Peru in the past year and is expected to continue. Inflation is a risk to be monitored. In the economic analysis, Behre Dolbear elected to hold the operating costs to the same level as the original ITR. Although inflation is a consideration, the recent drop in steel costs and fuel prices, two major consumable costs, potentially offset any inflation increases. This, combined with on-budget hiring and no labor cost increase trends to date for the Project and a power contract which has not escalated, suggested that the original operating cost estimates are within the accuracy of the estimate and have also been considered in the sensitivities run on the various parameters in the original economic analysis. Any increase in the operating cost is well within the sensitivity analysis conducted.

4.19.2 Conclusions

The Toromocho ITR Update, as of date of September 30, 2012, reconfirms the economic viability of the Toromocho Project as projected in the April 2012 Toromocho Project ITR. However, Behre Dolbear, again, cautions that the mining industry is cyclical and when a new cycle of lower prices will occur is not known.

4.19.3 Risk Analysis

No risk analysis is provided with the economic analysis in general, but risks for operating costs, capital investments and other items are discussed elsewhere in the report.

4.20 OVERALL RISK ASSESSMENT/CONSEQUENCE

A summary of the overall Toromocho Project's risk and likelihood assessment and resultant consequence assignment from the original ITR are provided in Table 4.5.

TABLE 4.5
TOROMOCHO PROJECT RISK ASSESSMENT SUMMARY

Issue	Risk	Likelihood	Consequence Rating
Land Status			
Fail to transfer parcel	Low	Unlikely	Low
Issues with adjacent operations	Low	Unlikely	Low
Resources and Reserves			
Problems with drilling data, mine sampling data, and assays	Low	Unlikely	Low
Variography inaccurate	Low	Unlikely	Low
Resource categorization unreliable	Low	Unlikely	Low
Mining losses and dilution insufficient (as adjusted by Behre Dolbear)	Low	Unlikely	Low
Geotechnical			
Pit slope angles unreliable	Low to Moderate	Unlikely to Possible	Low to Medium
Stockpiles and waste dumps unstable (complete proposed work)	Low to Moderate	Unlikely to Possible	Low to Medium
Mining			
Production levels not met	Low to Moderate	Unlikely to Possible	Low to Medium
Operating costs exceeded	Moderate	Possible	Medium
Capital costs exceeded	Low to Moderate	Unlikely to Possible	Low to Medium
Process			
Copper recovery not achieved	Low to Moderate	Unlikely to Possible	Low to Medium
Concentrate grade not achieved	Low	Unlikely	Low
Higher penalties for insol	Low to Moderate	Unlikely to Possible	Low to Medium
Silver recovery not achieved	Moderate	Unlikely to Possible	Low to Medium
Moly recovery circuit will not start-up as scheduled	High	Possible	Medium to High
Tailings deposition system may not work as planned	Moderate to High	Unlikely to Possible	Medium to High
Concentrates may not be as marketable as planned	Low to Moderate	Unlikely to Possible	Low to Medium
Infrastructure and Non-Process Facilities			
Incomplete highway relocation plans, lime quarry added scope, and uncertainties regarding the Morococha relocation may increase costs	Low to Moderate	Unlikely to Possible	Low to Medium

TABLE 4.5
TOROMOCHO PROJECT RISK ASSESSMENT SUMMARY

Issue	Risk	Likelihood	Consequence Rating
Environmental and Permitting			
Location issues could impact availability of skilled labor	Low to Moderate	Unlikely to Possible	Low to Medium
The large tailings area may have adverse impacts	Low	Unlikely	Low
Problems relocating Morococha residents could adversely impact the schedule	Low to Moderate	Unlikely to Possible	Low to Medium
Reclamation and Closure			
Dust and water reclamation may not be sufficient	Low	Unlikely	Low
Tailings reclamation may not be effective	Low	Unlikely	Low
Closed pit may reduce the quality of life in the area	Low	Unlikely	Low
Administration, Manpower, and Management			
Adequate skills, expertise, training, and numbers of personnel may not be available	Low to Moderate	Unlikely to Possible	Low to Medium
Capital Cost Estimate and Implementation Schedule			
The working capital estimate appears low (See Infrastructure and Non-Process Facilities) (See Mining)	Low to Moderate	Possible	Low to Medium
Operating Costs			
The escalation factors for 2007 to 2011 may be inaccurate	Low to Moderate	Unlikely to Possible	Low to Medium
Marketing and Sales (see Process, *i.e.*, concentrates)			
TC/RC charges could be more than projected in the future	Low to Moderate	Unlikely to Possible	Low to Medium
It may be difficult to market MoO3 due to quality	Low	Unlikely	Low

Additional and updated risks developed in the ITR Update, as of October 2012, are provided in Table 4.6.

TABLE 4.6
ADDITIONAL AND UPDATED RISKS DEVELOPED IN THE ITR UPDATE AS OF OCTOBER 2012

Issue	Risk	Likelihood	Consequence Rating
Increased Lime Plant CAPEX	Low to Moderate	Likely	Low
Schedule Delays Caused by Lime Plant, Productivity Issues	Low to Moderate	Likely	Medium
Transportation Safety Risks Impacting Schedule and Costs	Moderate	Possible	Medium
Social Protest in Delay of Project	Low	Unlikely	Low
Additional Development Funds Required for Community Development	Low	Likely to Possible	Low
Resettlement Issues with Morococha	Low	Unlikely	Low
Railroad Lands	Low	Unlikely	Low
Mining Lands and Other Companies	Low	Unlikely	Low
Electrical Power	Low	Unlikely	Low
Highway Relocation	Low	Unlikely	Low
Water Rights Acquisition	Low	Unlikely	Low

5.0 REFERENCE MATERIAL

1) Chinalco and MCP, Peru, Personal Communications with staff members involving Project Management, Construction, Process, Social, Environmental, Legal, Site Tour, Executive Management and Power.

2) Behre Dolbear Asia, Inc., Toromocho Project Independent Technical Review, April 2012.

APPENDIX 1.0

CASH FLOW BALANCE SHEETS

Economic analysis of
Chinalco Toromocho Copper Project, Peru
Prepared by Behre Dolbear & Co.
October 29, 2012
Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound

	Pre-production year -3	Pre-production year -2	Pre-production year -1	Production year +1	Production year +2	Production year +3	Production year +4	Production year +5	Production year +6	Production year +7
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Production										
Waste (tonnes)	0	0	43,893,000	31,961,000	37,253,000	38,839,000	38,789,000	32,871,000	27,475,000	19,297,000
Low-grade mill material stockpiled (tonnes)	0	0	1,208,000	11,345,000	12,686,000	12,954,000	11,671,000	18,443,000	23,739,000	32,075,000
High arsenic material stockpiled (tonnes)	0	0	3,919,000	17,452,000	1,881,000	27,000	1,360,000	506,000	606,000	448,000
High-grade milling ore (tonnes)	0	0	980,000	38,245,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
total material moved (tonnes)	0	0	50,000,000	99,003,000	95,000,000	95,000,000	95,000,000	95,000,000	95,000,000	95,000,000
High-grade ore to mill (tonnes)	0	0	980,000	38,245,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
Low-grade ore to mill (tonnes)	0	0	0	0	0	0	0	0	0	0
total ore to mill (tonnes)	0	0	980,000	38,245,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
High-grade ore										
copper (%)	0.0000%	0.0000%	0.4835%	0.5860%	0.5950%	0.5950%	0.6250%	0.6090%	0.6180%	0.6050%
molybdenum (%)	0.0000%	0.0000%	0.0981%	0.0124%	0.0160%	0.0200%	0.0210%	0.0110%	0.0170%	0.0160%
silver (grams per tonne)	0.000	0.000	11.800	7.429	7.338	7.533	6.455	9.901	7.193	7.232
Low-grade ore										
copper (%)	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
molybdenum (%)	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
silver (grams per tonne)	0	0	0	0	0	0	0	0	0	0
contained metal										
copper (tonnes)	0	0	4,738	224,116	256,921	256,921	269,875	262,966	266,852	261,239
molybdenum (tonnes)	0	0	961	4,742	6,909	8,636	9,068	4,750	7,341	6,909
silver (grams)	0	0	11,564,000	284,122,105	316,854,840	325,274,940	278,726,900	427,525,180	310,593,740	312,277,760
metallurgical recovery										
copper (%)	0.00%	0.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
molybdenum (%)	0.00%	0.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%
silver (%)	0.00%	0.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%
recovered metal										
copper (tonnes)	0	0	4,028	190,498	218,383	218,383	229,394	223,521	226,825	222,053
copper (pounds)	0	0	8,879,228	419,976,461	481,451,199	481,451,199	505,726,049	492,779,462	500,061,917	489,542,816
molybdenum (tonnes)	0	0	625	3,083	4,491	5,613	5,894	3,087	4,771	4,491
molybdenum (pounds)	0	0	1,377,660	6,795,845	9,900,331	12,375,414	12,994,185	6,806,478	10,519,102	9,900,331
silver (grams)	0	0	8,094,800	198,885,474	221,798,388	227,692,458	195,108,830	299,267,626	217,415,618	218,594,432
silver (troy ounces)	0	0	260,254	6,394,316	7,130,983	7,320,482	6,272,894	9,621,677	6,990,074	7,027,973

Economic analysis of
Chinalco Toromocho Copper Project, Peru
Prepared by Behre Dolbear & Co.
October 29, 2012
Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound

		Pre-production year -3	Pre-production year -2	Pre-production year -1	Production year +1	Production year +2	Production year +3	Production year +4	Production year +5	Production year +6	Production year +7
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
copper/silver concentrates											
concentrate (dry tonnes)		0	0	15,198	718,862	824,086	824,086	865,637	843,476	855,942	837,936
concentrate (wet tonnes)	9.00%	0	0	16,566	783,559	898,254	898,254	943,544	919,389	932,976	913,351
copper grade of concentrate (%)		26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%
silver grade of concentrate (grams per tonne)		0.00	0.00	532.61	276.67	269.14	276.30	225.39	354.80	254.01	260.87
arsenic grade of concentrate (%)		0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%
zinc grade of concentrate (%)		9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
molybdenum chemical grade oxide (tonnes)		0	0	625	3,083	4,491	5,613	5,894	3,087	4,771	4,491
molybdenum chemical grade oxide (pounds)		0	0	1,377,660	6,795,845	9,900,331	12,375,414	12,994,185	6,806,478	10,519,102	9,900,331

Economic analysis of Chinalco Toromocho Copper Project, Peru
Prepared by Behre Dolbear & Co.
October 29, 2012
Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound

	Production year +8	Production year +9	Production year +10	Production year +11	Production year +12	Production year +13	Production year +14	Production year +15	Production year +16	Production year +17	Production year +18
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Production											
Waste (tonnes)	31,851,000	43,933,000	40,429,000	38,017,000	47,649,000	51,820,000	50,916,000	50,917,000	49,892,000	49,912,000	50,962,000
Low-grade mill material stockpiled (tonnes)	19,932,000	6,048,000	10,901,000	13,782,000	4,171,000	0	903,000	837,000	1,760,000	997,000	833,000
High arsenic material stockpiled (tonnes)	37,000	1,839,000	480,000	21,000	0	0	0	66,000	167,000	911,000	25,000
High-grade milling ore (tonnes)	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
total material moved (tonnes)	95,000,000	95,000,000	94,990,000	95,000,000	95,000,000	95,000,000	94,999,000	95,000,000	94,999,000	95,000,000	95,000,000
High-grade ore to mill (tonnes)	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
Low-grade ore to mill (tonnes)	0	0	0	0	0	0	0	0	0	0	0
total ore to mill (tonnes)	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
High-grade ore											
copper (%)	0.5880%	0.6050%	0.5840%	0.5610%	0.5510%	0.5330%	0.4680%	0.4470%	0.4820%	0.4570%	0.4850%
molybdenum (%)	0.0180%	0.0280%	0.0240%	0.0230%	0.0180%	0.0220%	0.0120%	0.0160%	0.0190%	0.0210%	0.0220%
silver (grams per tonne)	6.494	5.377	5.843	6.804	8.105	7.144	8.571	6.367	6.668	5.193	8.057
Low-grade ore											
copper (%)	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
molybdenum (%)	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
silver (grams per tonne)	0	0	0	0	0	0	0	0	0	0	0
contained metal											
copper (tonnes)	253,898	261,239	252,171	242,240	237,922	230,149	202,082	193,015	208,128	197,333	209,423
molybdenum (tonnes)	7,772	12,090	10,363	9,931	7,772	9,500	5,182	6,909	8,204	9,068	9,500
silver (grams)	280,410,920	232,178,860	252,300,740	293,796,720	349,973,900	308,477,920	370,095,780	274,927,060	287,924,240	224,233,740	347,901,260
metallurgical recovery											
copper (%)	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
molybdenum (%)	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%
silver (%)	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%
recovered metal											
copper (tonnes)	215,814	222,053	214,346	205,904	202,234	195,627	171,770	164,062	176,908	167,733	178,010
copper (pounds)	475,787,067	489,542,816	472,550,420	453,939,702	445,848,085	431,283,175	378,687,666	361,695,270	390,015,929	369,786,887	392,443,414
molybdenum (tonnes)	5,052	7,859	6,736	6,455	5,052	6,175	3,368	4,491	5,333	5,894	6,175
molybdenum (pounds)	11,137,873	17,325,579	14,850,497	14,231,726	11,137,873	13,612,955	7,425,248	9,900,331	11,756,643	12,994,185	13,612,955
silver (grams)	196,287,644	162,525,202	176,610,518	205,657,704	244,981,730	215,934,544	259,067,046	192,448,942	201,546,968	156,963,618	243,530,882
silver (troy ounces)	6,310,794	5,225,306	5,678,159	6,612,048	7,876,345	6,942,456	8,329,198	6,187,377	6,479,885	5,046,497	7,829,699

Economic analysis of
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October 29, 2012
Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound

		Production year +8	Production year +9	Production year +10	Production year +11	Production year +12	Production year +13	Production year +14	Production year +15	Production year +16	Production year +17	Production year +18
		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
copper/silver concentrates												
concentrate (dry tonnes)		814,391	837,936	808,851	776,996	763,145	738,215	648,189	619,103	667,579	632,954	671,734
concentrate (wet tonnes)	9.00%	887,686	913,351	881,648	846,925	831,828	804,654	706,526	674,823	727,661	689,919	732,190
copper grade of concentrate (%)		26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%
silver grade of concentrate (grams per tonne)		241.02	193.96	218.35	264.68	321.02	292.51	399.68	310.85	301.91	247.99	362.54
arsenic grade of concentrate (%)		0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%
zinc grade of concentrate (%)		9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
molybdenum chemical grade oxide (tonnes)		5,052	7,859	6,736	6,455	5,052	6,175	3,368	4,491	5,333	5,894	6,175
molybdenum chemical grade oxide (pounds)		11,137,873	17,325,579	14,850,497	14,231,726	11,137,873	13,612,955	7,425,248	9,900,331	11,756,643	12,994,185	13,612,955

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound	Production year +19	Production year +20	Production year +21	Production year +22	Production year +23	Production year +24	Production year +25	Production year +26	Production year +27	Production year +28	Production year +29
	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Production											
Waste (tonnes)	50,539,000	50,444,000	50,719,000	48,025,000	36,505,000	25,883,000	21,752,000	18,981,000	19,880,000	13,230,000	10,488,000
Low-grade mill material stockpiled (tonnes)	1,281,000	1,376,000	1,101,000	0	0	0	0	0	0	0	0
High arsenic material stockpiled (tonnes)	0	0	0	0	0	0	0	0	0	0	0
High-grade milling ore (tonnes)	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
total material moved (tonnes)	95,000,000	95,000,000	95,000,000	91,205,000	79,685,000	69,063,000	64,932,000	62,161,000	63,060,000	56,410,000	53,668,000
High-grade ore to mill (tonnes)	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
Low-grade ore to mill (tonnes)	0	0	0	0	0	0	0	0	0	0	0
total ore to mill (tonnes)	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
High-grade ore											
copper (%)	0.5410%	0.4690%	0.4070%	0.3400%	0.3880%	0.3770%	0.3740%	0.4020%	0.3990%	0.4420%	0.4240%
molybdenum (%)	0.0250%	0.0290%	0.0300%	0.0270%	0.0100%	0.0110%	0.0130%	0.0160%	0.0180%	0.0220%	0.0250%
silver (grams per tonne)	7.562	6.562	6.057	9.183	6.057	6.435	5.766	5.474	4.979	7.270	7.581
Low-grade ore											
copper (%)	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
molybdenum (%)	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
silver (grams per tonne)	0	0	0	0	0	0	0	0	0	0	0
contained metal											
copper (tonnes)	233,604	202,514	175,743	146,812	167,538	162,789	161,493	173,584	172,288	190,856	183,083
molybdenum (tonnes)	10,795	12,522	12,954	11,659	4,318	4,750	5,613	6,909	7,772	9,500	10,795
silver (grams)	326,527,160	283,347,160	261,541,260	396,521,940	261,541,260	277,863,300	248,975,880	236,367,320	214,993,220	313,918,600	327,347,580
metallurgical recovery											
copper (%)	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
molybdenum (%)	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%
silver (%)	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%
recovered metal											
copper (tonnes)	198,563	172,137	149,381	124,790	142,408	138,370	137,269	147,546	146,445	162,227	155,621
copper (pounds)	437,756,468	379,496,827	329,328,803	275,114,971	313,954,731	305,053,953	302,626,468	325,282,995	322,855,510	357,649,462	343,084,552
molybdenum (tonnes)	7,017	8,139	8,420	7,578	2,807	3,087	3,649	4,491	5,052	6,175	7,017
molybdenum (pounds)	15,469,267	17,944,350	18,563,121	16,706,809	6,187,707	6,806,478	8,044,019	9,900,331	11,137,873	13,612,955	15,469,267
silver (grams)	228,569,012	198,343,012	183,078,882	277,565,358	183,078,882	194,504,310	174,283,116	165,457,124	150,495,254	219,743,020	229,143,306
silver (troy ounces)	7,348,664	6,376,875	5,886,122	8,923,933	5,886,122	6,253,458	5,603,332	5,319,570	4,838,534	7,064,901	7,367,128

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		Production year +19	Production year +20	Production year +21	Production year +22	Production year +23	Production year +24	Production year +25	Production year +26	Production year +27	Production year +28	Production year +29
		2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
copper/silver concentrates												
concentrate (dry tonnes)		749,295	649,574	563,703	470,906	537,387	522,152	517,997	556,778	552,623	612,178	587,248
concentrate (wet tonnes)	9.00%	816,732	708,035	614,436	513,288	585,752	569,146	564,617	606,888	602,359	667,274	640,100
copper grade of concentrate (%)		26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%
silver grade of concentrate (grams per tonne)		305.05	305.34	324.78	589.43	340.68	372.51	336.46	297.17	272.33	358.95	390.20
arsenic grade of concentrate (%)		0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%
zinc grade of concentrate (%)		9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
molybdenum chemical grade oxide (tonnes)		7,017	8,139	8,420	7,578	2,807	3,087	3,649	4,491	5,052	6,175	7,017
molybdenum chemical grade oxide (pounds)		15,469,267	17,944,350	18,563,121	16,706,809	6,187,707	6,806,478	8,044,019	9,900,331	11,137,873	13,612,955	15,469,267

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	Production year +30	Production year +31	Production year +32	Production year +33	Production year +34	Production year +35	Production year +36	Production year +37	Production year +38	Production year +39	Production year +40	Total
	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	
Production												
Waste (tonnes)	9,652,000	14,187,000	14,432,000									1,161,393,000
Low-grade mill material stockpiled (tonnes)	0	0	0	0	0	0	0	0	0	0	0	188,043,000
High arsenic material stockpiled (tonnes)	0	0	0	0	0	0	0	0	0	0	0	29,745,000
High-grade milling ore (tonnes)	43,180,000	43,180,000	17,715,000									1,352,340,000
total material moved (tonnes)	52,832,000	57,367,000	32,147,000	0	0	0	0	0	0	0	0	2,731,521,000
High-grade ore to mill (tonnes)	43,180,000	43,180,000	17,715,000	0	0	0	0	0	0	0	0	1,352,340,000
Low-grade ore to mill (tonnes)	0	0	25,465,000	43,180,000	43,180,000	43,180,000	33,038,000	0	0	0	0	188,043,000
total ore to mill (tonnes)	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	33,038,000	0	0	0	0	1,540,383,000
High-grade ore												
copper (%)	0.3720%	0.2810%	0.1660%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	
molybdenum (%)	0.0290%	0.0330%	0.0400%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	
silver (grams per tonne)	6.232	9.872	6.833	0	0	0	0	0	0	0	0	
Low-grade ore												
copper (%)	0.0000%	0.0000%	0.3660%	0.3660%	0.3660%	0.3660%	0.3660%	0.0000%	0.0000%	0.0000%	0.0000%	
molybdenum (%)	0.0000%	0.0000%	0.0080%	0.0080%	0.0080%	0.0080%	0.0080%	0.0000%	0.0000%	0.0000%	0.0000%	
silver (grams per tonne)	0	0	5.877	5.877	5.877	5.877	5.877	0	0	0	0	
contained metal												
copper (tonnes)	160,630	121,336	122,609	158,039	158,039	158,039	120,919	0	0	0	0	7,261,141
molybdenum (tonnes)	12,522	14,249	9,123	3,454	3,454	3,454	2,643	0	0	0	0	292,095
silver (grams)	269,097,760	426,272,960	270,704,400	253,768,860	253,768,860	253,768,860	194,164,326	0	0	0	0	10,559,651,311
metallurgical recovery												
copper (%)	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	0.00%	0.00%	0.00%	0.00%	
molybdenum (%)	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	0.00%	0.00%	0.00%	0.00%	
silver (%)	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	0.00%	0.00%	0.00%	0.00%	
recovered metal												
copper (tonnes)	136,535	103,135	104,217	134,333	134,333	134,333	102,781	0	0	0	0	6,171,970
copper (pounds)	301,008,144	227,374,432	229,759,941	296,153,174	296,153,174	296,153,174	226,593,529	0	0	0	0	13,606,849,070
molybdenum (tonnes)	8,139	9,262	5,930	2,245	2,245	2,245	1,718	0	0	0	0	189,862
molybdenum (pounds)	17,944,350	20,419,433	13,073,573	4,950,166	4,950,166	4,950,166	3,787,484	0	0	0	0	418,572,725
silver (grams)	188,368,432	298,391,072	189,493,080	177,638,202	177,638,202	177,638,202	135,915,028	0	0	0	0	7,391,755,918
silver (troy ounces)	6,056,185	9,593,495	6,092,343	5,711,200	5,711,200	5,711,200	4,369,769	0	0	0	0	237,650,447

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		2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	
copper/silver concentrates													
concentrate (dry tonnes)		515,227	389,190	393,274	506,917	506,917	506,917	387,854	0	0	0	0	23,290,454
concentrate (wet tonnes)	9.00%	561,597	424,217	428,668	552,539	552,539	552,539	422,760	0	0	0	0	25,386,595
copper grade of concentrate (%)		26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	
silver grade of concentrate (grams per tonne)		365.60	766.70	481.84	350.43	350.43	350.43	350.43	0.00	0.00	0.00	0.00	
arsenic grade of concentrate (%)		0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	
zinc grade of concentrate (%)		9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	
molybdenum chemical grade oxide (tonnes)		8,139	9,262	5,930	2,245	2,245	2,245	1,718	0	0	0	0	189,862
molybdenum chemical grade oxide (pounds)		17,944,350	20,419,433	13,073,573	4,950,166	4,950,166	4,950,166	3,787,484	0	0	0	0	418,572,725

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		Pre-production year -3	Pre-production year -2	Pre-production year -1	Production year +1	Production year +2	Production year +3	Production year +4	Production year +5	Production year +6	Production year +7
		2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
metal prices [CONSENSUS OF BROKERS OCTOBER 2012]											
copper (US dollars per lb)		$ 4.37	$ 3.62	$ 3.71	$ 3.65	$ 3.46	$ 3.43	$ 2.74	$ 2.74	$ 2.74	$ 2.74
silver (US dollars per troy ounce)		$24.18	$31.50	$ 34.10	$ 31.50	$ 27.80	$ 25.90	$ 22.40	$ 22.40	$ 22.40	$ 22.40
molybdenum tech oxide (US dollars per lb)		$16.64	$13.73	$ 14.86	$ 15.93	$ 15.10	$ 14.33	$ 14.25	$ 14.25	$ 14.25	$ 14.25
chemical grade oxide premium	10.00%	$ 1.66	$ 1.37	$ 1.49	$ 1.59	$ 1.51	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43
moly chemical grade price (US dollar per lb)		$18.30	$15.10	$ 16.34	$ 17.52	$ 16.61	$ 15.77	$ 15.68	$ 15.68	$ 15.68	$ 15.68
income from sales [DATA FROM E-MAIL OF 10/24/2012 FOR TREATMENT CHARGE, PENALTIES, AND OCEAN FREIGHT, OTHERWISE, DATA AS PREVIOUSLY USED]											
copper payment	97.50%	$ 0	$ 0	$32,157,107	$1,494,059,470	$1,626,308,003	$1,610,338,757	$1,350,676,135	$1,316,098,826	$1,335,548,562	$1,307,454,499
silver payment	95.00%	$ 0	$ 0	$ 8,430,923	$ 191,349,900	$ 188,329,262	$ 180,120,454	$ 133,487,182	$ 204,749,278	$ 148,748,769	$ 149,555,275
molybdenum oxide payment	100.00%	$ 0	$ 0	$22,514,664	$ 119,071,392	$ 164,445,676	$ 195,121,784	$ 203,684,913	$ 106,692,098	$ 164,887,787	$ 155,188,505
total payment		$ 0	$ 0	$63,102,694	$1,804,480,763	$1,979,082,941	$1,985,580,995	$1,687,848,230	$1,627,540,202	$1,649,185,118	$1,612,198,279
treatment charge (US$ per dry tonne cons)	$ 65.00	$ 0	$ 0	$ 987,891	$ 46,726,009	$ 53,565,605	$ 53,565,605	$ 56,266,392	$ 54,825,972	$ 55,636,208	$ 54,465,867
refining charge per lb copper	$ 0.070	$ 0	$ 0	$ 621,546	$ 29,398,352	$ 33,701,584	$ 33,701,584	$ 35,400,823	$ 34,494,562	$ 35,004,334	$ 34,267,997
refining charge per ounce silver	$ 0.400	$ 0	$ 0	$ 104,102	$ 2,557,726	$ 2,852,393	$ 2,928,193	$ 2,509,158	$ 3,848,671	$ 2,796,029	$ 2,811,189
arsenic penalty											
penalty per increment	$ 2.00										
increment	0.10%										
penalty		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
zinc penalty											
penalty per increment	$ 1.00										
increment	1.00%										
penalty		$ 0	$ 0	$ 75,992	$ 3,594,308	$ 4,120,431	$ 4,120,431	$ 4,328,184	$ 4,217,382	$ 4,279,708	$ 4,189,682
subtotal, treatment and penalties		$ 0	$ 0	$ 1,789,530	$ 82,276,396	$ 94,240,013	$ 94,315,812	$ 98,504,556	$ 97,386,587	$ 97,716,280	$ 95,734,736
transport and handling											
copper cons, rail to port, per wet tonne	$ 17.90	$ 0	$ 0	$ 296,534	$ 14,025,710	$ 16,078,746	$ 16,078,746	$ 16,889,439	$ 16,457,070	$ 16,700,278	$ 16,348,977
port handling & loading, per wet tonne	$ 7.80	$ 0	$ 0	$ 129,216	$ 6,111,762	$ 7,006,381	$ 7,006,381	$ 7,359,644	$ 7,171,237	$ 7,277,216	$ 7,124,135
insurance, per dry tonne	$ 0.74	$ 0	$ 0	$ 11,247	$ 531,958	$ 609,824	$ 609,824	$ 640,571	$ 624,173	$ 633,397	$ 620,073
ocean freight, per wet tonne	$ 50.00	$ 0	$ 0	$ 828,308	$ 39,177,962	$ 44,912,699	$ 44,912,699	$ 47,177,205	$ 45,969,469	$ 46,648,820	$ 45,667,535
supervision & assaying, per dry tonne	$ 0.35	$ 0	$ 0	$ 5,319	$ 251,602	$ 288,430	$ 288,430	$ 302,973	$ 295,217	$ 299,580	$ 293,278
moly oxide, rail to port, per tonne	$ 17.90	$ 0	$ 0	$ 11,186	$ 55,178	$ 80,384	$ 100,480	$ 105,504	$ 55,264	$ 85,408	$ 80,384
port handling & loading, per tonne	$ 7.80	$ 0	$ 0	$ 4,874	$ 24,044	$ 35,028	$ 43,785	$ 45,974	$ 24,081	$ 37,217	$ 35,028
insurance, of net payable	0.00083	$ 0	$ 0	$ 18,687	$ 98,829	$ 136,490	$ 161,951	$ 169,058	$ 88,554	$ 136,857	$ 128,806
ocean freight, per tonne	$ 50.00	$ 0	$ 0	$ 31,245	$ 154,127	$ 224,536	$ 280,670	$ 294,704	$ 154,369	$ 238,570	$ 224,536
subtotal, transport and handling		$ 0	$ 0	$ 1,336,617	$ 60,431,171	$ 69,372,518	$ 69,482,966	$ 72,985,072	$ 70,839,433	$ 72,057,342	$ 70,522,752
net smelter return		$ 0	$ 0	$59,976,547	$1,661,773,196	$1,815,470,409	$1,821,782,216	$1,516,358,602	$1,459,314,181	$1,479,411,496	$1,445,940,792

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound		Production year +8 2021	Production year +9 2022	Production year +10 2023	Production year +11 2024	Production year +12 2025	Production year +13 2026	Production year +14 2027	Production year +15 2028	Production year +16 2029	Production year +17 2030	Production year +18 2031
metal prices [CONSENSUS OF BROKERS OCTOBER 2012]												
copper (US dollars per lb)		$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74
silver (US dollars per troy ounce)		$ 22.40	$ 22.40	$ 22.40	$ 22.40	$ 22.40	$ 22.40	$ 22.40	$ 22.40	$ 22.40	$ 22.40	$ 22.40
molybdenum tech oxide (US dollars per lb)		$ 14.25	$ 14.25	$ 14.25	$ 14.25	$ 14.25	$ 14.25	$ 14.25	$ 14.25	$ 14.25	$ 14.25	$ 14.25
chemical grade oxide premium	10.00%	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43
moly chemical grade price (US dollar per lb)		$ 15.68	$ 15.68	$ 15.68	$ 15.68	$ 15.68	$ 15.68	$ 15.68	$ 15.68	$ 15.68	$ 15.68	$ 15.68
income from sales [DATA FROM E-MAIL OF 10/24/2012 FOR TREATMENT CHARGE, PENALTIES, AND OCEAN FREIGHT, OTHERWISE, DATA AS PREVIOUSLY USED]												
copper payment	97.50%	$1,270,716,108	$1,307,454,499	$1,262,071,780	$1,212,366,899	$1,190,756,080	$1,151,856,608	$1,011,386,290	$ 966,003,572	$1,041,641,435	$ 987,614,390	$1,048,124,681
silver payment	95.00%	$ 134,293,689	$ 111,194,513	$ 120,831,232	$ 140,704,382	$ 167,608,615	$ 147,735,465	$ 177,245,335	$ 131,667,372	$ 137,891,949	$ 107,389,456	$ 166,615,992
molybdenum oxide payment	100.00%	$ 174,587,069	$ 271,579,885	$ 232,782,758	$ 223,083,477	$ 174,587,069	$ 213,384,195	$ 116,391,379	$ 155,188,505	$ 184,286,350	$ 203,684,913	$ 213,384,195
total payment		$1,579,596,865	$1,690,228,896	$1,615,685,771	$1,576,154,758	$1,532,951,764	$1,512,976,268	$1,305,023,004	$1,252,859,450	$1,363,819,734	$1,298,688,759	$1,428,124,867
treatment charge (US$ per dry tonne cons)	$ 65.00	$ 52,935,421	$ 54,465,867	$ 52,575,316	$ 50,504,713	$ 49,604,451	$ 47,983,979	$ 42,132,274	$ 40,241,723	$ 43,392,641	$ 41,141,985	$ 43,662,720
refining charge per lb copper	$ 0.070	$ 33,305,095	$ 34,267,997	$ 33,078,529	$ 31,775,779	$ 31,209,366	$ 30,189,822	$ 26,508,137	$ 25,318,669	$ 27,301,115	$ 25,885,082	$ 27,471,039
refining charge per ounce silver	$ 0.400	$ 2,524,317	$ 2,090,122	$ 2,271,264	$ 2,644,819	$ 3,150,538	$ 2,776,982	$ 3,331,679	$ 2,474,951	$ 2,591,954	$ 2,018,599	$ 3,131,880
arsenic penalty												
penalty per increment	$ 2.00											
increment	0.10%											
penalty		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
zinc penalty												
penalty per increment	$ 1.00											
increment	1.00%											
penalty		$ 4,071,955	$ 4,189,682	$ 4,044,255	$ 3,884,978	$ 3,815,727	$ 3,691,075	$ 3,240,944	$ 3,095,517	$ 3,337,895	$ 3,164,768	$ 3,358,671
subtotal, treatment and penalties		$ 92,836,789	$ 95,013,669	$ 91,969,365	$ 88,810,289	$ 87,780,082	$ 84,641,859	$ 75,213,034	$ 71,130,860	$ 76,623,606	$ 72,210,434	$ 77,624,309
transport and handling												
copper cons, rail to port, per wet tonne	$ 17.90	$ 15,889,585	$ 16,348,977	$ 15,781,492	$ 15,159,961	$ 14,889,730	$ 14,403,314	$ 12,646,812	$ 12,079,327	$ 13,025,136	$ 12,349,558	$ 13,106,205
port handling & loading, per wet tonne	$ 7.80	$ 6,923,953	$ 7,124,135	$ 6,876,851	$ 6,606,016	$ 6,488,262	$ 6,276,304	$ 5,510,901	$ 5,263,617	$ 5,675,757	$ 5,381,372	$ 5,711,084
insurance, per dry tonne	$ 0.74	$ 602,649	$ 620,073	$ 598,550	$ 574,977	$ 564,728	$ 546,279	$ 479,660	$ 458,137	$ 494,009	$ 468,386	$ 497,083
ocean freight, per wet tonne	$ 50.00	$ 44,384,315	$ 45,667,535	$ 44,082,381	$ 42,346,259	$ 41,591,424	$ 40,232,721	$ 35,326,291	$ 33,741,137	$ 36,383,061	$ 34,495,972	$ 36,609,511
supervision & assaying, per dry tonne	$ 0.35	$ 285,037	$ 293,278	$ 283,098	$ 271,948	$ 267,101	$ 258,375	$ 226,866	$ 216,686	$ 233,653	$ 221,534	$ 235,107

Economic analysis of Chinalco Toromocho Copper Project, Peru
Prepared by Behre Dolbear & Co.
October 29, 2012
Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound

		Production year +8	Production year +9	Production year +10	Production year +11	Production year +12	Production year +13
		2021	2022	2023	2024	2025	2026
moly oxide, rail to port, per tonne	$ 17.90	$ 90,432	$ 140,672	$ 120,576	$ 115,552	$ 90,432	$ 110,528
port handling & loading, per tonne	$ 7.80	$ 39,406	$ 61,298	$ 52,541	$ 50,352	$ 39,406	$ 48,163
insurance, of net payable	0.00083	$ 144,907	$ 225,411	$ 193,210	$ 185,159	$ 144,907	$ 177,109
ocean freight, per tonne	$ 50.00	$ 252,603	$ 392,938	$ 336,804	$ 322,771	$ 252,603	$ 308,737
subtotal, transport and handling		$ 68,612,887	$ 70,874,318	$ 68,325,503	$ 65,632,996	$ 64,328,593	$ 62,361,530
net smelter return		$1,418,147,190	$1,524,340,910	$1,455,390,904	$1,421,711,473	$1,380,843,090	$1,365,972,880

	Production year +14	Production year +15	Production year +16	Production year +17	Production year +18
	2027	2028	2029	2030	2031
moly oxide, rail to port, per tonne	$ 60,288	$ 80,384	$ 95,456	$ 105,504	$ 110,528
port handling & loading, per tonne	$ 26,271	$ 35,028	$ 41,595	$ 45,974	$ 48,163
insurance, of net payable	$ 96,605	$ 128,806	$ 152,958	$ 169,058	$ 177,109
ocean freight, per tonne	$ 168,402	$ 224,536	$ 266,637	$ 294,704	$ 308,737
subtotal, transport and handling	$ 54,542,096	$ 52,227,658	$ 56,368,260	$ 53,532,061	$ 56,803,527
net smelter return	$1,175,267,874	$1,129,500,931	$1,230,827,869	$1,172,946,263	$1,293,697,031

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound		**Production year +19**	**Production year +20**	**Production year +21**	**Production year +22**	**Production year +23**	**Production year +24**	**Production year +25**	**Production year +26**	**Production year +27**	**Production year +28**	**Production year +29**
		2032	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**
metal prices [CONSENSUS OF BROKERS OCTOBER 2012]												
copper (US dollars per lb)		$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74
silver (US dollars per troy ounce)		$ 22.40	$ 22.40	$ 22.40	$ 22.40	$ 22.40	$ 22.40	$ 22.40	$ 22.40	$ 22.40	$ 22.40	$ 22.40
molybdenum tech oxide (US dollars per lb)		$ 14.25	$ 14.25	$ 14.25	$ 14.25	$ 14.25	$ 14.25	$ 14.25	$ 14.25	$ 14.25	$ 14.25	$ 14.25
chemical grade oxide premium	10.00%	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43
moly chemical grade price (US dollar per lb)		$ 15.68	$ 15.68	$ 15.68	$ 15.68	$ 15.68	$ 15.68	$ 15.68	$ 15.68	$ 15.68	$ 15.68	$ 15.68
income from sales [DATA FROM E-MAIL OF 10/24/2012 FOR TREATMENT CHARGE, PENALTIES, AND OCEAN FREIGHT, OTHERWISE, DATA AS PREVIOUSLY USED]												
copper payment	97.50%	$1,169,145,262	$1,013,547,372	$ 879,560,299	$ 734,767,817	$ 838,499,745	$ 814,727,845	$ 808,244,599	$ 868,754,890	$ 862,271,644	$ 955,198,163	$ 916,298,690
silver payment	95.00%	$ 156,379,562	$ 135,699,905	$ 125,256,679	$ 189,901,285	$ 125,256,679	$ 133,073,589	$ 119,238,899	$ 113,200,439	$ 102,964,009	$ 150,341,102	$ 156,772,475
molybdenum oxide payment	100.00%	$ 242,482,040	$ 281,279,166	$ 290,978,448	$ 261,880,603	$ 96,992,816	$ 106,692,098	$ 126,090,661	$ 155,188,505	$ 174,587,069	$ 213,384,195	$ 242,482,040
total payment		$1,568,006,864	$1,430,526,443	$1,295,795,426	$1,186,549,705	$1,060,749,239	$1,054,493,531	$1,053,574,159	$1,137,143,835	$1,139,822,722	$1,318,923,460	$1,315,553,205
treatment charge (US$ per dry tonne cons)	$ 65.00	$ 48,704,188	$ 42,222,300	$ 36,640,674	$ 30,608,917	$ 34,930,176	$ 33,939,887	$ 33,669,809	$ 36,190,543	$ 35,920,464	$ 39,791,592	$ 38,171,120
refining charge per lb copper	$ 0.070	$ 30,642,953	$ 26,564,778	$ 23,053,016	$ 19,258,048	$ 21,976,831	$ 21,353,777	$ 21,183,853	$ 22,769,810	$ 22,599,886	$ 25,035,462	$ 24,015,919
refining charge per ounce silver	$ 0.400	$ 2,939,465	$ 2,550,750	$ 2,354,449	$ 3,569,573	$ 2,354,449	$ 2,501,383	$ 2,241,333	$ 2,127,828	$ 1,935,414	$ 2,825,961	$ 2,946,851
arsenic penalty												
penalty per increment	$ 2.00											
increment	0.10%											
penalty		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
zinc penalty												
penalty per increment	$ 1.00											
increment	1.00%											
penalty		$ 3,746,476	$ 3,247,869	$ 2,818,513	$ 2,354,532	$ 2,686,937	$ 2,610,761	$ 2,589,985	$ 2,783,888	$ 2,763,113	$ 3,060,892	$ 2,936,240
subtotal, treatment and penalties		$ 86,033,083	$ 74,585,697	$ 64,866,653	$ 55,791,070	$ 61,948,392	$ 60,405,808	$ 59,684,979	$ 63,872,068	$ 63,218,876	$ 70,713,907	$ 68,070,130
transport and handling												
copper cons, rail to port, per wet tonne	$ 17.90	$ 14,619,499	$ 12,673,835	$ 10,998,403	$ 9,187,855	$ 10,484,964	$ 10,187,710	$ 10,106,641	$ 10,863,287	$ 10,782,218	$ 11,944,212	$ 11,457,796
port handling & loading, per wet tonne	$ 7.80	$ 6,370,508	$ 5,522,677	$ 4,792,600	$ 4,003,646	$ 4,568,867	$ 4,439,337	$ 4,404,011	$ 4,733,723	$ 4,698,397	$ 5,204,740	$ 4,992,782

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound		Production year +19	Production year +20	Production year +21	Production year +22	Production year +23	Production year +24	Production year +25	Production year +26	Production year +27	Production year +28	Production year +29
		2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
insurance, per dry tonne	$ 0.74	$ 554,478	$ 480,685	$ 417,140	$ 348,471	$ 397,667	$ 386,393	$ 383,318	$ 412,015	$ 408,941	$ 453,012	$ 434,564
ocean freight, per wet tonne	$ 50.00	$ 40,836,589	$ 35,401,775	$ 30,721,796	$ 25,664,400	$ 29,287,609	$ 28,457,290	$ 28,230,840	$ 30,344,378	$ 30,117,928	$ 33,363,720	$ 32,005,016
supervision & assaying, per dry tonne	$ 0.35	$ 262,253	$ 227,351	$ 197,296	$ 164,817	$ 188,086	$ 182,753	$ 181,299	$ 194,872	$ 193,418	$ 214,262	$ 205,537
moly oxide, rail to port, per tonne	$ 17.90	$ 125,600	$ 145,696	$ 150,720	$ 135,648	$ 50,240	$ 55,264	$ 65,312	$ 80,384	$ 90,432	$ 110,528	$ 125,600
port handling & loading, per tonne	$ 7.80	$ 54,731	$ 63,488	$ 65,677	$ 59,109	$ 21,892	$ 24,081	$ 28,460	$ 35,028	$ 39,406	$ 48,163	$ 54,731
insurance, of net payable	0.00083	$ 201,260	$ 233,462	$ 241,512	$ 217,361	$ 80,504	$ 88,554	$ 104,655	$ 128,806	$ 144,907	$ 177,109	$ 201,260
ocean freight, per tonne	$ 50.00	$ 350,838	$ 406,972	$ 421,005	$ 378,905	$ 140,335	$ 154,369	$ 182,436	$ 224,536	$ 252,603	$ 308,737	$ 350,838
subtotal, transport and handling		$ 63,375,755	$ 55,155,939	$ 48,006,149	$ 40,160,211	$ 45,220,163	$ 43,975,751	$ 43,686,971	$ 47,017,030	$ 46,728,249	$ 51,824,482	$ 49,828,123
net smelter return		$1,418,598,026	$1,300,784,807	$1,182,922,624	$1,090,598,424	$953,580,683	$950,111,972	$950,202,209	$1,026,254,736	$1,029,875,597	$1,196,385,071	$1,197,654,953

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound		Production year +30	Production year +31	Production year +32	Production year +33	Production year +34	Production year +35	Production year +36	Production year +37	Production year +38	Production year +39	Production year +40	Total	
		2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053		
metal prices [CONSENSUS OF BROKERS OCTOBER 2012]														
copper (US dollars per lb)		$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74	$ 2.74		
silver (US dollars per troy ounce)		$ 22.40	$ 22.40	$ 22.40	$ 22.40	$ 22.40	$ 22.40	$ 22.40	$22.40	$22.40	$22.40	$22.40		
molybdenum tech oxide (US dollars per lb)		$ 14.25	$ 14.25	$ 14.25	$ 14.25	$ 14.25	$ 14.25	$ 14.25	$14.25	$14.25	$14.25	$14.25		
chemical grade oxide premium	10.00%	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43		
moly chemical grade price (US dollar per lb)		$ 15.68	$ 15.68	$ 15.68	$ 15.68	$ 15.68	$ 15.68	$ 15.68	$15.68	$15.68	$15.68	$15.68		
income from sales [DATA FROM E-MAIL OF 10/24/2012 FOR TREATMENT CHARGE, PENALTIES, AND OCEAN FREIGHT, OTHERWISE, DATA AS PREVIOUSLY USED]														
copper payment	97.50%	$ 803,922,435	$ 607,263,990	$613,635,128	$790,955,945	$790,955,945	$790,955,945	$605,178,381	$ 0	$ 0	$ 0	$ 0	$37,386,517,792	
silver payment	95.00%	$ 128,875,619	$ 204,149,568	$129,645,067	$121,534,341	$121,534,341	$121,534,341	$ 92,988,688	$ 0	$ 0	$ 0	$ 0	$ 5,176,295,633	$0.3804
molybdenum oxide payment	100.00%	$ 281,279,166	$ 320,076,293	$204,929,333	$ 77,594,253	$ 77,594,253	$ 77,594,253	$ 59,396,127	$ 0	$ 0	$ 0	$ 0	$ 6,585,020,931	$0.4839
total payment		$1,214,077,220	$1,131,489,851	$948,209,527	$990,084,538	$990,084,538	$990,084,538	$757,536,197	$ 0	$ 0	$ 0	$ 0	$49,147,834,357	
treatment charge (US$ per dry tonne cons)	$ 65.00	$ 33,489,756	$ 25,297,370	$ 25,562,778	$ 32,949,599	$ 32,949,599	$ 32,949,599	$ 25,210,487	$ 0	$ 0	$ 0	$ 0	$ 1,513,879,497	
refining charge per lb copper	$ 0.070	$ 21,070,570	$ 15,916,210	$ 16,083,196	$ 20,730,722	$ 20,730,722	$ 20,730,722	$ 15,861,547	$ 0	$ 0	$ 0	$ 0	$ 952,479,435	
refining charge per ounce silver	$ 0.400	$ 2,422,474	$ 3,837,398	$ 2,436,937	$ 2,284,480	$ 2,284,480	$ 2,284,480	$ 1,747,908	$ 0	$ 0	$ 0	$ 0	$ 95,060,179	
arsenic penalty														
penalty per increment	$ 2.00													
increment	0.10%													
penalty		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	
zinc penalty														
penalty per increment	$ 1.00													
increment	1.00%													
penalty		$ 2,576,135	$ 1,945,952	$ 1,966,368	$ 2,534,585	$ 2,534,585	$ 2,534,585	$ 1,939,268	$ 0	$ 0	$ 0	$ 0	$ 116,452,269	
subtotal, treatment and penalties		$ 59,558,935	$ 46,996,929	$ 46,049,279	$ 58,499,386	$ 58,499,386	$ 58,499,386	$ 44,759,210	$ 0	$ 0	$ 0	$ 0	$ 2,677,871,380	$0.1968
transport and handling														
copper cons, rail to port, per wet tonne	$ 17.90	$ 10,052,594	$ 7,593,492	$ 7,673,159	$ 9,890,456	$ 9,890,456	$ 9,890,456	$ 7,567,413	$ 0	$ 0	$ 0	$ 0	$ 454,420,044	
port handling & loading, per wet tonne	$ 7.80	$ 4,380,460	$ 3,308,896	$ 3,343,611	$ 4,309,808	$ 4,309,808	$ 4,309,808	$ 3,297,532	$ 0	$ 0	$ 0	$ 0	$ 198,015,438	

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound		Production year +30	Production year +31	Production year +32	Production year +33	Production year +34	Production year +35	Production year +36	Production year +37	Production year +38	Production year +39	Production year +40	Total	
		2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053		
insurance, per dry tonne	$ 0.74	$ 381,268	$ 288,001	$ 291,022	$ 375,119	$ 375,119	$ 375,119	$ 287,012	$0	$0	$0	$0	$ 17,234,936	
ocean freight, per wet tonne	$ 50.00	$ 28,079,873	$ 21,210,871	$ 21,433,406	$ 27,626,971	$ 27,626,971	$ 27,626,971	$ 21,138,024	$0	$0	$0	$0	$ 1,269,329,732	
supervision & assaying, per dry tonne	$ 0.35	$ 180,329	$ 136,217	$ 137,646	$ 177,421	$ 177,421	$ 177,421	$ 135,749	$0	$0	$0	$0	$ 8,151,659	
moly oxide, rail to port, per tonne	$ 17.90	$ 145,696	$ 165,792	$ 106,148	$ 40,192	$ 40,192	$ 40,192	$ 30,752	$0	$0	$0	$0	$ 3,398,523	
port handling & loading, per tonne	$ 7.80	$ 63,488	$ 72,244	$ 46,255	$ 17,514	$ 17,514	$ 17,514	$ 13,400	$0	$0	$0	$0	$ 1,480,921	
insurance, of net payable	0.00083	$ 233,462	$ 265,663	$ 170,091	$ 64,403	$ 64,403	$ 64,403	$ 49,276	$0	$0	$0	$0	$ 5,465,567	
ocean freight, per tonne	$ 50.00	$ 406,972	$ 463,106	$ 296,504	$ 112,268	$ 112,268	$ 112,268	$ 85,899	$0	$0	$0	$0	$ 9,493,081	
subtotal, transport and handling		$ 43,924,141	$ 33,504,282	$ 33,497,844	$ 42,614,151	$ 42,614,151	$ 42,614,151	$ 32,605,056	$0	$0	$0	$0	$ 1,966,989,901	$0.1446
net smelter return		$1,110,594,144	$1,050,988,640	$868,662,405	$888,971,001	$888,971,001	$888,971,001	$680,171,930	$0	$0	$0	$0	$44,502,973,076	

Economic analysis of
Chinalco Toromocho Copper Project, Peru
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October 29, 2012
Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound

		Pre-production year -3	Pre-production year -2	Pre-production year -1	Production year +1	Production year +2	Production year +3	Production year +4	Production year +5	Production year +6	Production year +7
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Operating Costs											
unit costs											
mining per tonne of material moved		$0.000	$0.000	$ 1.196	$ 1.034	$ 1.114	$ 1.106	$ 1.300	$ 1.244	$ 1.383	$ 1.487
reclaim stockpile tonnage per tonne of stockpile moved		$0.000	$0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000
processing (milling) per tonne of ore milled		$ 0.00	$ 0.00	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28
moly plant per tonne of moly oxide produced		$ 0.00	$ 0.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00
processing infrastructure per tonne of ore milled		$ 0.00	$ 0.00	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06
processing G&A per tonne of ore milled		$ 0.00	$ 0.00	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42
annual cost											
mining ore and waste		$ 0	$ 0	$ 59,816,050	$ 102,330,788	$ 105,822,780	$ 105,030,100	$123,459,910	$118,208,405	$131,386,710	$141,295,210
reclaim from stockpile		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
milling		$ 0	$ 0	$ 5,174,400	$ 201,933,600	$ 227,990,400	$ 227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400
moly plant		$ 0	$ 0	$ 2,257,128	$ 11,134,160	$ 16,220,481	$ 20,275,601	$ 21,289,381	$ 11,151,580	$ 17,234,261	$ 16,220,481
processing infrastructure		$ 0	$ 0	$ 58,800	$ 2,294,700	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800
processing G&A		$ 0	$ 0	$ 1,391,600	$ 54,307,900	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600
Centromin royalty	1.71%	$ 0	$ 0	$ 1,025,599	$ 28,416,322	$ 31,044,544	$ 31,152,476	$ 25,929,732	$ 24,954,272	$ 25,297,937	$ 24,725,588
total cash cost		$ 0	$ 0	$ 69,723,577	$ 400,417,469	$ 444,984,605	$ 448,354,977	$462,575,823	$446,211,058	$465,815,707	$474,138,078
depreciation		$ 0	$ 0	$ 0	$ 695,350,399	$ 701,199,337	$ 706,155,381	$717,930,545	$728,737,077	$ 42,188,190	$ 48,792,839
employee profit sharing	8.00%	$ 0	$ 0	$ 0	$ 45,280,426	$ 53,542,917	$ 53,381,749	$ 26,868,179	$ 22,749,284	$ 77,712,608	$ 73,840,790
net income before taxes		$ 0	$ 0	-$ 9,747,030	$ 520,724,901	$ 615,743,550	$ 613,890,110	$308,984,055	$261,616,762	$893,694,991	$849,169,085
income taxes											
loss carried forward		$ 0	$ 0	$ 0	$ 9,747,030	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
federal income tax	30.00%	$ 0	$ 0	$ 0	$ 153,293,361	$ 184,723,065	$ 184,167,033	$ 92,695,216	$ 78,485,029	$268,108,497	$254,750,725
net income after taxes		$ 0	$ 0	-$ 9,747,030	$ 367,431,540	$ 431,020,485	$ 429,723,077	$216,288,838	$183,131,733	$625,586,494	$594,418,359
add back depreciation		$ 0	$ 0	$ 0	$ 695,350,399	$ 701,199,337	$ 706,155,381	$717,930,545	$728,737,077	$ 42,188,190	$ 48,792,839
net cash flow from operations		$ 0	$ 0	-$ 9,747,030	$1,062,781,939	$1,132,219,822	$1,135,878,458	$934,219,384	$911,868,811	$667,774,684	$643,211,198

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound	**Pre-production year -3**	**Pre-production year -2**	**Pre-production year -1**	**Production year +1**	**Production year +2**	**Production year +3**	**Production year +4**	**Production year +5**	**Production year +6**	**Production year +7**
	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
capital investments [PER OCT 2012 CAPEX FORECAST]	2011	2012	2013	2014						
initial investments										
mine preproduction development	$ 8,969,733	$ 14,677,005	$ 62,000,000							
mine equipment	$ 37,934,407	$ 82,710,928	$ 91,100,000							
contingency, mine equipment	$ 0	$ 1,523,482	$ 4,570,445							
process and infrastructure, direct	$366,427,340	$451,150,406	$443,000,000	$2,512,410						
process and infrastructure, indirect	$182,618,520	$195,689,079	$197,500,000	$ 605,671						
contingency, process and infrastructure	$ 0	$ 8,102,831	$ 24,308,493							
delay, spare parts, initial fill	$ 21,851,880	$ 42,467,920	$ 68,700,000	$3,288,502						
owner's cost	$165,086,212	$150,054,968	$174,701,837							
contingency, owner's cost	$ 3,552,000	$ 6,387,250	$ 12,057,750							

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound		Production year +8 2021	Production year +9 2022	Production year +10 2023	Production year +11 2024	Production year +12 2025	Production year +13 2026	Production year +14 2027	Production year +15 2028	Production year +16 2029	Production year +17 2030	Production year +18 2031
Operating Costs												
unit costs												
mining per tonne of material moved		$ 1.480	$ 1.421	$ 1.504	$ 1.599	$ 1.522	$ 1.607	$ 1.587	$ 1.604	$ 1.636	$ 1.616	$ 1.730
reclaim stockpile tonnage per tonne of stockpile moved		$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000
processing (milling) per tonne of ore milled		$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28
moly plant per tonne of moly oxide produced		$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00
processing infrastructure per tonne of ore milled		$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06
processing G&A per tonne of ore milled		$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42
annual cost												
mining ore and waste		$140,601,615	$134,953,770	$142,865,530	$151,897,305	$144,565,015	$152,689,985	$150,805,783	$152,392,730	$155,462,729	$153,482,665	$164,382,015
reclaim from stockpile		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
milling		$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400
moly plant		$ 18,248,041	$ 28,385,841	$ 24,330,721	$ 23,316,941	$ 18,248,041	$ 22,303,161	$ 12,165,360	$ 16,220,481	$ 19,261,821	$ 21,289,381	$ 22,303,161
processing infrastructure		$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800
processing G&A		$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600
Centromin royalty	1.71%	$ 24,250,317	$ 26,066,230	$ 24,887,184	$ 24,311,266	$ 23,612,417	$ 23,358,136	$ 20,097,081	$ 19,314,466	$ 21,047,157	$ 20,057,381	$ 22,122,219
total cash cost		$474,996,773	$481,302,641	$483,980,235	$491,422,312	$478,322,273	$490,248,082	$474,965,024	$479,824,477	$487,668,506	$486,726,227	$500,704,195
depreciation		$ 50,679,913	$ 46,543,659	$ 69,205,682	$ 75,294,140	$ 68,832,310	$ 78,084,375	$ 75,966,952	$ 49,337,109	$ 48,451,434	$ 48,573,039	$ 40,215,435
employee profit sharing	8.00%	$ 71,397,640	$ 79,719,569	$ 72,176,399	$ 68,399,602	$ 66,695,081	$ 63,811,234	$ 49,946,872	$ 48,027,148	$ 55,576,634	$ 51,011,760	$ 60,222,192
net income before taxes		$821,072,864	$916,775,041	$830,028,588	$786,595,419	$766,993,427	$733,829,189	$574,389,027	$552,312,198	$639,131,294	$586,635,237	$692,555,210
income taxes												
loss carried forward		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
federal income tax	30.00%	$246,321,859	$275,032,512	$249,008,576	$235,978,626	$230,098,028	$220,148,757	$172,316,708	$165,693,659	$191,739,388	$175,990,571	$207,766,563
net income after taxes		$574,751,004	$641,742,529	$581,020,011	$550,616,793	$536,895,399	$513,680,432	$402,072,319	$386,618,539	$447,391,906	$410,644,666	$484,788,647
add back depreciation		$ 50,679,913	$ 46,543,659	$ 69,205,682	$ 75,294,140	$ 68,832,310	$ 78,084,375	$ 75,966,952	$ 49,337,109	$ 48,451,434	$ 48,573,039	$ 40,215,435
net cash flow from operations		$625,430,917	$688,286,188	$650,225,693	$625,910,933	$605,727,709	$591,764,807	$478,039,270	$435,955,648	$495,843,340	$459,217,705	$525,004,081

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound	**Production year +8**	**Production year +9**	**Production year +10**	**Production year +11**	**Production year +12**	**Production year +13**	**Production year +14**	**Production year +15**	**Production year +16**	**Production year +17**	**Production year +18**
	2021	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**
capital investments [PER OCT 2012 CAPEX FORECAST]											
initial investments											
mine preproduction development											
mine equipment											
contingency, mine equipment											
process and infrastructure, direct											
process and infrastructure, indirect											
contingency, process and infrastructure											
delay, spare parts, initial fill											
owner's cost											
contingency, owner's cost											

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound

		Production year +19	Production year +20	Production year +21	Production year +22	Production year +23	Production year +24	Production year +25	Production year +26	Production year +27	Production year +28	Production year +29
		2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Operating Costs												
unit costs												
mining per tonne of material moved		$ 1.732	$ 1.717	$ 1.854	$ 1.854	$ 1.854	$ 1.854	$ 1.854	$ 2.105	$ 2.105	$ 2.105	$ 2.105
reclaim stockpile tonnage per tonne of stockpile moved		$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000
processing (milling) per tonne of ore milled		$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28
moly plant per tonne of moly oxide produced		$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00
processing infrastructure per tonne of ore milled		$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06
processing G&A per tonne of ore milled		$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42
annual cost												
mining ore and waste		$164,580,185	$163,093,910	$176,173,130	$169,135,477	$147,772,167	$128,074,157	$120,413,407	$130,834,857	$132,727,048	$118,730,301	$112,959,011
reclaim from stockpile		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
milling		$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400
moly plant		$ 25,344,501	$ 29,399,621	$ 30,413,401	$ 27,372,061	$ 10,137,800	$ 11,151,580	$ 13,179,141	$ 16,220,481	$ 18,248,041	$ 22,303,161	$ 25,344,501
processing infrastructure		$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800
processing G&A		$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600
Centromin royalty	1.71%	$ 24,258,026	$ 22,243,420	$ 20,227,977	$ 18,649,233	$ 16,306,230	$ 16,246,915	$ 16,248,458	$ 17,548,956	$ 17,610,873	$ 20,458,185	$ 20,479,900
total cash cost		$506,079,512	$506,633,751	$518,711,308	$507,053,571	$466,112,997	$447,369,452	$441,737,805	$456,501,093	$460,482,762	$453,388,447	$450,680,212
depreciation		$ 68,450,945	$ 69,749,355	$ 61,384,226	$ 59,302,041	$ 65,144,746	$ 35,693,942	$ 33,280,207	$ 27,718,531	$ 23,764,843	$ 20,426,566	$ 29,690,077
employee profit sharing	8.00%	$ 67,525,406	$ 57,952,136	$ 48,226,167	$ 41,939,425	$ 33,785,835	$ 37,363,886	$ 38,014,736	$ 43,362,809	$ 43,650,239	$ 57,805,605	$ 57,382,773
net income before taxes		$776,542,163	$666,449,564	$554,600,923	$482,303,387	$388,537,105	$429,684,691	$437,169,461	$498,672,303	$501,977,752	$664,764,453	$659,901,891
income taxes												
loss carried forward		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
federal income tax	30.00%	$232,962,649	$199,934,869	$166,380,277	$144,691,016	$116,561,132	$128,905,407	$131,150,838	$149,601,691	$150,593,326	$199,429,336	$197,970,567
net income after taxes		$543,579,514	$466,514,695	$388,220,646	$337,612,371	$271,975,974	$300,779,284	$306,018,623	$349,070,612	$351,384,427	$465,335,117	$461,931,324
add back depreciation		$ 68,450,945	$ 69,749,355	$ 61,384,226	$ 59,302,041	$ 65,144,746	$ 35,693,942	$ 33,280,207	$ 27,718,531	$ 23,764,843	$ 20,426,566	$ 29,690,077
net cash flow from operations		$612,030,459	$536,264,050	$449,604,872	$396,914,412	$337,120,720	$336,473,226	$339,298,829	$376,789,143	$375,149,270	$485,761,683	$491,621,401

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound	Production year +19	Production year +20	Production year +21	Production year +22	Production year +23	Production year +24	Production year +25	Production year +26	Production year +27	Production year +28	Production year +29
	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
capital investments [PER OCT 2012 CAPEX FORECAST]											
initial investments											
mine preproduction development											
mine equipment											
contingency, mine equipment											
process and infrastructure, direct											
process and infrastructure, indirect											
contingency, process and infrastructure											
delay, spare parts, initial fill											
owner's cost											
contingency, owner's cost											

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound		Production year +30	Production year +31	Production year +32	Production year +33	Production year +34	Production year +35	Production year +36	Production year +37	Production year +38	Production year +39	Production year +40	Total	
		2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053		
Operating Costs														
unit costs														
mining per tonne of material moved		$ 2.105	$ 2.164	$ 2.164	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$0.000	$0.000	$0.000	$0.000		
reclaim stockpile tonnage per tonne of stockpile moved		$ 0.000	$ 0.000	$ 0.889	$ 0.889	$ 0.889	$ 0.889	$ 0.889	$0.000	$0.000	$0.000	$0.000		
processing (milling) per tonne of ore milled		$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 0.00	$ 0.00	$ 0.00	$ 0.00		
moly plant per tonne of moly oxide produced		$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 0.00	$ 0.00	$ 0.00	$ 0.00		
processing infrastructure per tonne of ore milled		$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.00	$ 0.00	$ 0.00	$ 0.00		
processing G&A per tonne of ore milled		$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 0.00	$ 0.00	$ 0.00	$ 0.00		
annual cost														
mining ore and waste		$111,199,420	$124,155,096	$ 69,573,341	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 4,400,870,601	$0.3234
reclaim from stockpile		$ 0	$ 0	$ 22,629,116	$ 38,371,302	$ 38,371,302	$ 38,371,302	$ 29,358,756	$ 0	$ 0	$ 0	$ 0	$ 167,101,779	$0.0123
milling		$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$174,440,640	$ 0	$ 0	$ 0	$ 0	$ 8,133,222,240	$0.5977
moly plant		$ 29,399,621	$ 33,454,741	$ 21,419,449	$ 8,110,240	$ 8,110,240	$ 8,110,240	$ 6,205,329	$ 0	$ 0	$ 0	$ 0	$ 685,780,171	$0.0504
processing infrastructure		$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 1,982,280	$ 0	$ 0	$ 0	$ 0	$ 92,422,980	$0.0068
processing G&A		$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 46,913,960	$ 0	$ 0	$ 0	$ 0	$ 2,187,343,860	$0.1608
Centromin royalty	1.71%	$ 18,991,160	$ 17,971,906	$ 14,854,127	$ 15,201,404	$ 15,201,404	$ 15,201,404	$ 11,630,940	$ 0	$ 0	$ 0	$ 0	$ 761,000,840	$0.0559
total cash cost		$451,487,001	$467,478,543	$420,372,833	$353,579,747	$353,579,747	$353,579,747	$270,531,905	$ 0	$ 0	$ 0	$ 0	$16,427,742,471	
depreciation		$ 40,909,897	$ 55,481,318	$ 55,479,268	$ 45,312,703	$ 31,794,658	$ 14,879,536	$ 232,880	$ 0	$ 0	$ 0	$ 0	$ 5,030,233,555	
employee profit sharing	8.00%	$ 49,455,780	$ 42,242,302	$ 31,424,824	$ 39,206,284	$ 40,287,728	$ 41,640,937	$ 32,752,572	$ 0	$ 0	$ 0	$ 0	$ 1,844,379,526	
net income before taxes		$568,741,467	$485,786,477	$361,385,479	$450,872,267	$463,308,869	$478,870,781	$376,654,573	$ 0	$ 0	$ 0	$ 0	$21,200,617,523	
income taxes														
loss carried forward		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0		
federal income tax	30.00%	$170,622,440	$145,735,943	$108,415,644	$135,261,680	$138,992,661	$143,661,234	$112,996,372	$ 0	$ 0	$ 0	$ 0	$ 6,360,185,257	
net income after taxes		$398,119,027	$340,050,534	$252,969,836	$315,610,587	$324,316,208	$335,209,546	$263,658,201	$ 0	$ 0	$ 0	$ 0	$14,840,432,266	
add back depreciation		$ 40,909,897	$ 55,481,318	$ 55,479,268	$ 45,312,703	$ 31,794,658	$ 14,879,536	$ 232,880	$ 0	$ 0	$ 0	$ 0	$ 5,030,233,555	
net cash flow from operations		$439,028,923	$395,531,852	$308,449,104	$360,923,290	$356,110,866	$350,089,083	$263,891,081	$ 0	$ 0	$ 0	$ 0	$19,870,665,821	

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound	Production year +30	Production year +31	Production year +32	Production year +33	Production year +34	Production year +35	Production year +36	Production year +37	Production year +38	Production year +39	Production year +40	Total
	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	
capital investments [PER OCT 2012 CAPEX FORECAST]												
initial investments												
mine preproduction development												$ 85,646,738
mine equipment												$ 211,745,335
contingency, mine equipment												$ 6,093,927
process and infrastructure, direct												$1,263,090,156
process and infrastructure, indirect												$ 576,413,270
contingency, process and infrastructure												$ 32,411,324
delay, spare parts, initial fill												$ 136,308,302
owner's cost												$ 489,843,017
contingency, owner's cost												$ 21,997,000

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound

		Pre-production year -3	Pre-production year -2	Pre-production year -1	Production year +1	Production year +2	Production year +3	Production year +4	Production year +5	Production year +6	Production year +7
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
sustaining capital											
mine sustaining capital					$ 4,624,800			$ 34,095,600	$ 625,250	$ 18,532,000	$ 36,792,375
process sustaining capital					$ 25,897,822	$ 28,857,239	$ 24,392,770	$ 24,392,770	$ 53,019,962	$ 25,088,109	$ 25,088,109
general & administrative sustaining capital [SOURCE 2007 FINANCIAL ANALYSIS, ESCALATED BY 2.5%]					$ 118,900	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450
lime		$ 11,118,600	$ 19,412,400	$ 68,000,000	$ 1,469,000						
kingsmill		$ 44,750,000	$ 0	$ 0	$ 0						
kingsmill		$ 8,922,000	$ 6,948,000	$ 3,900,000	$ 1,230,000						
23 transmission line		$ 0	$ 700,585	$ 2,300,000	$ 86,415						
220 transmission line		$ 0	$ 2,000,000	$ 9,000,000	$ 18,000						
central highway relocation		$ 0	$ 220,000	$ 1,800,000	$ 67,980,000						
pan america project		$ 9,518,400	$ 18,145,600	$ 7,080,000	$ 5,256,000						
Callao port		$ 0	$ 4,356,000	$ 0	$ 0						
interest		$ 5,788,540	$ 5,659,025	$ 8,800,000	$ 5,013,841						
contingency		$ 0	$ 10,772,252	$ 32,316,748	$ 0						
relocation of Morococha		$ 130,380,213	$ 123,920,577	$ 5,699,210	$ 0						
working capital				$ 56,000,000							
total capital investment		$ 996,917,845	$ 1,144,898,308	$ 1,272,834,483	$ 118,101,361	$ 29,244,689	$ 24,780,220	$ 58,875,820	$ 54,032,662	$ 44,007,559	$ 62,267,934
net cash flow		-$996,917,845	-$1,144,898,308	-$1,282,581,513	$ 944,680,578	$1,102,975,133	$1,111,098,238	$875,343,564	$857,836,149	$623,767,125	$580,943,264
			total initial investment		$3,502,110,475						
life-of-mine net cash flow	$14,840,160,231										

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound		Production year +8	Production year +9	Production year +10	Production year +11	Production year +12	Production year +13	Production year +14	Production year +15	Production year +16	Production year +17	Production year +18
		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
sustaining capital												
mine sustaining capital		$ 1,403,225	$ 8,132,350	$137,279,275	$ 33,121,850	$ 3,625,425	$ 54,142,550	$ 1,274,075	$ 1,795,800	$ 47,114,125	$ 10,410,925	$ 18,532,000
process sustaining capital		$ 32,424,916	$ 29,674,750	$ 29,676,050	$ 40,940,550	$ 25,945,911	$ 25,945,911	$ 25,945,911	$ 32,010,311	$ 22,519,902	$ 19,768,437	$ 19,768,437
general & administrative sustaining capital [SOURCE 2007 FINANCIAL ANALYSIS, ESCALATED BY 2.5%]		$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450
lime												
kingsmill												
kingsmill												
23 transmission line												
220 transmission line												
central highway relocation												
pan america project												
Callao port												
interest												
contingency												
relocation of Morococha												
working capital												
total capital investment		$ 34,215,591	$ 38,194,550	$167,342,775	$ 74,449,850	$ 29,958,786	$ 80,475,911	$ 27,607,436	$ 34,193,561	$ 70,021,477	$ 30,566,812	$ 38,687,887
net cash flow		$591,215,327	$650,091,637	$482,882,918	$551,461,083	$575,768,923	$511,288,896	$450,431,834	$401,762,086	$425,821,863	$428,650,893	$486,316,194
life-of-mine net cash flow	$14,840,160,231											

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound		Production year +19 2032	Production year +20 2033	Production year +21 2034	Production year +22 2035	Production year +23 2036	Production year +24 2037	Production year +25 2038	Production year +26 2039	Production year +27 2040	Production year +28 2041	Production year +29 2042
sustaining capital												
mine sustaining capital		$148,629,100	$ 20,529,725			$ 47,745,525					$ 48,223,175	
process sustaining capital		$ 19,768,437	$ 19,768,437	$ 27,808,381	$ 19,768,437	$ 19,768,437	$ 21,143,520	$ 28,229,484	$ 0	$ 0	$ 2,599,400	$ 67,471,326
general & administrative sustaining capital [SOURCE 2007 FINANCIAL ANALYSIS, ESCALATED BY 2.5%]		$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 377,200
lime												
kingsmill												
kingsmill												
23 transmission line												
220 transmission line												
central highway relocation												
pan america project												
Callao port												
interest												
contingency												
relocation of Morococha												
working capital												
total capital investment		$168,784,987	$ 40,685,612	$ 28,195,831	$ 20,155,887	$ 67,901,412	$ 21,530,970	$ 28,616,934	$ 387,450	$ 387,450	$ 51,210,025	$ 67,848,526
net cash flow		$443,245,472	$495,578,438	$421,409,041	$376,758,525	$269,219,308	$314,942,257	$310,681,895	$376,401,693	$374,761,820	$434,551,658	$423,772,875
life-of-mine net cash flow	$14,840,160,231											

Economic analysis of
Chinalco Toromocho Copper Project, Peru
Prepared by Behre Dolbear & Co.
October 29, 2012
Updated cash flow projection of October 29, 2012; metal prices average of various forecasting companies; with copper cost per pound

		Production year +30	Production year +31	Production year +32	Production year +33	Production year +34	Production year +35	Production year +36	Production year +37	Production year +38	Production year +39	Production year +40	Total
		2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	
sustaining capital													
mine sustaining capital			$ 55,999,850										$ 732,629,000
process sustaining capital		$ 84,338,833	$ 16,867,507										$ 838,890,065
general & administrative sustaining capital [SOURCE 2007 FINANCIAL ANALYSIS, ESCALATED BY 2.5%]		$ 377,200	$ 377,200	$ 377,200	$ 377,200	$ 258,300	$ 140,425	$ 11,275					$ 12,876,050
lime													$ 100,000,000
kingsmill													$ 44,750,000
kingsmill													$ 21,000,000
23 transmission line													$ 3,087,000
220 transmission line													$ 11,018,000
central highway relocation													$ 70,000,000
pan america project													$ 40,000,000
Callao port													$ 4,356,000
interest													$ 25,261,406
contingency													$ 43,089,000
relocation of Morococha													$ 260,000,000
working capital									-$56,000,000				$ 0
total capital investment		$ 84,716,033	$ 73,244,557	$ 377,200	$ 377,200	$ 258,300	$ 140,425	$ 11,275	-$56,000,000	$0	$0	$0	$ 5,030,505,590
net cash flow		$354,312,891	$322,287,295	$308,071,904	$360,546,090	$355,852,566	$349,948,658	$263,879,806	$56,000,000	$0	$0	$0	$14,840,160,231
life-of-mine net cash flow	$14,840,160,231												

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Depreciation schedule	Pre-production year -3	Pre-production year -2	Pre-production year -1	Production year +1	Production year +2	Production year +3	Production year +4	Production year +5	Production year +6
	2011	2012	2013	2014	2015	2016	2017	2018	2019
year -3 to -1 (2011 to 2013) investments				$ 671,730,127	$ 671,730,127	$ 671,730,127	$ 671,730,127	$ 671,730,127	
year +1 investments				$ 23,620,272	$ 23,620,272	$ 23,620,272	$ 23,620,272	$ 23,620,272	
year +2 investments					$ 5,848,938	$ 5,848,938	$ 5,848,938	$ 5,848,938	$ 5,848,938
year +3 investments						$ 4,956,044	$ 4,956,044	$ 4,956,044	$ 4,956,044
year +4 investments							$ 11,775,164	$ 11,775,164	$ 11,775,164
year +5 investments								$ 10,806,532	$ 10,806,532
year +6 investments									$ 8,801,512
year +7 investments									
year +8 investments									
year +9 investments									
year +10 investments									
total annual depreciation	$0	$0	$ 0	$ 695,350,399	$ 701,199,337	$ 706,155,381	$ 717,930,545	$ 728,737,077	$ 42,188,190
loss carried forward determination									
net income before taxes	$0	$0	-$9,747,030	$ 520,724,901	$ 615,743,550	$ 613,890,110	$ 308,984,055	$ 261,616,762	$ 893,694,991
cumulative net income before taxes	$0	$0	-$9,747,030	$ 510,977,870	$ 1,126,721,421	$ 1,740,611,530	$ 2,049,595,585	$ 2,311,212,347	$ 3,204,907,338
cumulative loss	$0	$0	-$9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030
potential write-off	$0	$0	$ 0	$ 520,724,901	$ 615,743,550	$ 613,890,110	$ 308,984,055	$ 261,616,762	$ 893,694,991
cumulative potential write-off	$0	$0	$ 0	$ 520,724,901	$ 1,136,468,451	$ 1,750,358,560	$ 2,059,342,615	$ 2,320,959,377	$ 3,214,654,368
trial write-off	$0	$0	$ 0	$ 9,747,030	($ 510,977,870)	($1,126,721,421)	($1,740,611,530)	($2,049,595,585)	($2,311,212,347)
actual write-off	$0	$0	$ 0	$ 9,747,030	$ 0	$ 0	$ 0	$ 0	$ 0

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012
Depreciation schedule

	Production year +7	Production year +8	Production year +9	Production year +10	Production year +11	Production year +12	Production year +13	Production year +14	Production year +15
	2020	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
year -3 to -1 (2011 to 2013) investments									
year +1 investments									
	$ 4,956,044								
	$ 11,775,164	$ 11,775,164							
	$ 10,806,532	$ 10,806,532	$ 10,806,532						
	$ 8,801,512	$ 8,801,512	$ 8,801,512	$ 8,801,512					
	$ 12,453,587	$ 12,453,587	$ 12,453,587	$ 12,453,587	$ 12,453,587				
		$ 6,843,118	$ 6,843,118	$ 6,843,118	$ 6,843,118	$ 6,843,118			
			$ 7,638,910	$ 7,638,910	$ 7,638,910	$ 7,638,910	$ 7,638,910		
				$ 33,468,555	$ 33,468,555	$ 33,468,555	$ 33,468,555	$ 33,468,555	
year +11 investments					$ 14,889,970	$ 14,889,970	$ 14,889,970	$ 14,889,970	$ 14,889,970
year +12 investments						$ 5,991,757	$ 5,991,757	$ 5,991,757	$ 5,991,757
year +13 investments							$ 16,095,182	$ 16,095,182	$ 16,095,182
year +14 investments								$ 5,521,487	$ 5,521,487
year +15 investments									$ 6,838,712
year +16 investments									
year +17 investments									
year +18 investments									
year +19 investments									
total annual depreciation	$ 48,792,839	$ 50,679,913	$ 46,543,659	$ 69,205,682	$ 75,294,140	$ 68,832,310	$ 78,084,375	$ 75,966,952	$ 49,337,109
loss carried forward determination									
net income before taxes	$ 849,169,085	$ 821,072,864	$ 916,775,041	$ 830,028,588	$ 786,595,419	$ 766,993,427	$ 733,829,189	$ 574,389,027	$ 552,312,198
cumulative net income before taxes	$ 4,054,076,423	$ 4,875,149,286	$ 5,791,924,327	$ 6,621,952,915	$ 7,408,548,334	$ 8,175,541,760	$ 8,909,370,949	$ 9,483,759,976	$ 10,036,072,174
cumulative loss	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030
potential write-off	$ 849,169,085	$ 821,072,864	$ 916,775,041	$ 830,028,588	$ 786,595,419	$ 766,993,427	$ 733,829,189	$ 574,389,027	$ 552,312,198
cumulative potential write-off	$ 4,063,823,453	$ 4,884,896,317	$ 5,801,671,357	$ 6,631,699,945	$ 7,418,295,364	$ 8,185,288,791	$ 8,919,117,980	$ 9,493,507,006	$ 10,045,819,204
trial write-off	($3,204,907,338)	($4,054,076,423)	($4,875,149,286)	($5,791,924,327)	($6,621,952,915)	($7,408,548,334)	($8,175,541,760)	($8,909,370,949)	($ 9,483,759,976)
actual write-off	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Depreciation schedule

	Production year +16	Production year +17	Production year +18	Production year +19	Production year +20	Production year +21	Production year +22	Production year +23	Production year +24
	2029	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**
year -3 to -1 (2011 to 2013) investments									
year +1 investments									
	$ 5,991,757								
	$ 16,095,182	$ 16,095,182							
	$ 5,521,487	$ 5,521,487	$ 5,521,487						
	$ 6,838,712	$ 6,838,712	$ 6,838,712	$ 6,838,712					
	$ 14,004,295	$ 14,004,295	$ 14,004,295	$ 14,004,295	$ 14,004,295				
		$ 6,113,362	$ 6,113,362	$ 6,113,362	$ 6,113,362	$ 6,113,362			
			$ 7,737,577	$ 7,737,577	$ 7,737,577	$ 7,737,577	$ 7,737,577		
				$ 33,756,997	$ 33,756,997	$ 33,756,997	$ 33,756,997	$ 33,756,997	
	year +20 investments				$ 8,137,122	$ 8,137,122	$ 8,137,122	$ 8,137,122	$ 8,137,122
		year +21 investments				$ 5,639,166	$ 5,639,166	$ 5,639,166	$ 5,639,166
			year +22 investments				$ 4,031,177	$ 4,031,177	$ 4,031,177
				year +23 investments				$ 13,580,282	$ 13,580,282
					year +24 investments				$ 4,306,194
						year +25 investments			
							year +26 investments		
								year +27 investments	
									year +28 investments
total annual depreciation	$ 48,451,434	$ 48,573,039	$ 40,215,435	$ 68,450,945	$ 69,749,355	$ 61,384,226	$ 59,302,041	$ 65,144,746	$ 35,693,942
loss carried forward determination									
net income before taxes	$ 639,131,294	$ 586,635,237	$ 692,555,210	$ 776,542,163	$ 666,449,564	$ 554,600,923	$ 482,303,387	$ 388,537,105	$ 429,684,691
cumulative net income before taxes	$ 10,675,203,468	$ 11,261,838,705	$ 11,954,393,915	$ 12,730,936,078	$ 13,397,385,643	$ 13,951,986,566	$ 14,434,289,953	$ 14,822,827,058	$ 15,252,511,750
cumulative loss	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030
potential write-off	$ 639,131,294	$ 586,635,237	$ 692,555,210	$ 776,542,163	$ 666,449,564	$ 554,600,923	$ 482,303,387	$ 388,537,105	$ 429,684,691
cumulative potential write-off	$ 10,684,950,499	$ 11,271,585,736	$ 11,964,140,945	$ 12,740,683,109	$ 13,407,132,673	$ 13,961,733,596	$ 14,444,036,983	$ 14,832,574,088	$ 15,262,258,780
trial write-off	($10,036,072,174)	($10,675,203,468)	($11,261,838,705)	($11,954,393,915)	($12,730,936,078)	($13,397,385,643)	($13,951,986,566)	($14,434,289,953)	($14,822,827,058)
actual write-off	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0

Economic analysis of
Chinalco Toromocho Copper Project, Peru
Prepared by
Behre Dolbear & Co.
October 29, 2012
Depreciation schedule

	Production year +25	Production year +26	Production year +27	Production year +28	Production year +29	Production year +30	Production year +31	Production year +32	Production year +33
	2038	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**
year -3 to -1 (2011 to 2013) investments									
year +1 investments									
	$ 5,639,166								
	$ 4,031,177	$ 4,031,177							
	$ 13,580,282	$ 13,580,282	$ 13,580,282						
	$ 4,306,194	$ 4,306,194	$ 4,306,194	$ 4,306,194					
	$ 5,723,387	$ 5,723,387	$ 5,723,387	$ 5,723,387	$ 5,723,387				
		$ 77,490	$ 77,490	$ 77,490	$ 77,490	$ 77,490			
			$ 77,490	$ 77,490	$ 77,490	$ 77,490	$ 77,490		
				$ 10,242,005	$ 10,242,005	$ 10,242,005	$ 10,242,005	$ 10,242,005	
	year +29 investments								
					$ 13,569,705	$ 13,569,705	$ 13,569,705	$ 13,569,705	$ 13,569,705
		year +30 investments							
						$ 16,943,207	$ 16,943,207	$ 16,943,207	$ 16,943,207
			year +31 investments						
							$ 14,648,911	$ 14,648,911	$ 14,648,911
				year +32 investments					
								$ 75,440	$ 75,440
					year +33 investments				
									$ 75,440
						year +34 investments			
							year +35 investments		
								year +36 investments	
									year +37 investments
total annual depreciation	$ 33,280,207	$ 27,718,531	$ 23,764,843	$ 20,426,566	$ 29,690,077	$ 40,909,897	$ 55,481,318	$ 55,479,268	$ 45,312,703
loss carried forward determination									
net income before taxes	$ 437,169,461	$ 498,672,303	$ 501,977,752	$ 664,764,453	$ 659,901,891	$ 568,741,467	$ 485,786,477	$ 361,385,479	$ 450,872,267
cumulative net income before taxes	$ 15,689,681,211	$ 16,188,353,514	$ 16,690,331,266	$ 17,355,095,719	$ 18,014,997,610	$ 18,583,739,077	$ 19,069,525,554	$ 19,430,911,033	$ 19,881,783,300
cumulative loss	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030
potential write-off	$ 437,169,461	$ 498,672,303	$ 501,977,752	$ 664,764,453	$ 659,901,891	$ 568,741,467	$ 485,786,477	$ 361,385,479	$ 450,872,267
cumulative potential write-off	$ 15,699,428,241	$ 16,198,100,544	$ 16,700,078,296	$ 17,364,842,750	$ 18,024,744,641	$ 18,593,486,107	$ 19,079,272,584	$ 19,440,658,063	$ 19,891,530,331
trial write-off	($15,252,511,750)	($15,689,681,211)	($16,188,353,514)	($16,690,331,266)	($17,355,095,719)	($18,014,997,610)	($18,583,739,077)	($19,069,525,554)	($19,430,911,033)
actual write-off	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Depreciation schedule	Production year +34	Production year +35	Production year +36	Production year +37	Production year +38	Production year +39	Production year +40	Total
	2047	2048	2049	2050	2051	2052	2053	
year -3 to -1 (2011 to 2013) investments								$3,358,650,636
year +1 investments								$ 118,101,361
								$ 29,244,689
								$ 24,780,220
								$ 58,875,820
								$ 54,032,662
								$ 44,007,559
								$ 62,267,934
								$ 34,215,591
								$ 38,194,550
								$ 167,342,775
								$ 74,449,850
								$ 29,958,786
								$ 80,475,911
								$ 27,607,436
								$ 34,193,561
								$ 70,021,477
								$ 30,566,812
								$ 38,687,887
								$ 168,784,987
								$ 40,685,612
								$ 28,195,831
								$ 20,155,887
								$ 67,901,412
								$ 21,530,970
								$ 28,616,934
								$ 387,450
								$ 387,450

Economic analysis of Chinalco Toromocho Copper Project, Peru Prepared by Behre Dolbear & Co. October 29, 2012 Depreciation schedule	Production year +34	Production year +35	Production year +36	Production year +37	Production year +38	Production year +39	Production year +40	Total
	2047	2048	2049	2050	2051	2052	2053	
								$ 51,210,025
								$ 67,848,526
	$ 16,943,207							$ 84,716,033
	$ 14,648,911	$ 14,648,911						$ 73,244,557
	$ 75,440	$ 75,440	$ 75,440					$ 377,200
	$ 75,440	$ 75,440	$ 75,440	$ 75,440				$ 377,200
	$ 51,660	$ 51,660	$ 51,660	$ 51,660	$ 51,660			$ 258,300
		$ 28,085	$ 28,085	$ 28,085	$ 28,085	$ 28,085		$ 140,425
			$ 2,255	$ 2,255	$ 2,255	$ 2,255	$ 2,255	$ 11,275
				$ 0	$ 0	$ 0	$ 0	$ 0
	year +38 investments				$ 0	$ 0	$ 0	$ 0
		year +39 investments				$ 0	$ 0	$ 0
			year +40 investments				$ 0	$ 0
total annual depreciation	$ 31,794,658	$ 14,879,536	$ 232,880	$ 157,440	$ 82,000	$ 30,340	$ 2,255	$5,030,505,590
loss carried forward determination								
net income before taxes	$ 463,308,869	$ 478,870,781	$ 376,654,573	$ 0	$ 0	$ 0	$ 0	
cumulative net income before taxes	$ 20,345,092,169	$ 20,823,962,950	$ 21,200,617,523	$ 21,200,617,523	$ 21,200,617,523	$ 21,200,617,523	$ 21,200,617,523	
cumulative loss	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	-$ 9,747,030	
potential wirte-off	$ 463,308,869	$ 478,870,781	$ 376,654,573	$ 0	$ 0	$ 0	$ 0	
cumulative potential write-off	$ 20,354,839,199	$ 20,833,709,980	$ 21,210,364,553	$ 21,210,364,553	$ 21,210,364,553	$ 21,210,364,553	$ 21,210,364,553	
trial write-off	($19,881,783,300)	($20,345,092,169)	($20,823,962,950)	($21,200,617,523)	($21,200,617,523)	($21,200,617,523)	($21,200,617,523)	
actual write-off	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 9,747,030

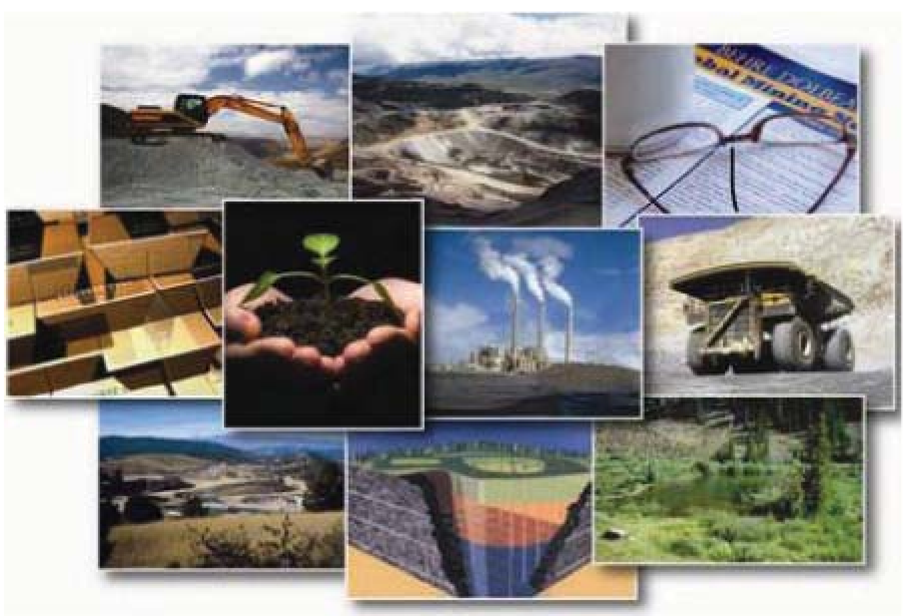
BEHRE DOLBEAR
founded 1911 MINERALS INDUSTRY ADVISORS

CHINALCO MINING CORPORATION INTERNATIONAL

TOROMOCHO PROJECT
INDEPENDENT TECHNICAL REVIEW

(BEHRE DOLBEAR PROJECT 11-152)

APRIL 2012



PREPARED BY:

BEHRE DOLBEAR ASIA, INC.
999 Eighteenth Street, Suite 1500
Denver, Colorado 80202
(303) 620-0020

A Member of the Behre Dolbear Group Inc.

BEHRE DOLBEAR

BEHRE DOLBEAR ASIA, INC.
founded 1911 MINERALS INDUSTRY ADVISORS

Tony Guo, Vice President

April 18, 2012

Dr. Peng Huaisheng
Chinalco
No. 62 Xizhimen North
Haidian District, Beijing, PRC 100082
Email: hsh_peng@chalco.com.cn

Dear Sir,

Chinalco Mining Corporation International (the "Group") —
Toromocho Project Independent Technical Review

I refer to the proposed listing (Proposed Listing) of the Group on The Stock Exchange of Hong Kong Limited (HKSE). Unless otherwise specified, terms used herein shall have the same meaning as those defined in the prospectus of the Company dated April 2012 (Prospectus).

I hereby confirm that, in relation to Behre Dolbear's report and advise (the "Expert Advice"):

- All bases and assumptions on which the Expert Advice are founded are fair, reasonable, and complete.
- I and the Behre Dolbear team (we) are appropriately qualified, experienced, and sufficiently resourced to give the Expert Advice.
- The Scope of Work is appropriate to the Expert Advice given and the opinion required to be given in the circumstances.
- We are independent from the Group, its subsidiaries, their respective directors (including directors proposed to be appointed prior to the Proposed Listing), and controlling shareholder(s), and we do not have a direct or indirect material interest in the securities or assets of the Group, its connected persons, or any associate of the Group beyond that allowed by rule 3A.07 of the Listing Rules.
- The Prospectus, based on Behre Dolbear's April 2012 Independent Technical Review, fairly represents our views and contains a fair representation of the conditions set forth in the HKSE's Chapter 18 Equity Securities.

999 Eighteenth Street, Suite 1500 S Denver, CO 80202 303-620-0020 fax 303-620-0024
BEIJING CHICAGO DENVER GUADALAJARA HONG KONG LONDON NEW YORK
SANTIAGO SYDNEY TORONTO ULAANBAATAR VANCOUVER
www.dolbear.com

- After making all due and careful inquiries we have reasonable grounds to believe and do believe that all factual information, which we have relied on, including factual information which we have stated that we have relied on, or have been believed to have relied on, and any supplementary or supporting information given by ourselves in relation to the Expert Advice, is true in all respects and that such factual information does not omit any material information.

- Behre Dolbear has provided and has not withdrawn its written consent of this Competent Person's Report (CPR). The CPR is based on the reporting standards set forth in the VALMIN Code and Guidelines for Technical Assessment and Valuation of Mineral Assets and Mineral Securities for Independent Expert Reports, as adopted by the Australasian Institute of Mining and Metallurgy in 1995 and updated in 2005. Mineral resources and reserves defined for the Toromocho Project have been reviewed for conformity with the December 2004 Australasian Code for Reporting Exploration Results, Mineral Resources and Ore Reserves (the "JORC Code") prepared by the Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia.

I will undertake to advise you immediately, if any change of circumstances arises, thereafter, that would render any information contained in this letter misleading in any aspect. Further, we understand that you may rely on confirmations and undertakings provided in this letter in connection with the Proposed Listing.

Sincerely,

BEHRE DOLBEAR ASIA, INC.

Yingting "Tony" Guo, Ph.D, P.Geo.
Vice President and Qualified Person

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1.0 INTRODUCTION

Behre Dolbear Asia, Inc. (Behre Dolbear) has undertaken an Independent Technical Report of the Toromocho Project in Peru for the Chinalco Mining Corporation International (Group). Some of the information in this Independent Technical Review (ITR) is paraphrased from the Toromocho Project Feasibility Study by Aker Kvaerner dated December 2007, the February 2009 Toromocho Project Basic Engineering Report by Aker Solutions, the February 2011 Aker Solutions Definitive Estimate, and the subcontractor reports, as referenced in the Appendices of these reports.

1.1 BEHRE DOLBEAR CONTRACT

It is Behre Dolbear's understanding that Group is considering a public listing for an entity housing the Toromocho Project via the Hong Kong Stock Exchange (HKSE). To help accomplish this important objective, the Group requires an ITR covering its Peruvian mining project (Toromocho Project), which is presented in the December 2007 Toromocho Project Feasibility Study by Aker Kvaerner and the February 2009 Toromocho Project Basic Engineering Report by Aker Solutions, and the February 2011 Definitive Estimate. Capital, operating costs, and financial valuations have been adjusted to reflect a fourth quarter 2011 basis.

Behre Dolbear Asia, Inc., a wholly owned subsidiary of Behre Dolbear & Company, Inc., part of the Behre Dolbear Group Inc. has been retained by the Group to conduct an Independent Technical Report for their Toromocho Project in Peru. Behre Dolbear has completed the work in four tasks, as follows.

- **Task 1** — Desktop Review of Reserves and Resources
- **Task 2** — Expedited Desktop Review of Technical documents
- **Task 3** — Site Visit and Property Inspection
- **Task 4** — Preparation of the ITR

Behre Dolbear completed Tasks 1 and 2 on June 6, 2011 and visited the site on July 25-27, 2011.

Behre Dolbear will complete a technical due diligence review of the project and prepare the ITR including a risk assessment consistent with the requirements of the Rules Governing the Listing of Securities on the HKSE (Chapter 18).

Behre Dolbear's review covers the geology, resource and reserve aspects, mining, processing, infrastructure, environmental, and social aspects of the project, project approvals, life of mine production plans, project implementation, manpower analysis, capital and operating costs, marketing and sales, an economic evaluation, and project risks.

Behre Dolbear has reviewed the project resources and reserves in accordance with the standard and in compliance with the Australasian Code for Reporting Identified Mineral Resources and Ore Reserves prepared by the Joint Committee of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists, and Minerals Council of Australia, December 2004 (the JORC Code). Behre Dolbear has not undertaken an audit of the data, re-estimation of the resources or reserves, or reviewed the tenements status with respect to any legal or statutory issues. The Group advised that there are not title impediments to the proposed operations and that all project tenements are in good standing.

1.2 GENERAL INFORMATION

The Toromocho Project is located in central Peru, approximately 140 kilometers (km) east of Lima, Peru in the Morococha mining district, Yauli Province, Junin Department (Figure 1.1). The paved main highway from Lima passes through Morococha. The region has steep topography with elevations over the deposit ranging from 4,700 meters (m) to over 4,900m above sea level. The valleys in the area are of glacial origin.

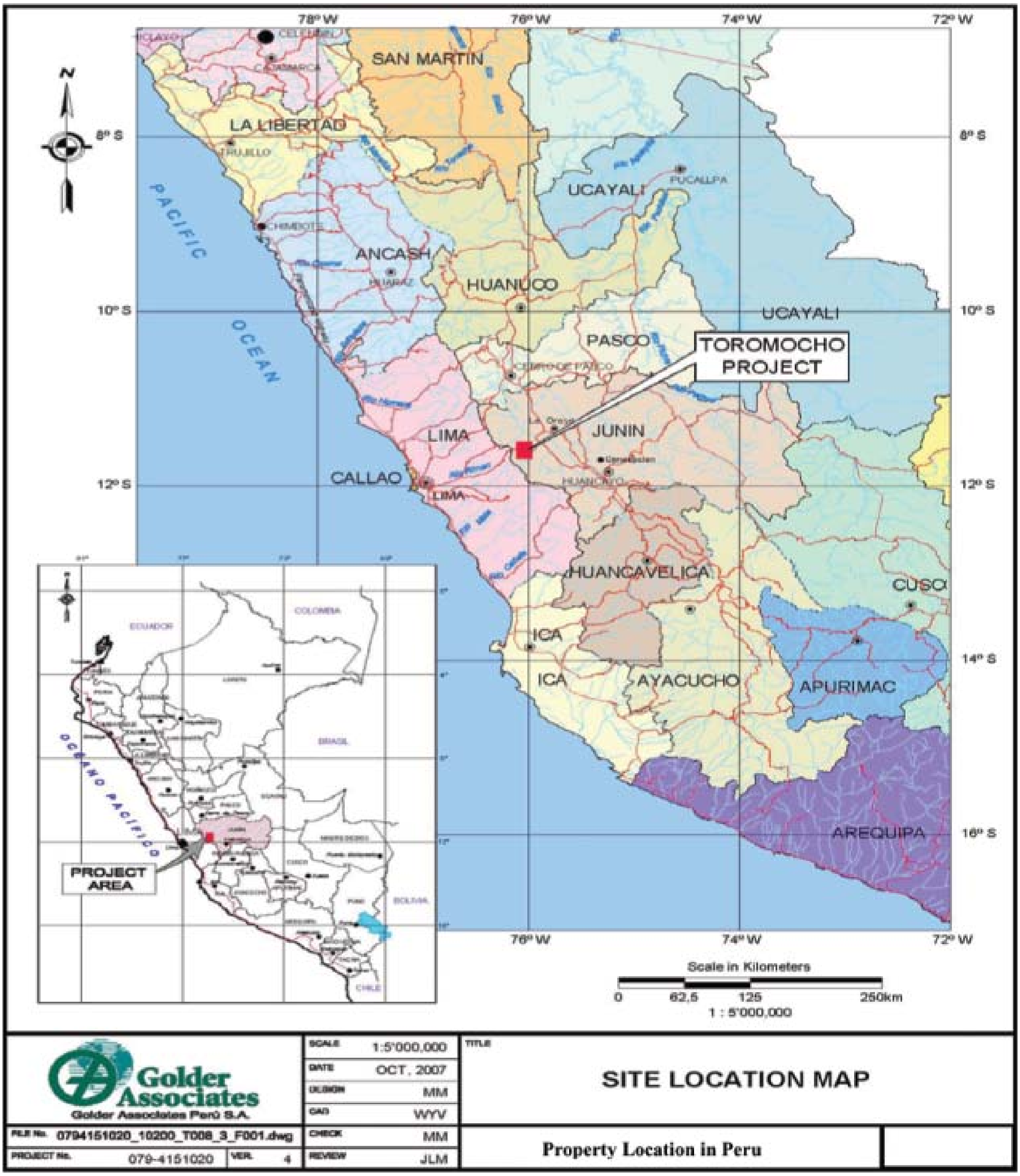

Figure 1.1. Property location in Peru
Source: Toromocho Project Feasibility Report, December 2007, Aker Kvaerner

Access to the Toromocho Project (previously the Pacific Project) is by both the paved Central Highway and the Central Railway, which connects the Morococha mining district to both Lima and La Oroya. The center of the Toromocho deposit is about 2.5 km from the town of Morococha in the Morococha mining district. Lima to Morococha is about 142 km by road and about 173 km by rail. The distance east to La Oroya is about 32 km by road and 35 km by rail. The Doe Run Company operates a custom smelter in the town of La Oroya.

The climate has two well-defined seasons. The wet season is from November to April and has frequent hail and snowfalls with temperatures ranging from 3°C to 20°C. Total wet season precipitation averages 650 millimeters (mm). The rest of the year is reasonably dry with sporadic and sudden rain squalls. Temperatures range from minus 4°C to 14°C. The wind is generally from a northerly direction with a maximum recorded speed of 30 km per hour (km/hr).

The town of Morococha is reasonably typical of a small Andean mining camp. Centromin reported in 1998 that there were 657 houses in Morococha and 20 additional units in Tuctu. Tuctu is located just across the highway to the north from Morococha.

Corona/Pan American Silver and Austria Duvaz are currently operating small underground mines in the Morococha area that will be curtailed when required by the Toromocho Project. Two operating sulfide flotation mills are operating at production levels of about 1,500 tonnes per day (tpd).

A large part of the population of the Morococha district works in the mining industry. The neighboring areas could provide a pool of skilled and experienced labor.

Power is currently available in Morococha; however, additional power lines for the scale of the Toromocho Project will be required. The power source identified in the feasibility study is the National Interconnected Electrical Grid and the connection will be at the 220-kV substations at Pomacocha. A 9 km single circuit transmission line will be built from Kingsmill (southeast of the project) to the project site.

Several potential water sources are available to the project. The Kingsmill Tunnel underlies most of the Toromocho mining area and drains most of the district to the southeast. Studies by Errol Montgomery and Associates indicate that only 50% of the Kingsmill Tunnel water will be required to meet the Project's needs. MCP has negotiated an agreement with the government to obtain the rights to the Kingsmill Tunnel discharge in return for the rights to the discharge. The Kingsmill water treatment plant is completed and operating. Treated water, in excess of process requirements, will be discharged to the Rio Yauli.

The area around the Toromocho pit is characterized by steep mountainous terrain with glacial valleys. Elevations range from 4,700m to over 4,900m above sea level in the mine area. The center of the Toromocho deposit is in a broad valley or basin that opens to the south. Topography climbs to the west, north, and east away from the center of the deposit.

1.3 HISTORY

The earliest recorded information on the Toromocho deposit dates from 1928 when a low-grade copper zone was discovered on the edge of the monzonite stock compromising the San Francisco peak along with several other low-grade blocks.

Between 1954 and 1955, Cerro de Pasco Corporation carried out an exploration program that indicated the presence of mineralization but without recognizing the potential of the district.

On May 18, 1973, the Peruvian Government declared all mining rights in Toromocho as obsolete and transferred the properties to Centromin, a Peruvian government entity. From April 1974 to January 1976, Centromin carried out the last phase of major exploration drilling.

During 2003, Peru Copper Inc. (PCI) and their subsidiary, Minera Peru Copper S.A. (MPC) acquired the option on the property from Centromin.

In 2007, PCI became a wholly owned subsidiary of the Group that changed the subsidiary's name to Minera Chinalco Peru S.A. (MCP) and refers to the Project as the Toromocho Project.

Behre Dolbear's ITR basis consists of information gained from reviewing Aker Kvaerner's December 2007 Toromocho Project Feasibility Study; Aker Solutions' February 2009 Toromocho Project Basic Engineering Report that includes basic engineering and additional studies to further refine the design of the process plant and refine the capital and operating costs, and the Aker Solutions February 2011 Definitive Estimate of the Capital Cost Estimate Revision 4.

The subcontractor's and their areas of responsibilities are:

- Andes Mining Research (AMR)
  - Marketing
- Buenaventura Ingenieros (work done during the pre-feasibility study)
  - Transportation of mills and heavy equipment
- CESEL
  - Power supply study
- Call and Nicholas, Inc. (CNI)
  - Pit slope design and waste dump design
- Errol L. Montgomery & Associates, Inc. (EMA)
  - Hydrogeologic investigations
  - Site-wide water balance
- Golder Associates
  - Surface water management
  - Tailings storage facility
- Independent Mining Consultants, Inc. (IMC)
  - Mine production schedule

  - Mine equipment requirements
  - Mine personnel
  - Mine capital costs
  - Mine operating costs
- Knight Piésold (KP)
  - Geotechnical investigations
  - Environmental Impact Assessment (EIA)
- Krech Ojard
  - Railroad evaluation
  - Port of Callao
  - Transportation costs for concentrate
- METCON
  - Metallurgical test work
- Minerals Advisory Group (MAG)
  - Metallurgy and supervision of METCON test work
- Montgomery Watson Harza (MWH)
  - Environmental geochemical assessment
  - Seismic investigation
- Phoenix Engineering
  - Lime supply
- SGS Lakefield
  - Grinding/flotation test work
  - Molybdenum hydrometallurgical test work

1.4 SEQUENCE OF STUDIES

In 1980, Kaiser Engineers performed a detailed feasibility study for Centromin. The study proposed an open pit mine with a conventional concentrator and a heap leach operation.

In February 2006, SNC-Lavalin (SNC) completed a pre-feasibility study for MPC. The work performed by SNC, MPC, and third parties covered site infrastructure, geology, hydrology, mining, including pit slope design, concentrator, tailings disposal, heap leaching with SX/EW, environmental and permit issues, community relations, and capital and operating costs estimates. The mine production schedule called for a feed of 150,000 tpd of run-of-mine (ROM) ore to primary crushing. The capital costs were estimated to be accurate within minus 10% to plus 25%. Metallurgical test work was further defined and continued.

In August 2006, MPC required Aker Kvaerner to perform a definitive feasibility study. Areas of work covered included the ones investigated by SNC. The hydrometallurgical treatment of molybdenum concentrate to produce molybdenum oxide was added to the scope of the study.

During the study, it became clear that processing part of the ore by heap leaching and SX/EW would not be economic and it was decided to delete this process variation from the feasibility study. As part of the feasibility study, Aker Kvaerner performed trade-off studies on concentrator capacity, ore conveying, concentrator location, and concentrator enclosure. The feasibility study report was issued in December 2007.

The December 2007 report recommended a number of optimization and refinement studies that were completed by Aker Solutions in 2008 resulting in an updated capital cost, operating cost, and schedule presented in the February 2009 Toromocho Project Basic Engineering Report.

The capital cost estimate was further refined to minus 5% and plus 10% in the February 2011 Definitive Estimate.

MCP in conjunction with IMC and Kvaerner/Jacobs personnel are currently updating the reserves, production plan, hydromet plant details, and related operating costs and capital costs estimates and related cash flow calculations based on:

- Minor revisions to the pit slope angles
- Removal of pit limit restrictions due to the commitment to move the national highway
- New government requirements for haul road width
- Refinements and revisions to the molybdenum hydrometallurgical plant design
- Revisions to the Peruvian mining tax law
- Updated consumables and equipment costs for mining and processing
- Updated costs for capital equipment for mining and processing
- Updating concentrate handling and processing costs and penalties

The aforementioned work was ongoing during Behre Dolbear's investigation and was not taken into consideration in this report.

The Toromocho Project feasibility study to date proposes mining and processing ore at a rate of 117,200 tpd (stripping ratio of 0.79:1) producing an average of 1,838 tpd of copper concentrates at 26.5% copper and 25.1 tpd of molybdenum oxide over a 36-year mine life. Initial capital costs are currently estimated at $2.948 billion (fourth quarter 2011 dollars) and production is scheduled to begin in the fourth quarter of 2013.

2.0 QUALIFICATIONS OF BEHRE DOLBEAR, DISCLAIMER, (INDEMNITIES), ETC.

2.1 QUALIFICATIONS

Behre Dolbear & Company, Inc. is an international minerals industry advisory group that has operated continuously in North America and worldwide since 1911. Behre Dolbear and its parent, Behre Dolbear Group Inc., currently have offices in Beijing, Denver, Guadalajara, London, New York, Santiago, Sydney, Toronto, Ulaanbaatar, Vancouver, and Hong Kong.

The firm specializes in performing mineral industry studies for mining companies, financial institutions, and natural resource firms, including mineral resource/ore reserve compilations and audits, mineral property evaluations and valuations, due diligence studies and independent expert reviews for acquisition and financing purposes, project feasibility studies, assistance in negotiating mineral agreements, and market analyses. The firm has worked with a broad spectrum of commodities, including base and precious metals, coal, ferrous metals, and industrial minerals on a worldwide basis. Behre Dolbear has acted on behalf of numerous international banks, financial institutions and mining clients and is well regarded worldwide as an independent expert engineering consultant in the minerals industry. Behre Dolbear has prepared numerous independent Technical Reports for mining projects worldwide to support securities exchange filings of mining companies in Hong Kong, China, the United States, Canada, Australia, the United Kingdom, and other countries.

Most of Behre Dolbear's associates and consultants have occupied senior corporate management and operational roles, and are well experienced from an operational viewpoint as well as being independent expert consultants.

Behre Dolbear Asia, Inc. was established in 2004 to manage Behre Dolbear Group's projects in China and other Asian countries. Project teams of Behre Dolbear commonly consist of senior-level professionals from Behre Dolbear Group's offices in Denver, Colorado, USA; Sydney, Australia; London, United Kingdom; and other worldwide offices. Since its establishment, Behre Dolbear has conducted over 40 technical studies for mining projects in China or mining projects located outside of China to be acquired by HKSE-listed Chinese companies, including preparing ITRs for the HKSE IPO prospectuses of Hunan Nonferrous Metals Corporation Limited, Zhaojin Mining Industry Company Limited, and Hildili Industry International Development Limited and for the Shanghai Stock Exchange (SSE) IPO listing of Western Mining Company Limited. These four companies were successfully listed on the HKSE/SSE in 2006 and 2007.

Behre Dolbear's primary team of minerals industry professionals has specialized capability and experience applicable to analysis of this Project. All of the proposed team members have at least 25 years of experience in the mining industry and have been involved in numerous assignments where their reports were utilized by the global stock exchanges. Detailed resumes of these professionals are attached separately to this document, in Appendix 2.0 and brief resumes follow.

Project Manager and Mining Engineer: Mr. Robert R. Dimock has more than 30 years of experience, including over 20 years in executive level management in the mining industry, with expertise in the areas of general management, corporate strategic planning, project development and management, mining, processing, construction management, and mining engineering in base, and precious metals. He is the former president of Rio Tinto's Kennecott Copper subsidiary and was instrumental in the redevelopment of the Bingham Canyon mine, mill, and smelter. He has managed copper, lead/zinc, and precious metals operations in both open pit and underground mines. Geographically, he has worked in North and South America, the Pacific Rim, and the Middle East. His credentials include a Bachelor of Science Degree in Mineral Economics and a Master of Science Degree in Mining Engineering. He is a Mining and Metallurgical Society of America Qualified Person.

Project Geologist: Dr. Yingting "Tony" Guo, P.Geologist, is vice president of Behre Dolbear Asia, Inc. and vice president of Behre Dolbear & Company, Ltd. in Canada. He has over 22 years of professional experience in the mineral industries. He has worked on gold, copper, iron, industrial mineral, and coal projects/mines in China, Mongolia, Africa, United States, and Canada. His business expertise includes the mineral resource exploration, assessment, acquisition, and project management. He has participated and managed gold, copper, and coal exploration work in China for the last 10 years. His credentials include a Bachelor of Science Degree in Geology from the Nanjing University as well as a Doctor Degree in Geology and Exploration from China University of Mining and Technology. He is a Registered Professional Geoscientist from the Province of British Columbia and a Member of Mineral Exploration Association of British Columbia, Canada. He meets the requirements for "Competent Person," as defined in the Australasian JORC Code and the requirements for "Qualified Person," as defined in Canadian National Instrument 43-101 for the purpose of mineral resource/ore reserve estimation and reporting. He has recently been involved in several (independent) technical reports for the HKSE and Toronto Stock Exchange (TSX).

Resource/Reserve Specialist: Dr. Robert Cameron has over 30 years of experience in geostatistical analysis of ore reserves, computerized mine planning, mine design, computerized studies for mine production optimization, ultimate pit limit optimization, mine efficiency studies, equipment selection and utilization, and operations research. He has completed geostatistical estimations or resource and reserve reviews or audits on over 100 properties worldwide during his career. He recently completed the certification of a major copper producer's reserves at all of its copper mines. He is a Mining and Metallurgical Society of America Qualified Person.

Metallurgical Processing Specialist: Mr. Mark Anderson has more than 40 years of diversified industry experience in both technical and managerial roles, including project feasibility, mine operations, and project due diligence. His experience includes evaluation of base and precious metal properties with emphasis on processing, metallurgy, project management, and feasibility analysis. His responsibilities have included construction, management, and operation of a 9 million tonne (Mt) per year open pit copper/molybdenum mining operation with a 28,000 tonne per day concentrator, and milling and smelting operations at a 21,500 tonne per day copper ore mining and processing operation. During his career, he has evaluated porphyry copper operations and developments throughout South America including Peru, Chile, and Argentina. He is a Mining and Metallurgical Society of America Qualified Person.

Environmental and Permitting Specialist: Dr. Scott Mernitz has over 25 years of expertise in environmental due diligence involving minerals projects, including fatal flaw and risk/liability analyses, agency negotiations and conflict resolution, and sustainability issues. This work has addressed projects involving precious and base metals, industrial minerals, and energy fuels such as uranium, coal, coal bed methane, oil and gas, and oil shale. Field reviews have been performed throughout North, Central, and South America, the Caribbean, Africa, Australia, and the Middle East. His desktop study experience includes additional projects in Africa, Greenland, Europe, and Australia. Dr. Mernitz's experience also consists of U.S. National Environmental Policy Act (NEPA) project management; international Environmental Impact Assessments (EIA) reviews and support documents; mining, solid, and hazardous waste management; environmental regulations and permitting; energy, mineral, and water resources planning; and environmental impact assessments. He has project management and principal investigator experience in several major interdisciplinary environmental baseline studies, environmental permitting, mining waste regulatory policy, and third-party EIS and EA projects under NEPA requirements. Further, he has reviewed, critiqued, summarized, and translated international EIAs, and served as Project Director for several supporting documents to Australian EIAs during his term in Perth. He has other in-depth experience in Environmental Site Assessments (ESA) for mining properties and support facilities, hazardous waste/mining waste Remedial Investigation/Feasibility Studies (RI/FS), and technical oversight projects under United States waste management laws and regulations. He is one of Behre Dolbear's specialists in the application of the Equator Principles to global mining project reviews for banks, mining companies, and governments. His credentials include a Bachelor of Arts Degree in Geography from Elmhurst College, Illinois; the Master of Arts Degree in Geography and Environmental Conservation from the University of Colorado at Boulder; and the Doctor of Philosophy Degree in Land Resources (Mediation of Environmental Disputes) through the interdisciplinary Institute of Environmental Studies, University of Wisconsin at Madison.

Financial Modeling, Economic Analysis and Valuation: Mr. William F. Jennings has over 30 years of mining industry experience with consulting firms and, early in his career, with the United States Geological Survey (USGS). He has specialized in the economics and valuation of mineral properties, with emphasis on base metals, precious metals, and coal, both in North America and internationally. On valuation and feasibility projects, he prepares economic analysis models and determines taxes, cash flow, discount rate, net present value, and rate of return. On projects where valuation is not amenable to standard cash flow net present value analysis, he performs valuations using other accepted techniques. On due diligence projects, he reviews and critiques the economic analyses prepared by others. He has provided expert witness testimony intermittently since 1978. He is a Registered Professional Engineer and a Certified Mineral Appraiser. He has been a Behre Dolbear associate since 1989.

Project Coordinator: Mr. Jack Song has over 25 years of experience in all phases of precious and base metal (including gold, copper and iron) exploration from grassroots reconnaissance to mine development. He has worked for different western minerals companies including Ivanhoe Mines, Gold Fields, and Omega Gold Investment, etc. in Australia, Mongolia, and China and has held project manager, senior geologist, chief geologist, and general manager positions with the companies. He has extensive exploration and project generation activities experience for gold, base metals, iron, etc. He has received a Bachelor's degree in geology and mineral exploration from Wuhan Geological College in August 1982. He was qualified as a Senior Geologist by the HR Department of Xinjiang Uygur Autonomous Region government in October 1994.

Senior Advisor: Mr. Bernard J. Guarnera has more than 40 years of experience with mining and consulting firms in the international mineral industry focusing on the valuation of developed and undeveloped mineral properties, negotiation, and structuring of mineral development and lease agreements, and economic geology. His valuation expertise spans all commodities and geographic areas with recent emphasis on base and precious metals and past emphasis on energy minerals. He is a Certified Mineral Appraiser with the American Institute of Mineral Appraisers. He has lectured and instructed the mining engineering group of the Internal Revenue Service (IRS) on mineral valuation techniques and has also presented seminars and instruction on mineral valuations to the American Institute of Rural and Farm Appraisers and financial institutions. He has provided expert witness testimony on mineral property values on several occasions. He is a Mining and Metallurgical Society of America Qualified Person.

2.2 DISCLAIMER (INDEMNITIES)

Behre Dolbear has conducted an independent technical review of the Group's Toromocho Project mining properties and holdings. A site visit was made to the project sites by Behre Dolbear professionals involved in this study. Behre Dolbear has exercised all due care in reviewing the supplied information and believes that the basic assumptions are factual and correct and the interpretations are reasonable. Behre Dolbear has independently analyzed the Company's data, but the accuracy of the conclusions of the review largely relies on the accuracy of the supplied data.

Behre Dolbear has relied on the work of Aker Kvaerner and its subcontractors and the Group in the preparation of this ITR. Where possible, Behre Dolbear has confirmed the information provided by comparison against other data sources, comparisons with other projects, or by field verification.

Where checks and confirmations were not possible, Behre Dolbear has assumed that all information supplied is complete and reliable within normally accepted limits of error. During the normal course of the review, Behre Dolbear has not discovered any reason to doubt that assumption.

Behre Dolbear has not specifically reviewed or audited the property ownership documents at Toromocho. However, MPC informed Behre Dolbear that they had acquired the mineral claims required for the orebody, and substantial surface holdings for plant, tailing, infrastructure, and support requirements. Information regarding the property situation at Toromocho, within this report, has been provided by MPC, as required under Chapter 18 listing rules. Behre Dolbear has not offered a professional opinion regarding the property situation.

The valuation assessment has been conducted in accordance with the Code for the Technical Assessment and Valuation of Mineral and Petroleum Assets and Securities for Independent Expert Reports (Valmin Code) as issues in 1995 and updated in 2005 and in accordance with Chapter 18 of the HKSE. In accordance with the latter requirements, Behre Dolbear has not included any consideration of Inferred resources in determining a value for the technical assets.

The report is provided to the Group for the purpose of assisting them in assessing the technical issues and associated risks of the development in the context of the proposed Hong Kong Stock Exchange listing. This report should not be used or relied upon for any other purpose. The report does not constitute a technical or legal audit. Neither the whole nor any part of this report nor any reference thereto may be included in, or with, or attached to any document or used for any purpose without Behre Dolbear's written consent to the form and context in which it appears.

2.3 GUARANTEE

Consultant guarantees that it shall perform the Services in accordance with the standards of care and diligence normally practiced by recognized consulting firms performing services of a similar nature. All information furnished by Client is a representation or warranty by Client. Client is responsible for the accuracy and completeness of such information and Consultant shall have the right to rely upon such information. If, during the 6 month period following completion of Services it is shown that Consultant has failed to fulfill this guarantee and Client has promptly notified Consultant in writing of such failure, Consultant shall perform, at Consultant's cost, such corrective Services as may be required to remedy such failure. Client shall release, defend, and indemnify Consultant from and against any further liability arising from the Services or this Agreement.

Consultant shall be liable to Client in the event Consultant is guilty of gross negligence and willful misconduct. In no event shall Consultant's aggregate limit of liability to Client exceed the value of the labor fees paid to the Consultant by the Client.

2.4 CONSEQUENTIAL DAMAGES

Neither party shall be responsible or held liable to the other for consequential damages including without limitation, loss of profit, loss of product, loss of investment, or business interruption. The rights and remedies provided herein are exclusive and in lieu of any other rights and remedies otherwise available at law or in equity. Indemnifications against, releases of liability and limitations of liability, damages, and remedies shall apply in the event of the fault, negligence, strict liability, or liability arising by statute of the party indemnified, released, or whose liability is limited, or in whose favor damages or remedies are limited.

3.0 ABBREVIATIONS, DEFINITIONS, AND RISK DEFINITIONS

3.1 ABBREVIATIONS AND DEFINITIONS

Term/Abbreviation	Description
AAS	Atomic Absorption Spectrometry
Ag	Silver
AMR	Andes Mining Research
ARD	Acid Rock Drainage
Au	Gold
Behre Dolbear	Behre Dolbear Asia, Inc.
CNI	Call & Nicholas, Inc.
Cu	Copper
DDH	Diamond Drill Holes
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMA	Errol L. Montgomery & Associates, Inc.
EPCM	Engineering, Procurement, and Construction Management
ESA	Environmental Site Assessment
g	Gram
Golder	Golder Associates Pty Limited
g/t	Grams per Tonne
ha	Hectare
HKSE	Hong Kong Stock Exchange
hr	Hour
IMC	Independent Mining Consultants, Inc.
ITR	Independent Technical Review
JORC	Joint Ore Reserve Committee
km	Kilometer
km^2	Square Kilometer
KMT WTP	Kingsmill Tunnel Water Treatment Plant
KP	Knight Piésold Pty Limited
kV	Kilovolts
kWhA	Kilowatt Hours per Tonne
L	Liter
LOM	Life of Mine
m	Meter
M	Million
m^3	Cubic Meter
MAG	Minerals Advisory Group
Masi	Meters Above Sea Level
MCP	Minera Chinalco Peru S.A.
mg	Milligrams
mg/L	Milligrams per Liter
mm	Millimeter
Mo	Molybdenum
MOE	Ministry of Environment
MoO_3	Molybdic Oxide
Mozs	Million Ounces
MPC	Minera Peru Copper S.A.
m/s^2	Meters per Second Squared

Term/Abbreviation	Description
Mt	Million Tonnes
Mtpa	Million Tonnes per Annum
MW	Megawatt
MWh	Megawatt Hour
MWH	Montogmery Watson Harza
NEPA	U.S. National Environmental Policy Act
NPV	Net Present Value
OEFA	Office of Environmental Evaluation and Fiscalization
ozs	Ounces
P_{80}	80% Passing
PAF	Potentially Acid Forming
PCI	Peru Copper Inc.
PGA	Peak Ground Acceleration
ppm	Parts Per Million
PTAR	PT Agincourt Resources
RI/FS	Remedial Investigation/Feasibility Study
ROM	Run-of-Mine
RQD	Rock Quality Designation
SAG	Semi Autogenous Grinding
SNC	SNC Lavalin
SX/EW	Solvent Extraction/Electrowinning
t	Tonne
TC/RC	Treatment Charges/Refining Charges
tpa	Tonnes Per Annum
TSX	Toronto Stock Exchange
V	Volt
VAT	Value Added Tax
WTP	Water Treatment Plant

3.2 RISK DEFINITIONS

Risk has been classified from low, moderate, to high based on the following definitions.

- **High Risk:** The factor poses an immediate danger of a failure, which if uncorrected, will have a material effect (>15% to 20%) on the project cash flow and performance and could potentially lead to project failure.

- **Moderate Risk:** The factor, if uncorrected, could have a significant effect (10% to 15% or 20%) on the project cash flow and performance unless mitigated by some corrective action.

- **Low Risk:** The factor, if uncorrected, will have little or no effect (<10%) on project cash flow and performance.

The likelihood of a risk must also be considered.

- **Likely** will probably occur
- **Possible** may occur
- **Unlikely** unlikely to occur

The degree or consequence of a risk and its likelihood are combined into an overall risk assessment, as presented in Table 3.1.

TABLE 3.1
OVERALL RISK ASSESSMENT

Likelihood of Risk	Consequence of Risk		
(within 7 years)	Low	Moderate	High
Likely	Medium	High	High
Possible	Low	Medium	High
Unlikely	Low	Low	Medium

4.0 EXECUTIVE SUMMARY

4.1 BACKGROUND

Behre Dolbear has conducted an ITR of the Chinalco Mining Corporation International (Group) Toromocho Project in Peru 140 km east of Lima. The ITR includes a review of MCP's proposed development plans, the current state of engineering and construction, and an updated financial analysis. Behre Dolbear has reviewed resource and reserve estimates, details of mining plans and production schedules, metallurgical test work, proposed flow sheets, processing operations, infrastructure and manpower plans, environmental aspects and approval status, implementation plans, projected operating and capital costs, and financial analysis consistent with the requirements of the Chapter 18 Rules for Listing on the Hong Kong Stock Exchange. A site visit was undertaken on July 25-27, 2011 and discussions were held with the project's owner's representatives, project management, and key operating and maintenance personnel.

4.2 PROJECT OVERVIEW

The Toromocho deposit dates from 1928 when a low-grade copper zone was discovered on the edge of the monzonite stock of the San Francisco peak. Cerrode Pasco carried out an exploration program during 1954-1955 that indicated the presence of mineralization. In 1973, the Peruvian government transferred the properties to Centromin, a Peruvian government entity. Centromin continued exploration during the mid 1970s. In 2003, Peru Copper Inc. (PCI) and their subsidiary, Minera Peru Copper S.A. (MPC) acquired the option from Centromin. In 2007, PCI became a wholly owned subsidiary of the Group, which renamed the property, the Toromocho Project, held by its wholly owned subsidiary Minera Chinalco Peru S.A. (MCP).

The Group is considering a public listing of the Toromocho Project via the Hong Kong Stock Exchange.

Access to the Toromocho Project is both by the paved Central Highway (142 km from Lima) and the Central Railway (173 km from Lima). The center of the Toromocho deposit lies about 2.5 km from the town of Morococha (a typical Andean mining camp) in the Morococha mining district. Small scale operating underground mines, processing plants, and a smelter are within 30+ km. A large part of the population of the Morococha district works in the mining industry. The neighboring areas could provide a pool of skilled and experienced labor.

Power is available in Morococha but would have to be upgraded to support the Toromocho Project. Sufficient water for the proposed operations has been assured by MCP as a result of constructing a water treatment plant for contaminated water that was previously collected and discharged to a local river.

A Feasibility Study for the Toromocho Project was completed by Aker Kvaerner in December 2007. The project consists of an open pit mining operations supporting 117,200 tonnes per day (tpd) of ore (stripping ratio 0.79:1) to a conventional SAG mill/ball mill/flotation processing plant producing an average of 1,838 tpd of 26.5% copper concentrate and a separate molybdenum hydromet plant to produce 25.1 tpd of molybdenum oxide over a plus 32 year life.

The original 2007 Feasibility Study was refined in February 2009 and a Definitive Estimate was produced in February 2011. The Definitive Estimate is for a total project capital cost of $2.5 billion and a plant start up in the fourth quarter of 2013.

MCP, ICM, and Kvaerner/Jacobs are currently working on updated and refined reserves, production plans, and capital and operating cost estimates to be available during the first quarter of 2012. This information was not available to Behre Dolbear.

4.3 LAND STATUS

The Toromocho Project is 100% owned and operated by MCP that is wholly owned by the Group (see Section 4.2 for owner progression).

MCP's legal vice president notified Behre Dolbear that the mining concessions are perfectly in place. A small strip of land, inside the pit area, that used to be owned by the railroad and is currently government controlled, is in the process of being transferred to MCP. Approval of the EIA implies intent to complete the transfer that should be finished within 6 months — **Low Risk/Unlikely.**

Two other larger companies holding property and mineral concessions adjacent to the Toromocho deposit and currently operating small underground mines are Pan American Silver and Austria Duvaz. Smaller companies holding concessions adjacent to Toromocho are Centenario, Pomatarea, Volcan, and Sacracancha. MPC has signed an agreement with Austria Duvaz, which granted the company an exclusive option to acquire the Morococha mining concessions, surface areas and assets of Austria Duvaz. In accordance with the share purchase agreement signed with Austria Duvaz, MCP gained 100% control of Minera Centenario and its stake in 30 concessions located in the Morococha mining district — **Low Risk/Unlikely.**

4.4 GEOLOGY

Peru is situated in the heart of the Andés mountain range. The cordillera of the Andés forms a northwest-trending belt that passes through Peru and is one of the most important metallogenic provinces in South America. The historical mining district of Morococha is part of the Miocene Belt of the Andés in central Peru. The Toromocho copper-polymetallic deposit is a complex, mineralized assemblage of veins, veinlets, stock works, "manto-type" bodies, and disseminated sulfides of the general "porphyry copper" type mineralization hosted in both intrusive and contact metamorphic units with well-zoned mineralization and alteration characteristics in the Morococha mining district. The skarn-type copper-polymetallic mineralized bodies are controlled mostly by the contacts between the Tertiary-age intrusives including diorites, granodiorites, quartz, monzonites, and quartz porphyries and Jurassic-age calcareous host units of the Pucara Formation. Broad areas of the deposit are brecciated with various levels of intensity. The breccia texture crosses all rock types in the central portion of the deposit.

The mineralization of the Toromocho deposit is well zoned. The metal zonation crosses rock type boundaries although the skarn units are better hosts than the intrusive. The deposit shows well developed concentric silicate alteration along with the metal zoning. There is a central potassic zone with secondary biotite, quartz, and pyrite that is surrounded by a phyllic zone with quartz and sericite.

The outer zone is propylitic with epidote, chorite, calcite, and sphene. The wall rocks of the Toromocho deposit include several intrusive phases of the regional plutons, and at least two phases of porphyritic stocks associated with the alteration and mineralization of the Tertiary Toromocho deposit.

The majority of copper mineralization is in the form of chalcopyrite and chalcocite. Molybdenum (moly) and silver are also present as byproduct credits. In the Toromocho deposit, chalcocite is distributed vertically over at least 250m, but some chalcopyrite remains throughout much of this interval. Sequential assays completed by drilling have confirmed this occurrence and provide a sound basis for interpretation of copper mineral species throughout the deposit.

The Toromocho ore body outcrops on the surface at elevations of 4,600m to 4,800m. The copper ore body extends downwards to a flat "bottom" 500m to 600m below the surface. The highest grade part of the ore body lies within a 1.0 km by 2.0 km body of brecciated skarn, surrounding a cupola-like 7-million year old feldspar porphyry and granodioritic intrusive. The ore body contains about 2.5 billion tonnes of plus 0.3% copper resources averaging about 0.5% copper. The primary ore body is over-printed by late-stage, pyritic primary mineralization, clay and serpentine alteration, and supergene chalcocite and covellite enrichment. Spotty and structurally controlled, moderate-to weak, chalcocite enrichment extends from the surface and from the top of dominant sulfides, downward to the bottom of enrichment, 200m to 400m below the present surface. A sulfate zone containing anhydrite disseminations and veinlets occur several hundred meters below the bottom of enrichment.

A significant portion of the original leached capping above the enriched zone was probably stripped by Pleistocene glaciation. The upper half of the enriched zone in many places contains more than 50% leachable copper by sequential analyses. The lower half of the enrichment blanket above the bottom of enrichment and the top of the primary zone is generally only weakly enriched and contains from 15% to 50% leachable copper by sequential analyses.

Metallic minerals in the deposit include chalcopyrite, chalcocite, molybdenite, tetrahedrite, galena, sphalerite, digenite, pyrite, pyrrhotite, magnetite, limonite, malachite, and azurite. Nonmetallic minerals include garnet, diopside, tremolite, epidote, quartz, feldspar, biotite, sericite, chlorite, calcite, anhydrite, chorite, calcite, and sphene.

4.5 GEOLOGICAL DATABASE

Behre Dolbear's geologist's observation in the field and study of the geology maps suggest that the Toromocho deposit is well understood by MCP. The major copper mineralization is in the form of chalcopyrite and chalcocite. Molybdenum and silver are present as byproduct credits. The deposit has typical porphyry copper mineralization and alteration characteristics.

Behre Dolbear has visited the primary lab for the Toromocho Project, CIMM PERU S.A. in Lima, Peru. The CIMM Lab Manager explained to Behre Dolbear the sample preparation and assay procedure used for the Toromocho Project. Behre Dolbear reviewed the lab's qualification and certification from both Peru and International Organizations. Behre Dolbear considers CIMM Peru as a well-qualified lab with a good reputation.

Behre Dolbear believes that the database used in the resource estimate by IMC for the Toromocho copper deposit is well organized, in good order, and acceptable based on observation in the field and study of the geology report. The work meets both Canadian NI 43-101 and Australasian JORC standards.

In Behre Dolbear's opinion, drilling efforts and sampling methods employed by PCI and MCP in their drilling efforts meet both Canadian NI 43-101 and Australasian JORC standards. The drilling of large-diameter (HQ) core using split inner tubes enhances core recovery, and also provides a larger sample for assay compared to smaller diameter cores. The sawing of the core for collection of samples for assay is appropriate and provides for more uniform and consistent sample sizes compared to splitting with a conventional manual or hydraulic splitter.

The sample preparation, analytical methods, and security procedures used by PCI and MCP for samples generated by the PCI and MCP drilling meet Canadian NI 43-101 and Australasian JORC standards. The analysis of 10m composites for accessory metals such as gold, silver, zinc, molybdenum, and arsenic is appropriate for the porphyry-style copper mineralization in the Toromocho deposit.

The QA/QC procedures outlined by IMC are adequate for porphyry copper mineralization from the Toromocho deposit.

4.6 RESOURCES AND RESERVES

4.6.1 General

The mineral resources at the Toromocho Project were estimated by IMC of Tucson, Arizona, USA. The current model was developed in November 2007 for PCI and has been subsequently utilized for the feasibility study produced by Aker Kvaerner. The mineral resource estimate was generated using a standard 3D-block model approach based on the March 1, 2007 drill hole database for the property. The 2007 IMC resource model was used by Behre Dolbear to spot check the accuracy of the modeling work and for compliance with reporting of Mineral Resources as required under the Australasian Joint Ore Reserve Committee JORC Code.

The ore reserves for the Toromocho property were estimated in November 2007 by developing a mine plan for extracting the in-situ resource contained within the resource block model. Behre Dolbear believes that the overall methodology employed for reserve definition is adequate for reporting under the JORC code. However, as the feasibility work was completed in 2007, costs and economic assumptions were of concern to several members of the Behre Dolbear team and a more detailed review was completed to assess their impact on the ore reserves stated in the feasibility study. This review indicated that the changes in the recoveries and economic assumptions did not affect the reserves stated for the project.

In summary, Behre Dolbear believes that the Toromocho Project, covered by this review, has approximately 1,540 Mt of Proved and Probable ore reserves averaging 0.471% copper, 0.019% molybdenum, and 6.86 grams of silver per tonne conforming to the definitions in the 2004 JORC Code, as shown in Table 4.1.

TABLE 4.1
JORC ORE RESERVES AT THE TOROMOCHO PROJECT
(DECEMBER 31, 2011)

Category	Tonnes (millions)	Grade Cu (%)	Mo (%)	Ag (g/t)
Proved	756	0.51	0.02	6.39
Probable	784	0.434	0.018	7.31
Total	**1,540**	**0.471**	**0.019**	**6.86**

In addition to the estimated Proved and Probable reserves, IMC reports an additional 520 Mt of Measured and Indicated mineral resource averaging 0.37% copper, 0.013% molybdenum, and 6.10 grams of silver per tonne (Table 4.2) and 174 Mt of Inferred mineral resources averaging 0.46% copper, 0.015% molybdenum, and 11.54 grams of silver per tonne (Table 4.3) also conforming to the definition in the 2004 JORC Code. These resources are not currently part of a mine plan because additional engineering and design work is required.

TABLE 4.2
JORC MEASURED AND INDICATED MINERAL RESOURCES AT THE TOROMOCHO PROJECT
(DECEMBER 31, 2011)

Category	Tonnes (millions)	Grade Cu (%)	Mo (%)	Ag (g/t)
Measured	156	0.41	0.014	6.20
Indicated	364	0.36	0.012	6.06
Total	**520**	**0.37**	**0.013**	**6.10**

Mineral Resources are in addition to Reserves

TABLE 4.3
JORC INFERRED MINERAL RESOURCES AT THE TOROMOCHO PROJECT
(DECEMBER 31, 2011)

Category	Tonnes (millions)	Grade Cu (%)	Mo (%)	Ag (g/t)
Inferred	174	0.460	0.015	11.54

Mineral Resources are in addition to Reserves

Behre Dolbear believes the mineral resource estimation model including the database, procedures, and parameters applied by IMC to the Toromocho Project to generally be reasonable and appropriate. The geological constraints were adequately considered in their estimation of the global resource. Behre Dolbear believes that the data density requirements used for Measured, Indicated, and Inferred Mineral Resources definition are generally adequate and comparable to those used for mineral resource estimation for similar deposits.

4.6.2 Conclusion

Behre Dolbear believes that IMC has completed credible work in determining the resource model of the mineralization at the Toromocho Project. Behre Dolbear also believes that the project's ore reserve statement is appropriate based on a review of the mineralized envelopes and the grade estimation methods.

4.6.3 Risks

A number of risk factors for the reserve estimate are present.

- **Behre Dolbear Has Not Audited the Sampling Data or Conducted Independent Sampling:** Behre Dolbear has accepted the drilling data, mine sampling data, and assays, as presented by Toromocho for this report. As both IMC and Aker Kvaerner are reputable independent consultants having completed extensive reviews of the data, Behre Dolbear views this as **Low Risk/Unlikely**.

- **Variography:** The lack of identified geometric (or directional) structure in the variograms used for estimation is not usually seen in these type of copper deposits but, not impossible. The geologic and structural complexities may mask some of this within the variography. On average it should present a very **Low Risk/Unlikely** to the overall reserve and the estimated metal content due to the large scale mining equipment selected for the proposed operations.

- **Resource Categorization:** Model blocks were estimated and classified into Indicated and Inferred Mineral Resources under the 2004 JORC definitions. Behre Dolbear believes that using the kriging variance or standard deviation sometimes will tend to overestimate the confidence of the estimate. Given the estimate split between Measured and Indicated Mineral Resource and the drill spacing, Behre Dolbear believes it represents a **Low Risk/Unlikely** to the ore reserve statement.

- **Mining Losses and Dilution:** The original ore reserve estimate completed by IMC did not consider mining losses and mining dilution. Behre Dolbear has adjusted the estimate to include these modifying factors using a 2% mining loss and 3% dilution at the average waste grade. This results in a very small overall adjustment to the ore reserve statement and believes this represents a very **Low Risk/Unlikely** to the project due to the large scale mining equipment proposed for the project.

4.7 GEOTECHNICAL

4.7.1 Pit Slope Design

The geotechnical work to establish the optimum open pit slope angles has been accomplished by Call and Nicholas, Inc. (CNI). CNI has been an experienced, highly qualified, and reputable supplier of geotechnical services to the mining industry for decades.

CNI developed an interramp overall slope angle model using geology maps, cross sections, and drill hole data supplied by PCI and MCP and geotechnical and hydrologic data developed by CNI and Knight Piésold. CNI's work was completed professionally and comprehensively and was reported objectively. Their work resulted in identifying 10 distinctive design sectors within the open pit based primarily on wall orientation and rock type. Slope angles range from as low as 24 degrees to as steep as 46 degrees in materials including:

- Skarn and sediments
- Igneous rock
- Reclaimed tailings
- Buenaventura Lake

4.7.2 Stockpile and Dump Stability

The Toromocho Project design includes two waste dumps containing 1.6 billion tonnes and a low-grade ore stockpile containing 186 Mt. CNI and Knight Piésold carried out test drilling, geotechnical testing, and seismic refraction surveys to evaluate the stability of the proposed dumps and stockpile and determine site preparation work to enhance the stability.

Specific programs were proposed for preparing the dump and stockpile bases and for the construction of them to assure their stability. Given that the two waste dumps are adjacent to and above the open pit, it is imperative that these programs are implemented.

4.7.3 Risks

4.7.3.1 Pit Slope Angles — Low to Moderate/Unlikely to Possible

Assessment of the final pit slope angles is an ongoing process. As mining interim pits progresses and knowledge of the relevant structural features and rock strengths are refined, the final pit slope angles will be refined.

It is Behre Dolbear's opinion that the work to determine the final slope angles is thorough and reliable.

The proposed interim pit slope angles appear to be somewhat conservative and the risk is low.

The low RQD index indicates that the risk of random localized slope failures is moderate to high. It will be important for MCP to continuously identify these localized areas of instability and monitor them for the safety of its operators and equipment.

4.7.3.2 Stockpiles and Waste Dumps — Low to Moderate/Unlikely to Possible

The proximity and orientation of the stockpiles and waste dumps to the open pit make it critical that the proposed additional work and the planned excavation of undesirable materials under the proposed stockpiles and dumps be completed, as planned. The risk is low to moderate, if the work is completed, as proposed, and moderate to high, if it is not.

4.8 MINING

4.8.1 General

IMC developed a number of model and mine plan iterations over the course of the project period to establish the final mine plan and cost estimate incorporated into the Aker Kvaerner December 2007 feasibility report and reviewed by Behre Dolbear. Those iterations were the basis for determining the best overall approach to the project subject to various project constraints.

The Toromocho deposit will be mined using conventional hard rock open pit methods. The mine will deliver 117,200 tpd (42,778 kt/yr) of sulfide flotation ore to the primary crusher and will generally move 260,274 tpd (95,000 kt/yr) of total material to assure sustained availability of the mill ore.

Multiple iterations of the mine scheduling process were completed to establish the mill cutoff grades and corresponding mill head grades that maximized the project return on investment compared to the mine capital and operating costs required to sustain the release of the planned ore.

Within the schedule, planned cutoff grades were elevated above conventional breakeven cutoff for the first 22 years of the mine's life. The cutoff strategy is the result of substantial effort to maximize project return on investment. The NPV optimization effort compared the benefits of processing and metal sales versus the operating costs plus the required mine capital to develop and operate the mine. Mine equipment capacities were kept in mind during the development of the best economic schedule.

Low-grade material that is less than the mill breakeven cutoff grade but still potentially economic is stockpiled south of the primary crusher. Lower grade material could be considered for stockpiling, but constraints on low grade and waste storage areas around the mine limit the size of the low-grade stockpile. The low-grade stockpile is remined during years 32 to 36 and delivered to the primary crusher.

There are zones of the Toromocho deposit that have elevated arsenic grades in the form of enargite (Cu_3AsS_4). In order to assure that the concentrate is marketable, high-grade arsenic material is not sent to the plant but is stockpiled. This material is stored permanently and not processed, although process options may exist for this material in the future.

IMC designed 10 phases or push backs as input to the development of a practical mine production schedule. Phases or push backs are practical expansions of a pit that incorporate proper equipment operating room, working geometries, and access roads. To the degree practical, they follow the theoretical economic extraction sequence defined by the floating cones.

Mine equipment has been selected to meet the production requirements of the mine plan. The size and type of mine equipment is consistent with the size of the project. Electric-cable shovels with 35.2 m^3 dippers are paired with 345 tonne haul trucks to meet the total annual production requirements of 95 to 99 Mt/yr.

Mine personnel requirements were estimated based on the mine plan and mine equipment requirements. Mine personnel includes salaried supervisory and staff personnel and hourly people required to operate and maintain the drilling and blasting, loading, hauling, and mine support activities.

The Mine salaried staff requirements projected in the 2007 Feasibility Study, over the project life, consisted of 56 persons during most of the mine life. Mine hourly personnel requirements build up to 384 personnel in years 18 and 19. Subsequently, in 2010, IMC, in conjunction with MCP's on site management were in the process of increasing personnel in the engineering, supervisory, and training areas. Based on work by IMC, Behre Dolbear's fourth quarter 2011 adjusted operating cost reflects these additions.

4.8.2 Conclusions

The following work to design and/or determine the:

- Mining sequence and annual production schedule
- Location of haul roads, waste dumps, and low-grade ore stockpiles
- Type, availability, productivity, quantity, and cost of major and support equipment
- Manpower requirements and cost
- Maintenance facilities, manpower, and training requirements
- Capital cost for the pre-production requirements and sustaining the operation
- Operating costs and cost per tonne of material mined

As completed by IMC, an experienced and reputable contractor is professional, thorough, and well presented.

The potential for mining problems has been minimized for the Toromocho Project by the following decisions and factors.

- The ore grade and metallurgy are relatively consistent allowing an orderly mining sequence without excessive equipment moves to accommodate blending for the process plant.
- The stripping ratio is low and consistent preventing random spikes in equipment requirements.
- The high-arsenic ore- grade material is being stockpiled separately preventing the need for inefficient ore blending during mining and avoiding concentrate marketing issues.
- The proposed pre-stripping exposes eight months of ore production.
- The ore cutoff grade has been increased for the first 22 years of production to maximize net present value.

- The cutoff grade for leach ore placed in the low-grade ore stockpile is greater than break even due to limitations on land available for stockpiling, thus making the low-grade ore quantity conservative.
- The relative near proximity of Lima and its port and the availability of highway and rail access should minimize the potential for equipment and consumables supply issues.
- The general historic mining culture of the area provides a pool of understanding and supportive residents to both support the existence of the operation and supply personnel to work in the operation.
- Experienced and competent senior supervisory personnel in the operations, engineering, and maintenance areas are on site and are intimately involved in the manning, training, hiring, and general pre-start up activities.

4.8.3 Risks

4.8.3.1 Production

Production planning is thorough and well executed. The equipment selection and quantity is appropriate and sufficient. The projected availabilities and productivities are aggressive and their achievement will depend on a well-run operation and well-trained operators and maintenance personnel — **Low to Moderate Risk/Unlikely to Possible.**

4.8.3.2 Operating Costs

The Definitive Estimate has resulted in numerous corrections and updates based on input from the recently hired senior mining operations and maintenance personnel. The increases in manpower and equipment were necessary and appropriate. The rapidly increasing salaried and hourly labor rates are an issue and pose some risk for higher costs. The quantity of labor, equipment, and consumables required for the operation are well based and reliable. The costs for these items are in a state of flux and future costs for these items are uncertain — **Moderate Risk/Possible.**

4.8.3.3 Capital Costs

The Definitive Estimate should be accurate as described and, unless the project implementation schedule slips, is a reliable estimate — **Low to Moderate Risk/Unlikely to Possible.**

4.9 PROCESS

4.9.1 General

The Aker Kvaerner Feasibility Study was completed in November 2007 based on open pit mining, conventional sulfide copper flotation, copper molybdenum separation, and recovery of chemical-grade molybdic oxide (MoO_3) from the copper concentrates. The feasibility study is based on mining and processing approximately 43 Mtpa of ore (117,200 tpd) at an average grade for the project of approximately 0.46% copper, 0.019% molybdenum, and 6.88 g/t silver. Selective mining will, in the first 10 years, result in an average head grade of approximately 0.612% copper, producing around 226,000 tpa of copper together with ±4.0 million ounces of silver. Molybdenum production is expected to run at ±4,000 tpa as MoO_3.

The design criteria for the Toromocho Project concentrator include the following salient process variables:

- Ore Grade 0.612% copper (First 10 years of project)
- Ore Grade 0.019% molybdenum (First 10 years of project)
- Mill Tonnage 117,200 tpd
- Copper Recovery 87%
- Copper Concentrate Grade 26.5%
- Molybdenum Recovery to MoO_3 65.0%
- Copper Concentrate Moisture 9.0%

In general, Behre Dolbear feels that the project design criteria can be met without a high degree of risk due to the existence of the historical metallurgical testing programs. In most cases, the design criteria have been used by Behre Dolbear to develop ore reserve and financial analysis sections of this review. The single questionable area is overall copper recovery that will be discussed below and in the processing section of this review.

The metallurgical testing regimens conducted at METCON were comprehensive and addressed a majority of the critical issues associated with processing. These issues included the high susceptibility of the copper minerals to oxidation while in place in the resource and in the exploration drill core storage areas, the presence of activated insoluble and talc like minerals, which impeded the production of molybdenite concentrates, and the high variability of metallurgical recoveries between laboratory, historical operations, and contemporary pilot plant operations.

The issues exposed in metallurgical testing have been, for the most part, handled in the process design. In 2002, based upon historical plant operations and contemporary metallurgical testing, the Minerals Advisory Group (MAG) recommended a copper recovery for the project between 82% and 88%. Behre Dolbear's opinion is that the copper recovery is optimistic at 87% and used a more conservative 85% in the economic analysis. Frequently, large copper concentrators will start up and achieve copper recoveries in excess of those expected from laboratory and pilot plant testing. In this case, the lack of contemporary laboratory locked cycle testing and pilot plant results obtained from fresh representative ore samples have led Behre Dolbear to recommend a copper recovery lower than the design criteria. There is a distinct possibility the full scale milling operations may result in achieving copper recoveries at or very near the design criteria.

In a similar vein, the silver recovery of 84.4%, as shown in Section 20.0 Economic Analysis of the Aker-Kvaerner Feasibility Study (2007), appears overly optimistic. A review of all pilot plant and locked cycle testing, where silver head grades and recoveries were published, confirms that all testing was done to optimize either copper or molybdenum. No apparent efforts were made to optimize silver recoveries. The available pilot plant results from Centromin include results for silver and these tests demonstrated silver recoveries at or near 70%, albeit on ores with significantly higher head grades than shown in the current mine plan.

A complete summary of silver metallurgical results is shown in Table 10.4. Behre Dolbear suggests the use of a silver recovery of 70% based on the available pilot plant data and the expectation of improved silver recoveries on continuous and full sized mill circuitry.

The presence of activated insolubles and talc in the concentrates that render the production of high quality molybdenum disulfide (MoS_2) concentrates problematic has been dealt with through the choice of a hydrometallurgical/pressure oxidation circuit for molybdenum recovery that will be a relatively unique installation. Only one potential operation is thought to exist internationally and it is being constructed at the Rio Tinto, Kennecott Utah Copper operations in Salt Lake City, Utah. No current publicly issued data has been released by Rio Tinto. The hydrometallurgical/pressure oxidation plant is scheduled for completion and pre-commissioning in the third quarter of 2013. This leaves the production of molybdenum as perhaps the single highest risk issue in the concentrator design.

Other significant variables that present short term problems to the Toromocho Project are the presence of quantities of arsenic and zinc in the ore body that result in smelter penalty level quantities of each in certain production years. The zinc issue is to be handled with blending on each of the production faces in the pit to minimize the amount of activated and mechanically locked sphalerite that will carry into the copper concentrate.

4.9.2 Conclusions

Composites representing production years were assembled, but no locked cycle testing was accomplished with them. The sampling and compositing was done to a high level and is attributed by Behre Dolbear as having contributed to the high degree of confidence in most of the metallurgical results. A review of the historical pilot plant and lock cycle testing work, coupled with the contemporary work at METCON and Lakefield would seem to reinforce the copper recovery with a range from 80% to 88%.

The molybdenum recovery plant does not mimic the patented Rio Tinto facility at Kennecott Utah Copper operations in Salt Lake City, Utah but is similar in concept. Current plans at Rio Tinto call for a start up of the facility in 2013. It is probable that Rio Tinto is looking at a 2-year start up period after almost 20 years of testing and evaluation. The circuit at Toromocho is different from the Rio Tinto circuit (sufficient to escape patent infringement) and is quite similar to conventional pure oxide production at the Fort Madison facility of Freeport McMoran. At the Toromocho Project, once the molybdenum is solubilized, the copper will be removed with SX/EW.

The concentrator is of conventional design and was designed to handle 146,500 tpd with a nominal operating rate of approximately 117,200 tpd. The crushing, grinding, stockpile, SAG mill grinding, ball mill grinding, classification, flotation, dewatering, filtration, and tailings disposal are well conceived and standard for the industry. The flow sheets, P&IDs, and basic engineering package are complete and can be used to bring the level of accuracy of capital cost estimation to the level of ±15%. A major amount of large milling equipment is at the site and in controlled storage that will make for minimal delays in logistics for the construction period of the mill certain capital items in the process plant were sized or designed to substantially reduce the cost to expand the throughput to 148,000 tpd in the future, if so desired.

The process flow sheets for the molybdenum production facility are reasonable and will, in all probability work, given the successful adaptation of the design to very unconventional hydrometallurgical products.

Given the successful application of the pressure oxidation/hydrometallurgical plant, the Toromocho Project molybdenum operations will not produce concentrates. The product will be essentially high purity MoO_3.

4.9.3 Risks

- Behre Dolbear's opinion is that the copper recovery is optimistic at 87% and used a slightly lower recovery in the economic analysis. However, large copper concentrators frequently exceed the results of laboratory and pilot plant testing when in actual operation. This reduces the risk to **Low to Moderate Risk/Unlikely to Possible**.
- The final copper concentrates are expected to average approximately 26.5% copper **— Low Risk/Unlikely**.
- Smelters will view the insol percentages above 10% as making the concentrates refractory and may introduce penalties for high insol levels. Behre Dolbear regards this as a risk to the success of the Toromocho Project **— Low to Moderate Risk/Unlikely to Possible**.
- The silver recovery is not backed up by a large number of tests and assays, but instead relies on the Behre Dolbear metallurgist's professional judgment **— Moderate Risk/ Unlikely to Possible**.
- The molybdenite recovery numbers for concentrating are low risk, but the successful start up of the hydrometallurgical facility is a **High Risk/Possible** venture and could take well over 2 years of start up. McNulty & Associates published a technical study indicating that high pressure oxidation and recovery of metals, such as copper, nickel, and probably molybdenum, could require start up periods in excess of 5 years.
- The chosen tailings deposition system is being designed by Golder & Associates. The system envisions the production of 55% solids tailings at the concentrator for transport to five "new generation" paste thickeners at the tailings impoundment. The installation of units with an unsubstantiated operating record must be regarded as high risk. On a short-term basis, the tailings impoundments can take normal tailings (50% to 60% solids) into the maintenance dump area. Over the long term, deposition of normal tailings would result in running out of tailings deposition room — **Moderate to High Risk/Low to Possible**.
- The production of marketable copper concentrate grades is regarded as — **Low to Moderate Risk/Unlikely to Possible**.

4.10 INFRASTRUCTURE AND NON-PROCESS FACILITIES

4.10.1 General

The need for almost all aspects of the infrastructure, to be constructed new, drives the expanding cost of the Toromocho Project. Each of the following infrastructure requirements is a major project in itself.

4.10.2 Electrical Power Supply

- The electric power supply is described by a report prepared by CESEL Ingenieros, Peru. The electric power will be delivered from a 220-kV substation near the township of Pomacocha.
- A new 11 km, double circuit overhead transmission line will be installed and routed from the Pomacocha Substation to the main substation at Toromocho. The new transmission line can deliver 220 MW on either circuit.
- A third 220-kV incoming power source will be provided by using the existing Mantero III transmission line. This line will serve as emergency back-up only.
- The project with a triple redundant system should experience a minimum of unexpected or unscheduled delays due to power outages.
- Emergency standby power will be installed to operate the large paste thickeners, the conventional tailings thickeners, the concentrate thickeners, camp medical facilities, etc.

4.10.3 Water Supply

The total water demand by the Toromocho plant for an average year will be 8.65 million m^3. Water will be supplied from the Kingsmill Tunnel (Section 12.1.2). Only 50% of the treated flow from the Kingsmill Tunnel will be required for plant process water. Culinary water will be supplied to the site from a reverse osmosis and chlorination system.

4.10.4 Office and Administrative Support Facilities

The non process buildings to house administration, mine truck shop, and maintenance will be constructed to provide office facilities for the administration and maintenance staff. In addition, facilities will be constructed to house analytical and metallurgical laboratories, reagent storage, fueling stations, explosives storage, and the camp facility.

4.10.5 Material and Supply Storage and Distribution

Warehousing will be located in the maintenance shop building adjacent to the concentrator. Other supply inventories will be contained in the fuel stations, reagent building, explosives storage, and mine truck shop.

4.10.6 Access Roads

Access to the site will be provided to the site by two roads.

- The Central Highway (paved), which is to be rerouted, will feed into the north access road to the administration area.
- A new access road, running parallel to the rail road will provide access to the site for local personnel.

The new access road is being constructed, as with all other internal roadways by MCP.

4.10.7 Railroad Access

Transportation of copper concentrate and molybdenum oxide will be from the site to the Port of Callao via the existing rail line between Callao and La Oroya that runs by the mill site. The railroad is operated by a Peruvian company and, per Aker Kvaerner (December 2007) in its current condition, has the capacity for the additional transportation of the Toromocho Project produced commodities.

The railroad is owned by the government but is operated under a 15-year concession agreement with FerroCarril Central Andino S.A. The concessionaire will upgrade the rail line and purchase rolling stock to accommodate the Toromocho traffic and will recoup the costs in the operating fees.

A 1 km spur to connect the mill site to the existing rail line, six rail lines in the yard at the mill and a traveling bridge crane for loading unloading, are to be provided by MCP. MCP will complete the 1 km rail spur from the main rail line to the mill site by the end of 2012.

4.10.8 Camp Facility

Camp facilities will include a construction camp to be constructed approximately 12 km to the east of the mine site in the vicinity of the Central Highway. The camp will have quarters for up to 6,000 construction workers.

4.10.9 Town Site

The town site of Morococha, located within the pit limits, will be demolished and the population moved to a new community near the mine site. The new town site is under construction and "move in" is scheduled for mid 2012. The initial capital costs could escalate substantially beyond the 2007 budget.

4.10.10 Miscellaneous Infrastructure

Included in miscellaneous infrastructure are compressed air systems, sewage treatment, fire protection, security, and communications.

4.10.11 Conclusions

Behre Dolbear has reviewed, in detail, all of the required infrastructure for the Toromocho Project and finds it complete and more than adequate for the size and complexity of the Toromocho Project.

4.10.12 Risks

Major project financial risk for infrastructure is rated as moderate due to the not yet finalized costs for relocation of Morococha, improvements to the Central Highway and internal site roads and site preparation — **Low to Moderate Risk/Unlikely to Moderate**.

4.11 ENVIRONMENTAL AND PERMITTING

4.11.1 General

The environmental setting and potential impacts and permitting status of the Toromocho Project generally present a favorable situation for project development. Early attention has been given to the land position, project design, housekeeping of early land preparation, and environmental studies to plan for success. Important environmental and construction permits have been secured and others are well into the planning process. Mitigation plans for key impact issues have received attention.

A few unfavorable environmental and social issues could delay the project but these are receiving proper attention and planning. Relocation of the Central Highway, development of the new village at Carhuacoto, water management, waste management, historic liabilities, transport alternatives to address health and safety of workers, employment, and training are all recognized as being on the critical path to project success. In sum, these risks are generally low and receiving proper studies, funding, and attention from an environmental, social, and corporate point of view.

4.11.2 Conclusions

Reviews of environmental, social, community, permitting, and general sustainability issues for the Toromocho Project suggest many favorable aspects going forward.

- Permitting progress to date is good — EIA and major construction permit approved; other important approvals all in process for most current project components and plans
- Major remaining permits (water use and mine plans) well into planning process
- Construction layout and pioneering progress — good environmental housekeeping, recognition of environmental impacts and issues
- KMT WTP is completed and functioning well
- Two-pronged advantage of KMT — (1) historic legacy mine sites mine water cleanup; and (2) adequate total mine water supply
- Quality new town construction at Morococha (Carhuacoto) — apparent 80% to 90% approval rating by old town residents
- Recognition of wetlands, wet areas in project construction regarding both environmental compensation and geotechnical issues (tailings dam area)
- Land position adequate for facilities and infrastructure — mining concessions and purchased lands
- Legacy of mining in area and general acceptance by communities — no agricultural/water use competition
- Well-developed transport route to mine from Lima — rail/air alternatives available
- Worker H&S program apparently well in place with the contractor and sponsor collaboration, meetings, incident response, and reporting to the government

A few other project aspects in these topical areas present unfavorable conditions for the project and they are the following.

- Unknown new final road alignment for the Central Highway in the pit vicinity will require a new EIA and potential environmental impacts.
- Dangerous road (H&S) aspects and access for workers and equipment truck drivers to the site from Lima.
- Potential requirements for extra capital costs for high-quality project components and later operations and maintenance (*e.g.*, new town, tailings dam, high altitude issues, and similar).
- Universal concern over full acceptance and efficient transfer of Morococha residents to the new town — Carhuacoto.
- High altitude working conditions — worker health and risks (*e.g.*, lightning, rain/snow with strong winds, fatigue).
- Minor contaminants in historic and new mining/processing/waste management and tailings — need potential control and isolation.

4.11.3 Risks

Transport of workers and equipment to the mine site will cause logistical, cost, and H&S problems that affect skilled employment and project operations — **Low to Moderate Risk/Unlikely to Possible**.

Operation of the tailings impoundment will cause local and regional environmental effects on ground and surface waters and local fauna habitat that cannot be easily remedied — **Low Risk/Unlikely**.

Timely and efficient re-settlement of Morococha residents to the new town, Carhuacoto, is not assured and poses some risk to the project's schedule — **Low to Moderate Risk/Unlikely to Possible**.

4.12 RECLAMATION AND CLOSURE

4.12.1 General

Given a projected operating life of 36 years, the progressive and final closure of the mine and related facilities is planned to proceed in a steady manner with adequate time for planning. The conceptual closure plan in the EIA will be refined and financial assurance (bond) review will occur at 5-year intervals. Current estimates are that $181 million will be financed, as a guarantee.

The conceptual closure plan provides for the usual attention to progressive and final closure of major facilities: pit, waste dumps, process plant area, shops, and other areas with concrete pads, limestone quarry, and access roads. It appears that all major issues are considered, at this time, including water management, plans to eliminate adverse impacts to water and air quality, and for cover and re-vegetation of areas, where feasible.

4.12.2 Conclusions

Planning for reclamation and closure is present in the EIA and other specialized baseline, impact and mitigation studies, and field efforts being carried out by MCP. A substantial closure expense and bond is estimated. Operations can help to lower closure costs and will be planned accordingly. Bond amounts are expected to be revised and re-negotiated in 5-year intervals during the 30+ years of mine life as the closure plan is refined.

4.12.3 Risks

Open pit mine, waste dumps, and other facilities will produce blowing dust that cannot be effectively controlled and contaminated mine water than cannot be effectively piped and treated by Kingsmill Tunnel during closure — **Low Risk/Unlikely**.

Closed tailings impoundment will produce adverse water quality and seepage down gradient that will adversely affect ponds and wetlands and local ground water, and cannot be remedied — **Low Risk/Unlikely**.

Closed open pit mine, without backfill and closed waste dumps as remaining structures, will substantially lower the quality of life in this historic mining area — **Low Risk/Unlikely**.

4.13 ADMINISTRATION, MANPOWER, AND MANAGEMENT

4.13.1 General

The management, administration, and engineering/operating personnel are basically highly respected in the industry, experienced in their respective roles, and very dedicated to the success of the Toromocho Project.

The staffing levels in the various support categories appear to be adequate.

Behre Dolbear was concerned with the levels of personnel committed to training in the December 2007 Aker Kvaerner Feasibility Study but the additions in the 2011 Definitive Estimate appear to resolve that issue.

4.13.2 Risks

The Toromocho Project is a highly complex project located in a remote location. It is imperative that MCP continue to retain experienced and dedicated experts in their various fields through the construction, start up period, and ongoing operations, if the projected schedules, costs, and production levels are to be achieved. The risk is **Low to Moderate/Unlikely to Possible** with the current staffing but replacement with lesser personnel would raise the risk to moderate to high.

4.14 CAPITAL COST ESTIMATE AND IMPLEMENTATION SCHEDULE

4.14.1 Mining

The mine capital cost consists of two components:

- Mine equipment
- Mine pre-production development costs.

The mine equipment costs are based on the equipment requirements discussed in Section 9.0.

The pre-production costs are based on estimated mine operating costs during the pre-production period (Section 17.1.2) and the material to be mined (55 Mt plus construction development).

The resultant updated mine capital costs for the Toromocho Project in fourth quarter 2011 dollars are forecast to be:

	Fourth Quarter 2011
	(US$000)
Pre-production, Road Work, etc.	25,019
Pre-production Stripping	65,816
Mine Equipment	181,801
Support Mine Equipment	40,004
Contingency	15,169
Total	**327,809**

4.14.2 Total Capital Cost Estimate

A comparison of the Toromocho Project's total capital cost between the 2007, 2010, and 2011 estimates is provided in Table 4.4.

TABLE 4.4
MINE, CONCENTRATOR, AND INFRASTRUCTURE CAPITAL COST
(US$ × 000)

Operations	2007 Estimate	Definitive Estimate Third Quarter 2010	Fourth Quarter 2011 Estimate
Mine	294,811	303,486	312,640
Process and Infrastructure	1,374,056	1,543,586	1,673,247
Owner's Cost	215,180	413,461	448,191
Subtotal	**1,884,047**	**2,260,533**	**2,434,078**
Contingency			
Mining	29,841	15,169	15,169
Process and Infrastructure	192,575	123,119	133,460
Owner's Cost	18,166	32,030	34,720
Subtotal	**240,222**	**170,318**	**183,349**
Working Capital Subtotal	**28,000**	**56,000**	**56,000**
Total Estimated Project Cost	**2,152,269**	**2,486,851**	**2,673,427**
Behre Dolbear's Suggested Additions			
Infrastructure			
Relocation of Central Highway[1]		75,000	75,000
Relocation of Morococha[2]		100,000	100,000
Construction of Lime Quarry and Plant[3]		75,000	100,000
Totals	**2,152,269**	**2,736,851**	**2,948,427**

1 Based on discussions at site visit
2 Based on discussions at Jacobs and with MCP management
3 Based on discussions with MCP management

As noted under "Behre Dolbear's Suggested Additions," in Table 4.4, the 2011 Definitive Estimate does not include the costs for developing a limestone mine and a burnt lime production plant near the mine site proper. The cost for 300K tpy lime facilities is estimated by MCP management at $100 million. Relocation of the Central Highway is currently in an alternative evaluation phase but is roughly estimated at $75 million. The general opinion, in the Aker offices, was that the relocation of Morococha could escalate up to $200 million and perhaps beyond. Although the site preparation work is underway, any further delays could significantly deteriorate the financial viability of the project. The risk is currently rated at moderate.

4.14.3 Sustaining Capital

The mining equipment life estimates to replacement are reasonable. Sustaining capital costs were increased to reflect the purchase of a production wheeled loader more than twice as large as planned in 2007.

Sustaining capital for the concentrator is limited to the costs associated with scheduled raises to the tailings impoundment. Process improvement projects within the process plants have their own paybacks and most often result in operating cost reduction or improved process recoveries and product quality.

4.14.4 Working Capital

Behre Dolbear feels that up to 3 months could be required before provisional smelter payments are forthcoming. Behre Dolbear has calculated the initial 5-year average operating costs for mining, concentrating, infrastructure, general and administrative (G&A), and molybdenum hydrometallurgical processing at $36.6 million per month.

At the request of the Client, the working capital has been maintained at the $56 million level, as shown in the 2011 Definitive Estimate, which is optimistic.

4.14.5 Construction Schedule

The construction of the concentrator, non-process facilities, and the molybdenum hydrometallurgical plant are scheduled to complete pre-commissioning during the fourth quarter of 2013, work compilation of approximately 24 months. The schedule represents a low risk to the project due to the stockpiling of major equipment at or near the site. Given the progress of the construction to date and a forecasted drop in government intervention or non-intervention, the schedule has an above average chance of being compressed several months. The highest risk activities, in Behre Dolbear's view, are the relocation of Morococha, relocation of the Central Highway, and construction of a lime mining and burning facility.

The key milestones of the project are shown in Table 4.5.

TABLE 4.5
KEY MILESTONES FOR THE TOROMOCHO PROJECT

	Start	Finish
Pre-Permit Activities	May 01, 2009	May 20, 2012
Procurement	October 02, 2008	June 28, 2011
Detail Engineering	October 02, 2008	August 29, 2011 (Changed to June 30, 2012)
Detail Engineering Hydrometallurgical Plant	August 29, 2011	
Contracts Formation	October 06, 2008	November 09, 2012
Pre-Stripping	January 15, 2013	
Construction	May 01, 2011	September 13, 2013
Pre-Commissioning	October 15, 2013	
Mechanical Completion		October 15, 2013

The schedule, as currently formed, is, in Behre Dolbear's opinion, achievable; however, certain key issues could delay full commissioning of the metallurgical facilities.

Pre-commissioning and commissioning of the molybdenite hydrometallurgical plant could extend well past the fourth quarter 2013 date given the nature of the process and equipment utilized. Rio Tinto is projecting a 2-year start up of the Kennecott Utah Copper facility and industry experts have gone on record predicting lengthy start ups (up to 5 years) for unproven hydrometallurgical plants treating mineral processing products.

The risk associated with a timely completion and start up of the hydrometallurgical facility is rated, by Behre Dolbear, as high. The risk associated with completing the relocation of Morococha is rated as moderate. While the operating viability of the Toromocho Project would not be significantly impacted, the costs associated with unforeseen problems could sap some of the economic viability.

4.14.6 Conclusions

The design and engineering required to develop the mining equipment, process plant, and infrastructure capital costs is thorough and is current. The contingency and owner's costs are realistic. The fact that many of the high cost items have been ordered or are on site minimizes the potential for surprises.

The uncertainty of the final designs for the Central Highway and the lime quarry and plant could result in higher than predicted final costs.

Behre Dolbear believes that the Definitive Estimate working capital is low.

The sustaining capital estimates are based on realistic life-to-replacement predictions.

The construction and start up schedule are realistic (with the exception of the molybdenum hydrometallurgical plant) given the Group's continuing commitment to proceed and the continued cooperation of the government to provide timely approvals.

4.14.7 Risks

The uncertainty of the final cost for the Central Highway relocation and the lime quarry and plant could increase capital costs — **Low to Moderate Risk/Unlikely to Possible**.

The continuing escalating costs for the relocation of Morococha are a concern — **Moderate to High Risk/Unlikely to Possible**.

The working capital estimate is optimistic — **Low to Moderate Risk/Possible**.

The start-up schedule for the molybdenum hydromet plant appears to be optimistic given the history of similar operations — **Moderate to High Risk/Possible to Likely**.

4.15 OPERATING COSTS

4.15.1 Mine

Mine operating costs were developed based on the mine plan, equipment requirements, and manpower requirements presented in Section 9.0. The mine operating costs include all the supplies, parts, and labor costs associated with mine supervision, operation, and equipment maintenance.

Table 4.6 presents the 2007 Feasibility Study mine operating costs on a cost per tonne per year basis.

TABLE 4.6
2007 FEASIBILITY STUDY MINE LIFE AVERAGE OPERATING COSTS

US$/tonne						
Drilling	Blasting	Loading	Hauling	Auxiliary	G&A	Total
0.037	0.049	0.055	0.756	0.143	0.091	1.131

The mine work schedule is assumed to be 2 shifts per day, 12 hours per shift.

For the February 2011 Definitive Estimate, ICM was required to update the pre-production operating costs including the ore and waste pre-stripping cost per tonne. The update included escalated salary and labor costs, a fuel price increase from $0.61/ℓ to $0.82/ℓ, a power cost increase from $0.047/kWh to $0.052/kWh and increased staffing, based on input from on site senior personnel. One key area supported by Behre Dolbear was an increased emphasis on training personnel.

The increased operations cost per tonne of material mined is best indicated by a comparison of the pre-production cost per tonne, as indicated in Table 4.7.

TABLE 4.7
PRE-PRODUCTION OPERATING COSTS PER TONNE COMPARISON

Pre-production Period	2007 Feasibility Study	2011 Definitive Estimate
	($/tonne)	($/tonne)
PPQ1	0.0	1.997
PPQ2	0.961	1.016
PPQ3	0.762	1.030
PPQ4	0.771	0.00
Average	**0.817**	**1.147**

In Behre Dolbear's opinion, the Definitive Estimate mining costs for the 2007 PPQ3 and PPQ4 (46 Mt) and the 2011 PPQ2 and PPQ3 (48 Mt) provide the most reliable indicator of the increased mining cost for the upgraded 2011 projected costs versus the 2007 estimate. The comparison, therefore, is an increased cost of 33.5%. This factor applied to the 2007 mine life projected a cost of

$1.13 per tonne results in a third quarter 2010 projected mine life average cost of $1.51 per tonne that compares favorably with current comparable costs for existing mining operations. This cost escalated with CostMine® October 2011 surface mine escalators to the fourth quarter 2011 at 4.3% results in a projection of $1.57 per tonne.

4.15.2 Processing, Infrastructure, and General and Administrative (G&A)

Behre Dolbear has escalated the 2007 operating costs for the concentrator, molybdenum hydrometallurgical plant, and G&A to the fourth quarter 2011. In order to obtain an order of magnitude estimate, the following escalators (taken from the October 2011 Mining & Milling Cost Indices) were used for the various work centers.

- Labor 21% (Does not include the 8% profit sharing labor agreement)
- Consumables 49.6%
- Power (Based on current contracts at $0.05169/kWhr)
- Other 29.2%
- Maintenance Supplies 17%

The operating costs for concentrating, hydrometallurgical plant, infrastructure, and G&A were adequately developed in 2007. Table 4.8 represents an order of magnitude estimate by Behre Dolbear of the projected fourth quarter 2011 costs.

TABLE 4.8
2011 OPERATING COSTS — CONCENTRATOR, MOLYBDENUM HYDROMETALLURGICAL PLANT, INFRASTRUCTURE, AND G&A

Operation	Unit Costs (US$)
Concentrator	5.28/t ore milled
Molybdenum Hydrometallurgical Plant	3,612/t MoO_3 (Produced)
Infrastructure	0.06/t ore milled
G&A	1.42/t ore milled

The operating cost structure for the concentrator, molybdenum hydrometallurgy plant, infrastructure and G&A are reasonable for an operation this size. The risk associated with the costs shown in Table 17.3 is rated as moderate.

4.15.3 Conclusions

The generation of and backup for the operating costs is thorough and professional. Both IMC and Aker Solutions are reputable and experienced contractors.

Behre Dolbear has based its escalation for the 2007 detailed operating cost estimate on IMC's update of the pre-stripping cost per tonne of material mined. IMC is in the process of providing updated mining costs by year for the Toromocho Project production schedule.

Behre Dolbear has used currently available general escalators to escalate the 2007 processing, infrastructure, and G&A costs per tonne of ore milled and per tonne of MoO_3 produced.

4.15.4 Risks

The projected 2007 Toromocho Project operating costs are based on sound engineering and pricing. Behre Dolbear's 2011 escalated costs are based on available escalation factors — **Low to Moderate Risk/Unlikely to Possible**.

4.16 MARKETING AND SALES

4.16.1 General

The study has delineated a composite assay for the typical copper concentrates as:

- Copper 26.5%
- Silver 256 g/t
- Arsenic 0.08%
- Zinc 2.89%

Behre Dolbear has stipulated to the copper concentrate grade in the metallurgical discussion and has adjusted the silver grade based on the discussion in Section 4.9.1.

4.16.2 Risks

The zinc assay at 2.89% appears low. A review of locked cycle testing indicates that the zinc assays in the final copper concentrates could average as high as 10% (Table 10.2 and Table 10.3 of this review). The risk to the project for zinc penalties is **Low to Moderate/Unlikely to Possible**.

There is no discussion in the marketing report of concentrate flow moisture requirements, insurance, and unexplained smelter losses incurred during concentrate delivery and smelting operations. The concentrate treatment charges are estimated at $79 for long-term contracts with no price participation and $10 per tonne for spot treatment charges. All of these terms are for 30% copper concentrates. MCP may be penalized for its lower copper content when and if the market loosens up for concentrates and will in all probability also face negotiation difficulties over its high insol levels over 10%. Behre Dolbear has used publicly available studies and studies provided to the Group by CRU, to arrive at TC/RC costs of $70 and $0.07 for the planned copper concentrate production. The concentrate marketing risk is rated at **Low to Moderate/Unlikely to Possible** for copper concentrates due to uncertainties in the future smelter schedules and **Low/Unlikely** for MoO_3 product.

4.17 ECONOMIC ANALYSIS

Behre Dolbear has prepared an economic analysis for the Toromocho Project in Peru. The February 2011 Aker Solutions Definitive Estimate, as adjusted by Behre Dolbear (Table 4.4), has been incorporated into the model. The Definitive Estimate capital has been updated by Behre Dolbear to fourth quarter 2011 dollars. The economic model is considered to be as of the fourth quarter 2011. A new production schedule has been developed by Behre Dolbear incorporating dilution and mining losses, which has been used in the analysis. Metal prices are as forecast by several forecasting companies in August 2011 and September 2011, and provided by the Group for use in the economic analysis. The Behre Dolbear base case economic analysis shows a life-of-mine cash flow (undiscounted) of US$13.786 billion. Sensitivity analyses on the base case for plus 10% and minus 10% on metal prices, operating costs, and initial capital investment individually show positive cash flows. Metal prices are the most sensitive item, as is typical of mining projects. Sensitivity analyses were also performed using the 5-year average metal prices and the third quarter 2011 metal prices. As these prices are higher than the long-term projected prices, cash flows were higher than the base case.

Behre Dolbear economic analyses are 100% equity analyses that show the basic economics of the project. The analyses do not incorporate financing (interest paid and loan principal paid back). The analyses do not incorporate any losses carried forward for tax purposes from the construction period and do not incorporate any refund of value-added taxes (VAT) previously or currently paid. Should financing be incorporated into an economic model, it would affect the tax situation by lowering the employee profit-sharing tax as well as the income tax, due to the deductibility of interest. Deductibility of losses carried forward would lower income taxes. Refund of VAT would increase cash flow in the year of the refund.

In assessing a mineral property, it is sometimes useful to compare the property's costs and output to the industry as a whole. To do this, Behre Dolbear compared the cash cost and production from the Toromocho Project to the rest of the copper industry utilizing World Mine Cost Data Exchange's Dynamic Cost Curve model containing production and cash cost data for mines that produced at least 90% of the western world copper. The Behre Dolbear average long-term cash cost of producing a pound of copper from the Toromocho Project is US68.6 cents when credits for the silver and molybdenum production are included. When compared to other producers in the model, the Toromocho Project's cash cost per pound of copper is just below the 30% mark at 29.3%. This indicates that 70.7% of the modeled copper mines' production cash costs are more than the Toromocho Project's cash cost of US68.6 cents.

Behre Dolbear concludes that the project is economically viable and has the opportunity for higher returns on investment, if prices remain at high levels. Nevertheless, it should be noted that the metal mining industry is cyclical, and when a new cycle of lower prices will occur is not known.

4.18 OVERALL RISK ASSESSMENT/CONSEQUENCE

Per the discussion regarding risk in Section 3.2, the overall Toromocho Project's risk and likelihood assessment and resultant consequence assignment are provided in Table 4.9.

TABLE 4.9
TOROMOCHO PROJECT RISK ASSESSMENT SUMMARY

Issue	Risk	Likelihood	Consequence Rating
Land Status			
• Fail to transfer parcel	Low	Unlikely	Low
• Issues with adjacent operations	Low	Unlikely	Low
Resources and Reserves			
• Problems with drilling data, mine sampling data, and assays	Low	Unlikely	Low
• Variography inaccurate	Low	Unlikely	Low
• Resource categorization unreliable	Low	Unlikely	Low
• Mining losses and dilution insufficient (as adjusted by Behre Dolbear)	Low	Unlikely	Low
Geotechnical			
• Pit slope angles unreliable	Low to Moderate	Unlikely to Possible	Low to Medium
• Stockpiles and waste dumps unstable (complete proposed work)	Low to Moderate	Unlikely to Possible	Low to Medium
Mining			
• Production levels not met	Low to Moderate	Unlikely to Possible	Low to Medium
• Operating costs exceeded	Moderate	Possible	Medium
• Capital costs exceeded	Low to Moderate	Unlikely to Possible	Low to Medium
Process			
• Copper recovery not achieved	Low to Moderate	Unlikely to Possible	Low to Medium
• Concentrate grade not achieved	Low	Unlikely	Low
• Higher penalties for insol	Low to Moderate	Unlikely to Possible	Low to Medium
• Silver recovery not achieved	Moderate	Unlikely to Possible	Low to Medium
• Moly recovery circuit will not start-up as scheduled	High	Possible	Medium to High
• Tailings deposition system may not work as planned	Moderate to High	Unlikely to Possible	Medium to High
• Concentrates may not be as marketable as planned	Low to Moderate	Unlikely to Possible	Low to Medium

TABLE 4.9
TOROMOCHO PROJECT RISK ASSESSMENT SUMMARY

Issue	Risk	Likelihood	Consequence Rating
Infrastructure and Non-Process Facilities			
• Incomplete highway relocation plans, lime quarry added scope, and uncertainties regarding the Morococha relocation may increase costs	Low to Moderate	Unlikely to Possible	Low to Medium
Environmental and Permitting			
• Location issues could impact availability of skilled labor	Low to Moderate	Unlikely to Possible	Low to Medium
• The large tailings area may have adverse impacts	Low	Unlikely	Low
• Problems relocating Morococha residents could adversely impact the schedule	Low to Moderate	Unlikely to Possible	Low to Medium
Reclamation and Closure			
• Dust and water reclamation may not be sufficient	Low	Unlikely	Low
• Tailings reclamation may not be effective	Low	Unlikely	Low
• Closed pit may reduce the quality of life in the area	Low	Unlikely	Low
Administration, Manpower, and Management			
• Adequate skills, expertise, training, and numbers of personnel may not be available	Low to Moderate	Unlikely to Possible	Low to Medium
Capital Cost Estimate and Implementation Schedule Rating			
• The working capital estimate appears low	Low to Moderate	Possible	Low to Medium
• (See Infrastructure and Non-Process Facilities)			
• (See Mining)			
Operating Costs			
• The escalation factors for 2007 to 2011 may be inaccurate	Low to Moderate	Unlikely to Possible	Low to Medium
Marketing and Sales			
• (See Process, *i.e.*, concentrates)			
• TC/RC charges could be more than projected in the future	Low to Moderate	Unlikely to Possible	Low to Medium
• It may be difficult to market MoO_3 due to quality	Low	Unlikely	Low

5.0 LAND STATUS

The Toromocho Project is 100% owned and operated by MCP (formerly Minera Peru Copper S.A. (MPC)) which evolved from Peru Copper Inc. (PCI), which was formed in 2004 as the successor to the Peru Copper Syndicate Ltd., which had been formed in April 2003 and has subsequently acquired the mineral concessions to the Toromocho deposit. In August 2007, PCI received and accepted a takeover bid from the Chinalco Overseas Holding Company Limited, a wholly owned subsidiary of the Group.

The Toromocho deposit is located in the core of the Morococha mining district. The history of the Morococha mining district dates to Inca times, when the region was explored and exploited for silver and gold. During the Spanish Colonial Period, the area was mined for oxidized minerals with silver, zinc, and lead content.

In 1908, the Cerro de Pasco Syndicate and the Backus & Johnston del Peru Company incorporated the Morococha Mining Company. The Morococha Mining Company was reorganized in 1915 and merged with the Cerro de Pasco Corporation. Three years later, Backus & Johnston sold its stake in Morococha to the Cerro de Pasco Corporation. The earliest recorded information on the Toromocho deposit dated from 1928, when a low-grade ore zone was identified along the edge of the San Francisco peak monzonite stock and several other low-grade blocks were discovered. Further exploration was carried out by Cerro de Pasco until 1973-1974, when the property was nationalized by the Peruvian government and transferred to Centromin.

During the 1970s, Centromin continued exploration, carried out a drilling program. In 1974, Centromin started a small-scale exploitation of the Toromocho deposit. In the 1990s, Centromin began the process of privatization of all its assets. Exploitation by Centromin ceased in October 1997. In 1999, J. David Lowell, one of the founders of PCI, began studying potential mineable deposits of copper ore reserves in Latin America. Through this process, in 2002, Mr. Lowell determined that Centromin's Toromocho deposit had potential as a large, open pittable operation. In April 2003, Peru Copper Syndicate was formed for the purpose of making a bid for the Toromocho mineral concessions. The bid was successful, and the Company entered the Toromocho Option agreement with Centromin in June 2003. The Toromocho Option Agreement gave the Company the right to acquire certain full and partial interests held by Centromin in the mineral concessions and related assets of the Toromocho Project.

The Toromocho mineral concessions were held as an option agreement between MCP and Centromin. The Toromocho Option Agreement required that in order for MPC to exercise the Toromocho Option, it must (1) expend up to $12 million on exploration and development on the property over a maximum 5-year option exercise period that commenced on June 11, 2003; (2) deliver to Centromin a feasibility study on the Toromocho Project within such option exercise period; and (3) either provide to Centromin evidence that it meets certain technical and financial requirements or, alternatively, provide evidence that a qualifying financial institution, acceptable to Centromin, is willing to provide the financing required to develop the Toromocho Project in accordance with the terms of the feasibility study. MCP fully executed all Options through May 2008. The Transfer Contract between Chinalco/MCP and Centromin was executed in May 2008 and was financed by Eximbank of China.

MCP's legal vice president notified Behre Dolbear that the mining concessions are perfectly in place. A small strip of land, inside the pit area, that used to be owned by the railroad and is currently government controlled, is in the process of being transferred to MCP. Approval of the EIA implies intent to complete the transfer that should be finished within 6 months — **Low Risk/Unlikely**.

Two other larger companies holding property and mineral concessions adjacent to the Toromocho deposit and currently operating small underground mines are Pan American Silver and Austria Duvaz. Smaller companies holding concessions adjacent to Toromocho are Centenario, Pomatarea, Volcan, and Sacracancha. MPC has signed an agreement with Austria Duvaz, which granted the company an exclusive option to acquire the Morococha mining concessions, surface areas and assets of Austria Duvaz. In accordance with the share purchase agreement signed with Austria Duvaz, MCP gained 100% control of Minera Centenario and its stake in 30 concessions located in the Morococha mining district — **Low Risk/Unlikely**.

6.0 GEOLOGY

6.1 REGIONAL GEOLOGY

Peru is situated in the heart of the Andés mountain range. The cordillera of the Andés forms a northwest-trending belt that passes through Peru and is one of the most important metallogenic provinces in South America. The historical mining district of Morococha is part of the Miocene Belt of the Andés in central Peru. It is located 150 km east of Lima and covers an area of about 70 km^2. The geology of the district consists of shale and phyllites, subordinate limestones, and lava flows of the Excelsior Group (Devonian age), continental volcanic rocks and red beds of the Mitu Group (Permian age), sedimentary carbonate, volcanic rocks, and basalts of the Pucará Group (Triassic-Jurassic-age), Goyllarisquizga Group, and Machay Group (Late Cretaceous age), cut by Miocene-age intrusions with different ages.

6.2 LOCAL GEOLOGY

6.2.1 General

The Morococha district occupies a Tertiary-age intrusive center with associated skarn, hornfels, and breccia mineralization. It is developed in Jurassic Pucara calcareous sediments on the flat dipping (45 degrees to 50 degrees) western flank of a regional anticline located between a large, older, pre-mineral andesitic (diorite) intrusive to the west and Permian-Triassic (Catalina) volcanics to the east along the axis of the regional anticline. Toromocho is located in the core of the Morococha mining district. The stratigraphic unit in the immediate area of the Toromocho deposit is the Pucara group of Jurassic-age dolomites, and siliceous limestones, with intercalated basalt and trachyite flows. This unit is estimated to be 430m thick.

Porphyry mineralization in the Morococha area is hosted in both the intrusive and skarn rock types. The copper grade in the skarn rock types is generally higher. The drill hole logging has indicated that much of the mineralization is hosted in a breccia. The breccia crosses the rock type boundaries so that clasts can be predominately intrusive, skarn, or a mixture. The work by the geologists and consultants indicate that the breccia character of the rock mass may be due to anhydrite depletion from the rock matrix and subsequent partial collapse. Detailed logging indicates that the breccia can have different intensity throughout the deposit. The more subtle breccia textures probably represent the anhydrite depleted zones; more intense brecciation could be mechanical contact breccia or hydrothermal breccia.

6.2.2 Geology of the Toromocho Porphyry Copper Deposit

Toromocho is a complex, mineralized assemblage of veins, veinlets, stock works, "manto-type" bodies, and disseminated sulfides of the general "porphyry copper" type. The Toromocho mineralization is hosted in Jurassic limestones of the Pucara formation and in Tertiary-age intrusives including diorites, granodiorites, quartz, monzonites, and quartz porphyries. Contact metamorphism is related to the intrusive activity. Extensive bodies of skarn are present at the contacts between intrusive and calcareous host units. Broad areas of the deposit are brecciated with various levels of intensity. The breccia texture crosses all rock types in the central portion of the deposit.

The Toromocho deposit is a roughly vertical cylindrical shaped mass, but in detail it has a complex shape. Intrusive bodies cut dipping limestone beds forming calc-silicate metamorphics skarns.

The copper grade is usually higher in the skarn forming large higher grade zones. All of the rock units can be brecciated to various degrees (Figure 6.1).

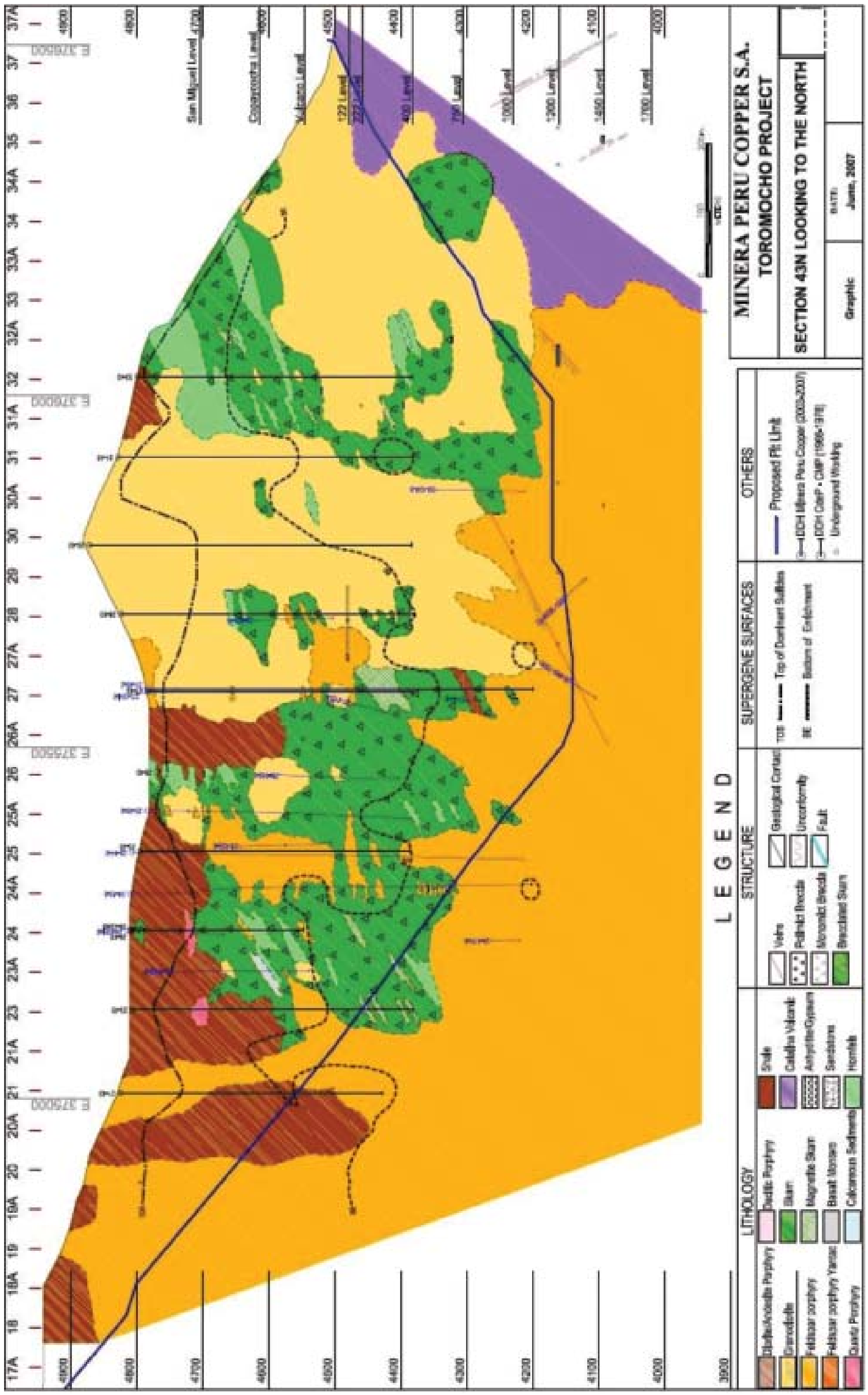

Figure 6.1. Cross section map of the Toromocha deposit
(after the Aker Kvaerner 2007 Report)

At the Toromocho deposit, chalcocite is distributed vertically over at least 250m, but some chalcopyrite remains throughout much of this interval. Sequential assays completed by drilling have confirmed this occurrence and provide a sound basis for interpretation of copper mineral species throughout the deposit.

The Toromocho ore body outcrops on the present surface at elevations of 4,600m to 4,800m. The copper ore body extends downwards to a flat "bottom" 500m to 600m below the surface. The highest grade part of the ore body lies within a 1.0 km by 2.0 km body of brecciated skarn, surrounding a cupola-like 7-million year old feldspar porphyry and granodioritic intrusive, and underlies on the west side, the older regional andesitic/dioritic intrusive exposed on the surface. The ore body contains about 2.5 billion tonnes of +0.3% copper resources averaging about 0.5% copper. The primary ore body is over-printed by late-stage, pyritic primary mineralization, clay, and serpentine alteration and supergene chalcocite and covellite enrichment. Spotty and structurally controlled, moderate-to weak, chalcocite enrichment extends from the surface and from the top of dominant sulfides, downward to the bottom of enrichment, 200m to 400m below the surface. A sulfate zone containing anhydrite disseminations and veinlets occur several hundred meters below the bottom of enrichment.

Deposit scale vertical zoning of copper, molybdenum, and arsenic and possibly also of very low levels of gold, is present in the Toromocho mineralized body. The patterns of molybdenum distribution in the central and main part of the mineralized body shown on the sections are in the form of inverted cones or shells open downwards, and plunging to the north. Spotty and weak enargite (Cu_3AsS_4) and tennantite [$(CuFe)_{12}As_4S_{13}$] mineralization indicates the presence of arsenic at Toromocho. The highest arsenic values are generally found above the 4,700m elevation and near the surface.

Behre Dolbear's geologist's observation in the field and study of the geology maps suggest that the Toromocho deposit is well understood by MCP. The major copper mineralization is in the form of chalcopyrite and chalcocite. Molybdenum and silver are present as byproduct credits. The deposit has typical porphyry copper mineralization and alteration characteristics.

6.3 GEOLOGICAL DATABASE

6.3.1 Database Used for the Mineral Resource Estimates

A total of 453 DDH with 168,931.35m of core have been completed from 1966 to 2008 by previous owners including Cerro de Pasco, Centromin, PCI, and MCP.

Drill hole data considered in IMC's November 2007 Report and subsequently Aker Kvaerner' reports contained the drill hole data prior to April 2008. The database used in the current resource block model reviewed by Behre Dolbear is a combination of all historic diamond drilling completed by previous owners including Cerro De Pasco, Centromin, PCI, and MCP. Multiple assay methods and several assay interval lengths are incorporated into a single database for use in the block grade estimation within the block model. The sampling, sample preparation, and assaying techniques and procedures for all the samples can be found in the IMC 2005 and 2006 reports and meet industry standards.

6.3.2 Drilling

The history of the Toromocho drill campaigns was summarized by IMC in its 2006 report and is summarized by Behre Dolbear below.

- The Cerro de Pasco and Centromin drilling is designated "Old Holes."
- The PCI drilling completed from 2003 to 2008 is designated "PCI Holes."
- The MCP drilling completed from 2011 is designated "MCP Holes."

IMC indicates that all of the Old Holes provided by Centromin to PCI are DDH of various diameters from NX to BX (55 mm to 42 mm diameter). Core recovery was variable in the Old Holes with average core recoveries for both programs reported as 80%. IMC personnel observed a number of places in Old Holes where the adjacent from-to blocks in the core tray representing 1m to 1.5m have no core between them. The current understanding of the Centromin and Cerro de Pasco procedures for Old Holes is summarized as below by IMC: Old Holes were split with half the core going to assay and the other half retained in the core tray. The split core was reduced to pulps before assaying for total copper. Occasional assays for zinc, molybdenum, and "oxide copper" were also recorded.

The PCI holes, during 2003 through 2008, were generally HQ core (63.5 mm diameter), recovered with face discharge bits and split inner barrels. Every effort was made to maximize core recovery. A few PCI holes are PQ diameter for metallurgical sample purposes.

Behre Dolbear has visited the core storage room and could not check the cores since all of the core boxes are piled up together and are not accessible.

6.3.3 Sampling, Sample Preparation, and Assaying

The drill holes were sampled by splitting the core with subsequent preparation of samples for assay. The precise procedures applied by Cerro de Pasco and Centromin for splitting and sampling for the Old Holes are not known, based on the IMC reports. PCI personnel have found 2,100 old sample pulps from Centromin and Cerro de Pasco. Those pulps have been reassayed as a check on the old methods. Split core is still available for many of the Old Holes in the core storage room.

The sampling of the PCI and MCP holes has been completed under the control of PCI and MCP personnel. Behre Dolbear visited and checked some drilling cores completed by PCI in the 2008 drilling program. Behre Dolbear has reviewed the logging sheets, logging procedures, sample preparation procedure, and interviewed MCP's geologists.

Behre Dolbear notes that IMC reported the assay samples were milled to 150 mesh. However, Behre Dolbear has confirmed with the PCI/MCP on site geologist and CIMM Laboratory that the assay samples were milled to 200 mesh, the preferred procedure.

Sample intervals lengths for the PCI and MCP holes are generally 1.50m to 1.55m in length corresponding to a 5-foot drill run. Sample lengths for the Old Holes generally average round 1.30m in length, although they vary significantly. Many shorter intervals are apparent in the Old Holes.

Sample analysis was undertaken by the CIMM Peru using the standard analytic methods specified in its documents such as "IC-VH-01 REV11/Resume JG-MC 2010-09-08." Gold grades were determined by fire assay and atomic absorption spectroscopy (AAS) procedure. Copper grades were determined by AAS-Leaching (H_2SO_4/NaCN) and perchloric digestion ($HCLO_4$, HNO_3, and HCL) method. Lead, zinc, molybdenum, arsenic, and silver grades were determined using AAS-Multi Acid Digestion (HF,$HCLO_4$,HNO_2, and HCL) procedure.

None of the PCI or MCP employees, officers, directors, or associates were involved in the in the CIMM Lab. Behre Dolbear considers the sample preparation procedures, analytic method, and security utilized to be appropriate for this type of copper-polymetallic deposit.

6.3.4 Quality Assurance/Quality Control (QA/QC)

6.3.4.1 PCI Data Verification

Outside Checks Assays of PCI Drilling

The primary lab for PCI assaying is the CIMM Lab in Lima, Peru. Duplicate pulps are sent to the ALS-Chemex Lab in Canada for check assays. PCI reports sending the duplicate pulps out for check assay on approximately a 1 out of 10 basis.

Table 6.1 presents the results of the check assays for total copper. The results indicate sound comparison between the CIMM Lab and the outside lab for total copper assay. Table 6.1 summarizes the results of the other mineral check assays that were run on the 1.5m assay interval basis.

TABLE 6.1
THE RESULTS OF THE CHECK ASSAYS FOR TOTAL COPPER

Metal	Number of Checks	CIMM Mean Grade	ALS-Chemex Mean Grade	T-Test of Means	Paired T	Binomial Test	KS Distribution Test
Copper (%)	4,514	0.455	0.488	Pass	Fail	Fail	Pass
Moly (%)	212	0.017	0.015	Pass	Fail	Fail	Pass
Silver (g/t)	560	6.302	6.084	Pass	Fail	Fail	Fail
Zinc (%)	560	0.253	0.25	Pass	Pass	Fail	Pass
Arsenic (%)	147	0.008	0.009	Pass	Fail	Pass	Fail

The results for all check assay values are sound. The failures indicated on Table 6.1 are due to tight variances within all the check assays. The means of the tested results are quite close as indicated by the T-test and population tests on the means are acceptable with the KS test.

Behre Dolbear noticed that blank samples were not inserted by MCP, PCI, and previous owners. Behre Dolbear recommends that in the future MCP consider submitting blank (zero grade) samples as check samples to test for possible contamination in the crushers and pulverization equipment.

PCI Drilling Pulp Weight Composites versus Calculated Composites

PCI assayed every 1.5m interval at the CIMM lab for total copper with occasional assays for arsenic, molybdenum, zinc, and silver. After preparation of the individual pulps for assay, pulp weight composites are made up to reflect 10m bench interval composites. In sub-horizontal holes, the composites are 10m downhole intervals. The pulp weight composites are then assayed at the CIMM labs for total copper, acid soluble copper, cyanide soluble copper on the acid reject, lead, zinc, molybdenum, arsenic, silver, and gold.

IMC compared the calculated composites for copper, zinc, molybdenum, and silver that were based on several 1.5m assays against the single 10m composite assay based on the pulp weight composites. This test accomplishes two goals:

1) Tests the reliability of the preparation of the 10m pulp weight composites

2) Checks the repeatability of the CIMM assay process.

Table 6.2 summarizes the results of the comparison between calculated composites and pulp weight composite values. All results comfortably pass the various statistical hypothesis tests with a 95% confidence level.

TABLE 6.2
RESULT SUMMARY OF THE COMPARISON BETWEEN CALCULATED COMPOSITES AND PULP WEIGHT COMPOSITE VALUES

Metal	Number of Checks	Calculated Composite Mean Grade	Weight Composite Mean Grade	T-Test of Means	Paired T	Binomial Test	KS Distribution Test
Copper (%)	8,345	0.448	0.449	Pass	Pass	Fail	Pass
Zinc (%)	94	0.368	0.365	Pass	Pass	Pass	Pass
Silver (g/t)	94	5.300	5.651	Pass	Pass	Pass	Pass
Moly (%)	91	0.012	0.013	Pass	Pass	Pass	Pass
Arsenic (%)	279	0.028	0.027	Pass	Pass	Pass	Pass

The results of the comparisons between calculated composites and pulp weight composites has led IMC to form the opinion that the two forms of data can be commingled within the PCI drill data. When both composites are available, calculated composites are used preferentially due to the additional assay support included within each composite mean.

6.3.4.2 Old Drilling Verification

Reassay of Old Drilling Pulps at CIMM

Over 2,000 of the original Old Drilling pulp weight composites of 10m intervals were found within the archives of Centromin by PCI personnel. These pulps were reassayed at the CIMM Lab as a check on the original assay results by Centromin and Cerro de Pasco. These reassays do not provide any information or checks on the sample collection and preparation used to prepare the pulps.

As a result of these comparisons, IMC has formed the opinion that the Old Drilling results for acid soluble copper, silver, gold, and arsenic are not reliable for resource estimation. Arsenic could be used if the intent is to overvalue arsenic on a conservative basis for checks of potential smelter issues. IMC has chosen not to use the old values for arsenic in the resource estimate. Copper, zinc, and molybdenum from the Old Drilling can be commingled with recent assays and used for resource estimation.

6.3.4.3 Nearest Neighbor Comparison — Old Drilling to PCI Drilling

In order to check the sampling and assay results between the Old Drilling and the PCI Drilling, the 10m composites were paired and compared when they were close to each other within the deposit. This procedure makes sound use of the twin holes that have been drilled, but also takes advantage of the recent angle holes that cross Old Drilling by providing additional pairs for comparison.

The copper grade comparison between the Old Drilling with the original assays and the PCI drilling with CIMM assays are a close comparison. The molybdenum results indicate that the Old Drilling with original assays is low when compared with PCI drilling and CIMM assays. This is likely due to core loss causing metal loss in the Old Drilling, particularly for molybdenum. Hypothesis tests indicate that the population means and the differences between individual samples are sufficiently close that the data can be commingled. However, there are differences in the population distributions as indicated by the binomial and KS tests.

6.3.5 Density Data

There were four sources of specific gravity or density information available for the Toromocho Project geology database.

1) Density data recorded by Cerro de Pasco and Centromin amounting to 27,072 density measurements (Old Holes)

2) 38 PCI samples sent to CIMM for density determinations without paraffin

3) 88 PCI samples sent to CIMM for density determinations with paraffin

4) 24 PCI core samples sent to Call and Nicholas (CNI) for rock strength testing had density values measured

The density data for the Old Holes were individual core samples weighed in air and weighed in water without any coatings prior to immersion in water. The CNI densities were calculated by careful weighing of the sample in air after preparation for geotechnical testing. Preparation for testing includes surface grinding of the core ends to assure they are parallel and careful measurement of the sample with a micrometer to determine the volume. Comparison of the methods found that the paraffin-coated samples were generally lighter than those samples that did not use paraffin. This is likely due to the fractured nature of the rocks absorbing water during the immersed weight. The Old Hole data and the CIMM data were used to determine average densities by rock type, alteration, and weathering zone within the model. The samples without paraffin were adjusted to reflect the results of the sample with paraffin when determining the rock type and alteration zone means. CNI results were used by IMC as a final independent comparison or check of the assignments established by IMC for each rock type.

The Block Density Assignments used in the resource estimation report by IMC in 2006 are as follows:

- Leach cap material above the 0.15% copper surface is 2.355 dry tonnes/m^3
- Everywhere else in the model is 2.57 dry tonnes/m^3

6.3.6 Conclusions

Behre Dolbear's geologist's observation in the field and study on the geology maps suggest that the Toromocho deposit is well understood by MCP. The major copper mineralization is in the form of chalcopyrite and chalcocite. Molybdenum and silver are present as byproduct credits. The deposit has typical porphyry copper mineralization and alteration characteristics.

Behre Dolbear has visited the primary lab for the Toromocho Project, CIMM PERU S.A. in Lima, Peru. The CIMM Lab Manager explained to Behre Dolbear the sample preparation and assay procedure used for the Toromocho Project. Behre Dolbear reviewed the lab's qualification and certification from both Peru and International Organizations.

Behre Dolbear considers CIMM Peru as a well-qualified lab with a good reputation.

Behre Dolbear believes that the database used in the resource estimate by IMC for the Toromocho copper deposit is well organized, in good order, and acceptable based on observation in the field and study of the geology report. The work meets both Canadian NI43-101 and Australasian JORC standards.

In Behre Dolbear's opinion, drilling efforts and sampling methods employed by PCI and MCP in their drilling efforts meet both Canadian NI 43-101 and Australasian JORC standards. The drilling of large diameter (HQ) core using split inner tubes enhances core recovery, and also provides a larger sample for assay compared to smaller diameter cores. The sawing of the core for collection of samples for assay is appropriate and provides for more uniform and consistent sample sizes compared to splitting with a conventional manual or hydraulic splitter.

The sample preparation, analytical methods, and security procedures used by PCI and MCP for samples generated by the PCI and MCP drilling meet Canadian NI 43-101 and Australasian JORC standards. The analysis of 10m composites for accessory metals such as gold, silver, zinc, molybdenum, and arsenic is appropriate for the porphyry-style copper mineralization in the Toromocho deposit.

The QA/QC procedures outlined by IMC are adequate for porphyry copper mineralization from the Toromocho deposit.

7.0 MINERAL RESOURCE ESTIMATES

The mineral resources at the Toromocho Project were last estimated by IMC. The current model was developed in November 2007 for PCI and has been subsequently utilized for the feasibility study produced by Aker Kvaerner. The mineral resource estimate at the Toromocho Project has been generated by IMC using a standard 3D-block model approach based on the March 1, 2007 drill hole database for the property. The 2007 IMC resource model was used by Behre Dolbear to spot check the accuracy of the modeling work and for compliance with reporting of Mineral Resources as required under the Australasian Joint Ore Reserve Committee JORC Code.

7.1 JORC RESOURCE AND RESERVE DEFINITIONS

The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, prepared by the Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia in September 1999 and revised in December 2004 (JORC Code) is a resource/reserve classification system that has been widely used and is internationally recognized. The JORC Code is used by Behre Dolbear to report the mineral resources at the Toromocho property in this report. Mineral resources under the JORC Code are defined as follows:

*A **'Mineral Resource'** is a concentration or occurrence of material of intrinsic economic interest in or on the Earth's crust in such form, quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge. Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories.*

*An **'Inferred Mineral Resource'** is that part of a Mineral Resource for which tonnage, grade and mineral content can be estimated with a low level of confidence. It is inferred from geological evidence and assumed but not, verified geological and/or grade continuity. It is based on information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes which may be limited or of uncertain quality and reliability.*

*An **'Indicated Mineral Resource'** is that part of a Mineral Resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a reasonable level of confidence. It is based on exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. The locations are too widely or inappropriately spaced to confirm geological and/or grade continuity but are spaced closely enough for continuity to be assumed.*

*A **'Measured Mineral Resource'** is that part of a Mineral Resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a high level of confidence. It is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. The locations are spaced closely enough to confirm geological and grade continuity.*

*An **'Ore Reserve'** is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined. Appropriate assessments and studies have been carried out, and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction could reasonably be justified. Ore Reserves are sub-divided in order of increasing confidence into Probable Ore Reserves and Proved Ore Reserves.*

*A **'Probable Ore Reserve'** is the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. It includes diluting materials and allowances for losses which may occur when the material is mined. Appropriate assessments and studies have been carried out, and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction could reasonably be justified.*

*A **'Proved Ore Reserve'** is the economically mineable part of a Measured Mineral Resource. It includes diluting materials and allowances for losses which may occur when the material is mined. Appropriate assessments and studies have been carried out, and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction could reasonably be justified.*

An ore reserve is defined in the Australasian JORC Code as that part of a Measured or Indicated Resource which could be mined and from which valuable or useful minerals could be recovered economically under conditions reasonably assumed at the time of reporting. Reserve figures incorporate mining dilution and allow for mining losses, and are based on an appropriate level of mine planning, mine design, and scheduling.

7.2 ELECTRONIC DATABASE USED FOR RESOURCE AND RESERVE MODELS

The electronic drill hole database supplied to Behre Dolbear contained a total of 362 diamond drill holes (DDH) of the 371 reported to be drilled on the property. The total drilled length in the database is 139,329m. The database used for the current Toromocho Project resource model is summarized in Table 7.1 by drilling campaign. Nine holes reported to be drilled between 1966 and 1972 were not included in the database used for the resource estimate.

TABLE 7.1
DRILL HOLE DATABASE USED FOR THE TOROMOCHO PROJECT RESOURCE ESTIMATION

Drilling Campaign	Number	Total Meters
1966 – 1972 Cerro de Pasco Corporation	71	18,264
1974 Centromin	59	21,602
2003 – 2007 Peru Copper	232	99,462
Total	**362**	**139,329**

The electronic database provided by IMC contains 93,179 assay intervals over a total of 139,329m. The assays for copper, molybdenum, silver, zinc, arsenic, lead, and gold are recorded along with rock type codes, ore type (mineralization zones) codes, alteration codes and structure codes. IMC used a total of 18 different rock types, 7 different ore types or mineralization zones and 15 alteration categories which are coded into the assay database. Assaying was conducted on approximately 1.5m intervals. Aker Kvaerner reports that no adjustments were made to assay intervals for changes in rock types or for transitions between geologic units.

The topography used for the resource estimation was provided to Behre Dolbear as an AutoCAD® file. The topography used and supplied was the current topography as of December 2006 and it is specified in standard UTM coordinates: WGS-84 Zone 18-S for Peru. The historic drill hole collars were originally located in a local mine coordinate system but were translated and specified in UTM coordinates in the database supplied to Behre Dolbear. The topographic work and controls appear adequate for mineral resource estimates.

7.3 BULK DENSITY MEASUREMENTS

IMC reports that here were four sources of specific gravity or density information available as part of their March 2007 database. The historic drilling completed by Cerro de Pasco and Centromin reports to have 27,072 density measurements and three different sets of measurements on 150 samples were taken by MCP's work at the project. IMC has analyzed and classified the density measurement and developed a table for density assignment. They have separated the densities base on the material below and within the leach cap and by rock type. Table 7.2 summarizes the densities based on the major rock types. For material below the leach cap, density was assigned rock type but was then modified based on alteration and RQD.

TABLE 7.2
IMC BULK DENSITY SUMMARY

	Density (g/cm^3)		
	Below Leach Cap		
Rock Type	Minimum	Maximum	Within Leach Cap
Anhydrite	2.71	NA	2.55
Volcanic	2.6	NA	2.44
Shale	2.5	NA	2.35
Calc Seds	2.54	NA	2.39
Basalt	2.76	NA	2.53
Mag Skn	3.16	NA	2.97
Horn	2.61	NA	2.53
Dacite	2.61	NA	2.45
Skarn	2.28	3.23	2.52
Quartz Porphyry	2.3	2.65	2.48
Felds Porphyry	2.3	2.65	2.37
Granodiorite	2.3	2.65	2.36
Diorite	2.3	2.65	2.34

Behre Dolbear has reviewed the bulk density procedures used for the resource modeling and believes that sufficient work has been done to estimate tonnage at the Toromocho property accurately.

7.4 DATA VERIFICATION

Behre Dolbear has not completed any independent sampling or data verification of the Toromocho deposit but has relied upon the opinions of IMC and Aker Kvaerner. If the checks and procedures used by these two firms have been completed as presented, Behre Dolbear believes that sufficient data verification has been completed for a resource model and estimate.

7.5 PROCEDURES AND PARAMETERS USED FOR THE RESOURCE MODELING

The mineralization in the Toromocho area is associated with an intrusive event. It is believed that the intrusive event created permeability in surrounding country rocks, which was then susceptible to mineralizing fluids. The Toromocho deposit is located in the center of the Morococha mining district which occupies a Tertiary-age intrusive center with associated skarn, hornfels, and breccia mineralization.

The Toromocho deposit is a copper-molybdenum porphyry system hosted in both sediments and contact metamorphic skarns. The deposit has been subject to secondary enrichment forming a thick zone of mixed chalcocite and chalcopyrite in the upper zones of the deposit.

The hydrothermal mineralization of the Toromocho deposit is well zoned. The metal zonation crosses rock type boundaries although the skarn units are better hosts than the intrusives. The deposit shows well developed concentric silicate alteration along with the metal zoning. There is a central potassic core that is surrounded by a phyllic zone and then a propylitic outer zone.

The Toromocho deposit is a roughly vertical, cylindrical-shaped mass, but in detail, it has a complex shape. Intrusive bodies cut dipping limestone beds forming calc-silicate metamorphics. The copper grade is usually higher in the skarn forming large, higher grade zones. All of the rock units can be brecciated to various degrees.

- **3D Geologic Model:** MCP geologists developed a series of cross sections aligned with drill grid northwest-southeast and northeast-southwest relative to UTM north. Multiple sets of these sections were developed showing rock type, alteration, and mineral occurrence. The rock type and alteration information on the sections were then transferred to plan maps. Differences between the north-south and east-west sections were resolved on the level maps. The rock type and alteration information was then digitized on plan and assigned to the block model on a nearest whole block.

- Behre Dolbear has examined and reviewed the level of detail entered into IMC block model and the assigned rock types for the Toromocho Project. Behre Dolbear believes that sufficient 3D geologic information and constraints have been included in the resource block model to achieve reasonable accuracy for a JORC-compliant mineral resource and reserve estimate.

- **Assay Statistics and Grade Populations:** IMC completed a detailed classical statistical analysis of the sample database. IMC used this analysis to subdivided the deposit into grade population zones for the grade assignment process. Rock types, alteration zones, and grade zones were all investigated as boundaries to the grade distribution of all the assayed metals. The final selection of grade distribution (population boundaries) was based on detailed statistical hypothesis testing of the grade distribution across each of the possible boundaries. IMC then developed an estimate of the leach cap boundary based on the first 0.15% total copper composite within the surface drill hole composite database. The resulting surface was used to code the model to differentiate the leach cap and non-leached copper mineralization.

IMC also investigated each combination of rock type and alteration type above and below the leach cap to determine what combination of geologic information should be used as grade distribution boundaries. Each boundary was investigated by comparing the grades of closely spaced composites on either side of the boundary. Statistical hypothesis tests on the mean and paired difference (T-test and Paired-T) were applied along with basic statistics on each side of the boundary to determine population limits. Details of this analysis can be found in their November 2007 Feasibility Study report.

- Behre Dolbear has reviewed the statistical work presented by IMC and ran some spot-checks on their calculations. Behre Dolbear believes that sufficient detailed analysis have been performed to accurately divide the resource estimation populations for JORC-compliant mineral resource and reserve reporting.

- **Compositing:** Assays were composited to 10m fixed-length bench type composites. The regularization of the intervals through compositing is Behre Dolbear believes that the composite length is appropriate for the modeling work.

- **Variography:** Variograms models were estimated by IMC for the Toromocho area at a variety of orientations and directions. This detailed variography analysis was used to set the search ellipsoid and variograms models to be used in grade estimation of the block model. In total, the IMC variography study set the estimation parameters for 10 separate copper estimation domains, 6 molybdenum, 6 arsenic, 9 silver, 7 zinc, 7 acid soluble, 6 As+CN soluble, 6 gold, and 6 lead domains.

- **Block Model Definition:** A 3D-block model with a block size of 20m × 20m × 15m was defined for the Toromocho block model by IMC. The estimation zones, rock types, mineralization zones, alteration codes envelopes were coded into the block model using the center of the block, *i.e.*, a block is considered inside the mineralized envelope if the center of the block is located inside the mineralized envelope. Table 7.3 shows the definitions of the model used.

TABLE 7.3
IMC TOROMOCHO BLOCK MODEL DEFINITION

Direction	From	To	Length (m)	Block Dimensions (m)	Number of Blocks
East	363,600	377,500	1,600	20	195
North	8,714,500	8,718,700	1,500	20	210
Vertical	3,870	4,995	1,420	15	75

- **Grade Estimation:** Block grade estimation for both gold and copper was conducted using the ordinary kriging (OK) procedure. The search ellipsoid and variograms used for each estimation domain are shown in Table 7.4. The estimates used maximum number of composites of 10, a minimum number of 1 with a maximum of 3 composites from a single drill hole. Behre Dolbear has spot checked grade estimates within the ICM model based on the above parameters and found no significant differences. Behre Dolbear believes that the estimation procedures utilized will give an acceptable risk for JORC-compliant mineral resource and reserve estimates.

- **Resource Classification:** Model blocks were classified into Measured, Indicated and Inferred Mineral Resources by IMC. Their procedure was based on the total copper kriging run and utilized the kriging standard deviation and the number of composites used for each block. Measured confidence was based on the presence of sufficient density of PCI drilling. Holes drilled by predecessors were not used to establish the measured category within the block model. The kriging standard deviation and the number of PCI composites were stored for the determination of the measured category. Inferred and Indicated categories used all of the accepted total copper composites from all drilling campaigns and the kriging standard deviation and number of composites were stored. IMC notes that the procedures establish an outside radius of about 75 to 100m for Indicated resources around isolated or outside limit drill holes. Table 7.5 outlines the categorization parameters used for the Toromocho deposit.

TABLE 7.4
GRADE ESTIMATION PARAMETERS

Domain	Rock Type	Alteration	Search Ellipse	Variogram Nugget/CO/Sill
Copper				
1	Diorite	Argillic		
2	Diorite	Other	150 × 150 × 55	0.20/0.80/1.00
	+ Feldspar Porphyry	All	150 × 150 × 55	0.20/0.80/1.00
3	Granodiorite	Sericite	240 × 150 × 55	0.30/0.70/1.00
4	Granodiorite	Other	240 × 150 × 55	0.30/0.70/1.00
5	Quartz Porphyry	All	150 × 150 × 55	0.30/0.70/1.00
6	Skarn + Magnetite Skarn	All	150 × 150 × 55	0.20/0.80/1.00
7	Hornfels/Baslats/Calc Seds/Shale/Anhydrite	All	150 × 150 × 55	0.30/0.70/1.00
8	Volcanics	All	150 × 150 × 55	0.30/0.70/1.00
9	Dacite Porphyry	All	150 × 150 × 55	0.30/0.70/1.00
10	Undefined Rock Types	All	150 × 150 × 55	0.30/0.70/1.00
Molybdenum				
1	Feldspar Porphyry	All	150 × 150 × 55	0.20/0.80/1.00
2	Skarn + Magnetite Skarn + Hornfels	All	150 × 150 × 55	0.20/0.80/1.00
3	Diorite + Quartz Porph + Dacite Porph + Granodiorite	All	150 × 150 × 55	0.30/0.70/1.00
4	Basalt + Calc Seds + Shale + Anyhydrite	All	150 × 150 × 55	0.30/0.70/1.00
5	Volcanics	All	150 × 150 × 55	0.30/0.70/1.00
6	Undefined Rock Types	All	150 × 150 × 55	0.30/0.70/1.00

Domain	Rock Type	Alteration	Search Ellipse	Variogram Nugget/CO/Sill
Arsenic				
1	Feldspar Porphyry	All	150 × 150 × 55	0.20/0.80/1.00
2	Skarn + Magnetite Skarn + Hornfels	All	150 × 150 × 55	0.20/0.80/1.00
3	Diorite + Quartz Porph + Dacite Porph + Granodiorite	All	150 × 150 × 55	0.30/0.70/1.00
4	Basalt + Calc Seds + Shale + Anyhydrite	All	150 × 150 × 55	0.30/0.70/1.00
5	Volcanics	All	150 × 150 × 55	0.30/0.70/1.00
6	Undefined Rock Types	All	150 × 150 × 55	0.30/0.70/1.00
Silver				
1	Diorite + Feldspar Porphyry	All	150 × 150 × 55	0.20/0.80/1.00
2	Granodiorite	Sericite	240 × 150 × 55	0.30/0.70/1.00
3	Granodiorite	Other	240 × 150 × 55	0.30/0.70/1.00
4	Quartz Porphyry	All	150 × 150 × 55	0.30/0.70/1.00
5	Skarn	All	150 × 150 × 55	0.20/0.80/1.00
6	Mag Skarn + Hornfels + Basalt + Calc Seds + Shale + Anhydrite	All	150 × 150 × 55	0.20/0.80/1.00
7	Volcanics	All	150 × 150 × 55	0.30/0.70/1.00
8	Dacite Porphyry	All	150 × 150 × 55	0.30/0.70/1.00
9	Undefined Rock Types	All	150 × 150 × 55	0.30/0.70/1.00
Zinc				
1	Diorite + Feldspar Porphyry + Quartz Porphyry	All	150 × 150 × 55	0.20/0.80/1.00
2	Granodiorite	All	240 × 150 × 55	0.30/0.70/1.00
3	Skarn	All	150 × 150 × 55	0.20/0.80/1.00
4	Mag Skarn + Hornfels + Basalt + Calc Seds + Shale + Anhydrite	All	150 × 150 × 55	0.20/0.80/1.00
5	Volcanics	All	150 × 150 × 55	0.30/0.70/1.00
6	Dacite Porphyry	All	150 × 150 × 55	0.30/0.70/1.00
7	Undefined Rock Types	All	150 × 150 × 55	0.30/0.70/1.00
Acid Soluble				
1	Diorite + Feldspar Porph + Quartz Porph + Granodiorite	All	150 × 150 × 55	0.30/0.70/1.00
2	Skarn	All	150 × 150 × 55	0.20/0.80/1.00
3	Magnetite Skarn	All	150 × 150 × 55	0.20/0.80/1.00
4	Hornfels + Feldspar Porphyry	All	150 × 150 × 55	0.20/0.80/1.00
5	Basalt + Calc Seds + Shale + Anhydrite	All	150 × 150 × 55	0.30/0.70/1.00
6	Volcanics	All	150 × 150 × 55	0.30/0.70/1.00
7	Undefined Rock Types	All	150 × 150 × 55	0.30/0.70/1.00
As + CN Soluble				
1	Diorite + Quartz Porph + Dacite + Feldspar Porph + Granodiorite	All	150 × 150 × 55	0.30/0.70/1.00
2	Skarn + Hornfels	All	150 × 150 × 55	0.20/0.80/1.00
3	Magnetite Skarn	All	150 × 150 × 55	0.20/0.80/1.00
4	Basalt + Calc Seds + Shale + Anhydrite	All	150 × 150 × 55	0.30/0.70/1.00
5	Volcanics	All	150 × 150 × 55	0.30/0.70/1.00
6	Undefined Rock Types	All	150 × 150 × 55	0.30/0.70/1.00

Domain	Rock Type	Alteration	Search Ellipse	Variogram Nugget/CO/Sill
Gold				
1	Diorite + Quartz Porph + Dacite Porph + Feldsapr Porph + Grano	All	150 × 150 × 55	0.30/0.70/1.00
2	Skarn + Magnetite Skarn	All	150 × 150 × 55	0.20/0.80/1.00
3	Hornfels	All	150 × 150 × 55	0.20/0.80/1.00
4	Basalt + Calc Seds + Shale + Anhydrite	All	150 × 150 × 55	0.30/0.70/1.00
5	Volcanics	All	150 × 150 × 55	0.30/0.70/1.00
6	Undefined Rock Types	All	150 × 150 × 55	0.30/0.70/1.00
Lead				
1	Diorite + Quartz Porph + Dacite Porph + Granodiorite	All	150 × 150 × 55	0.30/0.70/1.00
2	Skarn + Magnetite Skarn + Hornfels	All	150 × 150 × 55	0.20/0.80/1.00
3	Feldspar Porphyry	All	150 × 150 × 55	0.20/0.80/1.00
4	Basalt + Calc Seds + Shale + Anhydrite	All	150 × 150 × 55	0.30/0.70/1.00
5	Volcanics	All	150 × 150 × 55	0.30/0.70/1.00
6	Undefined Rock Types	All	150 × 150 × 55	0.30/0.70/1.00

TABLE 7.5

MINERAL RESOURCE CATEGORIZATION PARAMETERS FOR TOROMOCHO PROJECT

Resource Category	Maximum Kriging Standard Deviation	Minimum Number Composites
Measured[1]	0.6	10
Indicated	1.0	4
Inferred	None	1

1 No historic drilling used was for the Measured category estimation

Behre Dolbear believes that the resource categorization methods used by IMC are sufficient for use in JORC-compliant reporting of mineral resources and reserves.

7.6 PROCEDURES FOR RESERVE ESTIMATION

Under the JORC Code, Reserves represent that part of a Measured or Indicated Resource which is planned to be mined, incorporating mining dilution and allowing for mining losses, and on which a sufficient level of mine planning, mine design and scheduling have been carried out to demonstrate economic viability. Under the JORC Code, Inferred Resources are deemed to be too poorly delineated to be transferred into a reserve category.

Ore reserves for the Toromocho property were estimated by developing a mine plan for extracting the in-situ resource contained within the resource block model. The procedures and parameters used for the reserve estimation are described in detail by IMC in their report titled "Mine Feasibility Study Toromocho Project" completed in November 2007. The procedures and parameters outlined by IMC that were used for their reserve estimation are summarized as follows:

- generate an economic block model from the grade model
- generate an optimum pit from the block model
- design a final pit with ramps and access

- develop a life-of-mine (LOM) production schedule
- generate a reserve summary from the production schedule

Behre Dolbear believes that the overall methodology employed for reserve definition is adequate to determine and report a JORC-compliant reserve. However, as the feasibility work was completed in 2007, costs and economic assumptions were of concern to several members of the Behre Dolbear team and a more detailed review was completed to assess their impact on the ore reserves stated in the feasibility study.

7.6.1 IMC Economic Block Model

IMC generated their economic block model based on the parameters valid in 2007. A value was determined for each block in the resource model based on grade, recovery, processing costs and mining costs. Table 7.6 shows the economic parameters used by IMC.

TABLE 7.6
IMC ECONOMIC FOR PIT OPTIMIZATION

Cost Item	Cost or Recovery	Units
Mining Cost	$0.805	$/t total material
Mine Sustaining Capital	$0.133	$/t total material
Total	$0.938	$/t total material
Haulage Increment	$0.031	$ per Bench Below 4,695
Bench Discount	2%	Per bench
Processing Cost per tonne	$ 4.13	$/t of ore
Flotation Process Recoveries		
Copper	87.20%	
Molybdenum	54.00%	
Silver	52.30%	
Mine Site G&A	$ 0.50	$/t – $18 million/year based on 36,000 tpa
Treatment and Refining Charges		
SNC Pre-feasibility Source	$ 0.20	$/lb of copper – If No Arsenic
Average Concentrate Grade	26.50%	Copper in concentrate
Arsenic Penalty	$ 3.00	Per 0.1 As between 0.20 and 1% As
	$ 4.00	Per 0.1 As greater than 1% As
Zinc Penalty	$ 2.00	Per 1% above 2.5%
Molybdenum Roasting	$ 0.50	$/lb molybdenum
Silver Refining	$ 0.50	$/oz silver
Recovery in Smelter or Refinery		
Copper	95.75%	1% Smelter Deduct and 0.5% Shipping Loss
Molybdenum	99.50%	0.5% Shipping Loss
Silver	90.00%	
Metal Prices as Basis for Schedule		
Copper	$ 1.30	Per pound of copper
Molybdenum	$15.00	Per pound of molybdenum
Silver	$ 8.50	Per ounce of silver
Slope Angles Variable and Averaged 36 degrees		

7.6.2 Optimum Pit Generation

IMC utilized the floating cone algorithm to provide guidance to the design of the final pit and to establish the best extraction order for the mine life. Approximate costs and recoveries were developed as input to the floating cone. Table 7.6 summarizes the input information used for mill ore. IMC applies a bench discounting process to the floating cones as an approximation of the time value of money. Varying metal pricing was used to produce a series of optimum pit shells, which were used for phases for pit development for the final pit design. The pit shell generation was constrained to surface ownership and prevented mining around the national highway.

The maximum pit slope angles (see Section 8.0) used for optimum pit generation were the detailed pit slope recommendations supplied to IMC by CNI, the project's geotechnical consultants. All floating cones applied economic value to Measured and Indicated category mineralization only. Inferred category mineralization was treated as waste.

Behre Dolbear has reviewed and checked the optimum pit shell generation and believes the techniques used by IMC are reasonable. However, during this review many of the economic and recovery assumptions in the above Table 7.6 were modified by Behre Dolbear since many of the parameters have changed since the original feasibility study in 2007. To ensure that the pit design was still economic and that the mining schedule produced in 2007 involved mining and processing economic material, Behre Dolbear adjusted the economic block model and re-floated the pit based on the economic and recovery parameters listed in Table 7.7. Behre Dolbear then visually inspected the pit shell produced and concluded that the overall pit produced in 2007 is still reasonable with the increased metal prices and the increased cost assumptions.

TABLE 7.7
BEHRE DOLBEAR MODIFIED ECONOMICS FOR PIT OPTIMIZATION CHECK

Cost Item	Cost or Recovery	Units
Mining Cost	$ 1.57	$/t total material
Haulage Increment	None	(average costs includes haulage increment)
Bench Discount	None	
Processing Cost per tonne	$ 5.28	$/t of ore
Mine Sustaining Capital	$ 0.27	$/t material moved; mine only
Flotation Process Recoveries		
Copper	85%	
Molybdenum	65%	To Tech Oxide
Silver	Variable	Based on the formula: AgRec = 53.44 + (13.74 × AgHead ozt)
Mine Site G&A	$ 0.00	Included in revised Mining
Infrastructure Operating Costs	$ 0.06	Per tonne of ore milled
Mill G&A	$ 1.42	Per tonne of ore milled
Treatment and Refining Charges	$ 70.00	Per dry tonne of concentrates
Average Concentrate Grade	26.50%	Copper in concentrate
Arsenic Penalty	$ 2.50	Per 0.1 As between 0.20 and 1% As
Zinc Penalty	$ 2.50	Per 1% above 2.5%
Additional Molybdenum Costs	$ 3,612	$/t Tech Oxide
Silver Refining	$ 0.40	$/oz silver
Recovery in Smelter or Refinery		
Copper	97.50%	
Molybdenum	100%	
Silver	95.00%	
Metal Prices as Basis for Schedule		
Copper Price	$ 2.57	Per pound of copper
Molybdenum	$ 16.69	Per pound of molybdenum, as chemical grade oxide; includes 10% premium over tech oxide
Silver	$ 22.50	Per ounce of silver
Slope Angles Variable and Averaged 36 degrees		

In addition, Behre Dolbear ran a rough comparison of the break even cutoff for the 2007 and 2011 economics. This analysis shows that under the 2007 operating, capital cost, and metals pricing assumptions, the breakeven cutoff was approximately 0.307% copper equivalence. Using the 2011 assumptions, the breakeven cutoff is approximately 0.232% copper equivalence.

7.6.3 Final Pit Design

The pit shells were used as a guide to develop a 10-phase mine design for the Toromocho Project pit. The different phases or push backs are practical expansions of the mine that attempt to develop the highest value ore early in the mine life. All practical mining constraints such as operating room and access roads are incorporated into the IMC phase design and are discussed further in the mining section of this report.

Behre Dolbear reviewed the series of pit designs produced by IMC and believes that they are appropriate for reserve estimation work.

7.6.4 Life-of-Mine Production Schedule

IMC then produced a life-of-mine production schedule based on the material to be removed for the series of pit designs. A mining schedule was produced with some smoothing of production tonnage and then IMC summarized the direct mill feed, low grade stockpile, heap leach ores, high arsenic stockpile and waste. All Inferred material within the design was treated as waste for scheduling purposes.

7.7 RESERVE AND RESOURCE STATEMENT

In 2007, IMC developed an ore reserve for the Toromocho Project by summarizing the proposed production schedule. They concluded that the total Proved and Probable ore reserves at the Toromocho Project amounted to 1,526 Mt averaging 0.479% copper, 0.019% molybdenum, and 6.88 grams of silver per tonne. No breakdown was given between Proved and Probable ore reserves. The 2006 IMC report prior to the inclusion of all of the 2006 drilling shows that the reserve is approximately 34% Proved and 66% Probable.

However, IMC has not considered mining dilution or mining losses in their reserve summary. Behre Dolbear adjusted the production schedule to include expected mining losses and dilution. A 2% mining loss was subtracted from the milling and low-grade stockpile production and 3% mining dilution was at the average reported grade of the waste material (0.222% copper, 0.007% molybdenum, and 5.95 grams of silver per tonne). This brings the estimated Proved and Probable JORC compliant ore reserve to 1,540 Mt averaging 0.471% copper, 0.019% molybdenum, and 6.86 grams of silver per tonne, as shown in Table 7.8. The slight increase in tonnes over the IMC estimate is due to the addition of the dilution. The modified production schedule, including dilution, is shown in Table 9.2 of the report.

In addition to the estimated Proved and Probable reserves, IMC reports an additional 520 Mt of Measured and Indicated mineral resource averaging 0.37% copper, 0.013% molybdenum, and 6.10 grams of silver per tonne (Table 7.9) and 174 Mt of Inferred mineral resources averaging 0.46% copper, 0.015% molybdenum, and 11.54 grams of silver per tonne (Table 7.10) also conforming to the definition in the 2004 JORC Code. These Mineral resources, while outside of the current pit design, are adjacent to the pit. Access to these additional Mineral resources will require the movement of the national highway to allow pit expansion toward the west and north and the relocation of the stockpile and crusher on the southeast side. These resources are not currently part of a mine plan because additional engineering and design work is required.

TABLE 7.8
JORC ORE RESERVES AT THE TOROMOCHO PROJECT
(DECEMBER 31, 2011)

		Grade		
Category	Tonnes (millions)	Cu (%)	Mo (%)	Ag (g/t)
Proved	756	0.51	0.02	6.39
Probable	784	0.434	0.018	7.31
Total	**1,540**	**0.471**	**0.019**	**6.86**

TABLE 7.9
JORC MEASURED AND INDICATED MINERAL RESOURCES AT THE TOROMOCHO PROJECT[1]
(DECEMBER 31, 2011)

Category	Tonnes (millions)	Grade Cu (%)	Grade Mo (%)	Grade Ag (g/t)
Measured	156	0.41	0.014	6.20
Indicated	364	0.36	0.012	6.06
Total	**520**	**0.37**	**0.013**	**6.10**

1 Mineral Resources are in addition to Reserves

TABLE 7.10
JORC INFERRED MINERAL RESOURCES AT THE TOROMOCHO PROJECT[1]
(DECEMBER 31, 2011)

Category	Tonnes (millions)	Grade Cu (%)	Grade Mo (%)	Grade Ag (g/t)
Inferred	174	0.460	0.015	11.54

1 Mineral Resources are in addition to Reserves

7.8 CONCLUSIONS

Behre Dolbear believes that IMC has completed credible work in determining the resource model of the mineralization at the Toromocho Project. Behre Dolbear also believes that the project's ore reserve statement is appropriate based on our review of the mineralized envelopes and the grade estimation methods.

Behre Dolbear believes that the Toromocho Project, covered by this review, has approximately 1,540 Mt of Proved and Probable ore reserves averaging 0.471% copper, 0.019% molybdenum, and 6.86 grams of silver per tonne conforming to the definitions in the 2004 JORC Code.

Behre Dolbear believes the mineral resource estimation model including the database, procedures, and parameters applied by IMC to the Toromocho Project to generally be reasonable and appropriate. The geological constraints were adequately considered in their estimation of the global resource. Behre Dolbear believes that the data density requirements used for Measured, Indicated, and Inferred Mineral Resources definition are generally adequate and comparable to those used for mineral resource estimation for similar deposits.

The reserves at the Toromocho Project are based on a pit design using the 2007 economic parameters and recovery assumptions. Behre Dolbear's simplified breakeven analysis shows that the 2007 economic and operating assumptions require a break even cutoff grade of approximately 0.307% copper equivalence while the 2011 modifications indicates that the breakeven cutoff is now around

0.232% copper equivalence. While Behre Dolbear believes that the current pit design completed in 2007 is adequate for ore reserve estimation and reporting, our check work shows it would be prudent to rework the pit design and production schedule using updated economics prior to mining production as there maybe some upside potential.

The IMC estimation of ore reserves has not included adjustments for mining losses or mining dilution. The reserve tonnage and grades were adjusted by Behre Dolbear to conform to JORC reporting standards.

Behre Dolbear feels that IMC estimates of the contained metals in the reserves are reasonable for the proposed large scale bulk mining operation.

7.9 RISK ANALYSIS

A number of risk factors for the reserve estimate are present.

- **Behre Dolbear Has Not Audited the Sampling Data or Conducted Independent Sampling:** Behre Dolbear has accepted the drilling data, mine sampling data, and assays, as presented by Toromocho for this report. As both IMC and Aker Kvaerner are reputable independent consultants having completed extensive reviews of the data, Behre Dolbear views this as **Low Risk/Unlikely.**

- **Variography:** The lack of identified geometric (or directional) structure in the variograms used for estimation is not usually seen in these type of copper deposits but, not impossible. The geologic and structural complexities may mask some of this within the variography. On average it should present a very **Low Risk/Unlikely** to the overall reserve and the estimated metal content due to the large-scale mining equipment selected for the proposed operations.

- **Resource Categorization:** Model blocks were estimated and classified into Indicated and Inferred Mineral Resources under the 2004 JORC definitions. Behre Dolbear believes that using the kriging variance or standard deviation sometimes will sometimes tend to overestimate the confidence of the estimate. Given the estimate split between Measured and Indicated Mineral Resource and the drill spacing, Behre Dolbear believes it represents a **Low Risk/Unlikely** to the ore reserve statement.

- **Mining Losses and Dilution:** The original ore reserve estimate completed by IMC did not consider mining losses and mining dilution. Behre Dolbear has adjusted the estimate to include these modifying factors using a 2% mining loss and 3% dilution at the average waste grade. This results in a very small overall adjustment to the ore reserve statement and believes this represents a very **Low Risk/Unlikely** to the project due to the large scale mining equipment proposed for the project.

8.0 GEOTECHNICAL

8.1 OPEN PIT SLOPE ANGLES

The geotechnical work to develop the recommended open pit slope angles for the Toromocho Project were conducted in two segments by Call & Nicholas, Inc. (CNI). The initial work was reported in a December 2005 report titled *Slope Design and Fragmentation Evaluation for the Toromocho Deposit.* That work is superseded and updated by the November 2007 report *Feasibility Slope Angles and Fragmentation Distributions for the Toromocho Deposit.* The more recent document takes advantage of:

- Additional geotechnical data from drilling through December 2006
- Updated geology, alteration, and Rock Quality Distribution (RQD) models
- Shear testing of remolded skarn material
- Interpreted phreatic surface based on water wells and underground workings

Portions of the following narrative are extracted from the mentioned reports.

CNI has been an experienced, highly qualified, and reputable supplier of geotechnical services to the mining industry for decades. CNI's charge was to develop an interramp overall slope angle model for the Toromocho Project open pit. The recommendations are based on an evaluation of the risk of instability in the pit walls composed mostly of intrusive and skarn rock.

MCP provided the geologic maps, geology cross sections, and drill hole RQD data used by CNI. CNI completed the following tasks as input to IMC's open pit limit design analyses.

- Review current rock exposures and geology interpretations and develop an engineering geology model for the design of the final pit walls.
- Map cells throughout available rock outcrops in the project area.
- Select rock core samples from drill holes for subsequent rock strength testing.
- Collect RQD and geo-mechanical data from drill holes.
- Test each lithology for intact rock strength and fracture shear strength.
- Determine engineering rock-type strengths based on laboratory test values.
- Reduce geologic structure data and drill hole geo-mechanical data.
- Develop a geology MineSight® model for the deposit based on geology cross sections and maps provided by MPC.
- Develop an RQD and geo-technical rock type model for Toromocho Project based on available drill hole data.
- Develop a phreatic surface based on water elevations provided by Errol Montgomery & Associates.

- Evaluate fragment size distribution for the deposit based on drill hole geo-mechanical data.
- Perform a fabric analysis that involves processing the cell mapping database, determining design structure sets and set statistics, and analyzing joint-fabric data to define structural domains.
- Analyze bench scale stability of single (15m) and double (30m) bench heights.
- Analyze multiple bench stability (overall and interramp) using the *Slope/W* stability program.
- Develop a slope angle model for the Toromocho Project pit.

The geology of the Toromocho Project deposit is described in Section 6.0. The low strength, rubbleized rock mass created by the destruction of the sulfate zone of the deposit is a significantly unfavorable condition for pit slope stability.

The work noted in the above bullets was completed professional and comprehensively and was reported objectively. The industry practice is to select the steepest pit slope angle consistent with a level of risk that will not have an adverse impact on the economics of the property. This angle is determined by performing engineering analyses to assess the stability of the benches, the interramp slope, and the overall slope.

Because of the complex geology at the Toromocho Project deposit, additional geotechnical analysis will need to be conducted for slope design of interim pit walls. Pit slope design in such a complex setting should be an integral part of mine planning, and should not be considered as a separate "one time" study to be performed by consultants. As the mine is expanded and additional geologic data is collected, a better understanding of the geology within the deposit will be developed and determination of the optimum slope design will be refined.

8.1.1 Slope Geometry

A pit slope design has three major components: bench configuration, interramp slope angle, and overall slope angle (Figure 8.1). The bench configuration is defined by the bench height, catch bench width, and bench face angle. The interramp slope angle is formed by a series of uninterrupted benches while the overall slope angle is formed by a series of interramp angles separated by haul roads. At the Toromocho Project, the final pit has a haul road only at the north end; therefore, the remaining slopes will all be interramp slope geometries.

8.1.2 Design Sectors

Slope angles in an open pit are controlled by rock strength, geologic structure, groundwater conditions, seismic events, wall orientation, and operational considerations. Design sectors are areas where these parameters are either the same or will have a similar impact on slope design. The primary factors used in defining the limits of a design sector are structural domain boundaries and wall orientation. When more than one structural domain occurs in a sector, that sector is subdivided for design purposes. Once the design sectors are defined, the rock strength for specific rock types and geologic structures for use in the stability analyses can be determined.

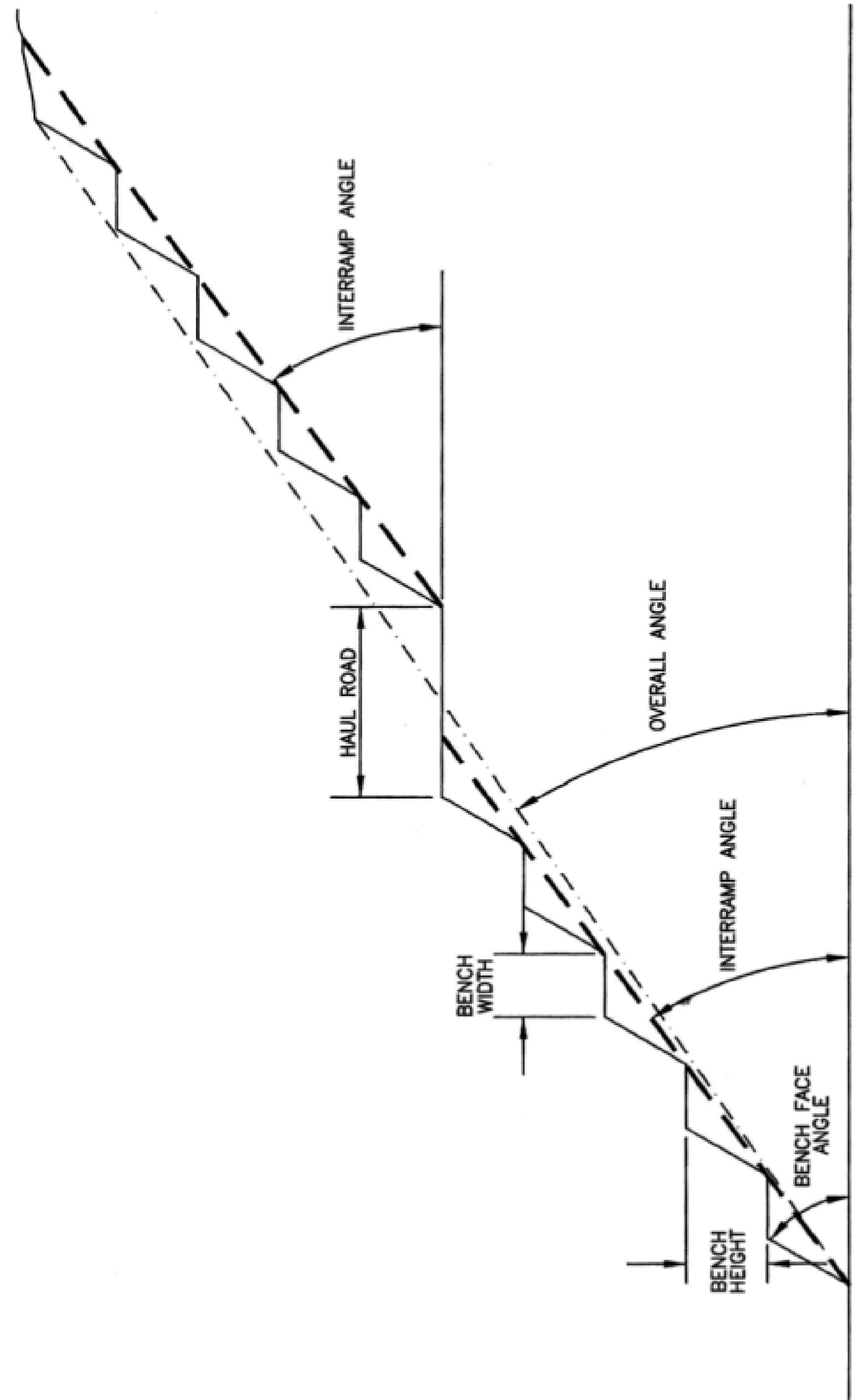

Figure 8.1. Definition of bench face, interramp, and overall angles
Source: Call & Nicholas, Inc., Appendix G, November 2007

8.1.3 Modes of Instability

A failure mechanism is an engineering term used to denote a hypothesized set of conditions that could result in slope displacement. Engineering analyses such as limit equilibrium methods are used to evaluate whether the displacement will actually occur, and numerical models are used to estimate the magnitude of displacement, if displacement does occur. A failure in an engineering sense occurs if displacement occurs; however, this must be distinguished from failure in an operational sense in which a failure only occurs if displacement is so great that it adversely affects operations. Typical failure models are depicted on Figure 8.2.

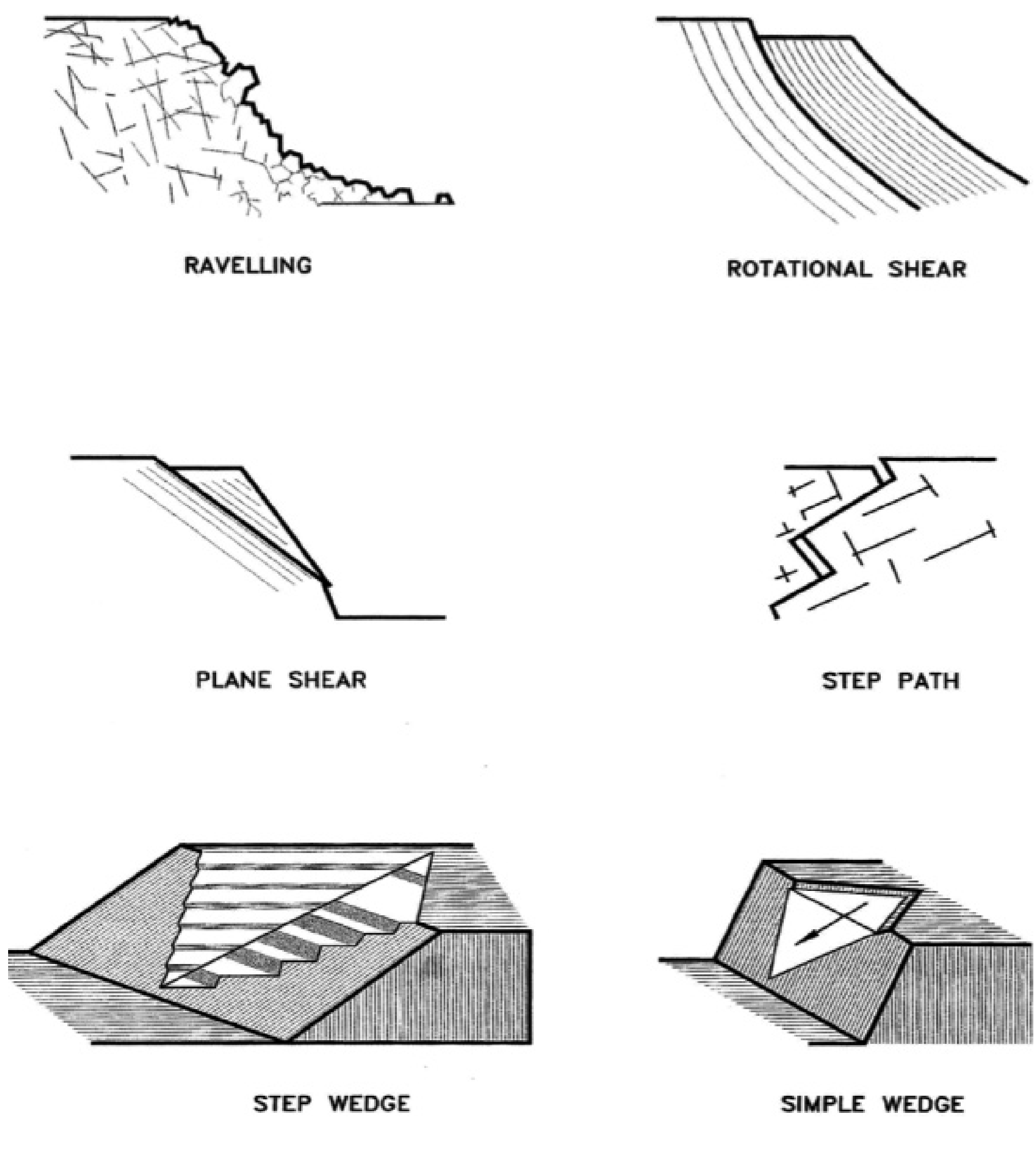

Figure 8.2. Typical failure models

- **Raveling.** Also referred to as rock fall, raveling occurs in slopes where the geologic structure produces a rock mass characterized by many-sided blocks that are easily detached from the rock mass. The detached blocks can fall and accumulate as talus piles on the benches.

- **Rotational Shear Failure.** The rotational shear failure model is used to assess the stability of slopes that are composed of material with either low rock mass strength or rock mass with closely spaced and randomly oriented rock fabric. The failure surface is generally assumed to be in the shape of a circular or non-circular arc segment.

- **Plane Shear Failure.** The plane shear failure mode may occur when a geologic structure strikes parallel, or nearly parallel, to the strike of the face and dips into the pit at an angle flatter than the pit slope.

- **Step-Path Failure.** Whereas a plane shear failure occurs along a single plane, a step-path failure occurs along a number of surfaces dipping out of the face (the master joint set) with separation along either (1) a joint set oriented approximately perpendicular to the master set (the cross joints) or (2) tensile failure through intact rock bridges separating the master joints.

- **Simple Wedge Failure.** The simple wedge failure geometry is the result of two planar, or nearly planar, geologic structures that intersect to form a completely detached prism of material where the line of intersection daylights and dips into the pit.

- **Step-Wedge Failure.** The step wedge failure model is similar to the simple wedge. However, in this case, structures that intersect to form the wedge do not need to be singular, continuous features. Rather, as with the step-path, the combination of different structural sets forms the failure surface.

8.1.4 RQD

Rock Quality Designation (RQD) is a measure of the degree of jointing or fracture in a rock mass, measured as a percentage of the drill core in lengths of 10 cm or more. High-quality rock has an RQD of more than 75%, low-quality of less than 50%. The RQD of the rock in and around the Toromocho Deposit is generally low with 50% of the RQD values below 40%, and with an average RQD value of 29% for the mine area. The overall low RQD results in low rock-mass-strength parameters, resulting in flat slope angles. However, the low RQD will result in less blasting, crushing, and grinding requirements.

8.1.5 Slope Dewatering

Based on the information provided by Errol Montgomery and Associates, most of the pit walls are already depressurized due to the drainage into the Kingsmill Tunnel. Recommended slope angles are based on the assumption that the pit walls are depressurized. The interpreted phreatic surface shows that the south wall will require depressurization using one or more of the following techniques:

- Drill drain holes from underground workings

- Pump from surface wells

- Drill and manifold horizontal drains

Horizontal drains will be required throughout the pit regardless of other depressurization measures taken to depressurize perched water.

8.1.6 Rock Mass Strength

The rock-mass strengths were calculated using the intact shear-strengths for the rock type, the fracture shear-strength for the rock type, and the RQD. Because the RQD for the different rock types could have a wide range, four ranges of RQD were used to calculate the rock-mass strength; the RQD percent groupings are: 0 to 20, 20 to 40, 40 to 60, and greater than 60.

8.1.7 Seismic Investigation

Montgomery Watson Harza (MWH) presented the expected g force due to earthquakes at the Toromocho Project mine site in their report "*Toromocho Project Seismic Hazard Analysis for Tailings Impoundment Feasibility Level Design*" (January 2007). The g force the mine site will experience for the 50% maximum credible earthquake for a 50 year time period is 0.21 grams.

CNI has not performed stability analyses using this g force for the Toromocho Place pit slopes. However, CNI has performed stability analyses for g forces of 0.2 in undisturbed rock and has determined that with a static factor of safety (FOS) of 1.2 or higher and the ground depressurized, an earthquake will cause only bench scale stability issues.

8.1.8 Design Sectors

The Toromocho final pit plan was divided into 10 design sectors for the stability analyses and subsequent presentations of slope design recommendations (Figure 8.3). Design sectors are areas of the pit where geotechnical conditions and pit geometry will have a similar impact on slope stability. The delineation of design sectors at the Toromocho Project pit were based primarily on wall orientation and rock type. The rock type division was skarn and sediments in one group and igneous rock types in another. Additional sector divisions included the reclaimed tailings, Buenaventura Lake, and the contact zone of skarn and Catalina volcanics.

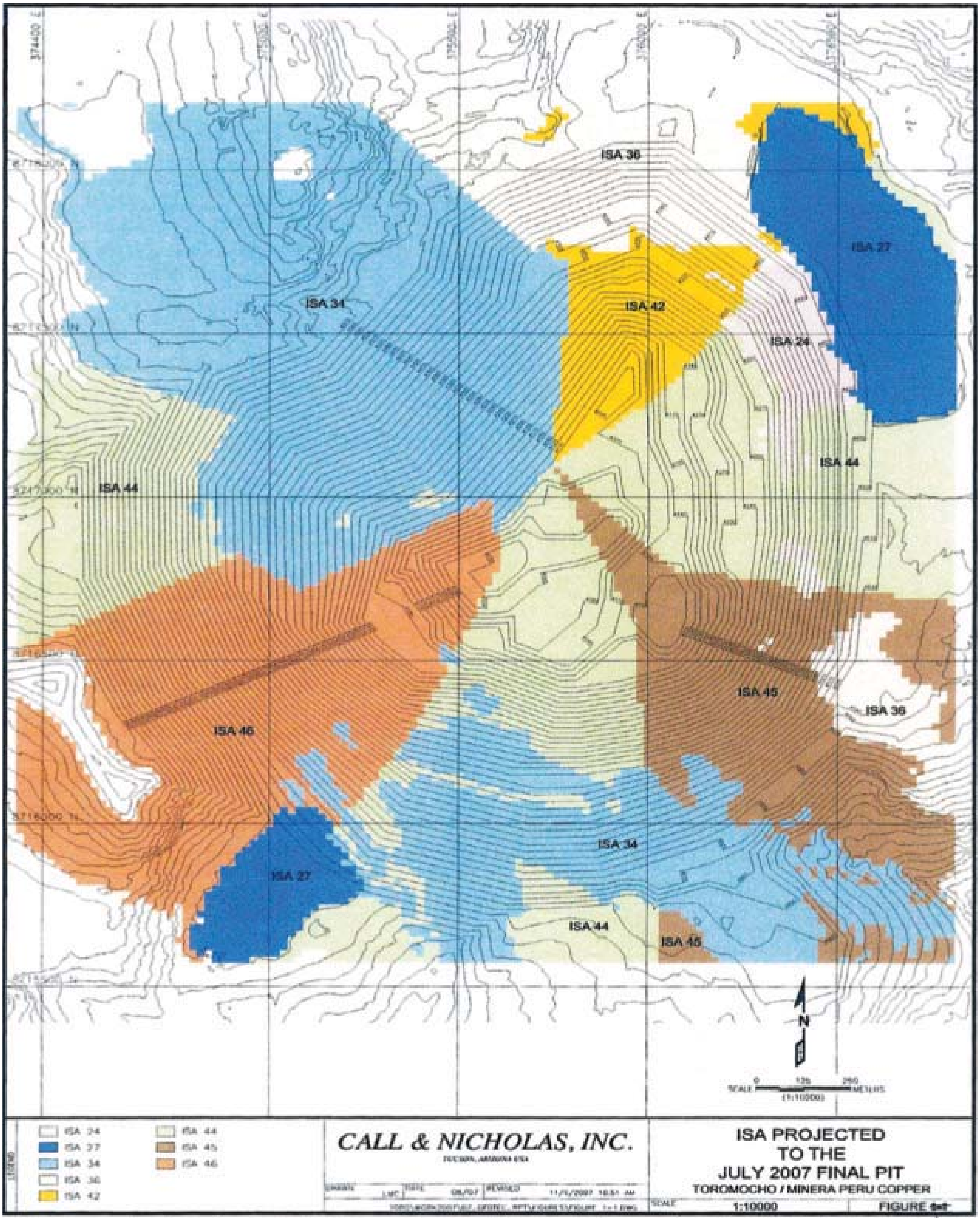

Figure 8.3. **ISA projected to the July 2007 final pit plan**

Source: Call & Nicholas, Inc., Appendix F, November 2007

8.1.9 Slope Stability Analyses

Slope-stability analyses were performed to evaluate multiple-bench and overall slope stability, and the appropriate catch-bench design. Rock-mass strength values were calculated based on laboratory rock-strengths and ranges of RQD. The multiple-bench and overall stability was evaluated using Spencer's Method of Slices in the Slope/W stability analysis program. To determine if the multiple-bench and overall slope angles resulted in adequate catch-bench widths in the intrusive, a catch-bench analysis based on fractures in the rock, was performed using CNI's Backbreak analysis program. The recommended slope angles in most areas of the pit result from the rock-mass and overall slope analyses that were performed. The slope angles were incorporated into a block model so that as the pit wall changed in position, the mine-planning engineer would have appropriate angles to use.

8.1.10 Recommended Slope Angles

Figure 8.3 and Table 8.1 show the recommended overall/interramp-slope angles for the Toromocho final pit plan. The recommended angles are based on field data collected by CNI in November 2004; geotechnical drilling conducted in 2005 and 2006; RQD and geologic data provided by MPC; and rock-strength testing and slope-stability analyses performed by CNI.

An additional recommendation for designing the final pit walls is for the final wall to be at least 150m from the national highway that runs along the north and northeast side of the pit. This setback will protect the highway, if a pit-wall failure were to occur on the north side of the pit. The planned relocation of the highway will make this a moot point.

TABLE 8.1
OVERALL SLOPE ANGLES (OSA) FOR TOROMOCHO

Rock Type	Sector Name	Sector	OSA (degrees)
Sediment	North	1	36
Sediment	East	2	36
Sediment	South	3	35
Sediment	Southwest	4	46
Sediment	West	5	34
Igneous	North	1	42
Igneous	East	2	44
Igneous	Southeast	3	45
Igneous	South	4	44
Igneous	Southwest 1	5	46
Igneous	Southwest 2	6	46
Igneous	Southwest 3	7	34
Igneous	West	8	44
Igneous	Northwest	9	34
Igneous	Skarn-Volcanic Contact	N/A	24
Sediment	Lake Sediments and Tailings	N/A	27

CNI is currently updating its slope angle recommendations based on drilling in 2009 and 2010. The revised slopes are incorporated in the first quarter 2012 update. Behre Dolbear has been advised by MCP that there are plusses and minuses and the impact on reserves and production schedules should not be substantial.

8.2 STOCKPILE AND DUMP STABILITY

CNI provided recommendations on the stability of the proposed waste dump configuration plan and guidance on the placement and long-term stability. Independent Mining Consultants (IMC) of Tucson, Arizona provided the mine plan and the annual waste dump configuration for this study. Knight-Piésold Inc. (KP) of Denver, Colorado and Lima, Peru provided the site geology and subsurface geology and characterizations for this study. As noted previously, each of these consulting firms has a long-term, established reputation as highly qualified in its respective area of expertise. Portions of the following narratives are extracted from:

- CNI's November 2007 report titled "Toromocho Project Waste Dumps and Stockpile Geotechnical Assessment
- Knight Piésold's November 2, 2007 report titled "Toromocho Project Southwest and Southeast Waste Dumps and Low Grade Mill Stockpile Geotechnical Investigation Final Report"

In the final mine design, there are two proposed waste dumps (southwest and southeast) and a low-grade ore stockpile that is located south of the final pit in between the two waste dumps (Figure 8.4). Current mine design calls for approximately 1.6 billion tonnes of waste to be placed into the two waste dumps and 186 Mt to be moved to the low-grade stockpile. The low-grade stockpile will be placed throughout pit construction and will be processed after mining has ended.

CNI proposed 5 drill holes and 11 test pits be completed for the feasibility level investigation. For the detailed engineering stage, or before pre-production, CNI proposed an additional 28 drill holes and 12 test pits be completed to better characterize the waste dump and low-grade stockpile sites, as well as to provide characterization of the reclaimed tailings on the northeast and east side of the proposed pit.

The feasibility study site investigation was carried out by Knight Piésold during June, July, and August 2007, and consisted of drilling 5 HQ-size core holes and constructing 12 test pits to characterize the sub-surface conditions below the waste dumps and low-grade stockpile. The purpose of the site investigations was to estimate the shape of the bedrock surface beneath the dumps and to obtain samples for strength testing of material above bedrock, if necessary.

A seismic refraction survey was completed by Arce Geofisicos of Lima, Peru, as part of this study to help delineate the bedrock profile.

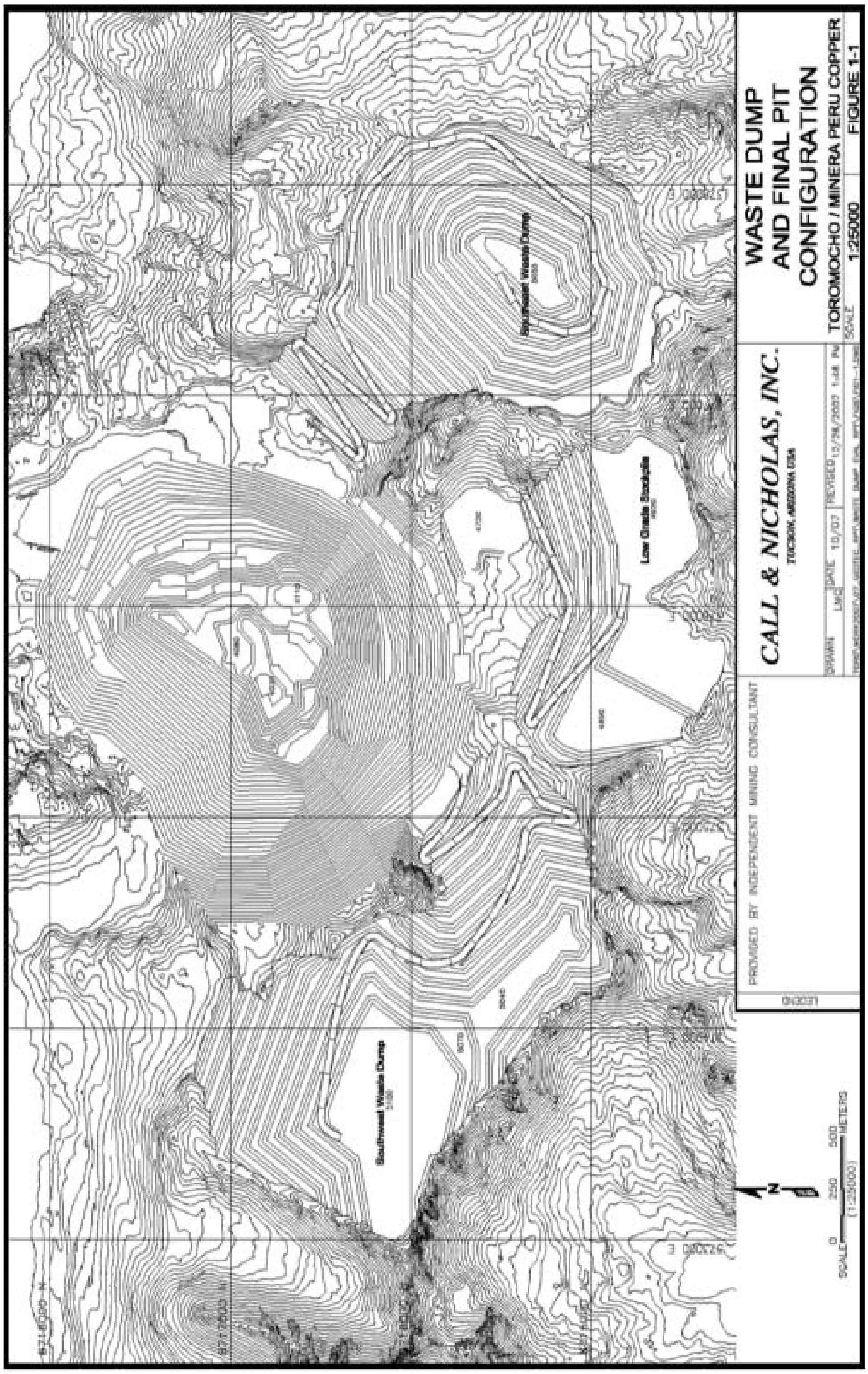

Figure 8.4. Waste dump and final pit configuration
Source: Call & Nicholas, Inc., 2007

Initial recommendations are based on the characteristics of the tested samples and the configuration of the waste dumps and low-grade stockpile, with both the final pit and the existing topography.

It should be noted that the configurations of the waste dumps and the low-grade stockpile are such that the toes of the dumps are very close to the crest of the final pit and, in part, are sloping onto original topography toward the final pit. The foundation of the low-grade stockpile appears, from drill information, to be very close to lying on bedrock. However, the toes of both waste dumps are, in part, on pitward sloping topography that contains fine-grained, unconsolidated sediments. It is these sediments that will control the stability of the waste dump toes.

Both dumps and the low-grade stockpile are to be constructed using a bottom-up construction method. The lift height should not exceed 40m and the overall construction slope angle should be at a 2:1 slope or flatter. The face angle of each lift will be between 36 degrees and 38 degrees. Each lift should be contoured so that water will flow back to the toe of the slope, and it should be graded at 3% to 5% to one side or the other of the edge of the dump and collected.

All dumps need the first lift, or at least part of the first lift, to be able to drain water. In general, this will require rock fill material that is at least 50 MPa in compressive strength with 80% of the material greater than 50 mm, and less than 10% sand-size material.

8.2.1 Southwest Waste Dump

Drilling and test pits have identified a layer of lake sediments and gravels overlaying bedrock in the basin of Buenaventura Lake. The toe of the waste dump is less than 100m from the crest of the final pit. The fine-grained and clayey nature of the sediments that were sampled by drill holes may cause the toe of the waste dump to settle and, possibly could cause the dump to fail along the clay sediments toward the pit.

The lake sediments should be removed and backfilled to provide a stable foundation upon which the toe of the waste dump can be placed. Approximately, 100m to 150m of the lake sediments should be removed and 25m to 50m of clean rock backfill placed so that the toe of the waste dump is lying atop the backfill. This should prevent the waste dump from failing along the lake sediments and give the toe of the dump a stable foundation.

8.2.2 Southeast Waste Dump

The southeast waste dump is similar in configuration to the southwest waste dump. The basin sediments at the toe of the waste dump is over an area that could have pyritic sands. The thickness of these sands could be 20m to 30m based on the seismic measurements. The risk is that the sands will liquefy during an earthquake. To mitigate this problem there are two options:

- Place a layer of rock backfill 15m thick in front of the toe of the dump for 30m to 50m.
- Remove pyritic sands around 30m in front of the toe of the dump and around 20m behind the toe of the dump and replace with rock fill.

Geotechnically, either option will mitigate the possible problem of liquefying sands.

8.2.3 Low-grade Stockpile

Figure 8.4 shows the final configuration of the low-grade stockpile before it is processed at the end of mining. The crusher location is in the area between the toe of the main dump and the pit crest. It is recommended that the low-grade stockpile to be at least 50m from the crusher location. It is also recommended that a diversion structure, approximately 5m in height, be constructed to protect the crusher location, if any sloughing of the stockpile should occur. The barrier should be constructed concave side toward the crusher; the legs of the berm should direct any material from the stockpile out and away from the crusher pocket.

8.2.4 Future Work

Work that must be performed during the detailed engineering is listed below.

- Better define the rock "soil" contact by drilling the detailed engineering proposed holes and using geophysics to help define the bedrock.
- Determine or estimate the in-place density using test pits with a nuclear density gage, core samples, or SPTs of the materials. SPT data is also needed for the earthquake evaluations.
- Additional lab testing to better define soil characterization and shear strengths
- Determine the water level and permeability of the solids.
- Evaluate stability based on earthquake analyses.

8.3 CONCLUSIONS

As noted in Section 8.1, CNI has been an experienced, highly qualified, and reputable supplier of geotechnical and open pit slope design services for decades. Their work on the Toromocho Project for the pit slope angles and stockpile and waste dump designs appears to be thorough, representative, and adequately conservative.

Critical to the Toromocho Project slope stability and operating safety will be strict adherence by the operator to CNI's recommendations for ongoing work and slope, stockpile, and waste dump construction. Also, critical is strict adherence to the proposed slope dewatering program.

8.4 RISK ANALYSIS

8.4.1 Pit Slope Angles — Low to Moderate/Unlikely to Possible

Assessment of the final pit slope angles is an ongoing process. As mining interim pits progresses and knowledge of the relevant structural features and rock strengths are refined, the final pit slope angles will be refined.

It is Behre Dolbear's opinion that the work to determine the final slope angles is thorough and reliable.

The proposed interim pit slope angles appear to be somewhat conservative and the risk is low.

The low RQD index indicates that the risk of random localized slope failures is moderate to high. It will be important for MCP to continuously identify these localized areas of instability and monitor them for the safety of its operators and equipment.

8.4.2 Stockpiles and Waste Dumps — Low to Moderate/Unlikely to Possible

The proximity and orientation of the stockpiles and waste dumps to the open pit make it critical that the proposed additional work and the planned excavation of undesirable materials under the proposed stockpiles and dumps be completed, as planned. The risk is low to moderate, if the work is completed, as proposed, and moderate to high, if it is not.

9.0 MINING

9.1 OVERVIEW

IMC developed a number of model and mine plan iterations over the course of the project period to establish the final mine plan and cost estimate incorporated into the Aker Kvaerner December 2007 feasibility report and reviewed by Behre Dolbear. Those iterations were the basis for determining the best overall approach to the project subject to various project constraints.

The Toromocho deposit will be mined using conventional hard rock open pit methods. The mine will deliver 117,200 tpd (42,778 kt/hr) of sulfide flotation ore to the primary crusher and will generally move 260,274 tpd (95,000 kt/yr) of total material to assure sustained availability of the mill ore.

Multiple iterations of the mine scheduling process were completed to establish the mill cutoff grades and corresponding mill head grades that maximized the project return on investment compared to the mine capital and operating costs required to sustain the release of the planned ore.

Within the schedule, planned cutoff grades were elevated above conventional breakeven cutoff for the first 22 years of the mine's life. The cutoff strategy is the result of substantial effort to maximize project return on investment. The NPV optimization effort compared the benefits of processing and metal sales versus the operating costs plus the required mine capital to develop and operate the mine. Mine equipment capacities were kept in mind during the development of the best economic schedule.

Low grade material that is less than the mill breakeven cutoff grade, but still potentially economic, is stockpiled south of the primary crusher. Lower grade material could be considered for stockpiling, but constraints on low grade and waste storage areas around the mine limit the size of the low-grade stockpile. The low-grade stockpile is remined during years 32 to 36 and delivered to the primary crusher.

There are zones of the Toromocho Project deposit that have elevated arsenic grades in the form of the mineral enargite (Cu_3AsS_4). In order to assure that the concentrate is marketable, high-grade arsenic material is not sent to the plant but is stockpiled. This material is stored permanently and not processed, although process options may exist for this material in the future.

IMC designed 10 phases or push backs as input to the development of a practical mine production schedule. Phases or push backs are practical expansions of a pit that incorporate proper equipment operating room, working geometries, and access roads. To the degree practical, they follow the theoretical economic extraction sequence defined by the floating cones.

Mine equipment has been selected to meet the production requirements of the mine plan. The size and type of mine equipment is consistent with the size of the project. Electric cable shovels with 35.2m^3 dippers are paired with 345-tonne haul trucks to meet the total annual production requirements of 95 to 99 Mt/yr.

Mine personnel requirements were estimated based on the mine plan and mine equipment requirements. Mine personnel includes salaried supervisory and staff personnel and hourly people required to operate and maintain the drilling and blasting, loading, hauling, and mine support activities.

The Mine salaried staff requirements projected in the 2007 Feasibility Study, over the project life, consisted of 56 persons during most of the mine life. Mine hourly personnel requirements build up to 384 personnel in years 18 and 19. Subsequently, in 2010, IMC, in conjunction with MCP's on site management were in the process of increasing personnel in the engineering, supervisory, and training areas. Based on work by IMC, Behre Dolbear's 2011 adjusted operating cost reflects these additions.

The mining capital costs in the third quarter 2010 dollars are estimated to be $303.5 million, including $87.1 million for pre-stripping 55 Mt, and $216.4 million for equipment. The average mine operating costs over the mine life are predicted to be $1.51 per tonne of material mined in third quarter 2010 dollars.

9.2 OPEN PIT PHASES

IMC designed 10 phases or push backs as input to the development of a practical mine production schedule. Phases or push backs are practical expansions of a pit that incorporate proper equipment operating room, working geometries, and access roads. To the degree practical, they follow the theoretical economic extraction sequence defined by the floating cones.

The mine will never look like any single phase until mining is complete. This is because multiple phases are always in operation at any point in time. For example, while ore is produced from Phase 1, waste stripping will be progressing on Phase 2 or even Phase 3 to assure that the ore in those phases is released prior to completion of ore mining in Phase 1.

IMC phase designs at Toromocho are generally wider than 130m due to the large equipment sizes and high productivities that are contemplated for Toromocho. Haul road criteria for the phase designs was:

- Haul Road Gradient 10%
- Haul Road Width 30m (includes ditch and berm)

The slope angles proposed by CNI for the interim and final slopes is discussed in Section 8.0.

The size of Phase 1 was adjusted by IMC until there were roughly 18 to 20 months of ore available in the phase. The intent was to minimize the amount of pre-production stripping but provide sufficient ore for one year plus a 6 months ore cushion in case there are delays advancing to Phase 2. Figure 9.1 illustrates the phase sequence and Table 9.1 summarizes the contained Measured and Indicated mineralization and total material by phase at the approximate breakeven cutoff of $1.75 per tonne net of process.

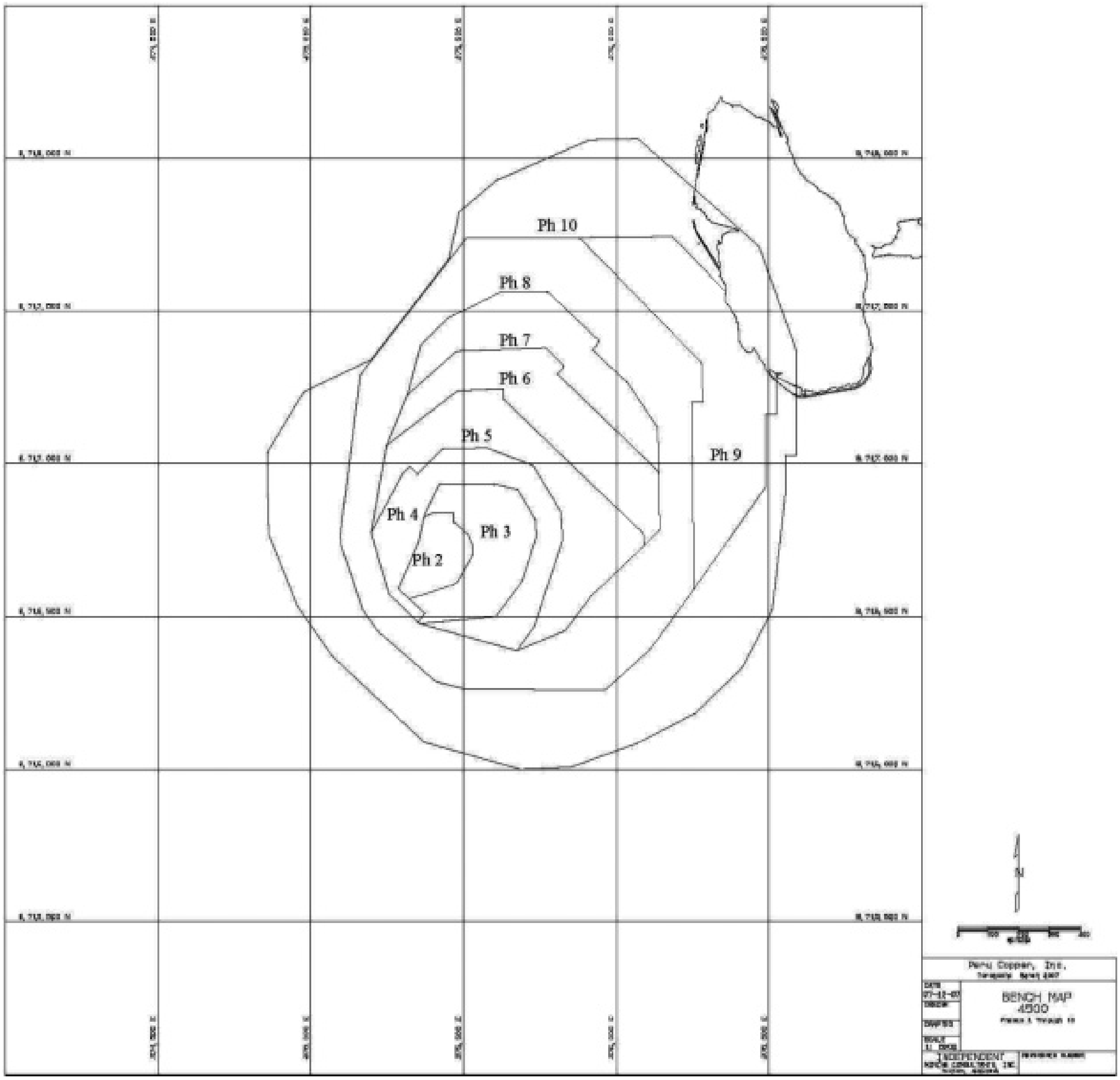

Figure 9.1. All phase designs sliced on the 4500 bench elevation

TABLE 9.1
PHASE DESIGN SUMMARY MILL COST ONLY ECONOMICS — MEASURED AND INDICATED MINERALIZATION ONLY

Phase	Ktonnes	Total Copper%	Molybdenum %	Waste Ktonnes	Total Ktonnes
1	94,894	0.546	0.012	50,358	145,252
2	67,213	0.469	0.016	28,625	95,838
3	120,299	0.532	0.020	26,162	146,461
4	132,630	0.523	0.017	49,798	182,428
5	166,600	0.519	0.014	11,290	177,890
6	117,372	0.482	0.014	13,319	130,691
7	85,057	0.549	0.016	9,868	94,925
8	411,245	0.417	0.020	177,174	588,419
9	88,355	0.465	0.016	63,381	151,736
10	504,730	0.377	0.018	513,161	1,017,891
Total	**1,788,395**	**0.453**	**0.017**	**943,136**	**2,731,531**

Note:

Phase 1 rejects high arsenic ore at 1.1% arsenic in concentrate
No other arsenic or zinc rejects in other phases
Net of Process = NSR — Estimated Process Cost

Source: IMC, November 2007 Report, Appendix E, Table 6-1

9.3 PRODUCTION SCHEDULE

The 2007 Feasibility Study mine production schedule was developed to deliver 42,778,000 tonnes of mill ore per year (117,200 tpd) to the primary crusher and process plant. Sufficient waste mining is scheduled to assure sustained release of the required mill ore throughout the mine's life. Table 9.2 summarizes Behre Dolbear's schedule for the Toromocho Project ITR as adjusted for mining losses and dilution per the discussion in Section 7.7.

TABLE 9.2
BEHRE DOLBEAR PRODUCTION ESTIMATE INCLUDING 2% MINING LOSSES AND 3% DILUTION

	Mill Ore						Stockpile						High As Stockpile					
	Ktonnes	Tot Cu%	Moly %	Silver gm/t	Zinc in Con%	Arsenic in Con%	Ktonnes	Tot Cu%	Moly %	Silver gm/t	Zinc in Con%	Arsenic in Con%	Ktonnes	Tot Cu%	As+Cn Frac	Arsenic in Con%	Waste Ktonnes	Total Material Ktonnes
Prep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,600	4,600
Prep	20	0.556	0.007	8.202	0.33	0.705	64	0.292	0.011	14.989	2.41	1.23	385	0.603	73.20%	6.31	20,181	20,650
Prep	960	0.482	0.010	11.785	0.696	0.846	1,144	0.281	0.012	16.173	2.61	1.55	3,534	0.500	72.50%	3.30	19,112	24,750
Yr1 Q1	6,397	0.526	0.010	7.377	2.562	0.388	2,641	0.340	0.008	6.979	5.22	0.37	6,773	0.433	67.10%	1.40	8,940	24,750
Yr1 Q2	10,256	0.558	0.011	6.581	2.549	0.346	4,368	0.347	0.009	5.290	3.46	0.27	4,958	0.616	62.40%	2.91	5,169	24,750
Yr1 Q3	10,796	0.586	0.013	6.620	2.477	0.25	2,681	0.355	0.010	6.086	3.85	0.31	3,754	0.805	55.60%	4.59	7,520	24,750
Yr1 Q4	10,796	0.649	0.015	9.076	2.281	0.25	1,655	0.324	0.012	6.814	2.97	0.39	1,967	0.782	52.10%	2.27	10,332	24,750
2	43,180	0.595	0.016	7.338	2.921	0.346	12,686	0.329	0.012	5.183	5.82	0.31	1,881	0.468	62.60%	3.30	37,253	95,000
3	43,180	0.595	0.020	7.533	4.386	0.326	12,954	0.344	0.012	5.018	6.61	0.31	27	0.453	58.20%	3.15	38,839	95,000
4	43,180	0.625	0.021	6.455	2.25	0.367	11,671	0.355	0.009	5.251	4.19	0.27	1,360	0.264	72.80%	0.70	38,789	95,000
5	43,180	0.609	0.011	9.901	3.96	0.367	18,443	0.380	0.006	5.649	6.97	0.20	506	0.423	54.50%	51.72	32,871	95,000
6	43,180	0.618	0.017	7.193	4.511	0.232	23,739	0.378	0.006	5.863	10.39	0.15	606	0.398	49.20%	42.47	27,475	95,000
7	43,180	0.605	0.016	7.232	4.489	0.41	32,075	0.400	0.007	6.270	8.28	0.37	448	0.450	46.10%	35.63	19,297	95,000
8	43,180	0.588	0.018	6.494	4.768	0.25	19,932	0.379	0.008	5.795	7.98	0.17	37	0.626	37.40%	14.97	31,851	95,000
9	43,180	0.605	0.028	5.377	2.849	0.166	6,048	0.367	0.008	7.183	9.04	0.37	1,839	0.298	67.90%	0.76	43,933	95,000
10	43,180	0.584	0.024	5.843	3.283	0.151	10,901	0.372	0.007	5.921	7.32	0.33	480	0.376	66.40%	1.81	40,439	95,000
11	43,180	0.561	0.023	6.804	4.01	0.268	13,782	0.359	0.009	6.008	8.02	0.35	21	1.212	65.50%	15.24	38,017	95,000
12	43,180	0.551	0.018	8.105	4.736	0.306	4,171	0.310	0.009	5.707	9.00	0.22					47,649	95,000
13	43,180	0.533	0.022	7.144	4.591	0.215											51,820	95,000
14	43,180	0.468	0.012	8.571	7.806	0.326	903	0.317	0.008	5.018	9.38	0.09					50,916	95,000
15	43,180	0.447	0.016	6.367	6.351	0.25	837	0.326	0.008	4.882	6.71	0.22	66	0.275	68.70%	0.03	50,917	95,000
16	43,180	0.482	0.019	6.668	4.514	0.346	1,760	0.332	0.007	4.513	4.63	0.11	167	1.833	70.40%	36.15	49,892	95,000
17	43,180	0.457	0.021	5.193	4.272	0.166	997	0.311	0.009	4.756	5.33	0.25	911	0.557	64.00%	6.57	49,912	95,000
18	43,180	0.485	0.022	8.057	4.673	0.123	833	0.321	0.010	5.406	7.38	0.50	25	0.656	53.10%	9.42	50,962	95,000
19	43,180	0.541	0.025	7.562	4.794	0.151	1,281	0.307	0.009	7.086	8.10	0.53					50,539	95,000
20	43,180	0.469	0.029	6.562	4.453	0.151	1,376	0.311	0.009	6.581	11.79	0.41					50,444	95,000
21	43,180	0.407	0.030	6.057	3.389	0.073	1,101	0.299	0.011	5.455	16.23	0.14					50,719	95,000
22	43,180	0.340	0.027	9.183	5.487	0.097											48,025	91,205
23	43,180	0.388	0.010	6.057	8.651	0.123											36,505	79,685
24	43,180	0.377	0.011	6.435	8.619	0.123											25,883	69,063
25	43,180	0.374	0.013	5.766	7.561	0.097											21,752	64,932
26	43,180	0.402	0.016	5.474	5.768	0.085											18,981	62,161
27	43,180	0.399	0.018	4.979	5.054	0.073											19,880	63,060
28	43,180	0.442	0.022	7.270	4.039	0.123											13,230	56,410
29	43,180	0.424	0.025	7.581	2.971	0.053											10,488	53,668
30	43,180	0.372	0.029	6.232	2.458	0.053											9,652	52,832
31	43,180	0.281	0.033	9.872	3.856	0.02											14,187	57,367
32	17,715	0.166	0.040	6.833	5.335	0.02											14,432	32,147
Totals	**1,352,342**	**0.486**	**0.020**	**6.991**			**188,041**	**0.366**	**0.008**	**5.877**	**7.531**	**0.28**	**29,745**				**1,161,402**	**2,731,530**

Adjusted for 2% mining losses and 3% dilution at the average waste grade of 0.222% Cu, 0.007% Mo and 5.95 g Ag/t

Within the schedule, planned cutoff grades were elevated above conventional breakeven cutoff for the first 22 years of the mine's life. The cutoff strategy is the result of substantial effort to maximize project return on investment. The NPV optimization effort compared the benefits of processing and metal sales versus the operating costs plus the required mine capital to develop and operate the mine. Mine equipment capacities were kept in mind during the development of the best economic schedule.

This mine plan and schedule develops 29.7 Mt of high-arsenic material that is stockpiled and not processed within this plan. The high-arsenic material incorporates a sufficiently high penalty during smelting that it is likely not marketable in concentrate. The high-arsenic stockpile is currently stored for the mine life and not processed. Process alternatives for this material will be considered in the future. The schedule on Table 9.2 is based on the reject of material with greater than 1.10% arsenic in concentrate from Phase 1. The resulting rejected material is included in the high-arsenic stockpile material. No further arsenic grade reject was required in the remaining Phases 2 through 10. Material reject from Phases 2 through 10 was based on the net economics of that material being sufficiently low (due to calculated arsenic penalties) that it did not make mill process cutoff grade for the time period.

9.4 ROADS, STOCKPILES, AND WASTE DUMPS

The waste and low-grade storage facilities surround the mine on the southeast, south, and west sides. No material stockpiles are planned for the north or east sides of the pit (see Figure 8.4).

Early in pre-production, waste material is used to build the flat area on the 4,720m elevation directly east of the primary crusher location. This flat area will be used for storage of the mill ore encountered during pre-production and will be used throughout the mine life for minor tonnage of run-of-mine stockpile, as required.

The remaining waste is stored in the southwest and southeast waste storage areas throughout the mine life. Allocation to each storage area is based on the available mine road exit and shortest haul in each time period.

High-arsenic material is stored in two places:

- Adjacent to the southwest waste storage and just west of the conveyor belt location
- In the western limb of the bottom of the low grade stockpile

The low-grade stockpile is located south of the primary crusher and over dumps the high arsenic stockpile starting in year 1. About 14 Mt of high arsenic material are stored below the low-grade stockpile. A component of this material would be accessible during the mine life, but the remaining portion would not be accessible until after the low-grade stockpile is remined and delivered to the crusher. The western component of the high-arsenic stockpile is accessible throughout the mine life (15 Mt).

Waste storage areas are prepared prior to material placement by removing all surface (alluvial) materials down to bedrock for the first 100m of the toe area of the storage area, as described in

Section 8.0. Waste storage areas are recontoured as lifts are completed as part of an on-going reclamation program. Topsoil (alluvium) is spread over the recontoured slopes.

The low-grade stockpile is stacked from the bottom up at 2 to 1 overall slope (26.5 degrees). The low grade stockpile is not permanent and recontouring will not be required.

9.5 EQUIPMENT SELECTION AND REQUIREMENTS

Mine equipment has been selected to meet the production requirements of the mine plan presented in Table 9.2. The size and type of the mine equipment is consistent with the size of the project. Electric cable shovels, with 35.2m^3 dippers are paired with 345-tonne haul trucks to meet the total annual production requirements of 95 to 99 Mt/yr.

A summary of major mine equipment for the project is provided in Table 9.3.

The mine equipment is required to complete the following duties on site.

- Pioneer and construct roads to the mine area, and from the mine area to the crusher, stockpiles, and waste storage areas.
- Complete pre-production development of the mine prior to ore production.
- Drill, blast, load, and haul ore to the crusher, low-grade to the stockpiles, and waste to the waste storage areas throughout the planned mine life.
- Remine the low-grade stockpile and deliver to the crusher during years 32 to 36.
- Maintain all mine work areas, in-pit haul roads, and ex-pit haul roads. Waste and stockpile storage areas will also be maintained by mine equipment.
- Removal of alluvial material from the dump toes prior to construction of the waste and low-grade storage areas.
- Remove surface (alluvial) material from the mine area to a stockpile located east-northeast of the mine.
- Recontour the mine waste storage areas concurrently during the mine life, as part of the on-going reclamation.
- Remine and spread the stockpiled surface (alluvial) material over the recontoured areas of the waste storage, as part of the on-going reclamation.
- Construct minor drainage structures associated with the mine, *i.e.*, drain ditches in and around the mine and dumps.

The major mining equipment selected by MCP is of the highest worldwide quality including Caterpillar (CAT) mining equipment, Bucyrus electrical shovels (recently purchased by CAT), LeTourneau wheel loaders, and Atlas Copco drills.

TABLE 9.3
MAJOR MINE EQUIPMENT ON SITE
Mine Major Equipment Fleet On Hand, Pre-production through Year 9

Equipment Type	Pre-production				Year 1				Years							
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2	3	4	5	6	7	8	9
Blast Hole Drill (125,000 lb pull down)	0	1	2	3	3	3	3	3	3	3	3	3	3	3	3	3
Cable Shovel (35.2m^3)	0	1	2	3	3	3	3	3	3	3	3	3	3	3	3	3
Wheel Loader (17m^3)	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Haul Truck (345 tonnes)	0	8	17	22	22	22	22	22	22	22	28	28	31	35	35	35
Track Dozer (580 horsepower)	3	5	6	6	7	7	7	7	7	7	7	7	7	7	7	7
Wheel Dozer (354 horsepower)	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4
Motor Grader (7.3m)	2	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4
Water Truck (90,000 liters)	1	2	3	4	4	4	4	4	4	4	4	4	4	4	4	4
Wheel Loader (11.5m^3)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Auxiliary Haul Truck (90 tonnes)	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5
Auxiliary Rock Drill, IR ECM 780	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Auxiliary Backhoe (1.6m^3)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total	**15**	**30**	**43**	**53**	**56**	**56**	**56**	**56**	**56**	**56**	**62**	**62**	**65**	**69**	**69**	**69**

Mine Major Equipment Fleet On Hand, Years 10 through 36

Equipment Type	Years														
	10	11	12	13	14	15	16	17	18	19	20	21-25	26-30	31-32	36
Blast Hole Drill (125,000 lb pull down)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Cable Shovel (35.2m^3)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Wheel Loader (17m^3)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Haul Truck (345 tonnes)	35	38	38	39	39	39	40	40	43	43	43	43	32	33	7
Track Dozer (580 horsepower)	7	7	7	7	7	7	7	7	7	7	6	6	5	6	6
Wheel Dozer (354 horsepower)	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Motor Grader (7.3m)	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Water Truck (90,000 liters)	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3
Wheel Loader (11.5m^3)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Auxiliary Haul Truck (90 tonnes)	5	5	5	5	5	5	5	3	3	3	3	3	3	3	3
Auxiliary Rock Drill, IR ECM 780	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Auxiliary Backhoe (1.6m^3)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total	**69**	**72**	**72**	**73**	**73**	**73**	**74**	**72**	**75**	**75**	**74**	**73**	**61**	**63**	**37**

Source: IMC November 2007 Report, Appendix E, Table 8-1

9.5.1 Mine Work Schedule

The mine is planned to work 365 days per years, two shifts per day, with 12 hours per shift. There are 16 shifts per year allowed as lost days due to weather. Consequently, there are 714 shifts per year as the basis for equipment calculation. Three crews are required to meet the shift schedule.

9.5.2 Operating Hours per Shift

Operating time per shift is the time during the shift that the equipment is actually productive. IMC has assumed that there will be 11 hours worked with a standard efficiency of 50 minutes per hour for 550 operating minutes per shift. This term is sometimes referred to as effective time per shift. All equipment productivities in this study are based on 550 operating minutes per shift.

9.5.3 Material Characteristics

The mine material was separated into four basic material types for equipment calculations. The detailed density information stored in the model and utilized in the mine plan tonnage calculations were summarized into the four categories shown in Table 9.4. Swell factors and moisture contents for productivity calculations are shown in Table 9.4.

TABLE 9.4
MATERIAL CHARACTERISTICS FOR EQUIPMENT CALCULATIONS

Parameter	Ore	Low Grade and High Arsenic	Non-Cap Waste	Lch-Cap Waste
Dry Bank Density (Mt/m^3)	2.530	2.530	2.517	2.387
Material Handling Swell	35.0%	35.0%	35.0%	35.0%
Moisture Content	2.5%	2.5%	2.5%	2.5%
Dry Loose Density (Mt/m^3)	1.87	1.87	1.86	1.77
Wet Loose Density (Mt/m^3)	1.92	1.92	1.91	1.81

All equipment productivities are reported in dry tonnes. The appropriate moisture content and swell factors have been applied, but the final productivity is reported in terms of dry in-situ-tonnes. This approach is used so that there is a direct match between the mine plan reported in dry tonnes and the equipment production capacity in dry tonnes per shift.

The typical maximum values for availability and use of availability are based on typical experience at other operating mines for this type of equipment. The maximum values established by IMC are shown in Table 9.5.

TABLE 9.5
AVAILABILITY AND UTILIZATION FOR MAJOR MINE EQUIPMENT

Equipment Type	Mechanical Availability	Use of Availability	Utilization for Planning
Blast Hole Drill (125,000 lb pull down)	0.85	0.85	0.723
Cable Shovel (35.2m³)	0.90	0.90	0.810
Wheel Loader (17m³)	0.85	0.90	0.765
Haul Truck (345 tonnes)	0.85	0.95	0.808
Track Dozer (580 horsepower)	0.85	0.75	0.638
Wheel Dozer (354 horsepower)	0.85	0.75	0.638
Motor Grader (7.3m)	0.85	0.75	0.638
Water Truck (90,000 liters)	0.85	0.75	0.638
Wheel Loader (11.5m³)	0.85	0.75	0.638
Auxiliary Haul Truck (90 tonnes)	0.85	0.75	0.638
Auxiliary Rock Drill, IR ECM 780	0.85	0.75	0.638
Auxiliary Backhoe (1.6m³)	0.85	0.75	0.638

9.5.4 Drilling and Blasting

Blast hole drills are planned to be 125,000 lb pull down (56,700 kt) rotary units that are electrically powered and track mounted. Blast hole bit sizes are planned to be 12.25 inches (31 cm) but larger bits can be configured to drills in this class.

The estimated drill shift productivity was developed based on the following assumptions.

- All of the material in the pit will require blasting.
- Mining will occur on 15m benches.
- A sub-grade of 3m has been utilized.
- A powder factor of 0.12 kg/t has been estimated based on the highly fractured and low RQD character of the Toromocho rock mass.
- A drill hole spacing of about 10.4m was set based on typical applications with 15m bench heights.
- Three drills are sufficient for the mine life with one drill assigned to work with each cable shovel in the pit.

9.5.5 Loading

The primary loading fleet is planned as three 35.2m³ cable shovels. A large front-end loader with a 40m³ dipper is provided for loading functions in the pit (see Section 16.1.3). The loader will be used for clean up within the pit and also provides support when the crusher must be fed from the stockpile. In most years of the mine plan, the shovels are planned to load 90% of the total material and the loader will load 10% of the total material from the mine. During years 7, 9, and 10, the loader will handle 4%, 8%, and 8%, respectively of the total material. These adjustments were made to maintain a consistent mine loading fleet.

9.5.6 Hauling

Rigid frame haul trucks of the 345-tonne class are planned for use at the Toromocho Project. Haul truck productivity was calculated based on detailed haul time simulation.

IMC measured a number of haul profiles for each period of the mine life. Profiles were measured to each of the following destinations from each pushback, in each time period.

- Crusher
- Low-grade stockpiles
- High-arsenic stockpile
- Southwest waste storage
- Southeast waste storage

In total there were 298 haul profiles measured for the 36-year project life. IMC used a haul time simulation program to calculate the truck speeds, haul time, and productivity for the 345-tonne trucks over a 12-hour shift. The downhill speed limits were based on IMC's observations of the conservative speeds used at a number of large open pit operations.

9.5.7 Major Auxiliary Equipment

Auxiliary equipment is those units that maintain the mine in good working order so that the drilling, loading, and hauling equipment can work safely and efficiently. Many of the requirements for auxiliary equipment are based on experience and judgment regarding the amount of equipment required.

The auxiliary equipment selected for the Toromocho Project is as follows.

- Track Dozer (580 horsepower)
- Wheel Dozers (354 horsepower)
- Mold Board Grader (7.3m)
- Water Truck (90,000 liters)
- Front-end Loader (11.5m^3)
- Haul Truck (90 tonnes)
- Rock Drill (secondary and support)
- Backhoe Excavator (1.6m^3)

The track dozers will be used for pioneering, road construction, and dump maintenance. Some work will be performed around the loading units as well. Typically, seven units are required. The track dozers will be used in the development of pre-production access and removal of surface alluvial material in the mine and waste storage areas. The waste storage areas will be recontoured by the track dozers as they are completed and the stockpiled surface alluvial material will be spread back on to the waste areas when complete.

The wheel dozers will be used for road clean up, and cleanup around the mine loading units. Some support work will occur on the waste dumps and stockpiles.

Graders will be used primarily for road maintenance. Graders with 7.3m (24 feet) mold boards have been used in this study. Typically, four units are required.

Water trucks of the 90,000 liters (24,000 gallons) capacity will be required throughout the mine life for dust suppression on roads, in the pit, and on dumps. This size of unit is typically mounted on a 90-tonne truck frame like the Caterpillar 77 unit. Typically, 4 units are required.

A front-end loader of the 11.5m^3 class combined with three to five 90-tonne trucks will be used for general clean up and maintenance around the mine. Ditches, roads, berms, etc. will be constructed and maintained with these units. Surface alluvial material will be removed and hauled to stockpile with these units. That material will be remined from the stockpile and hauled back to the waste storage areas to be spread after reclamation. Typically, 1 loader and 3 trucks are required.

A smaller rotary percussion rock drill will be required for secondary blasting, external road pioneering, and wall control drilling. A 1.6m^3 backhoe unit will be utilized for construction of drainage ditches and road maintenance around the mine.

9.6 2011 DEFINITIVE ESTIMATE UPDATE

As part of the 2011 Definitive Estimate Update, IMC re-estimated the Mine's manpower requirements and salaried and hourly labor rates as a function of updating the capital cost for pre-production stripping.

Behre Dolbear's concerns regarding the supervisory, engineering, and training personnel requirements were addressed in the updated estimate. The site senior operating and maintenance personnel provided new insights resulting in IMC increasing the projected salaried personnel in the aforementioned areas. The added costs for these personnel are reflected in the updated mine operating costs discussed in Section 16.1.

Substantitive revisions were as follows:

- Added more salary and hourly personnel per the operations superintendent's direction.
  - Increased the number of operations foremen during the construction period.
  - Six surveyors for LOM
  - Added more mining engineers for six total between senior engineers and mining engineers. The engineers were added to ensure enough manpower for long and short range planning as well as other tasks.

  - Added one more geologist
  - Added more laborers to fill dump spotter positions
- Added more salaried and hourly personnel per the maintenance superintendent's recommendations.
  - Added additional maintenance planners
  - Added salaried staff to the construction period
  - Added light vehicle mechanics earlier in the construction schedule
  - Increased the number of hourly maintenance personnel

9.7 MINE MAINTENANCE AND ANCILLARY FACILITIES

The following mining related maintenance and ancillary facilities and costs are described in Section 12.0.

9.7.1 Mine Truck Shop

The mine truck shop will be located east of the open pit. It will contain four drive-through bays, each with two truck service stations, so that up to eight trucks can be serviced at any one time. Each bay will be 21m wide × 9m long × 21m high. The bays will have vertically lifting doors at both ends. Exhaust fume extraction fans will be provided for each service station. Ventilators for space ventilation will be located on the roof of the building.

Two overhead traveling cranes will be provided for maintenance purposes, each having 35 tonne lift capacity.

The truck shop building will contain lay down areas, an electrical shop, and storage rooms furnished with racks and containers for storage of spare parts. Offices for operating personnel, first aid room, lunchroom, as well as toilet, shower, and change facilities will be located in a separate wing of the building.

A compressor supplying compressed air, complete with air receiver/storage vessels, will be housed in its own enclosure outside the truck shop.

Located outside in a dedicated fenced enclosure will be facilities for tire storage and repair and a tire-mounting machine.

The truck shop building, outside storage facilities and work areas, parking, and open space, otherwise available for truck servicing, will cover an area of 240m × 340m. The area is adequate to house any vendor supplied services, such as tire repair and equipment maintenance. A truck wash station will be located within the confines of this area.

9.7.2 Administration Building

Mining administrative and technical personnel will be located in the whole operation common administrative building described in Section 12.0.

9.7.3 Maintenance Building and Warehouse

Maintenance and warehouse services, other than those provided by the truck shop, will be provided through common shops, including the following, and are described in Section 12.0.

- Welding Shop
- Mechanical Shop
- Machine Shop
- Electrical Shop
- Warehouse

9.7.4 Laboratory

Mine and process plant laboratory services will be provided in the common laboratory described in Section 12.0.

9.7.5 Fueling Stations

Diesel fueling stations will be located near their respective fuel storage tanks in the vicinity of the mine truck shop. Mine haul trucks will be refueled with diesel fuel in the mine pit by a refueling truck.

The fuel storage tanks will be above ground and have berms to contain any spillage of fuel. Diesel fuel will be delivered to the process area site by train and then pumped through an 8 km long pipeline to the diesel storage tank.

9.7.6 Explosives Storage

Explosive storage will be located on the southwest side of the open pit in a secured area.

9.7.7 Camp Facility

A temporary construction camp will be built approximately 12 km to the east of the mine site in the vicinity of the central highway and the second site access road. The camp will initially house construction workers and will be downsized and converted at the end of construction activities to a permanent facility for some administration, mine, and plant operating personnel.

9.7.8 Mine Electric Power Distribution

Overhead 69 kV is distributed from the main substation via four main circuits in a primary selective scheme. Two parallel 69 kV circuits are routed to the concentrator and the other two 69 kV circuits are routed to the mine. Each substation is connected to both 69 kV lines. The system is designed so that one primary circuit can be taken out of service. A failure of one primary source allows the other alternate source to be switched. Both primary feeders are sized to carry full loads. This scheme provides increased reliability with quick restoration of service when a primary feeder has failed, or a transfer has overloaded or faulted.

Two of the 69 kV circuits feed the following:

- Mine loop
- Primary crusher
- Paste tailings
- Conveyor transfer stations 3 through 7

9.8 CONCLUSIONS

The following work to design and/or determine the:

- Mining sequence and annual production schedule
- Location of haul roads, waste dumps, and low-grade ore stockpiles
- Type, availability, productivity, quantity, and cost of major and support equipment
- Manpower requirements and cost
- Maintenance facilities, manpower, and training requirements
- Capital cost for the pre-production requirements and sustaining the operation
- Operating costs and cost per tonne of material mined

As completed by IMC, an experienced and reputable contractor, is professional, thorough, and well presented.

The potential for mining problems has been minimized for the Toromocho Project by the following decisions and factors.

- The ore grade and metallurgy are relatively consistent allowing an orderly mining sequence without excessive equipment moves to accommodate blending for the process plant.
- The stripping ratio is low and consistent preventing random spikes in equipment requirements.
- The high-arsenic ore grade material is being stockpiled separately preventing the need for inefficient ore blending during mining and avoiding concentrate marketing issues.
- The proposed pre-stripping exposes eight months of ore production.

- The ore cutoff grade has been increased for the first 22 years of production to maximize net present value.
- The cutoff grade for leach ore placed in the low-grade ore stockpile is greater than break even due to limitations on land available for stockpiling, thus making the low-grade ore quantity conservative.
- The relative near proximity of Lima and its port and the availability of highway and rail access should minimize the potential for equipment and consumables supply issues.
- The general historic mining culture of the area provides a pool of understanding and supportive residents to both support the existence of the operation and supply personnel to work in the operation.
- Experienced and competent senior supervisory personnel in the operations, engineering, and maintenance areas are on site and are intimately involved in the manning, training, hiring, and general pre-start up activities.

9.9 RISK ANALYSIS

9.9.1 Production

Production planning is thorough and well executed. The equipment selection and quantity is appropriate and sufficient. The projected availabilities and productivities are aggressive and their achievement will depend on a well-run operation and well-trained operators and maintenance personnel — **Low to Moderate Risk/Unlikely to Possible**.

9.9.2 Operating Costs

The Definitive Estimate has resulted in numerous corrections and updates based on input from the recently hired senior mining operations and maintenance personnel. The increases in manpower and equipment were necessary and appropriate. The rapidly increasing salaried and hourly labor rates are an issue and pose some risk for higher costs. The quantity of labor, equipment, and consumables required for the operation are well based and reliable. The costs for these items are in a state of flux and future costs for these items are uncertain — **Moderate Risk/Possible**.

9.9.3 Capital Costs

The Definitive Estimate should be accurate as described and, unless the project implementation schedule slips, is a reliable estimate — **Low to Moderate Risk/Unlikely to Possible**.

10.0 METALLURGY, CONCENTRATOR AND TAILINGS PROCESS, AND PLANT DESIGN

The Aker Kvaerner Feasibility Study was completed in November 2007 based on open pit mining, conventional sulfide copper flotation, copper molybdenum separation, and recovery of chemical grade molybdic oxide (MoO_3) from the copper concentrates. The Study is based on mining and processing approximately 43 Mtpa of ore (117,200 tpd) at an average grade for the project of approximately 0.46% copper, 0.019% molybdenum, and 6.88 g/t silver. Selective mining will, in the first 10 years, result in an average head grade of approximately 0.612% copper, producing around 226,000 tpa of copper together with ±4.0 million ounces of silver. Mo production is expected to run at ±4,000 tpa as MoO_3.

The design criteria for the Toromocho Project concentrator include the following salient process variables:

- Ore Grade — 0.612% copper (First 10 years of project)
- Ore Grade — 0.019% molybdenum (First 10 years of project)
- Mill Tonnage — 117,200 tpd
- Copper Recovery — 87%
- Copper Concentrate Grade — 26.5%
- Molybdenum Recovery to MoO_3 — 65.0%
- Copper Concentrate Moisture — 9.0%

10.1 METALLURGICAL TESTING BASIS

Comprehensive metallurgical testing has been conducted at METCON facilities in Tucson, Arizona, Lakefield Research in Lakefield, Ontario, Canada, and other sub-contractors to METCON. The testing was done on bulk samples from the existing Centromin pit, preserved drill hole core, contemporary core, and composites that were assembled to represent the stages of mine production for the first 10 plus years of the project. In general, the testing was adequate to define the metallurgical design criteria used in the process design, but in Behre Dolbear's view, does not include a sufficient quantity of locked cycle and pilot plant work on fresh samples. This resulted in a severe bias in test results due to marginal copper recoveries due to mineral oxidation.

10.1.1 Mineralogy

The ore contains identifiable quantities of chalcopyrite, digenite (chalcocite) and covellite as the copper mineral species. Molybdenum is present as molybdenite and zinc is present as sphalerite. The predominant non-copper or molybdenum sulfide is pyrite which is abundant and requires significant pH adjustment to depress in the flotation circuits. Gangue minerals include magnetite, quartz, talc, chlorite, biotite/sericite, and amphibole (hornblende). The metallurgical characteristics of the gangue minerals present are troublesome in themselves. The activation of insoluble and talc at other copper/molybdenum separation plants is common but historically has been dealt with by using several methods including concentrate roasting, autoclaving to destroy surface coatings, passivation of activated silica and talc through acid bake techniques, and the recovery of molybdenum through the use of electro-oxidation.

The zinc, present in the ore body as sphalerite (ZnS), is apparently carried within the copper mineralization in what is close to solid solution. (The zinc cannot be liberated from the copper minerals at a practical comminution size.) Inordinately high zinc content in the concentrates may be mitigated by careful blending of high zinc ores. Depression of zinc, through the use of selective reagents, is probably impractical due to the negative effect on copper recovery.

The deposit is a typical porphyry ore body with ore types identified including intrusives (intrusivos) and skarns (tactitas). The two identified ore types behave similarly in processing with the small exception of increased hardness for the skarn ore types.

10.1.2 Sampling

The laboratory and pilot plant data developed for the plant design was based upon drill hole composites that were assembled by the geological staff in order to support copper and molybdenite production values for the various rock types and combinations of each. Composites representing production years were also assembled but no locked cycle testing was accomplished with them. The sampling and compositing was done to a high level and is attributed by Behre Dolbear as having contributed to the high degree of confidence in most of the metallurgical results.

10.2 COPPER

10.2.1 Recovery

The historical and contemporary metallurgical testing included limited single cycle laboratory testing, locked cycle laboratory testing, and pilot plant testing.

Historical metallurgical testing was completed in 1974 and 1976 by Centromin. The work was completed on a bulk sample containing 77% skarn and 23% intrusive ore types. The laboratory locked cycle testing on this composite yielded the following metallurgical results, as shown in Table 10.1.

Pilot plant testing on the bulk sample taken by Centromin in 1974 and conducted in 1975-1976 is summarized in Table 10.2.

TABLE 10.1
TOROMOCHO LOCKED CYCLE LABORATORY TESTING — CENTROMIN

		Head Analysis %						Recovery %				
Product	Wt. %	Cu	Cu N-S	Pb	Zn	Ag (opt)	Mo	Cu	Pb	Zn	Ag	Mo
Head	100.0	0.77	0.04	0.10	0.33	0.71	0.016	100.0	100.0	100.0	100.0	100.0
Concentrate . . .	2.7	23.6		1.7	10.1	16.5	19.0	82.3	46.2	79.1	63.3	55.3
Tailing	97.3	0.14	0.04	0.05	0.06	0.25	0.006	17.7	53.8	20.9	36.7	44.7

TABLE 10.2
PILOT PLANT TESTING — CENTROMIN GRIND AT < 200 MESH TYLER

	Head Analysis %			Concentrate %			Recovery %		
Campaign	Cu	Zn	Ag (opt)	Cu	Zn	Ag (opt)	Cu	Zn	Ag
VII	0.80	0.46	0.96	24.4	16.0	21.3	69.7	82.3	58.5
III	0.77	0.56	1.00	18.7	16.1	20.8	79.5	85.4	67.8
IV	0.98	0.32	0.79	27.7	9.9	15.9	85.1	86.4	68.0
IX	0.49	0.10	0.43	26.1	6.0	14.3	89.7	79.4	64.4

An additional pilot plant was run in 1978 on a composite of Toromocho ores that included the following:

- Skarn 59%
- Intrusive 13%
- Granodiorite 5%
- Mixed Zones 21%

The average results for this pilot plant run are shown in Table 10.3.

TABLE 10.3
PILOT PLANT TESTING — CENTROMIN

	Head Analysis %			Recovery %		
Product	Cu	Zn	Ag (opt)	Cu	Zn	Ag
Head	0.91	0.19	0.60			
Concentrate	25.0	4.8	13.8	84.0	77.5	70.0
Tailing	0.15	0.04	0.18			

In summary, the Centromin pilot plant data indicated an arithmetic average of:

- Head Grade 0.79% copper
- Concentrate 20.92% copper
- Copper Recovery 81.7% copper

Contemporary laboratory tests were primarily rougher flotation single pass tests. The tests were used to determine flotation kinetics, grind requirements, reagent suites, and flow sheet adaptations. No locked cycle tests were run on annual mine composites due to sample oxidation.[1] Locked cycle tests were run on the ore type composites and summarized in Table 10.4.

1 Minerals Advisory Group, "Metallurgical Summary Report," Section 3.0, Page 9, September 1978

Table 10.4
Locked Cycle Tests by Ore Type — Metcon

Ore Type	Calculated Head % Cu	Calculated Head Ag g/t	Calculated Head Mo	Final Concentrate Cu %	Final Concentrate Ag g/t	Final Concentrate Mo %	Final Concentrate Insol %	Recovery (%) Cu	Recovery (%) Ag	Recovery (%) Mo
Intrusive Breccia Soluble > 20%	0.62	4.4	0.016	25.99	142.9	0.493	7.24	89.46	69.55	67.28
Intrusive Soluble > 20%	0.60	8.8	0.014	26.62	269.8	0.391	12.82	88.20	60.64	56.85
Intrusive Soluble < 20%	0.57	6.9	0.036	24.03	171.9	0.047	18.46	92.13	54.61	
Skarn Breccia Soluble > 20%	0.54	5.5	0.011	27.03	169.9	0.043	22.48	76.52	47.85	
Skarn Breccia Soluble < 20%	0.57	7.5	0.027	29.86	220.9	0.104	5.59	88.85	49.98	
Skarn Soluble < 20%	0.57	8.3	0.014	27.07	220.6	0.025	8.35	84.04	58.60	
Skarn Soluble > 20%	0.65	7.3	0.009	27.51	226.6	0.012	7.28	80.04	46.69	
Arithmetic Average	0.59	6.96	0.020	26.87	203.2		11.75	86.03	55.42	

A contemporary pilot plant has been run at Lakefield Research, on a bulk sample taken from the Centromin pit. The purpose of the test was to obtain sufficient sample to operate a small pilot plant testing the molybdenum hydrometallurgical plant. Results for copper recovery were marginal due to the oxidized nature of the sample. The results are illustrated in Table 10.5.

Table 10.5
SGS Lakefield Pilot Plant Run

Flow Sheet	Product	Wt. %	Grade Total Cu %	Grade N-S Copper %	Grade Mo %	Recovery Cu %	Recovery Mo %
Standard Flow Sheet	Flotation Feed	100.0	0.59	0.12	0.014	100.0	100.0
	Cu Third Cleaner Concentrate	2.3	25.50		0.65	62.8	65.7
	Cu/Mo First Cleaner Scavenger Tail	8.2	0.29		0.007	7.4	7.2
	Cu/Mo Rougher Tail	89.0	0.21		0.005	30.1	27.2

The Centromin milling operations have been discounted in the feasibility study due to the simplicity of the flow sheet, the lack of a molybdenum recovery circuit, and the absence of a concentrate regrind circuit. A review of the historical pilot plant and lock cycle testing work, coupled with the contemporary work at METCON and Lakefield, would seem to reinforce the copper recovery within a range of 80% to 88%. Behre Dolbear's opinion is that the copper recovery is optimistic at 87% and used a more conservative 85% in the economic analysis. Frequently, large copper concentrators will start up and achieve copper recoveries in excess of those expected from laboratory and pilot plant testing. In this case, the lack of contemporary laboratory locked cycle testing and pilot plant results obtained from fresh representative ore samples led Behre Dolbear to recommend a copper recovery lower than design criteria. There is a distinct possibility the full-scale milling operations may result in achieving copper recoveries at or very near the design criteria.

10.2.2 Copper Concentrate Grade

The copper concentrate grade is included in the design criteria at 26.0% copper. The historical and contemporary test work indicates copper concentrates in the range of from 18.7% to 30.0% copper.

The concentrate grade appears to be a function of the amount of activated insol and pyrite rimmed with digenite occurring in the ore body. All of the final concentrates produced in the locked cycle and pilot plant testing had relatively high insol percentages in the final concentrate. These percentages ranged from 5.7% to 23%. Smelters will view the insol percentages above 10% as making the concentrates refractory and may introduce penalties for high insol levels. Behre Dolbear regards this as a moderate risk to the success of the Toromocho Project.

Arsenic-bearing ores are planned for stockpiling with the resulting arsenic values in the concentrates being below penalty limits. The zinc contamination in the concentrates may trigger penalties, if blending does not reduce the quantities of zinc in the feed.

In a similar vein, the silver recovery of 84.4%, as shown in Section 20.0 — Economic Analysis of the Aker-Kvaerner 2007 Feasibility Study, appears overly optimistic. A review of all pilot plant and locked cycle testing, where silver head grades and recoveries were published, confirms that all testing was done to optimize either copper or molybdenum. No apparent efforts were made to optimize silver recoveries.

The available pilot plant results from Centromin include results for silver and these tests demonstrated silver recoveries at or near 70%, albeit on ores with significantly higher head grades than shown in the current mine plan. The metallurgical results are illustrated in Table 10.6.

TABLE 10.6
SILVER RECOVERY RESULTS[1]

Laboratory	Test Type	Ore Type	Ag Head Grade (opt)	Ag Concentrate Grade (opt)	Ag Recovery (%)
	Locked Cycle	Not Given	0.71	16.5	63.3
	Pilot Plant VII	Not Given	0.96	21.3	58.5
	Pilot Plant VIII	Not Given	1.00	20.8	67.8
Centromin	Pilot Plant IV	Not Given	0.79	15.9	68.0
	Pilot Plant IX	Not Given	0.43	14.3	64.4
	1978	Not Given	0.60	13.8	70.0
	Locked Cycle	Intrusive Breccia	0.14	4.6	69.55
	Locked Cycle	Intrusive	0.28	8.7	60.64
	Locked Cycle	Intrusive	0.22	5.7	54.61
METCON	Locked Cycle	Skarn Breccia	0.18	5.6	47.85
	Locked Cycle	Skarn Breccia	0.24	7.1	49.98
	Locked Cycle	Skarn	0.27	7.1	58.60
	Locked Cycle	Skarn	0.23	7.5	46.69
	Arithmetic Average		0.22	6.8	55.42

1 The statistical analysis was run on 13 data points representing a wide range of ore samples and grades

The historic pilot plant and locked cycle testing can be expected to be improved in actual plant practice with the advent of continuous operations and attention to improving precious metals recovery. On this basis Behre Dolbear recommends the use of a 70% silver recovery which is a reduction from the feasibility study recommendation and optimistic given the body of metallurgical testing to date.

10.3 MOLYBDENUM

10.3.1 Recovery

The Toromocho ore body contains economic quantities of molybdenum. Conventional copper/molybdenum separation techniques do not result in the production of marketable grades for molybdenite concentrates. In order to improve molybdenite recoveries and produce marketable molybdenum products, a hydrometallurgical/pressure oxidation circuit has been proposed for the plant.

Molybdenite will be separated from low-grade copper/molybdenum concentrate by pressure autoclave conditioning to solubilize the copper and molybdenum and produce copper from a solvent extraction/electro winning (SX/EW) circuit (this copper is not included in the financial analysis) and the production of MoO_3 as a final product. With 66% recovery in the copper concentrator and 95% recovery in the hydrometallurgical facility, the overall molybdenum recovery will average at approximately 65% as MoO_3.

The molybdenum recovery plant does not mimic the patented Rio Tinto facility at Kennecott Utah Copper operations in Salt Lake City, Utah but is similar in concept. Current plans at Rio Tinto call for a start up of the facility in 2013. It is probable that Rio Tinto is looking at a 2-year start up period after almost 20 years of testing and evaluation. The circuit at the Toromocho Project is different from the Rio Tinto circuit (sufficient to escape patent infringement) and is quite similar to conventional pure oxide production at the Fort Madison facility of Freeport McMoran once the molybdenum is solubilized and copper is removed with SX/EW.

The molybdenite recovery numbers for concentrating are low risk, but the successful start up of the hydrometallurgical facility is a high-risk venture and could take well over 2 years. McNulty & Associates published a technical study indicating that high pressure oxidation and recovery of metals, such as copper, nickel, and probably molybdenum, could require start up periods in excess of 5 years.

Concentrate grade within the concentrator circuits are expected to average 15% to 20% molybdenum for the product fed to the autoclaves in the pressure oxidation/hydrometallurgical facility. This level of recovery is a function of mass pull in the plant and is readily achievable. The hydrometallurgical facility is designed at approximately 95% molybdenum recovery. This could be as high as 98% given the experience at Freeport McMoran plants. Possible failures in the hydrometallurgical facility will probably not result from the autoclave circuit, but could result from design oversights in the slurry handling, slurry rheology, filtration, thickening, heat recovery systems, etc.

A similar application of pressure oxidation by Climax Molybdenum in the 1970s resulted in the destruction of the USAF high pressure autoclave at Tullahoma, Tennessee. Failure was attributed to marginal choke design, lack of understanding of slurry rheology, and the inability to handle the large volumes of elemental sulfur produced in the pressure oxidation step. Climax Molybdenum has not, to Behre Dolbear's knowledge, returned to this technology even in the face of several mines with similar metallurgical requirements.

10.3.2 Molybdenite Concentrate Grade

Given the successful application of the pressure oxidation/hydrometallurgical plant, the Toromocho Project molybdenum operations will not produce concentrates. The product will be essentially high purity MoO_3.

This is a moderate risk task. Pure oxide (MoO3) should warrant a premium price but this is not discussed in the marketing analysis. The marketing study included in the 2007 Feasibility Study, priced molybdenum as tech grade MoO_3 or tech oxide. The hydrometallurgical molybdenum facility will produce high purity MoO_3 or chemical grade moly oxide. This product will command a premium in the market and is likely not priced properly in the study.

10.4 MINERAL PROCESSING FACILITIES

The concentrator is of conventional design and was designed to handle 146,500 mtpd with a nominal operating rate of approximately 117,200 tpd. The crushing, grinding, stockpile, SAG mill grinding, ball mill grinding, classification, flotation, dewatering, filtration, and tailings disposal are well conceived and standard for the industry. The flow sheets, P&IDs, and basic engineering package are complete and can be used to bring the level of accuracy of capital cost estimation to the level of ±15%. A major amount of large milling equipment is at the site and in controlled storage that will make for minimal delays in logistics for the construction period of the mill. Certain capital items in the process plant were sized or designed to substantially reduce the cost to expand the throughput to 148,000 tpd in the future, if so desired.

The chosen tailings deposition system is being designed by Golder & Associates. The system envisions the production of 55% solids tailings at the concentrator for transport to five "new generation" paste thickeners at the tailings impoundment. The paste thickeners will thicken to a slurry in excess of 69% solids for deposition in thin layers on the tailings impoundment by spigoting on the periphery. The large 40m diameter thickeners represent a major departure from current levels of technology. The installation of units with an unsubstantiated operating record must be regarded as high risk. On a short term basis, the tailings impoundments can take normal tailings (50% to 60% solids) into the maintenance dump area. Over the long term, deposition of normal tailings would result in running out of tailings deposition room.

The hydrometallurgical/pressure oxidation plant has been reviewed and no obvious design flaws are apparent. The lack of operating history for the plant and the lack of bench marking plants internationally makes for a high-risk application. To Behre Dolbear's knowledge, no investigation into the autoclaving of copper/molybdenum concentrates, acid bake flotation of silica and talc, or electro-oxidation of low grade concentrates has been made. The process flow sheets for the molybdenum production facility are reasonable and will, in all probability work, given the successful adaptation of the design to very unconventional hydrometallurgical products.

10.5 FINAL PRODUCT QUALITY

10.5.1 Copper

The final copper concentrates are expected to average at approximately 26.5% copper. Given the test results, this is supportable. The complete analysis of copper concentrates, as expected from production, is not detailed in the plethora of metallurgical tests available for review.

The concentrates will probably contain, in addition to copper and molybdenum, the following critical elements:

- Arsenic ≈0.08% (dependent on ore segregation to lower arsenic values in the feed)
- Zinc ≈9.0% (Behre Dolbear observation from majority of testing performed)
- Insol (silica) ≈9%
- Silver ≈256 g/t (Behre Dolbear analysis of metallurgical testing results)
- Moisture <9.0% H_2O

The marketing study assigned a zinc assay of 2.89% to the copper concentrates. Behre Dolbear feels that this is a bit unrealistic and has assigned a value of 9%. Also, no testing for concentrate flow moisture is apparent in the literature forwarded by Aker, the marketing consultant or MCP.

The production of marketable copper concentrate grades is regarded as low to moderate risk.

10.5.2 Molybdenum

The final product from the Toromocho hydrometallurgical plant will be high purity molybdenum oxide or chemical grade moly oxide. The molybdenum is priced in the marketing study at a recommended $12/lb molybdenum as contained in tech grade moly oxide. The molybdenum price should include the premium for producing the higher value product (pure molybdic oxide). Due to the opacity of the molybdenum market, no current chemical grade MoO_3 pricing is readily available.

10.6 CONCLUSIONS

Composites representing production years were assembled, but no locked cycle testing was accomplished with them. The sampling and compositing was done to a high level and is attributed by Behre Dolbear as having contributed to the high degree of confidence in most of the metallurgical results. A review of the historical pilot plant and lock cycle testing work, coupled with the contemporary work at METCON and Lakefield would seem to reinforce the copper recovery with a range from 80% to 88%.

The molybdenum recovery plant does not mimic the patented Rio Tinto facility at Kennecott Utah Copper operations in Salt Lake City, Utah but is similar in concept. Current plans at Rio Tinto call for a start up of the facility in 2013. It is probable that Rio Tinto is looking at a 2-year start up period after almost 20 years of testing and evaluation. The circuit at Toromocho is different from the Rio Tinto circuit (sufficient to escape patent infringement) and is quite similar to conventional pure oxide production at the Fort Madison facility of Freeport McMoran once the molybdenum is solubilized and copper is removed with SX/EW.

The concentrator is of conventional design and will produce at the rate of approximately 117,200 tpd. The crushing, grinding, stockpile, SAG mill grinding, ball mill grinding, classification, flotation, dewatering, filtration, and tailings disposal are well conceived and standard for the industry. The flow sheets, P&IDs, and basic engineering package are complete and can be used to bring the level of accuracy of capital cost estimation to the level of ±15%. A major amount of large milling equipment is at the site and in controlled storage that will make for minimal delays in logistics for the construction period of the mill.

The process flow sheets for the molybdenum production facility are reasonable and will, in all probability work, given the successful adaptation of the design to very unconventional hydrometallurgical products.

Given the successful application of the pressure oxidation/hydrometallurgical plant, the Toromocho Project molybdenum operations will not produce concentrates. The product will be essentially high purity MoO_3.

10.7 RISK ANALYSIS

- Behre Dolbear's opinion is that the copper recovery is optimistic at 87% and used a slightly lower recovery in the economic analysis. However, large copper concentrators frequently exceed the results of laboratory and pilot plant testing when in actual operation. This reduces the risk to **Low to Moderate Risk/Unlikely to Possible**.

- The final copper concentrates are expected to average approximately 26.5% copper — **Low Risk/Unlikely**.

- Smelters will view the insol percentages above 10% as making the concentrates refractory and may introduce penalties for high insol levels. Behre Dolbear regards this as a risk to the success of the Toromocho Project — **Low to Moderate Risk/Unlikely to Possible**.

- The silver recovery is not backed up by a large number of tests and assays, but instead relies on the Behre Dolbear metallurgist's professional judgment — **Moderate Risk/Unlikely to Possible**.

- The molybdenite recovery numbers for concentrating are low risk, but the successful start up of the hydrometallurgical facility is a **High Risk/Possible** venture and could take well over 2 years. McNulty & Associates published a technical study indicating that high pressure oxidation and recovery of metals, such as copper, nickel, and probably molybdenum, could require start up periods in excess of 5 years.

- The chosen tailings deposition system is being designed by Golder & Associates. The system envisions the production of 55% solids tailings at the concentrator for transport to five "new generation" paste thickeners at the tailings impoundment. The installation of units with an unsubstantiated operating record must be regarded as high risk. On a short-term basis, the tailings impoundments can take normal tailings (50% to 60% solids) into the maintenance dump area. Over the long term, deposition of normal tailings would result in running out of tailings deposition room — **Moderate to High Risk/Low to Possible**.

- The production of marketable copper concentrate grades is regarded as — **Low to Moderate Risk/Unlikely to Possible**.

11.0 SMELTING

Behre Dolbear is not aware of any ongoing smelter negotiations to determine smelter contract terms for concentrate freight to port, shipping, insurance, treatment charges, refining charges, and sales costs. The terms used in the feasibility study financial analysis appear to be standard. It must be noted that treatment charges are highly volatile. While long-term contracts for higher grade copper concentrates (30%+ copper) are active with charges of approximately $79, spot treatment charges are still in evidence for less than $10.

The Toromocho Project concentrates will average at approximately 26.5% and will carry high values for insol and zinc. This may result in less than optimum treatment charges. MCP does not own or operate a smelter in South America. Behre Dolbear has access to multiple sources of smelting price projections. These projections and the projections received by the Group from CRU yield a blended recommendation for TC/RC terms at $70 and $0.07, respectively.

12.0 INFRASTRUCTURE AND NON-PROCESS FACILITIES

12.1 GENERAL

The need for almost all aspects of infrastructure, to be constructed new, drives the expanding cost of the Toromocho Project. Each of the following infrastructure requirements is a major project in itself.

12.1.1 Electrical Power Supply

- The electric power supply is described by a report prepared by CESEL Ingenieros, Peru. The electric power will be delivered from a 220-kV substation near the township of Pomacocha.

- A new 11 km, double circuit overhead transmission line will be installed and routed from the Pomacocha Substation to the main substation at Toromocho. The new transmission line can deliver 220 MW on either circuit.

- The project with a triple redundant system should experience a minimum of unexpected or unscheduled delays due to power outages.

- Emergency standby power will be installed to operate the large paste thickeners, the conventional tailings thickeners, the concentrate thickeners, camp medical facilities, etc.

12.1.2 Water Supply

The total water demand by the Toromocho plant for an average year will be 8.65 million m^3. Water will be supplied from the Kingsmill Tunnel (Section 12.1.2). Only 50% of the treated flow from the Kingsmill Tunnel will be required for plant process water. Culinary water will be supplied to the site from a reverse osmosis and chlorination system.

12.1.3 Office and Administrative Support Facilities

The non process buildings to house administration, mine truck shop, and maintenance will be constructed to provide office facilities for the administration and maintenance staff. In addition, facilities will be constructed to house analytical and metallurgical laboratories, reagent storage, fueling stations, explosives storage, and the camp facility.

12.1.4 Material and Supply Storage and Distribution

Warehousing will be located in the maintenance shop building adjacent to the concentrator. Other supply inventories will be contained in the fuel stations, reagent building, explosives storage, and mine truck shop.

12.1.5 Access Roads

Access to the site will be provided to the site by two roads.

- The Central Highway (paved), which is to be rerouted, will feed into the north access road to the administration area.
- A new access road, running parallel to the rail road will provide access to the site for local personnel.

The new access road is being constructed, as with all other internal roadways by MCP.

12.1.6 Railroad Access

Transportation of copper concentrate and molybdenum oxide will be from the site to the Port of Callao via the existing rail line between Callao and La Oroya that runs by the mill site. The railroad is operated by a Peruvian company and, per Aker Kvaerner (December 2007) in its current condition, has the capacity for the additional transportation of the Toromocho Project produced commodities.

The railroad is owned by the government but is operated under a 15-year concession agreement with FerroCarril Central Andino S.A. The concessionaire will upgrade the rail line and purchase rolling stock to accommodate the Toromocho traffic and will recoup the costs in the operating fees.

A 1 km spur to connect the mill site to the existing rail line, six rail lines in the yard at the mill and a traveling bridge crane for loading unloading, are to be provided by MCP. MCP will complete the 1 km rail spur from the main rail line to the mill site by the end of 2012.

12.1.7 Camp Facility

Camp facilities will include a construction camp to be constructed approximately 12 km to the east of the mine site in the vicinity of the Central Highway. The camp will have quarters for up to 6,000 construction workers. The construction camp will be used for the future expansion.

12.1.8 Town Site

The town site of Morococha, located within the pit limits, will be demolished and the population moved to a new community near the mine site. The new town site is under construction and "move in" is scheduled for mid 2012. The initial capital costs could escalate substantially beyond the 2007 budget.

12.1.9 Miscellaneous Infrastructure

Included in miscellaneous infrastructure are compressed air systems, sewage treatment, fire protection, security and communications.

12.2 CONCLUSIONS

Behre Dolbear has reviewed, in detail, all of the required infrastructure for the Toromocho Project and finds it complete and more than adequate for the size and complexity of the Toromocho Project.

12.3 RISK ANALYSIS

Major project financial risk for infrastructure is rated as moderate due to the not yet finalized costs for relocation of Morococha, improvements to the Central Highway and internal site roads and site preparation — **Low to Moderate Risk/Unlikely to Moderate**.

13.0 ENVIRONMENTAL AND PERMITTING

13.1 BACKGROUND

13.1.1 Environmental Setting — General

Environmental and social baseline conditions are described thoroughly in the 2007 Feasibility Study and Appendices (Knight Piésold, 2007) prepared for the Toromocho Project. Summary statements from that document are presented below to describe the general environmental setting. Overall, the setting appears little changed since 2007 except for the comments given below; and those key issues noted in the Environmental and Permitting discussion.

The project site is located in the high Andes of central Peru at mean elevation (altitude) of 4,300 masl (meters above sea level). The site is located directly east of the spine of the Cordillera Occidentale (Western Cordillera) of the mountain range, about 115 km east of Lima and the Pacific Ocean. Distances are deceiving. Even on one of the best maintained mountain roads in Peru — the Carretera Central — expert local drivers are a necessity to make this 4 to 5 hour car trip from Lima, due to the heavy traffic and dangerous driving conditions. Figure 13.1 shows a view of the area during the site visit made in August 2011, also during the winter season. Importantly, the Central Railroad from Lima passes through the area. A local airstrip is not available.

Figure 13.1. Local site topography and environmental setting at Toromocho is shown in this view during winter season August 2011
Carretera Central Highway is at left

The majority of mine infrastructure is planned within the District of Morococha (the key local town for Figure 13.2), Province of Yauli, Department of Junin, in terms of local and regional governments and their permits. The mining concessions area presents a high, rugged, dry, windswept local topography, above tree line, with elevations between 4,400 masl and 5,000 masl. Working conditions for employees and equipment are thus affected.

Figure 13.2. The historic mining town of Morococha is shown with reclaimed waste areas in the foreground
The Toromocho ("bull with no horns") is prominent above the town with its reddish nose and eyes up the slope

This is a periglacial area previously shaped by glacial advances and retreats during pre-historic times. Soils are glaciofluvial (formed by glaciers and flowing water) and typical of the Peruvian upland plains in formation. Geologic, geotechnical, and seismic risks are present and must be considered in mine and support facilities design. Existing environmental liabilities are present from historic mining in the Cerro de Pasco era (1920s to 1940s) in the surrounding project area, but most are reported to be outside the Toromocho concession area. In any case, such liabilities are in play in the major project plans of MCP, as will be discussed below.

Climate is also characterized as being cold and dry, with a wet season from October to March (summer south of the Equator). Evaporation generally exceeds precipitation, and mountain and valley winds of moderate speed often flow up the valley to mountain tops during the day and back down the slopes as temperatures cool in the afternoon and evening.

Even with the dry conditions, the average rainfall and snowfall of 850 mm infiltrates to groundwater and further sustains area streams and high altitude lakes, some affected adversely in water quality from domestic sewage and historic mine runoff. Other impoundments from historic and current mining are also present. The lakes contain some planted trout and native killifish.

Air quality is generally good in the area except for occasional blowing dust from historic mine waste areas, with some elevated metals concentrations.

Flora and fauna observed were sparse during the winter but some species of regional and national significance requiring protection have been noted in field surveys and addressed in recent mine planning.

The White-Bellied Cinclodes is notable among the approximately 66 bird species present. Vicunas are also present. Some sensitive habitat areas exist and will be discussed further.

The social and community setting will also be discussed further below in terms of current mining plans and impacts.

Regarding the above existing environmental baseline conditions, as these have changed or new issues have arisen during the period 2007-2011, Behre Dolbear will comment in the Physical and Biological, and Human Environment subsections which follow.

13.1.2 Physical and Biological Environment — Current Issues

A tour of the site showed some pioneering of land areas (basic clearing and testing for site suitability) and initiation of quality construction activities and staging of materials. Pioneering that was occurring at the concentrator site (Figure 13.3) appeared to be well planned in terms of erosion and sedimentation control, runoff, and attention to the nearby rail line.

Figure 13.3. Initial pioneering work is occurring in the concentrator area in the southern part of the project site

Regarding flora and fauna issues and habitat, the planned tailings impoundment area in the Tunshuruco drainage is large in footprint (approximately 790 ha and has required detailed study for geotechnical and biological issues, as well as cultural and socio-economic conditions (these will be discussed in the next subsection). The area contains wet soils ("bofedal"), flora, and fauna habitat totaling about 50 ha on one margin that has required excavation and removal to insure a secure tailings area (Figure 13.4). MCP has also designated a "compensation" area to re-establish by re-planting what could be termed "wetlands" on another part of their properties. This work is in process and appears to be carefully considered with a compensation area to the north in the generally undisturbed corridor San Antonio-Sierra Nevada.

Figure 13.4. Wet, marshy soils ("bofedal") are being removed from the margin of the tailings dam construction area in the Tunshuruco valley (Alignment of the dam is shown in the flags at the right)

Regarding land use and water management, an important point concerning this project and water use is that no agricultural/water conflicts are present (as at a number of mining projects in Latin America). Water (albeit of poor quality) is present in abundance from the Kingsmill Tunnel, previously constructed to drain mine water (perhaps 90% to 100%) from historic mine workings in the Toromocho peak area. This water is now effectively treated in the Kingsmill Tunnel Water Treatment Plant (KMT WTP) which was toured by Behre Dolbear. The plant is well constructed, appears to be a modern and efficient operation, and is protected by river rock gabions from the calculated 500-year flood (Figure 13.5).

Figure 13.5. The Kingsmill Tunnel Water Treatment Plant facility (Appears to be functioning well with quality construction to treat historic mine drainage in the Toromocho peak area and supply process water for the new mining project)

A steady and substantial lime resource will need to be located in the region to supply the treatment plant, as lime is one of the chemicals used to neutralize acidic water and precipitate metals.

The MCP staff stated that process water for the new mining project will require only about one-half of the KMT WTP discharge. This plant could operate for decades with an estimated 32-year mine life and possibly operate in perpetuity, if a market for the treated water (suitable for mining process and other industrial and livestock use) exists. Therefore, the KMT WTP provides dual environmental benefits of: (1) legacy and modern contaminated mine water cleanup; and (2) adequate process and water supply for the mining project and surrounds.

The KMT WTP has process ponds to polish the water and precipitate metals sludge before the treated water is discharged to the river. This excess sludge is to report to the bottom of the unlined tailings pond discussed above, after it is constructed and operating. Careful monitoring of ground water, collection, and pump back, and other management down gradient of the tailings pond in the lake/wetland area will be necessary to insure no negative impacts occur to regional ground water and domestic wells.

Geotechnical and seismic (earthquake) hazards do exist in this area and are being considered in ongoing geotechnical studies of open pit mine slopes and other facilities planning.

Some potential for residual acid rock drainage (ARD) from historic mine openings and wastes exists from the Toromocho concessions and such will be monitored under a comprehensive Environmental Management Plan presented in the Environmental Impact Assessment (EIA) as well as a detailed Water Management Plan and Water Balance for project operations. MCP has committed to regular data analysis and corrective actions so as not to affect local and regional ground and surface waters.

Air quality will be improved in the area as historic wastes are mined through and reprocessed, or stored in engineered waste dumps with dust control. Dust control on pit roads, other access roads, from the cleared areas of the plant, and from other mine facilities will be a key aspect of mitigation. Blowing dust and some gaseous emissions from the plant and equipment are noted as potentially significant impacts from this large operation, if not carefully controlled and will receive attention.

13.1.3 Human (Social and Community) Environment — Current Issues

As noted above, this is a historical mining area dating back some centuries, with modern mining beginning in the early 1900s through 1940s during the Cerro de Pasco era. Pan American Silver has current operations including waste dumps, process ponds, and infrastructure in the Yauli and Morococha area. Thus, some local trained miners exist, who may need upgraded training for a large operation. Notable small-scale historical mining (legacy) disturbance exists on the Toromocho peak and to the west; and much of this area (perhaps 80% to 90%) will be mined through with ore and some waste reprocessed during the new project life. Considering legacy impacts from mine waste and water quality effects due to past mining, the KMT WTP discussed above and the large new open pit mine will eliminate or mitigate many of these impacts for local residents and the environment.

The Toromocho peak and town of Morococha, shown in Figure 13 .2, will also be mined through during the later years of mine life. Thus, relocation of the town is planned and a new town is being constructed in the Carhuacoto area east of the planned mine along the Central Highway (Figure 13.6 and Figure 13.7), tobe completed in mid-2012.

Figure 13.6. Vista from the Central Highway to the new town at Carhuacoto and the peaks to the west

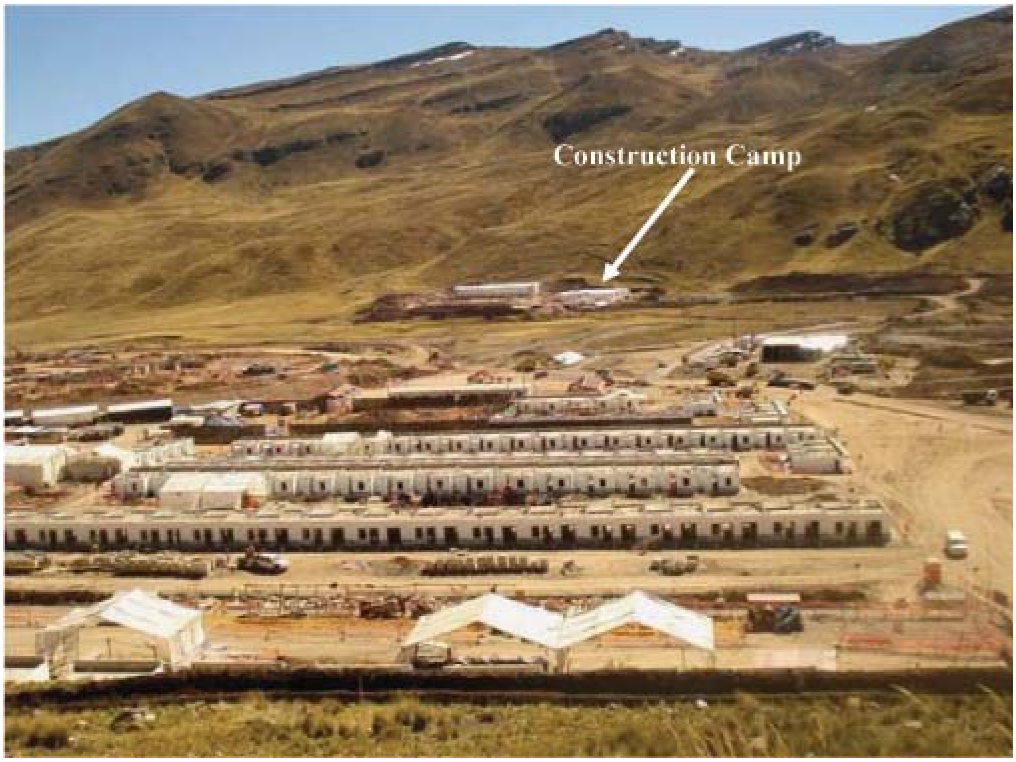

Figure 13.7. The new town at Carhuacoto (Well under construction in the foreground with a construction camp being developed in the background against the ridge)

Curiously, current local unemployment is estimated by the MCP staff and consultants to be at low levels and it is expected that an influx of new miners, many needing training, will need to be imported from Lima, La Oroya, Huancayo, or surrounding areas or from other mining areas in Peru to supply the workforce, especially for operations. Low unemployment is reportedly due to the harsh environment. The opinion is that one would not live at this altitude if not subsisting on some means of income.

Employment of skilled workers for construction and operations remains as one of the concerns of the MCP management and human resources staff. The global mining boom has taken up many such workers for other projects in Peru and beyond. MCP is competing for such workers in the employment market. Recruiting is active and the new town at Carhuacoto (for past and new residents of Morococha area), a modern mine camp, and other facilities under construction are being planned to make the project area attractive to in-migrants. Training programs by MCP, and those with equipment suppliers and plant operations engineers, are actively planned.

Worker health and safety (H&S) is proceeding informally and will be instituted in a formal manner as construction ramps up. Contractors have internal regulations, an H&S manual exists, regular meetings are held with MCP and contractor staff, and corrective actions are performed.

The new town construction is a key attraction and appears to be of very good quality and layout, with running water and electricity, modern toilet facilities, and a serviceable kitchen and living areas. An "open house" of 2 to 3 large display rooms in the old town area of Morococha (currently about 3,200 residents) has been open for some months to educate and promote the new facilities and show testimonials of local residents regarding their feelings about relocation and resettlement. MCP has retained staff and a consultant, Social Capital Group, to work with local residents and advise in these matters. About 1,050 new residences are currently under construction. A formal community relations plan (with a manager and staff) and resettlement plan are being carried out.

Seismic risk has been considered in the new town construction, and protective features (*e.g.*, a large engineered channel to handle a dam break from Pan American Silver's Huascacocha Lake upstream and storm drainage) are in place. A park, municipal building, and other town features are under construction.

Transport of other commuting workers to the mine during operations from Lima and the surroundings is noted as a key risk and issue for MCP planning purposes. The Central Highway is well-used and generally well-maintained from Behre Dolbear's observations, but repairs and accidents are common on this two-lane highway (Figure 13.8). Crowding and aggressive driving is evident. Buses transporting workers will likely be staged from selected centers. Train cars to transport workers and supplies are being considered and seem a good alternative. An airstrip for emergencies and management purposes may be a consideration in the Yauli area.

Figure 13.8. Conditions on the Central Highway from Lima (Include new bridge improvements, with the red reinforcement bars under the bridge platform (barely visible below the platform at right) supplied by MCP to handle their major shipments of equipment and supplies)

The Central Highway will require a new alignment for about 10 km (6 miles) in the vicinity of the major new open pit since the highway will be too close to the pit wall for safety purposes. Alignment alternatives are being studied and no final route has been selected.

Concerning re-settlement for construction of new mine facilities, removal has already occurred of seven beneficiaries (families) in the Tunshuruco tailings area, with compensation. Cultural resources (historical and archaeological) also remain under study in this area before construction.

In summary, the primary and nearly universal concern appears to be acceptance of the new town by the Morococha residents. In spite of the new and improved conditions, the culture, social norms, folkways, traditions, festivals, and other events historically associated with the town below Toromocho will change and voluntary movement will be required soon. MCP and its consultants believe about 85% of the residents generally approve and are committed to a resettlement plan, as shown in the EIA and hope for a successful result.

13.2 PERMITTING STATUS AND SCHEDULE

13.2.1 EIA and Construction Permits

Of major importance for the project going forward is recent approval of the voluminous EIA in December 2010, after 13 months of reviews, appeals, and modifications by the Ministry of Energy and Mines of Peru (MEM). This was termed a "delay" in some project documents but is not unexpected in current global mining projects that require a "social license to operate" as well as the usual environmental protection conditions. Also of importance, a construction permit for active construction work at the concentrator plant and tailings area over the next 2½ years was approved by MEM while Behre Dolbear was on site during July 2011.

13.2.2 Mine Plans, Water Use, and Other Permits and Approvals

Several other permits have been obtained or are in the planning horizon. Some of these relate to notable project changes since the EIA was first submitted in 2009. The major critical path items are assessed as follows.

- A detailed hydrology and hydrogeologic study for the pit will be an important part of the new pit mine plan to be submitted for approval late 2011
- A quarry mine plan (rock for construction and haul road repair) approval was secured July 2011
- Water use permits for the mine and concentrator plant are in preparation
- Reclamation and closure plan will be detailed further in 2011 (conceptual) and refined as operations progress (Section 14.0)
- Cultural resources mitigation permits; several obtained, a few still in process
- New highway alignment EIA still to be accomplished
- New lime source to be secured with environmental approvals

- Environmental Assessment (EA) for the Kingsmill Tunnel has been completed
- EIA for KMT WTP was completed in 2008; further technical certifications needed

After a couple of sessions of detailed technical discussions with the MCP Vice President of Environment and Corporate Affairs in Lima, it is expected by Behre Dolbear that the necessary permits and approvals can be secured in a timely manner to proceed with construction and operations, as detailed elsewhere in this report. Assessment of Risks is presented below.

13.2.3 Government Changes in Peru — Agency and Community Perceptions

Recent legislative changes in Peru (2010) have established that the Ministry of Environment (MOE) and its Agency of Environmental Evaluation and Fiscalization (OEFA) develop a major role in environmental protection from mine impacts. Behre Dolbear was informed in Lima that such agencies have not gained traction, staff, or budget to take prominence in such a role. MEM and related agencies remain in their traditional and powerful roles as the key permitting agencies for MCP efforts and are receiving the focus of staff attention.

A presidential election occurred just before Behre Dolbear was in Lima during July 2011. A new president and administration took office. Therefore, key agency informants in Lima or the region were not deemed feasible to be contacted to confirm the MPC permitting status and any agency perceptions of difficult issues, since the government change will likely cause new conditions.

Further, Behre Dolbear sometimes requests interviews with local community informants to check the progress of mining company efforts and any notable conflicts. This effort was similarly not deemed feasible during this visit.

The uncertainty of post-election government appointees and the delicate situation in the Morococha community rendered infeasible local interviews. Behre Dolbear spent substantial time with the MCP staff and consultants. The approved EIA and recent construction permit serve as evidence of agency and community support.

13.2.4 Water Management Update to December 2011

An update to the water supply and water management plans review for the Toromocho Project to November-December 2011 is pertinent because of recent events in Peru and the new administration (this new administration and agency structure is discussed in the following section).

It has been noted from internet website searches that other mining projects in Peru — as they have matured and conceptual plans have been formalized — have raised current community issues regarding watershed effects (alpine lakes), competition with agricultural water uses, and potential effects in terms of water quality and quantity on domestic water supplies in those areas. These community and NGO (non-governmental organizations) activities have resulted in threatened labor strikes at the mines, lockouts, local unrest, and temporary project postponements in some areas. These locations are generally in the north and south of Peru, and not related to the particular area of the Toromocho Project or the Cerro de Pasco/La Oroya vicinity.

A similar website search for Toromocho Project water management, NGO activities, agency comments, or related matters has yielded no information that would signal controversy with the current situation, as depicted in the September 2010 EIA Executive Summary for the Project,

Further, the plan for water management for the Project, including water treatment by the Kingsmill Tunnel of historic mine drainage, to provide more than adequate water supply for project uses, still appears viable. The dual purposes of treating contaminated water draining from historic workings in the planned new mine pit vicinity, and providing process water for the mine and plant, remain desirable from an environmental sustainability point of view. The overall Project water balance is documented in detailed text and diagrams from reputable consulting firms, Knight Piésold and Golder Associates, during 2008-2009 that were discussed with Project environmental staff. While Behre Dolbear has not technically verified all aspects of the conceptual water balance, we have not received any responses from the Toromocho Project staff to denote any major changes to these plans. Therefore, we have no reason to believe the water situation has essentially changed or does not remain a valid analysis, at this time.

Further, Behre Dolbear has not contacted agency staff in the new Humala administration (since July 2011) to verify their regulatory analyses and perceptions of the Toromocho Project water management plans. From the recent website news, it seems the Environment Minister now has more traction to influence regulatory reviews, especially regarding the Minas Conga Newmont project in the north near Cajamarca.

13.3 CONCLUSIONS

Reviews of environmental, social, community, permitting, and general sustainability issues for the Toromocho Project suggest many favorable aspects going forward.

- Permitting progress to date is good — EIA and major construction permit approved; other important approvals all in process for most current project components and plans
- Major remaining permits (water use and mine plans) well into planning process
- Construction layout and pioneering progress — good environmental housekeeping, recognition of environmental impacts and issues
- KMT WTP is completed and functioning well
- Two-pronged advantage of KMT: (1) historic legacy mine sites mine water cleanup; and (2) adequate total mine water supply
- Quality new town construction at Morococha (Carhuacoto) — apparent 80% to 90% approval rating by old town residents
- Recognition of wetlands, wet areas in project construction regarding both environmental compensation and geotechnical issues (tailings dam area)
- Land position adequate for facilities and infrastructure — mining concessions and purchased lands

- Legacy of mining in area and general acceptance by communities — no agricultural/water use competition
- Well-developed transport route to mine from Lima — rail/air alternatives available
- Worker H&S program apparently well in place with the contractor and sponsor collaboration, meetings, incident response, and reporting to the government

A few other project aspects in these topical areas present unfavorable conditions for the project and they are the following.

- Unknown new final road alignment for the Central Highway in the pit vicinity will require a new EIA and potential environmental impacts.
- Dangerous road (H&S) aspects and access for workers and equipment truck drivers to the site from Lima.
- Potential requirements for extra capital costs for high-quality project components and later operations and maintenance (*e.g.*, new town, tailings dam, high altitude issues, and similar).
- Universal concern over full acceptance and efficient transfer of Morococha residents to the new town — Carhuacoto.
- High altitude working conditions — worker health and risks (*e.g.*, lightning, rain/snow with strong winds, fatigue).
- Minor contaminants in historic and new mining/processing/waste management and tailings — need potential control and isolation.

13.4 RISK ANALYSIS

Transport of workers and equipment to the mine site will cause logistical, cost, and H&S problems that affect skilled employment and project operations — **Low to Moderate Risk/Unlikely to Possible**.

Operation of the tailings impoundment will cause local and regional environmental effects on ground and surface waters and local fauna habitat that cannot be easily remedied — **Low Risk/Unlikely**.

Timely and efficient re-settlement of Morococha residents to the new town, Carhuacoto, is not assured and poses some risk to the project's schedule — **Low to Moderate Risk/Unlikely to Possible**.

14.0 RECLAMATION AND CLOSURE

14.1 CONCEPTUAL CLOSURE PLAN

Discussion in the EIA describes the conceptual plans for physical and chemical closure of the major mine, plant, and support facilities. Passive closure is planned, if feasible, so that major maintenance and staffing is not necessary. However, active closure will be undertaken, if needed. In any case, post-closure monitoring, water management, and security will likely occur. Following are the key aspects planned for major facilities during progressive and final closure.

- **Open Pit** — Dismantle auxiliary services (energy, etc.) and equipment; physically stabilize for 500-year planning horizon, chemically stabilize and limit water infiltration; pipe and treat pit water, as necessary, using the KMT WTP; construct perimeter barrier and warning signs; monitor conditions.

- **Waste Rock Dumps** — Physically and chemically stabilize; compact fines to limit infiltration, monitor ARD (acid rock drainage); control water run-on and run-off; if necessary pipe water to KMT WTP for treatment; construct perimeter barriers and warning signs; monitor conditions.

- **Process Plant** — Decommission, dismantle, and remove structures and equipment, salvage as feasible; sell or transfer equipment; re-grade area and re-vegetate, and remedy contaminated soils.

- **Concrete Pads and Shops, Laydown, and Equipment Areas, and Other Infrastructure** — Remove structures and equipment; demobilize, dismantle, salvage, sell or transfer equipment; closure of concrete pads in place (*in situ)* with soil cover and re-vegetation as feasible using topsoil stockpiles; remedy contaminated soils.

- **Tailings Impoundment** — Physically and chemically stabilize; install dry cover to prevent infiltration and oxidation (acidic conditions or ARD); provide water management and run-on, run-off control; monitor piezometers (water level indicators) in dam face and surrounds, monitor water quality in wells downstream and ponds, wetlands; collect downstream seepage and return as necessary; insure long-term integrity of concrete/rock dam.

- **Limestone Quarry** — Remove equipment, restore to original contours as feasible, scarify topsoil areas, and re-vegetate.

- **Access Roads** — scarify, plug soils, and re-vegetate; keep open those roads needed for monitoring and water management post-closure.

14.2 DETAILED CLOSURE PLAN

A revised version of the conceptual closure plan in the 2009-2010 EIA is expected to be prepared in the third quarter 2011, given current mine planning. A detailed closure plan with cost estimates may be submitted late 2011 or early 2012.

14.3 FINANCIAL ASSURANCE

Early estimates suggest $181 million is being considered to be financed by MCP as a guarantee against future reclamation and closure. However, actions during mine planning and operations can lead to substantial cost savings at closure and will undoubtedly be considered. Therefore, this amount will likely be revised and renegotiated as actual mining impacts are experienced, mine plans change, and progressive reclamation proceeds. A 5-year bond review cycle is indicated.

14.4 MINE LIFE AND SUSTAINABILITY

Various aspects of sustainability are favorable for the project given the progressive work completed by MCP to date and other planned actions.

- **Financial** — With a 36-year operating life and assuming a favorable price climate for copper and molybdenum, prospects are good that the project will have adequate profits and cash flow to contribute to the other sustainability aspects below.

- **Environmental** — Permits, approvals, and committed mitigation are being progressively undertaken, and monitoring to address unforeseen conditions is planned. Environmental protection and enhancement post-closure appears to be adequately considered.

- **Economic** — The economic sustainability of the Morococha area during operations and post-closure is being considered regarding employment, services, training, and infrastructure to enhance the area and surrounds during a modern, large-scale operation with long life and potential for expansion.

- **Social** — With the new village, open house, attention to the socio-cultural aspects of this historic mining area, and transport issues, MCP appears to be taking strong steps regarding community relations, re-settlement, and future planning for quality of life in the area.

- **Governance** — Transparency by MCP seems evident in the permitting documents and information shared with agencies and in response to inquiries during this independent technical review. As to the new Peruvian government, it remains to be seen regarding their mining, economic and environmental protection policies, but a good basis for this project seems to be in place.

14.5 CONCLUSIONS

Planning for reclamation and closure is present in the EIA and other specialized baseline, impact and mitigation studies, and field efforts being carried out by MCP. A substantial closure expense and bond is estimated. Operations can help to lower closure costs and will be planned accordingly. Bond amounts are expected to be revised and re-negotiated in 5-year intervals during the 30 plus years of mine life as the closure plan is refined.

14.6 RISK ANALYSIS

Open pit mine, waste dumps, and other facilities will produce blowing dust that cannot be effectively controlled and contaminated mine water than cannot be effectively piped and treated by Kingsmill Tunnel during closure — **Low Risk/Unlikely**.

Closed tailings impoundment will produce adverse water quality and seepage down gradient that will adversely affect ponds and wetlands and local ground water, and cannot be remedied — **Low Risk/Unlikely**.

Closed open pit mine, without backfill and closed waste dumps as remaining structures, will substantially lower the quality of life in this historic mining area — **Low Risk/Unlikely**.

15.0 ADMINISTRATION, MANPOWER, AND MANAGEMENT

15.1 MANAGEMENT AND GENERAL ADMINISTRATION

During the site visit, Behre Dolbear had occasion to interact with the following MCP managers and administrators:

- Jack Huang — President and General Manager
- Du Tsiang — Director of the Board
- David J. Thomas — Executive Vice President and Chief Operating Officer
- Armando Arrieta — Vice President, Legal
- Ezio Canepa — Vice President, Corporate and Environmental Business
- Esteban Bedoya — Human Development Manager
- Leo Hilsinger — Vice President of Construction
- David Dai — Vice President, Finance
- Dan Gurtler — Mine Manager

Behre Dolbear's Process, Infrastructure, and Construction expert met with the MCP engineering and design personnel, Richard Rickard and Tom Olson, in Akers Solutions/Jacobs Engineering offices in Tucson, Arizona.

15.2 MANPOWER

15.2.1 Administration

The proposed administration staffing is large enough to support project operations but it also appears to be designed to handle a large percentage of what would normally be corporate assignments. This is a low risk area but may lead to higher than anticipated costs, if recruitment proves to be problematic.

15.2.2 Mining

The manning of the mining and process operations are discussed in Sections 9.0 and 10.0. The manpower proposed for operations matches the equipment requirements.

15.2.3 Milling and Hydrometallurgical Processing

Behre Dolbear has reviewed the manpower staffing requirements for the concentrator, hydrometallurgical plant, and administration. Although one may argue that the staffing seems a bit excessive, the location and availability of highly skilled workers in the immediate area is questionable.

15.3 CONCLUSIONS

The management, administration, and engineering/operating personnel are basically highly respected in the industry, experienced in their respective roles, and very dedicated to the success of the Toromocho Project.

The staffing levels in the various support categories appear to be adequate.

Behre Dolbear was concerned with the levels of personnel committed to training in the December 2007 Aker Kvaerner Feasibility Study but the additions in the 2011 Definitive Estimate appear to resolve that issue.

15.4 RISK ANALYSIS

The Toromocho Project is a highly complex project located in a remote location. It is imperative that MCP continue to retain experienced and dedicated experts in their various fields through the construction, start up period, and ongoing operations, if the projected schedules, costs, and production levels are to be achieved. The risk is **Low to Moderate/Unlikely to Possible** with the current staffing but replacement with lesser personnel would raise the risk to moderate to high.

16.0 CAPITAL COST ESTIMATE AND IMPLEMENTATION SCHEDULE

16.1 MINE

The mine capital cost consists of two components: mine equipment and mine pre-production developments costs. The estimated mine equipment capital cost includes the following items:

- Mine major equipment
- Mine support equipment
- Shop tools and initial spare parts
- Engineering and safety equipment
- Equipment dispatch system

The second component of the mine capital cost is mine pre-production development costs that are based on the estimated mine operating costs during the pre-production period. Details of this calculation are discussed in Section 17.1.2.

The mine equipment purchases are based on the equipment requirements calculated in Section 9.0.

Mine replacement calculations were based on the required operating hours for the major equipment units and the operating life of each unit. Replacement calculations were adjusted for practicality, so there are no major mine equipment purchases planned after year 32. Some minor units are replaced in the last few years as part of an ongoing operational requirements during the stockpile reclaim.

The basis for mining equipment pricing is:

- Costs are shown in the third quarter 2010 US dollars in the year in which the equipment is required.
- It is assumed that payment for the equipment is made at the time of delivery.
- Equipment costs reflect 2010 dealer budget quotes for new equipment.
- Costs are based on prices obtained by IMC during 2007, unless otherwise noted on the table.
- The costs shown include delivery to the site and assembly.
- A zero salvage value was assigned for the equipment, facilities, and the spare parts inventory.

The capital cost estimate for the Toromocho Project was updated in February 2009 and again in February 2011 in the Definitive Estimate.

The Definitive Estimate mine equipment adjustments made by IMC are listed as follows:

- Production schedule remains unchanged from the Basic Engineering Estimate
- Work Schedule: Set to make use of the available fleet (more time scheduled rather than buy more equipment)
  - Year -3 quarter 2 through year -2 quarter 3 is one shift per day 7 days per week with 3 crews
  - Year -2 quarter 4 and forward is 7 days per week, 2 shifts per day with 3 crews
- Quantities (Table 16.1):

TABLE 16.1
MATERIAL HANDLING QUANTITIES

Construction	BCM × 1,000
Crusher Access Road	1,325
Pit Development Road Access	532
Alluvium/Tails Access Roads	470
Alluvium and Old Tailings	2,813
Total Construction	5,140
Pit Development	**Tonnes × 1,000**
Waste and Stockpiled Ore	55,000

- Major mining equipment productivities remain unchanged from the 2007 Feasibility Study.
- For the construction period:
  - Reduced construction period from 8 quarters to 7 quarters
  - Realigned construction schedule to fit the 7 quarters
  - Revised quarterly equipment requirements
  - Assumed higher mechanical availability and use of availability for first year and a half:
    - 90% mechanical availability
    - 95% use of availability for brand new machines

16.1.1 Major Mine Equipment

- Cost reductions due to:
  - Order only 16 — Caterpillar 797F haul trucks instead of 19 haul trucks due to optimization of the haul cycles and larger truck body provided by Caterpillar.

- Cost increases due to:
  - Equipment unit prices being higher.
  - LeTourneau wheel loader is now in Version 2, thus has a higher unit price. The wheel loader needs a high lift boom that was not included in the previous quotation.
- Blast hole drills were based on a different drill manufacturer that did not hold up under further technical and MARC evaluations during the Definitive Estimate analysis.
- The cranes for equipment assembly was assumed to be provided by the equipment manufacturers. The final proposals stated that MCP had to provide a majority of the cranes.
- Equipment prices had to be increased due to the one year delay in equipment deliveries.

16.1.2 Mine Support Equipment

The mine support equipment includes support equipment vehicles, mine facilities, tools/small equipment, and spare parts/components.

Costs increased due to:

- Additional support equipment not forecasted that was determined to be required to perform operations and maintenance tasks in a safe and efficient manner. The additional equipment was determined after extensive review by MCP personnel and discussions with other operations.

  The tractor mover with a tow hook and trailer and spare shovel dipper were in the sustaining capital area, but MCP determined that the equipment was required earlier.
- Additional temporary mine facilities were required in the Definitive Estimate Morococha town relocation to Carhuacoto has been delayed. The community people located in the mine truck shop area cannot be moved until housing is ready in Carhuacoto, which is forecasted for the first quarter of 2012. Thus, earthworks in the truck shop area cannot start until the second quarter of 2012. Therefore, the temporary mine maintenance and operations facilities had to be built to support the mine equipment fleet and the start of the pre-production mining activities until the permanent mine shop is constructed. The temporary mine facilities costs are forecasted to be about $2.8 million.
- The aggregate crushing plant for road base is forecasted to cost $3.6 million more than the estimated cost.
- The original estimate assumed that the vendors, Orica and Repsol, for the explosive area and two fuel facilities were going to finance the facility construction and MCP would purchase the facilities overtime during operations as an operating cost. During final negotiations, MCP determined that the vendors did not want to finance most of the facilities; thus requiring MCP to pay for most of the facility construction. MCP decided to fund the complete construction of the facilities and not be held hostage by the vendors.

- Additional tools/small equipment were not forecasted due to the equipment proposals stating that the vendors would provide most of the tooling under the various MARCs. During the final negotiations, it was determined that MCP would not enter into most of the MARC contracts for equipment maintenance due to cost; thus, MCP needed to purchase the required tooling for maintenance. The additional cost for the tooling is approximately $2.3 million. Additional radios are required since MCP is performing the mine maintenance itself instead of under a MARC. It was assumed that all equipment training simulations would be done with the Ferreyros (Caterpillar) training simulators. It was dictated by senior management that MCP own a training simulator with forecasted costs at about $1.5 million.

The resultant updated mine capital costs for the Toromocho Project in fourth quarter 2011 dollars are forecast to be:

	Third Quarter 2010	Fourth Quarter 2011
	(US$000)	(US$000)
Pre-production, Road Work, etc.	23,988	25,019
Pre-production Stripping	63,103	65,816
Mine Equipment	177,367	181,801
Support Mine Equipment	39,028	40,004
Contingency	15,169	15,169
Total	**318,655**	**327,809**

16.1.3 Sustaining Capital

The hours of equipment life to replacement, projected by IMC in 2007, are reasonable. A review of the current costs for mining equipment indicates that the inflation since 2007 has been offset by the exceptionally high costs of the equipment in 2007 during a shortage of manufacturing capacity. Consequently, the projections for mining equipment sustaining capital have not been changed (except for the production wheel loader) for the 2011 financial evaluation.

The one exception to the above is the production wheel loader. MCP, in the 2011 Definitive Estimate, has replaced the 17m^3 wheel loader in the 2007 Feasibility Study with a 40m^3 unit. Consequently, the sustaining capital in years 10 and 20 has been increased by $4.4 million to adjust for the larger unit. The fourth quarter 2010 based sustaining capital in the Definitive Estimate has been increased by 2.5% to reflect a fourth quarter 2011 base.

16.2 TOTAL CAPITAL EXPENDITURES

The Toromocho Project capital expenditures are valued as shown in Table 16.2.

TABLE 16.2
CONCENTRATOR AND INFRASTRUCTURE CAPITAL COST
(US$ × 000)

Operations	2007 Estimate	Definitive Estimate Third Quarter 2010	Fourth Quarter 2011 Estimate
Mine	294,811	303,486	312,640
Process and Infrastructure	1,374,056	1,543,586	1,673,247
Owner's Cost	215,180	413,461	448,191
Subtotal	**1,884,047**	**2,260,533**	**2,434,078**
Contingency			
Mining	29,841	15,169	15,169
Process and Infrastructure	192,575	123,119	133,460
Owner's Cost	18,166	32,030	34,720
Subtotal	**240,222**	**170,318**	**183,349**
Working Capital Subtotal	**28,000**	**56,000**	**56,000**
Total Estimated Project Cost	**2,152,269**	**2,486,851**	**2,673,427**
Behre Dolbear's Suggested Additions			
Infrastructure			
Relocation of Central Highway[1]		75,000	75,000
Relocation of Morococha[2]		100,000	100,000
Construction of Lime Quarry and Plant[3]		75,000	100,000
Totals	**2,152,269**	**2,736,851**	**2,948,427**

1 Based on discussions at site visit
2 Based on discussions at Jacobs and with MCP management
3 Based on discussions with MCP management

The current Definitive Estimate does not include the costs for developing a limestone mine and a burnt lime production plant near the mine site proper. The cost for 300K tpy lime facilities is estimated by MCP's management at $100 million. Relocation of the Central Highway is currently in an alternative evaluation phase but is roughly estimated at $75 million. The general opinion, in the Aker offices, was that the relocation of Morococha could escalate up to $200 million and perhaps beyond. Although the site preparation work is underway, any further delays could significantly deteriorate the financial viability of the project. The risk is currently rated at moderate.

The February 2011 Definitive Estimate of $1,543,586,000 for the process plant and infrastructure represents an increase of $169,530,000 over the 2007 estimate or 11%. Construction costs for two product concentrators have escalated at approximately 10% for the same period, as calculated by available indexes. In as much as major additional cost was incurred in the molybdenum hydrometallurgical plant, the indicated increase for the total concentrator is questionably low. Behre Dolbear has escalated the process and infrastructure capital costs to reflect an estimate as of the fourth quarter 2011. Because a high percentage of capital equipment is on site, the estimated total escalation of 10.9% in capital costs has been reduced by 22.5% (sunk cost of onsite equipment) to a value of 8.4%.

Owner's costs include the following:

- Force majeure events
- Project insurance
- Social outreach
- Contract services
- Licenses and royalties
- Financial costs
- Taxes
- Exchange rate fluctuations
- Commissioning and pre-operational cost
- Property acquisition and payments
- The new Morococha
- Secondary projects

16.2.1 Concentrator Sustaining Capital

Sustaining capital for the concentrator is limited to the costs associated with scheduled raises to the tailings impoundment. Process improvement projects within the process plants have their own paybacks and most often result in operating cost reduction or improved process recoveries and product quality.

16.2.2 Working Capital

Behre Dolbear feels that up to 3 months of working capital could be required before provisional smelter payments are forthcoming. Behre Dolbear calculated the initial 5-year average operating costs for mining, concentrating, infrastructure, general and administrative (G&A), and molybdenum hydrometallurgical processing at $36.6 million per month.

At the request of the Client, the working capital has been maintained at the $56 million level as shown in the 2011 Definitive Estimate, which is optimistic.

16.3 CONSTRUCTION SCHEDULE

The construction of the concentrator, non-process facilities, and the molybdenum hydrometallurgical plant are scheduled to complete pre-commissioning during the fourth quarter of 2013, work compilation of approximately 24 months. The schedule represents a low risk to the project due to the stockpiling of major equipment at or near the site. Given the progress of the construction to date and a forecasted drop in government intervention or non-intervention, the schedule has an above average chance of being compressed several months. The highest risk activities, in Behre Dolbear's view, are the relocation of Morococha, relocation of the Central Highway, and construction of a lime mining and burning facility.

The key milestones of the project are shown in Table 16.3.

TABLE 16.3
KEY MILESTONES FOR THE TOROMOCHO PROJECT

	Start	Finish
Pre-Permit Activities	May 01, 2009	May, 2012
Procurement	October 02, 2008	June, 2012
Detail Engineering	October 02, 2008	August 29, 2011 April, 2012
Detail Engineering Hydrometallurgical Plant	August 29, 2011	April, 2012
Contracts Formation	October 06, 2008	November, 2012
Pre-Stripping	First quarter, 2013	
Construction	July 01, 2011	September 13, 2013
Pre-Commissioning	October, 2013	
Mechanical Completion		October, 2013

The schedule as currently formed is, in Behre Dolbear's opinion, achievable; however, certain key issues could delay full commissioning of the metallurgical facilities.

Pre-commissioning and commissioning of the molybdenite hydrometallurgical plant could extend well past the fourth quarter 2014 date given the nature of the process and equipment utilized. Rio Tinto is projecting a 2-year start up of the Kennecott Utah Copper facility and industry experts have gone on record predicting lengthy start ups (up to 5 years) for unproven hydrometallurgical plants treating mineral processing products.

The risk associated with a successful completion and start up of the hydrometallurgical facility is rated, by Behre Dolbear, as high. The risk associated with completing the relocation of Morococha is rated as moderate. While the operating viability of the Toromocho Project would not be significantly impacted, the costs associated with unforeseen problems could sap some of the economic viability.

16.4 CONCLUSIONS

The design and engineering required to develop the mining equipment, process plant, and infrastructure capital costs is thorough and is current. The contingency and owner's costs are realistic. The fact that many of the high cost items have been ordered or are on site minimizes the potential for surprises.

The uncertainty of the final designs or outcomes for the Central Highway, relocation of Morococha, and the lime quarry and plant could result in significantly higher than predicted final costs.

Behre Dolbear believes that the Definitive Estimate working capital is low.

The sustaining capital estimates are based on realistic life-to-replacement predictions.

The construction and start up schedule are realistic (with the exception of the molybdenum hydrometallurgical plant) given the Group's continuing commitment to proceed and the continued cooperation of the government to provide timely approvals.

16.5 RISK ANALYSIS

The uncertainty of the final cost for the Central Highway relocation and the lime quarry and plant could increase capital costs — **Low to Moderate Risk/Unlikely to Possible**.

The continuing escalating costs for the relocation of Morococha are a concern — **Moderate to High Risk/Unlikely to Possible**.

The working capital estimate is optimistic — **Low to Moderate Risk/Possible**.

The start-up schedule for the molybdenum hydrometallurgical plant appears to be optimistic given the history of similar operations — **Moderate to High Risk/Possible to Likely**.

17.0 OPERATING COST ESTIMATE

17.1 MINE

17.1.1 November 2007 Feasibility Study

Mine operating costs were developed based on the mine plan, equipment requirements, and manpower requirements presented in previous sections. The mine operating costs include all the supplies, parts, and labor costs associated with mine supervision, operation, and equipment maintenance.

Table 17.1 presents the 2007 Feasibility Study mine operating costs on a cost per tonne per year basis.

The mine work schedule is assumed to be 2 shifts per day, 12 hours per shift.

TABLE 17.1
SUMMARY OF MINE OPERATING COSTS — PER TOTAL TONNE
(US$ × 1,000)

Mining Year	Total Material (kt)	Drilled/Blasted (kt)	Drilling	Blasting	Loading	Hauling	Auxiliary	General Mine	General Maintenance	G&A	Total	Total Cost
PP Q1												**1,601**
PP Q2	4,600	4,600	0.037	0.060	0.054	0.382	0.218	0.023	0.023	0.165	**0.961**	**4,422**
PP Q3	20,650	20,650	0.038	0.053	0.055	0.382	0.140	0.017	0.021	0.056	**0.762**	**15,727**
PP Q4	24,750	24,750	0.038	0.053	0.057	0.423	0.116	0.016	0.021	0.048	**0.771**	**19,089**
Year 1 Q1	25,721	24,750	0.038	0.051	0.056	0.385	0.124	0.016	0.020	0.045	**0.735**	**18,908**
Year 1 Q2	24,750	24,750	0.039	0.053	0.055	0.371	0.129	0.016	0.021	0.046	**0.731**	**18,085**
Year 1 Q3	24,750	24,750	0.039	0.053	0.055	0.378	0.130	0.016	0.021	0.046	**0.738**	**18,275**
Year 1 Q4	24,750	24,750	0.039	0.053	0.055	0.410	0.130	0.016	0.021	0.044	**0.767**	**18,990**
2	95,000	95,000	0.039	0.053	0.055	0.438	0.132	0.016	0.021	0.046	**0.800**	**76,016**
3	95,000	95,000	0.039	0.053	0.055	0.432	0.132	0.016	0.021	0.046	**0.794**	**75,387**
4	95,000	95,000	0.039	0.053	0.055	0.570	0.132	0.016	0.021	0.047	**0.933**	**88,672**
5	95,000	95,000	0.039	0.053	0.055	0.532	0.132	0.016	0.021	0.046	**0.894**	**84,968**
6	95,000	95,000	0.040	0.053	0.055	0.629	0.132	0.016	0.021	0.047	**0.993**	**94,327**
7	95,000	95,000	0.040	0.053	0.053	0.706	0.132	0.016	0.021	0.047	**1.068**	**101,444**
8	95,000	95,000	0.039	0.053	0.055	0.700	0.132	0.016	0.021	0.047	**1.063**	**101,001**
9	95,000	95,000	0.039	0.053	0.054	0.658	0.132	0.016	0.021	0.047	**1.020**	**96,893**
10	95,000	95,000	0.039	0.053	0.054	0.717	0.132	0.016	0.021	0.047	**1.080**	**102,587**
11	95,000	95,000	0.040	0.053	0.055	0.784	0.132	0.016	0.022	0.048	**1.148**	**109,106**
12	95,000	95,000	0.040	0.053	0.055	0.729	0.132	0.016	0.021	0.047	**1.093**	**103,809**
13	95,000	95,000	0.039	0.053	0.055	0.790	0.132	0.016	0.022	0.048	**1.154**	**109,618**
14	95,000	95,000	0.040	0.053	0.055	0.776	0.132	0.016	0.022	0.048	**1.140**	**108,311**
15	95,000	95,000	0.039	0.053	0.055	0.788	0.132	0.016	0.022	0.048	**1.152**	**109,455**
16	95,000	95,000	0.039	0.053	0.055	0.811	0.132	0.016	0.022	0.048	**1.175**	**111,625**
17	95,000	95,000	0.039	0.053	0.055	0.796	0.132	0.016	0.022	0.048	**1.160**	**110,239**
18	95,000	95,000	0.039	0.053	0.055	0.879	0.132	0.016	0.022	0.048	**1.243**	**118,128**
19	95,000	95,000	0.040	0.053	0.055	0.879	0.132	0.016	0.022	0.048	**1.244**	**118,134**
20	95,000	95,000	0.040	0.053	0.055	0.879	0.121	0.016	0.022	0.048	**1.233**	**117,129**
21-25	399,885	399,885	0.040	0.053	0.055	0.940	0.149	0.017	0.023	0.056	**1.332**	**532,605**
26-30	288,131	288,131	0.041	0.054	0.056	1.074	0.169	0.017	0.025	0.079	**1.512**	**435,639**
31-32	114,742	89,514	0.031	0.043	0.055	1.126	0.179	0.017	0.025	0.077	**1.554**	**178,271**
33-36	161,062	0	0.000	0.000	0.052	0.316	0.189	0.018	0.025	0.038	**0.638**	**102,808**
Total	**2,918,791**	**2,731,530**	**0.037**	**0.049**	**0.055**	**0.756**	**0.143**	**0.017**	**0.022**	**0.052**	**1.131**	**3,301,274**
Percent			3.3%	4.4%	4.9%	66.8%	12.6%	1.5%	2.0%	4.6%	100.0%	
Per Tonne Drilled/Blasted			0.40	0.053								

Mine operating costs include:

- All mine labor, salaried and hourly
- Consumables, fuel, parts, tires, etc.
- An allowance for mine related overheads
- An allowance for general operating expenses in the mine offices
- Blasting supplies and loading of explosives
- All mine functions to deliver material to the dumps, stockpiles, or crushers
- Remining of the low-grade stockpile and delivery to the primary crusher
- Pre-production access development to the mine and material storage areas
- Removal and stockpiling of surface alluvial material from the mine area and the first 100m of the toe of the waste and low-grade storage areas
- Recontouring of the waste storage areas concurrently during the mine life
- Remining and spreading of surface alluvial material on the recontoured dumps

Mine operating costs do not include:

- Process related or crushing costs
- General overhead outside of the mine
- Taxes and property holding costs, etc.
- Contingency

Pre-production development was calculated as part of the operating costs. That cost is treated as a capital cost in the financial evaluation.

The various mine operating cost unit are described below.

Blast Hole Drilling includes the operating cost of the blast hole drills. Bits and downhole accessories are included in the parts and consumables costs along with electric power to operate the drills.

Blasting includes the operating costs for blasting. Blasting labor and blasting agents costs are included in the estimate.

Loading includes the total loading costs for both the $40m^3$ shovels and the $17m^3$ front-end loader.

Hauling includes the haulage costs for all material handled by the 345-tonne haul trucks.

Auxiliary includes the costs of all of the auxiliary equipment.

General Mine includes unallocated costs that are required to sustain the operations. The labor costs in this category include the laborers. Parts and consumables costs are set at $0.015 per tonne of material to cover fuel in the minor equipment units and general supplies at the mine site.

General Maintenance includes unallocated costs that are required to sustain the maintenance group. The labor costs for lube, fuel, tire men, and laborers are included in this category. A component of the maintenance labor mechanics, helpers, welders, and electricians are allocated to general maintenance for the light vehicle maintenance. Parts and consumables are set at $0.015 per tonne total material to cover fuel in maintenance equipment and general supplies in the shops and warehouse.

Mine General and Administration (G&A) includes the labor costs of the personnel on the salaried list. VS&A costs are also included in the G&A category.

17.1.2 February 2011 Definitive Estimate Operating Cost Update

For the February 2011 Definitive Estimate, ICM was required to update the pre-production operating costs including the ore and waste pre-stripping cost per tonne.

The capitalized pre-production operating costs include:

- **Crusher Access Road** — This road is from the truck shop platform to the primary crusher platform. The road includes a 35m wide mine haulage road and a 10m wide vehicle road to provide access to the plant area.
- **Pit Initial Access Roads** — These roads are for accessing the mine, stockpile, and dump areas for the pre-production stripping operation.
- **Roads for Alluvium/Tails Removal** — These roads are for hauling the alluvium/tails material from the excavation areas to various stockpiles.
- **Alluvium/Tails Removal** — Alluvium/Tails material are required to be excavated from under the projected dump and stockpile toes for geotechnical stability purposes. Approximately 5.14 million m^3 of material is to be removed. The alluvium material will be used in dump reclamation activities at a future date.
- **Pre-production Stripping** — The mine requires approximately 55 Mt to be removed before plant mechanical completion by using the major mine equipment fleet. The time frame for this activity is 9 months.

The 2011 updated mine operating cost projection for pre-stripping includes the following substantive revisions to the 2007 cost projection.

- Salary and hourly labor rates increased
- Fuel price increase to $0.824 per liter ($0.609/ℓ in 2007) and consumption is higher due to more operating equipment hours
- Maintenance contract costs — $5.39 million increase
- Power price increase to $0.05169 per kWh ($0.04706/kWh in 2007)

- Updated tire prices with those from a local vendor
- Updated all hourly repair, lube/oil, and wear part costs. There were two sources for the costs:
  - 2010 Mine and Mill Equipment Costs — An Estimator's Guide published by InfoMine USA, Inc.
  - The Group's budget estimates for repairs, parts, and components
- Added a 16M grader to the fleet
- Revised construction period and pre-production period support equipment requirements based on the seven quarter construction period.
  - This revision is what set the work schedule since a finite fleet of equipment is available only.
- Added more salary staff in engineering per operations superintendent's direction
  - Increased the number of operations foremen during the construction period
  - Six surveyors for LOM
  - Added more mining engineers for six total between senior engineers and mining engineers. The engineers were added to ensure enough manpower for long and short range planning as well as other tasks.
  - Added one more geologist
- Updated maintenance salaries staff per maintenance superintendents
  - Added additional maintenance planners
  - Added salaried staff to the construction period
  - Added light vehicle mechanics earlier in the construction schedule
  - Increased the number of hourly maintenance personnel
- Add more trainers and training facilities
- Added more laborers to fill dump spotter positions
  - Also added more supervision in the early months of construction
- Updated explosives and accessories costs obtained by the Group
- Updated software license costs
  - 2010 MineSite® quote from another project
- A contingency of 8% was applied to the estimated operating costs for the LeTourneau wheel loader, since it has not been ordered and the mine support equipment. A contingency of 2% was applied to the major mine equipment with Caterpillar, Bucyrus, and Atlas Copco equipment purchase orders to cover the variability of freight costs.

- Construction start date was delayed from April 2010 to May 2011, thus the major mine equipment deliveries to the site were delayed by one year, which increased the unit prices for most of the major mine equipment, except the Bucyrus electric shovels.

The increased operations cost per tonne of material mined is best indicated by a comparison of the pre-production cost per tonne, as indicated in Table 17.2.

TABLE 17.2
PRE-PRODUCTION OPERATING COSTS PER TONNE COMPARISON

Pre-production Period	2007 Feasibility Study ($/t)	2011 Definitive Estimate ($/t)
PPQ1	0.0	1.997
PPQ2	0.961	1.016
PPQ3	0.762	1.030
PPQ4	0.771	0.00
Average	**0.817**	**1.147**

In Behre Dolbear's opinion, the Definitive Estimate mining costs for the 2007 PPQ3 and PPQ4 (46 Mt) and the 2011 PPQ2 and PPQ3 (48 Mt) provide the most reliable indicator of the increased mining cost for the upgraded 2011 projected costs versus the 2007 estimate. The comparison, therefore, is an increased cost of 33.5%. This factor applied to the 2007 mine life projected a cost of $1.13 per tonne results in a third quarter 2010 projected mine life average cost of $1.51 per tonne that compares favorably with current comparable costs for existing mining operations. This cost escalated with CostMine October 2011 surface mine escalators to the fourth quarter 2011 at 4.3% results in a projected mining cost of $1.57 per tonne of material mined.

17.2 PROCESSING, INFRASTRUCTURE, AND G&A

MCP has not escalated the Toromocho Project operating costs since the 2007 estimate. Behre Dolbear has escalated the operating costs for the concentrator, molybdenum hydrometallurgical plant, and G&A to the fourth quarter of 2011. In order to obtain an order of magnitude estimate, the following escalators were used for the various work centers.

- Labor — 21% (Does not include the 8% profit sharing labor agreement)
- Consumables — 49.6%
- Power — (Current costs are estimated at $0.05169 by contract)
- Other — 29.2%
- Maintenance Supplies — 17%

The operating costs for concentrator, hydrometallurgical plant, infrastructure, and G&A were adequately developed in 2007. Table 17.3 represents an order of magnitude estimate by Behre Dolbear of the fourth quarter 2011 costs.

TABLE 17.3
FOURTH QUARTER 2011 OPERATING COSTS — CONCENTRATOR, MOLYBDENUM HYDROMETALLURGICAL PLANT, INFRASTRUCTURE, G&A

Operation	Unit Costs (US$)
Concentrator	5.28/t ore milled
Molybdenum Hydrometallurgical Plant	3,612/t MoO_3 (Produced)
Infrastructure	0.06/t ore milled
G&A	1.42/t ore milled

In the 2007 Feasibility Study, the cost of burned lime was estimated at $69 per tonne delivered to the site storage facilities. This cost appears to be derived from the in-house cost of lime, as recommended in the Phoenix Study of $50.25 per tonne and an unknown additional sum of approximately $19 per tonne, perhaps the cost of rapidly escalating fuel and transportation costs. The $69 per tonne budgeted sum was escalated with the same escalator as all other consumables to arrive at the fourth quarter 2011 costs.

If the Toromocho Project was to purchase lime from outside suppliers, the cost would be $150 per tonne in 2007 dollars and, given the rapidly rising costs for fuel, could be in excess of $200 in end of fourth quarter 2011 costs.

Because no company owned limestone deposit has been identified and no facilities built, the current cost for lime in Table 17.3 is a reasonable approximation of the cost of lime for operating the concentrator facility.

The operating cost structure for the concentrator, molybdenum hydrometallurgy plant, infrastructure and G&A are reasonable for an operation this size. The risk associated with the costs shown in Table 17.3 is rated as moderate.

17.3 CONCLUSIONS

The generation of and backup for the operating costs is thorough and professional. Both IMC and Aker Solutions are reputable and experienced contractors.

Behre Dolbear has based its escalation for the 2007 detailed operating cost estimate on IMC's update of the pre-stripping cost per tonne of material mined. IMC is in the process of providing updated mining costs by year for the Toromocho Project production schedule.

Behre Dolbear has used currently available Mining Cost Service general escalators to escalate the 2007 processing, infrastructure, and G&A costs per tonne of ore milled and per tonne of MoO_3 produced.

17.4 RISK ANALYSIS

The projected 2007 Toromocho Project operating costs are based on sound engineering and pricing. Behre Dolbear's fourth quarter 2011 escalated costs are based on available escalation factors — **Low to Moderate Risk/Unlikely to Possible**.

18.0 MARKETING AND SALES

18.1 CONCLUSIONS

The study has delineated a composite assay for the typical copper concentrates as:

- Copper 26.5%
- Silver 256 g/t
- Arsenic 0.08%
- Zinc 2.89%

Behre Dolbear has stipulated to the copper concentrate grade in the metallurgical discussion and adjusted the silver grade based on the discussion in Section 10.2.2. Arsenic-bearing ores, which are deemed problematic, will be stockpiled and treated as waste until further studies indicate otherwise.

18.2 RISK ANALYSIS

The zinc assay at 2.89% appears low. A review of locked cycle testing indicates that the zinc assays in the final copper concentrates could average as high as 10% (Table 10.2 and Table 10.3). The risk to the project for zinc penalties is **Low to Moderate/Unlikely to Possible**.

There is no discussion in the marketing report of concentrate flow moisture requirements, insurance, and unexplained smelter losses incurred during concentrate delivery and smelting operations. The concentrate treatment charges are estimated at $79 for long-term contracts with no price participation and $10 per tonne for spot treatment charges. All of these terms are for 30% copper concentrates. MCP may be penalized for its lower copper content when and if the market loosens up for concentrates and will in all probability also face negotiation difficulties over its high insol levels over 10%. Behre Dolbear has used publicly available studies and studies provided to the Group by CRU to arrive at TC/RC costs of $70 and $0.07 for the planned copper concentrate production. The concentrate marketing risk is rated at **Low to Moderate/Unlikely to Possible** for copper concentrates due to uncertainties in the future smelter schedules and **Low/Unlikely** for MoO_3 product quality.

19.0 ECONOMIC ANALYSIS

Behre Dolbear has prepared an economic analysis for the Toromocho Project in Peru. The February 2011 Aker Solutions Definitive Estimate, as adjusted by Behre Dolbear (Table 16.2), has been incorporated into the model. The definitive capital investment is in third quarter 2010 dollars, and has been updated by Behre Dolbear to the fourth quarter 2011 dollars. The economic model is considered to be as of the fourth quarter 2011. A new production schedule has been developed by Behre Dolbear incorporating dilution and mining losses, which has been used in the analysis. Metal prices are as forecast by several forecasting companies in August 2011 and September 2011, and provided by the Group for use in the economic analysis.

Behre Dolbear economic analyses are 100% equity analyses that show the basic economics of the project. The analyses do not incorporate financing (interest paid and loan principal paid back). The analyses do not incorporate any losses carried forward for tax purposes from the construction period and do not incorporate any refund of value-added taxes (VAT) previously or currently paid. Should financing be incorporated into an economic model, it would affect the tax situation by lowering the employee profit-sharing tax as well as the income tax, due to the deductibility of interest. Deductibility of losses carried forward would lower income taxes. Refund of VAT would increase cash flow in the year of the refund.

19.1 STRUCTURE OF THE SPREADSHEET

Behre Dolbear has prepared a cash flow spreadsheet that shows 3 pre-production years and 36 production years. It is assumed that pre-production year -3 is 2011. Production year 36 is 2049. Production is shown in the top portion of the spreadsheet (Appendix 3.0).

Tonnages of waste, ore to the mill, low-grade copper ore to a stockpile, and high arsenic copper ore to a stockpile are shown. Waste is dumped and not considered again. Ore designated for the mill is sent there directly; thus, the annual tonnage of mill-grade ore mined is equal to the mill-grade ore milled. Low-grade copper mineralization is stockpiled; then reclaimed in years 32 to 36. High arsenic stockpiled material is not considered again in the model, but could be processed at some point. No decision has been made regarding this material.

Grades for copper, silver, and molybdenum are shown for the high-grade and low-grade material. Annual grades for the mill ore are taken directly from the Behre Dolbear production plan. Grades for the low-grade stockpiled material are the average grades for the entire stockpile, since there is no way to know how the material will be stacked and then reclaimed.

The total metal contained in the material sent to the mill is calculated and shown. Metal recoveries are shown and metal recovered to concentrates (copper, silver) or to chemical grade molybdenum oxide are shown as tonnes or pounds (copper, molybdenum) or grams or troy ounces (silver). The constituents of the concentrate are shown along with the tonnage of concentrate and molybdenum product.

Metal prices are shown next. These are the average projections for the next 5 years (2011-2015) and a long-term price projection by several price forecasting companies (2016 forward). The details of the price forecasts are discussed later in this section.

Copper, silver, and molybdenum payments are shown, along with the various treatment charges and transportation and handling charges.

Once income is determined, the operating costs are deducted from the revenue to calculate the net income before taxes. Operating costs considered are mining of ore, reclaim stockpiled material (years 32-36), processing in mill and molybdenum plant, and infrastructure and G&A. There is a royalty to Centromin of 1.71% for copper prices above $1.10 per pound (lesser rates for lower prices). Depreciation for all investments is determined and entered as operating cost. Employee profit sharing is calculated as 8% of net smelter return less cash operating costs and depreciation. Net income before taxes is net smelter return less cash operating costs, depreciation, and employee profit sharing.

Income taxes are determined at a rate of 30%. Any losses carried forward are deducted before determining income tax. Net cash flow from operations is determined from net smelter return less cash operating costs, employee profit sharing, and income taxes.

The Peruvian taxation system modeled that is in affect on September 30, 2011. Peru revised its taxation of mining companies with legislation passed in September 2011, but the new laws did not take effect until October 1, 2011. The Group had previously signed a "Tax Stabilization Agreement," and because of that, is not affected by most portions of the new laws. The Group is affected by the "Special Mining Burden," which applies to companies that have a tax stabilization agreement and then voluntarily sign a further agreement regarding the "Special Mining Burden." The Group informed Behre Dolbear that the Group has signed an agreement that they are prepared to negotiate the "Special Mining Burden" rates as they apply to them. They do not have to accept the rates in the new law, since they have a tax stabilization agreement, but can negotiate the rates for the "Special Mining Burden." Since the negotiations will not take place until 2012 and the Group will not know the rates that apply to them, the Group has requested that the tax system in affect on September 30, 2011 be used in the cash flow analysis. Part of the purpose of the "Special Mining Burden" is to fund infrastructure by the government. The Group's position is that they are doing just that by means of the new town site and water treatment plant. They see a credit against the "Special Mining Burden" for these expenditures as a negotiating point next year.

Capital investments are tabulated next, then net cash flow is determined and shown. Net cash flow is net smelter return, less cash operating costs, less employee profit sharing, less income taxes, less capital.

19.2 METAL PRICES

For 2016 and thereafter, the long-term prices of $2.57 per pound (copper), $22.50 per troy ounce (silver), and $15.17 per pound (technical molybdenum oxide). However, the project expects to produce chemical grade oxide, which carries a 10% premium over tech oxide, so the long-term price used was $16.69.

Base case metal prices are the averages of price forecasts made in the period August 2011 and September 2011 by reputable firms that are in the business of providing forecasts. The data were compiled by the Group and are used by Behre Dolbear at the Group's request. Behre Dolbear does not make forecasts of its own, but relies on those of other companies. Data from the forecasts are provided as Table 19.1. Note that not all forecasters predicted all metals for all periods. Thus, the average prices forecast are based only on the forecasts made.

TABLE 19.1
SUMMARY OF METAL PRICE FORECASTS

COPPER PRICE

December 31 — Calendar Year	*Estimates in US$/lb*						
Broker	**Estimate Date**	**2011E**	**2012E**	**2013E**	**2014E**	**2015E**	**LT**
JP Morgan	2011-09-27	4.37	4.48	4.24	3.86	—	2.49
Salman Partners	2011-09-27	4.35	4.34	4.21	3.45	—	2.75
Citi	2011-09-27	—	—	3.87	3.65	3.21	2.60
GS	2011-09-27	4.31	4.85	4.25	—	—	—
Morgan Stanley	2011-09-26	4.33	4.60	3.80	—	—	2.71
BoA ML	2011-09-26	4.32	4.50	4.10	—	—	2.60
Credit Suisse	2011-09-26	4.28	4.45	3.80	3.70	—	2.50
RBC Capital	2011-09-26	—	3.50	—	3.51	3.50	—
Desjardins	2011-09-26	4.50	5.00	—	—	—	—
Canaccord	2011-09-16	4.27	4.30	4.00	—	—	2.50
Macquarie Research	2011-09-12	4.67	5.25	3.50	—	—	—
RBC	2011-09-12	4.20	—	4.00	4.25	4.50	—
Morgan Stanley	2011-09-12	4.40	4.60	—	—	—	2.71
TD Newcrest	2011-09-12	4.17	4.25	—	3.50	3.00	—
RBS	2011-09-09	4.37	4.65	5.23	—	—	2.50
Deutsche Bank	2011-09-09	4.33	4.93	4.31	3.63	—	—
Credit Suisse	2011-09-08	4.70	4.50	—	3.70	—	2.50
Raymond James	2011-08-31	4.37	4.65	5.00	5.00	5.00	2.50
BMO	2011-08-10	4.32	4.20	—	—	—	2.50
Analyst Mean Benchmark Prices		**4.37**	**4.53**	**4.18**	**3.83**	**3.84**	**2.57**

TABLE 19.1
SUMMARY OF METAL PRICE FORECASTS

MOLYBDENUM PRICE

December 31 — Calendar Year	Estimates in US$/oz						
Broker	**Date**	**2011E**	**2012E**	**2013E**	**2014E**	**2015E**	**LT**
Citigroup	2011-09-27	15.76	15.20	15.48	—	—	14.00
DB	2011-09-27	15.91	17.50	17.00	16.00	—	14.00
Credit Suisse	2011-09-26	16.92	18.00	17.50	16.50	—	15.00
Canaccord	2011-09-16	16.75	18.00	18.00	16.00	—	15.00
TD Newcrest	2011-09-12	17.83	20.00	25.00	20.00	18.00	15.00
Raymond James	2011-08-31	16.01	18.00	19.00	19.00	19.00	14.50
BMO	2011-08-10	16.90	16.00	15.00	—	—	14.00
RBC	2011-08-03	17.75	20.00	25.00	—	—	—
JP Morgan	2011-08-05	16.30	19.00	—	—	—	19.00
Jennings Capital	2011-06-22	16.25	16.13	16.00	16.00	—	16.00
Analyst Mean Benchmark Prices		**16.64**	**17.78**	**18.66**	**17.25**	**18.50**	**15.17**

SILVER PRICE

December 31 — Calendar Year	Estimates in US$/oz						
Broker	**Date**	**2011E**	**2012E**	**2013E**	**2014E**	**2015E**	**LT**
JP Morgan	2011-09-27	20.24	38.52	35.73	—	—	18.00
Deutsche Bank	2011-09-27	20.10	36.71	41.00	39.00	36.00	—
Salman Partners	2011-09-27	20.24	40.00	43.75	33.00	25.00	20.00
RBC Capital	2011-09-26	20.00	39.00	42.50	40.00	35.00	25.00
Credit Suisse	2011-09-26	20.34	35.50	30.00	—	—	20.00
BoA ML	2011-09-26	20.17	33.77	35.60	35.70	—	—
Morgan Stanley	2011-09-26	20.26	36.60	36.90	32.98	—	—
Canaccord	2011-09-16	39.01	41.00	35.00	31.00	—	22.00
TD Newcrest	2011-09-15	37.24	40.00	32.00	—	—	30.00
Analyst Mean Benchmark Prices		**24.18**	**37.90**	**36.94**	**35.28**	**32.00**	**22.50**

Behre Dolbear has compiled historical metal prices for the 5 years prior to September 30, 2011. These metal prices and the average metal prices for the 5-year period ending September 30, 2011 are shown on Table 19.2. The 5-year average metal prices for the period October 1, 2006 through September 30, 2011 have been used for a sensitivity analysis, as have the third quarter 2011 prices (considered "current prices" for the purposes of the analysis).

TABLE 19.2
AVERAGE METAL PRICES — JANUARY 1, 2006 THROUGH JUNE 30, 2011

	Copper (US$/lb)	Molybdenum (US$/lb) Low, as quoted	Average of Low and High Quotes	Molybdenum (US$/lb) High, as quoted	Gold (US$/troy ounce)	Silver (US$/troy ounce)
October 2006	$3.40	$25.75	$27.13	$28.50	$580.61	
November 2006	$3.19	$25.00	$25.50	$26.00	$624.87	
December 2006	$3.02	$24.50	$25.25	$26.00	$625.63	
4Q2006						$12.55
January 2007	$2.57	$24.30	$24.90	$25.50	$632.34	
February 2007	$2.46	$25.00	$25.50	$26.00	$662.53	
March 2007	$2.91	$27.50	$28.88	$30.25	$653.79	
1Q2007						$13.27
April 2007	$3.53	$27.60	$28.93	$30.25	$680.80	
May 2007	$3.48	$28.15	$29.33	$30.50	$666.87	
June 2007	$3.38	$32.00	$33.50	$35.00	$654.29	
2Q2007						$13.32
July 2007	$3.61	$31.75	$33.38	$35.00	$664.54	
August 2007	$3.42	$31.00	$33.00	$35.00	$667.58	
September 2007	$3.48	$31.50	$33.25	$35.00	$711.54	
3Q2007						$12.67
October 2007	$3.62	$31.00	$33.00	$35.00	$756.20	
November 2007	$3.12	$32.75	$33.38	$34.00	$811.94	
December 2007	$3.08	$32.00	$32.93	$33.85	$808.94	
4Q2007						$14.27

TABLE 19.2
AVERAGE METAL PRICES — JANUARY 1, 2006 THROUGH JUNE 30, 2011

	Copper (US$/lb)	Molybdenum (US$/lb) Low, as quoted	Average of Low and High Quotes	Molybdenum (US$/lb) High, as quoted	Gold (US$/troy ounce)	Silver (US$/troy ounce)
January 2008	$3.24	$32.75	$33.00	$33.25	$884.15	
February 2008	$3.57	$33.00	$33.25	$33.50	$920.38	
March 2008	$3.77	$33.30	$33.55	$33.80	$963.81	
1Q2008						$17.45
April 2008	$3.93	$32.80	$33.05	$33.30	$904.30	
May 2008	$3.79	$32.00	$32.25	$32.50	$890.06	
June 2008	$3.72	$33.20	$33.40	$33.60	$882.50	
2Q2008						$17.06
July 2008	$3.79	$33.50	$33.75	$34.00	$932.80	
August 2008	$3.46	$33.75	$33.88	$34.00	$835.19	
September 2008	$3.22	$33.75	$33.88	$34.00	$822.06	
3Q2008						$15.07
October 2008	$2.31	$29.50	$30.40	$31.30	$827.70	
November 2008	$1.70	$ 9.50	$10.25	$11.00	$763.25	
December 2008	$1.41	$ 9.25	$ 9.75	$10.25	$828.05	
4Q2008						$10.37
January 2009	$1.49	$ 9.25	$ 9.50	$ 9.75	$853.62	
February 2009	$1.50	$ 8.75	$ 8.93	$ 9.10	$946.38	
March 2009	$1.68	$ 8.50	$ 8.65	$ 8.80	$907.56	
1Q2009						$12.53
April 2009	$1.97	$ 7.70	$ 7.85	$ 8.00	$895.95	
May 2009	$2.08	$ 8.90	$ 8.95	$ 9.00	$931.12	
June 2009	$2.26	$10.10	$10.30	$10.50	$948.62	
2Q2009						$13.73

TABLE 19.2

AVERAGE METAL PRICES — JANUARY 1, 2006 THROUGH JUNE 30, 2011

	Copper (US$/lb)	Molybdenum (US$/lb) Low, as quoted	Average of Low and High Quotes	Molybdenum (US$/lb) High, as quoted	Gold (US$/troy ounce)	Silver (US$/troy ounce)
July 2009	$2.37	$10.80	$11.40	$12.00	$ 934.70	
August 2009	$2.77	$17.70	$18.00	$18.30	$ 947.81	
September 2009	$2.82	$14.50	$14.75	$15.00	$ 997.20	
3Q2009						$14.70
October 2009	$2.84	$13.00	$13.25	$13.50	$1,046.31	
November 2009	$3.06	$10.80	$11.40	$12.00	$1,133.50	
December 2009	$3.21	$10.85	$11.00	$11.15	$1,132.75	
4Q2009						$17.69
January 2010	$3.36	$13.10	$13.40	$13.70	$1,118.06	
February 2010	$3.13	$15.50	$15.85	$16.20	$1,101.69	
March 2010	$3.41	$16.30	$16.80	$17.30	$1,137.00	
1Q2010						$17.09
April 2010	$3.50	$17.75	$18.00	$18.25	$1,149.94	
May 2010	$3.08	$16.80	$17.00	$17.20	$1,202.38	
June 2010	$2.96	$13.40	$13.70	$14.00	$1,230.70	
2Q2010						$18.39
July 2010	$3.07	$13.70	$13.95	$14.20	$1,187.19	
August 2010	$3.29	$15.10	$15.35	$15.60	$1,215.13	
September 2010	$3.49	$15.10	$15.35	$15.60	$1,273.90	
3Q2010						$18.95
October 2010	$3.75	$14.50	$14.88	$15.25	$1,343.88	
November 2010	$3.80	$15.90	$16.10	$16.30	$1,373.50	
December 2010	$4.12	$15.80	$15.95	$16.10	$1,391.83	
4Q2010						$26.59

TABLE 19.2
AVERAGE METAL PRICES — JANUARY 1, 2006 THROUGH JUNE 30, 2011

	Copper (US$/lb)	Molybdenum (US$/lb) Low, as quoted	Average of Low and High Quotes	Molybdenum (US$/lb) High, as quoted	Gold (US$/troy ounce)	Silver (US$/troy ounce)
January 2011	$4.34	$16.90	$17.15	$17.40	$1,361.69	
February 2011	$4.46	$17.75	$17.88	$18.00	$1,370.63	
March 2011	$4.36	$16.60	$16.78	$16.95	$1,426.70	
1Q2011						$32.12
April 2011	$4.30	$16.80	$17.00	$17.20	$1,482.75	
May 2011	$4.06	$16.85	$16.93	$17.00	$1,517.94	
June 2011	$4.13	$16.45	$16.50	$16.55	$1,530.90	
2Q2011						$38.53
July 2011	$4.38	$14.45	$14.63	$14.80	$1,579.31	
August 2011	$4.11	$14.50	$14.85	$15.20	$1,762.95	
September 2011	$3.78	$14.45	$14.60	$14.75	$1,766.13	
3Q2011						$39.06
October 2006	$3.40	$25.75	$27.13	$28.50	$ 580.61	
November 2006	$3.19	$25.00	$25.50	$26.00	$ 624.87	
December 2006	$3.02	$24.50	$25.25	$26.00	$ 625.63	
4Q2006						$12.55
January 2007	$2.57	$24.30	$24.90	$25.50	$ 632.34	
February 2007	$2.46	$25.00	$25.50	$26.00	$ 662.53	
March 2007	$2.91	$27.50	$28.88	$30.25	$ 653.79	
1Q2007						$13.27

TABLE 19.2
AVERAGE METAL PRICES — JANUARY 1, 2006 THROUGH JUNE 30, 2011

	Copper (US$/lb)	Molybdenum (US$/lb) Low, as quoted	Average of Low and High Quotes	Molybdenum (US$/lb) High, as quoted	Gold (US$/troy ounce)	Silver (US$/troy ounce)
Average Prices 4Q2006 through 3Q2011	$3.22		$21.08		$1,014.27	$18.77
Average Prices 3Q2011	$4.09		$14.69		$1,702.80	$39.06

Sources:
Copper — London Metal Exchange cash prices as reported in the Northern Miner
Gold — London Metal Exchange P.M. fix as reported in the Northern Miner
Molybdenum in oxide, as quoted in the Northern Miner, one quote per month at mid-month
Silver — London Metal Exchange, as reported in the Northern Miner

For convenience, the data of Table 19.1 and Table 19.2 are summarized as Table 19.3.

TABLE 19.3

METAL PRICES

Metal	2012	2013	2014	2015	Long-term
Average of Forecasts — Made August 2011 to September 2011					
Copper ($/lb)	$ 4.53	$ 4.18	$ 3.83	$ 3.84	$ 2.57
Molybdenum ($/lb)	$17.78	$18.66	$17.25	$18.50	$15.17
Silver ($/oz)	$37.90	$36.94	$35.28	$32.00	$22.50

Note: Not all metals projected by all forecasters

ACTUAL HISTORICAL

Five-year Average Prices (4Q2006 through 3Q2011)	
Copper	$ 3.22
Molybdenum	$21.08
Silver	$18.77

Third Quarter 2011 Average Prices (considered "current prices" for purposes of report, since costs are estimated as of 4Q2011)	
Copper	$ 4.09
Molybdenum	$14.69
Silver	$39.06

19.3 OTHER INPUT

Metallurgical recovery used was 85% for copper, two percentage points below the feasibility study projection, as specified in Section 10.2.1. Molybdenum recovery for all processes is 65%. Silver recovery is 70%.

The copper-silver concentrate is assumed to contain 26.5% copper. From the copper recovered and this copper percentage in the concentrate, the tonnes of concentrates produced are calculated. Moisture is assumed to 9%, and both the dry tonnes and wet tonnes are calculated. Also shown is the silver, arsenic, and zinc grade in the concentrates. Silver grade is calculated from the metal recovered and the tonnes of concentrates. Silver content ranges from 194 g/t to 766 g/t of dry concentrates, but averages 317 g/t, about 55% greater than the 205 g/t specified in the feasibility study. Arsenic grade of the concentrates is assumed to be 0.08% and zinc content is assumed to be 9%, as explained in Section 10.5.1.

For the most part, the smelter charges and payments were taken from the 2007 Feasibility Study, except for the treatment charge for concentrates and refining charge for copper (TC/RC), which is explained in Section 18.0. The smelter payment percentage is 97.5%, based on the Group's smelter subsidiary, China Yunnan Copper. The payment for silver is estimated at 95%, based on a prior Behre Dolbear study. From the payments for contained metals, the various charges are deducted to yield the net smelter return, considered the annual income to the project.

It is assumed that initial investments are spent one-third in each of the three pre-production years. Initial investment is $2.948 billion, as shown in Table 16.2. Mine sustaining capital is discussed in Section 16.1.3. For the process sustaining capital and G&A sustaining capital, the data were taken from the 2007 Feasibility Study, but increased 30.0%.

19.4 RESULTS

For the base case, the life-of-mine cash flow (undiscounted) is $13.786 billion.

19.5 SENSITIVITY

Sensitivity analyses have been run for various changes in the base case parameters. In addition, sensitivities have been prepared for the five-year average metal prices and for the then current metal prices (third quarter 2011). Note that molybdenum prices cited are for technical grade oxide. The project will produce chemical grade oxide, which carries a 10% premium above the tech oxide prices cited. Results are presented in Table 19.4 (Appendix 3.0).

TABLE 19.4
RESULTS OF SENSITIVITY ANALYSES

Base Case	Undiscounted Life-of-Mine Cash Flow ($ Billions)
Metal Prices	
+10%	16.791
Base	13.786
-10%	10.780
Cash Operating Cost	
+10%	12.776
Base	13.786
-10%	14.794
Initial Capital	
+10%	12.599
Base	13.786
-10%	13.972
Price Alternatives	
5-Year Average Metal Prices	
(Molybdenum prices cited as tech oxide; chemical grade oxide carries 10% premium)	
Cu ($3.22/lb)	
Mo($21.08/lb)	19.590
Ag ($18.77/troy oz)	
Third Quarter 2011	
Cu ($4.09/lb)	
Mo ($14.69/lb)	27.935
Ag ($39.06/oz)	

For nearly all mining projects, the cash flow is most sensitive to changes in metal prices. The Toromocho Project is no exception, as the above results show. If third quarter 2011 prices were to prevail throughout the Toromocho Project, then the cash flow would be over $27 billion. This is compared to the long-term projections by various price analysts, which is the base case. For the long-term price forecasts, the base case shows a life-of-mine cash flow of $13.786 billion. However, should the long-term forecasts be increased 10%, the cash flow becomes $16.791 billion.

19.6 COST COMPARISON

In assessing a mineral property, it is sometimes useful to compare the property's costs and output to the industry as whole. To do this, Behre Dolbear compared the cash cost and production from the Toromocho Project to the rest of the copper industry utilizing World Mine Cost Data Exchange's Dynamic Cost Curve model containing production and cash cost data for mines that produced at least 90% of the western world copper (215 Mines). Mine production cash costs are based on year 2010 actual input costs, prices, and exchange rates updated third quarter 2011.

Behre Dolbear's projected average long-term cash cost of producing a pound of copper from the Toromocho Project is US68.6 cents. This cost includes a credit of US90.2 cents for the silver and molybdenum production as well as cost for treatment and transportation. To ensure comparability between the Toromocho Project and copper producers, the same long-term price for silver and molybdenum production was used, $22.50/oz and $15.17/lb, respectfully.

When compared to other producers in the model, the Toromocho Project's cash cost per pound of copper is just below the 30% mark at 29.3%. This indicates that 70.7% of the modeled copper mine's production cash costs are more than the Toromocho Project's cash cost of US68.6 cents.

Figure 19.1 shows the Toromocho Project's relative ranking to other 215 copper producers. The Y axis represents cash cost per pound and the X axis represents tonnes of production. Each rectangle represents the production of single copper producing entity and its cash costs.

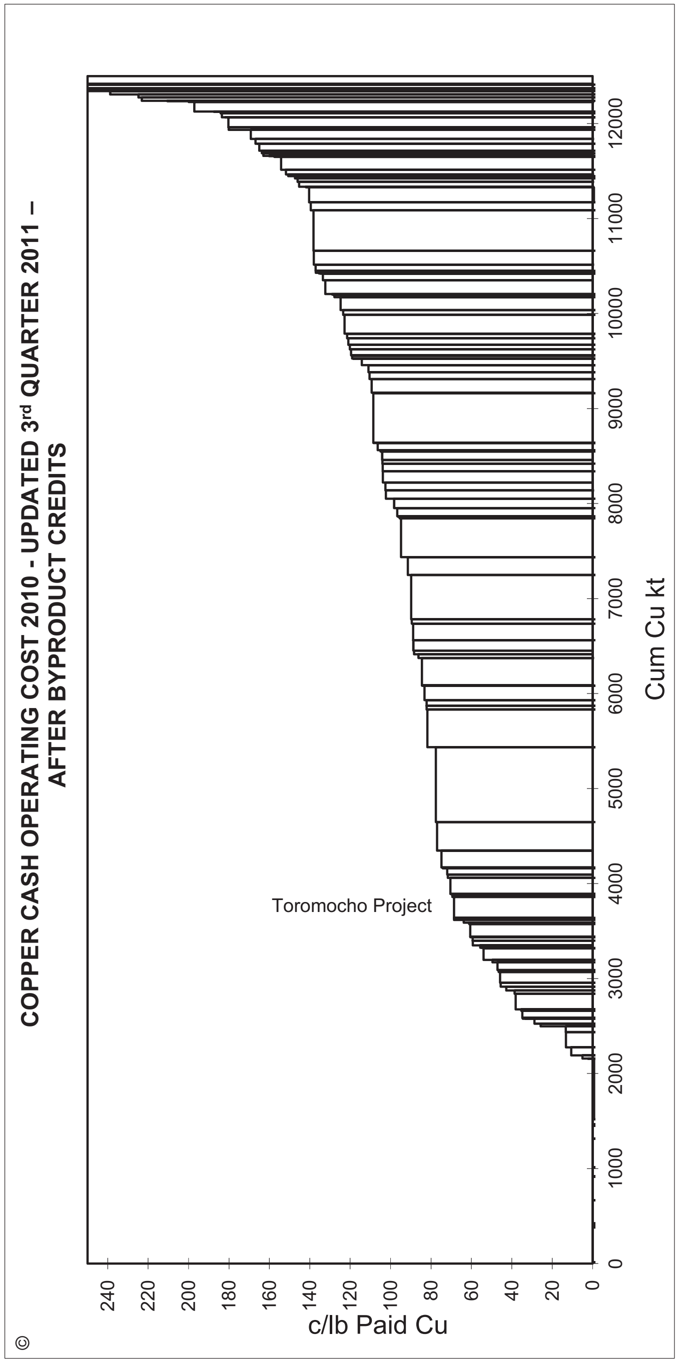

Figure 19.1. Copper cash operating costs — fourth quarter 2011 — after byproduct credits (Source: www.minecost.com)

19.7 CONCLUSIONS

Considering the results of the 2007 Feasibility Study economic analysis, the Behre Dolbear model with 2011 costs and investments, the sensitivity analyses, and the relative position of Toromocho to other copper producing mines, Behre Dolbear concludes that the Toromocho Project is economically viable and has the opportunity for higher returns on investment, if prices remain at high levels. Nevertheless, it should be noted that the mental mining industry is cyclical, and when a new cycle of lower prices will occur is not known.

19.8 RISK ANALYSIS

No risk analysis has been prepared for the economic analysis in general, but risks for operating costs, capital investments, and other items are discussed elsewhere in this report.

APPENDIX 1.0

REFERENCE MATERIAL

APPENDIX 1.0

REFERENCE MATERIAL

Minera Peru Copper S.A. *Toromocho Project Feasibility Study* — Report and Appendices, Aker Kvaerner, November 2007.

Minera Chinalco Peru, S.A., *Basic Engineering Report*, Aker Solutions, February 2009.

Minera Chinalco Peru, S.A., Toromocho Project, *Definitive Estimate*, Estimate Revision Number 4, Volume 1, Aker Solutions, February 2011.

Minera Peru S.A., 2009, Proyecto Toromocho. Estudio de Impact Ambiental (EIA Executive Summary), Resumen Ejecutivo, Knight Piésold, Noviembre.

Chinalco Peru, 2011, Personal Communications with several staff members regarding Environmental, Social, Community, and Permitting Issues and Site Tour.

Mineral Peru Copper Syndicate, S.A., 2007, Toromocho Project, Definitive Feasibility Study, Environmental and Social Components, Knight Piésold, November.

Government of Peru, 2011, Permits and Mining Project Information, various websites.

Toromocho Project, Preliminary Metallurgical Assessment, KD Engineering Co., Inc., October 7, 2003.

Toromocho Project, Resource Estimate Technical Report, Prepared for Peru Copper Inc. Prepared By Independent Mining Consultants Inc., August 25, 2004.

Toromocho Project, Resource Estimate Update Technical Report, Prepared For Peru Copper Inc. Prepared By Independent Mining Consultants Inc., May 11, 2005.

Toromocho Project, Resource Estimate Technical Report, Prepared for Peru Copper Inc., Prepared By Independent Mining Consultants Inc., March 22, 2006.

Miocene Magamatism and Related Porphyry and Polymetallic Mineralization in the Morococho District, Central Peru, Bendezú Aldo, Catchpole Honza, Kouzmanov Kalin, Fontboté Lluís & Astorga Carlos, In: XIII, Geological Congress of Peru, Lima, 2008.

CostMine, Cost Indexes and Metal Prices, October 2011.

APPENDIX 2.0

RESUMES OF BEHRE DOLBEAR'S PROJECT TEAM PROFESSIONALS

ROBERT R. DIMOCK
SENIOR ASSOCIATE, DIRECTOR, and PRINCIPAL

Mining Engineering and Operations, Organization, Human Resources, Strategic Planning, and Optimization

Mr. Robert Dimock has more than 30 years of experience, including over 20 years in executive level management, in the mining industry, with expertise in the areas of general management, corporate strategic planning, project development and management, mining, processing, construction management, and mining engineering in base and precious metals. Mr. Dimock has also had direct oversight of exploration, concentrating, smelting, refining, marketing, and sales, human relations, public and government relations, HSEQ, and legal issues. He has managed copper, lead/zinc, and precious metals operations in both open pit and underground mines. Geographically, he has worked in North and South America, the Pacific Rim, and the Middle East. His credentials include a Bachelor of Science Degree in Mineral Economics and a Master of Science Degree in Mining Engineering. He is a Mining and Metallurgical Society of America Qualified Person.

Mr. Dimock's specific project experience includes conducting:

- Analysis for and implementation of a plus $1 billion modernization program for a major United States copper producer
- Greenfield development from discovery through permitting for a plus $700 million remote Papua New Guinea gold mining operation
- Greenfield analysis and development of several United States-based precious metals operations
- Due diligence examinations and reserve and mining operations disclosure reviews on base metal, precious metal, and coal properties for Behre Dolbear & Company, Inc.
- Mining operations optimization analyses
- Valuation of major precious and base metals operations for purposes of financing, merger, or transfer of assets
- Organizational analysis for establishment of a Middle East national mining company

CORPORATE EXPERIENCE

1997 – Present	Behre Dolbear & Company (USA), Inc., Senior Associate, Director, and Principal
1994 – 1996	Kennecott Corporation, Kennecott Utah Copper Corporation, Executive Vice President and President
1992 – 1993	Rio Tinto, Lihir Management Company Pty. Ltd., President
1963 – 1991	Kennecott Corporation (held various positions):

- Vice President, New Mine Development and Operations
- Director, Utah Copper Division Modernization Project

- Mine Plant Superintendent, Utah Copper
- Manager, Headquarters Mining Engineering Department
- General Mining Operations and Engineering Positions in New Mexico and Nevada

PROFESSIONAL ASSOCIATIONS

- Society of Mining Engineers (Board of Directors 1976-1982, Mining and Exploration Division Chairman 1982)
- Copper Development Association Board, 1994-1996
- International Copper Association Board, 1994-1996
- Mining and Metallurgical Society of America (Member, Qualified Person)

REGISTRATIONS/CERTIFICATIONS

- Qualified Person — Mining and Metallurgical Society of America.

AWARDS

- Society of Mining Engineers, Distinguished Member — 1991

EDUCATION

- Penn State University, B.S. Mineral Economics — 1963
- New Mexico School of Mining and Technology, M.S. Mining Engineering — 1971

PUBLICATIONS/PRESENTATIONS

Mr. Dimock has authored or co-authored nine papers on slope stability and drilling and blasting.

"Kennecott Utah Copper: From Shutdown to World Class Competitor," Westminster College School of Business, Weldon J. Taylor Executive Lecture Series. 1996.

"Copper beyond the Millennium: Challenge and Change for Industry," University of Utah School of Mining, Wilson Lecture in Mining Engineering. 1996.

DR. TONY Y. GUO, P. GEOLOGIST
SENIOR CONSULTANT Geologist

Dr. Tony Guo is the Vice President of Behre Dolbear Asia Inc and Vice President of Behre Dolbear & Company, Ltd. He has over 22 year professional experience in the mineral industries. He has worked on gold, copper, iron, industrial mineral, and coal projects/mines in China, Mongolia, Africa, US and Canada. Dr. Guo's business expertise includes the mineral resource exploration, assessment, acquisition, and project management. Dr. Guo has participated and managed several gold, copper, and coal exploration work in China and Mongolia for the last 10 years. His credentials include a Bachelor of Science Degree in Geology from the Nanjing University as well as a Doctor Degree in Geology and Exploration from China University of Mining and Technology. He is a registered Professional Geoscientist from the Province of British Columbia and a Member of Mineral Exploration of British Columbia, Canada. He meets the requirements for "Competent Person" as defined in the Australian JORC Code and the requirements for "Qualified Person" as defined in Canadian National Instrument (NI) 43-101 for the purpose of mineral resource/ore reserve estimation and reporting. Dr. Guo has involved a number of (independent) technical reports for the Stock Exchange of Hong Kong (SEHK) and Toronto Stock Exchange (TSX) in recent years.

SUMMARY OF QUALIFICATIONS

- 22 years mineral resource exploration and mining industry experience in Asian, North America, and Africa
- Professional Geoscientist registered at Professional Engineer and Geoscientist Association of British Columbia, Canada
- Senior Engineer Title granted by the Jiangsu Provincial Government in China in 1992
- Proven mining and mineral exploration project management skill and experience
- Experience in preparing Canadian National Instrument (NI) 43-101 compliant technical reports and Chinese Geological Report; familiar with Canadian NI 43-101 and Australian JORC Code
- Experience with exploration Quality Assurance/Quality Control (QA/QC) programs
- Professional in sourcing, assessing, and acquiring the mineral property
- Proficient in geology and mining software such as MapInfo, ArcGIS, MAPGIS, and Micromine

CORPORATE EXPERIENCE

1/2011 – Present Behre Dolbear & Asia, Inc. and Behre Dolbear & Company, Ltd., Vice President

12/2009 – 1/2011 China Gold International Resources, Inc., Vancouver, Canada, Exploration and Development Manager, Qualified Person for the Jiama Project

Responsibilities and Accomplishments

- As an Exploration and Development Manager, coordinated and supervised, in 2010, 50,000 meter drilling program in the world class Jiama Cu-Mo deposit through the site visits and daily and weekly drilling reports. I have supervised the core logging and set up the core handling logging and assaying protocols.
- Charged to coordinate with Behre Dolbear, for Jiama ITR and Haywood Security, for the Jiama valuation for the Hong Kong Listing purpose.

9/2006 – 1/2011 Gansu Pacific Mining Company, Gansu, China, General Manager and Board Director

Responsibilities and Accomplishments

- Organized all kinds of exploration works from surface mapping, soil sampling, trenching, aditing, and drilling and responded for the JV company daily management
- Involved in all stages of the project including identifying, acquisition, and exploration
- Organized and involved in the Chinese Detailed Exploration Report writing and resource estimation
- Involved all QA/QC for a three phases drilling program. I am one of the three authors of the Canadian NI 43-101 exploration and resource report. This million ounce gold deposit was sold to a subsidiary of China National Gold Group last year

4/2004 – 6/2006 Jinshan Gold Mines Inc., Vancouver, British Columbia, Canada, Consulting Geologist

- As a consulting geologist, worked for Jinshan Gold Mines to organize the paper, tabular and digital geological, geochemical, and geophysical data collection, preparation, and analysis a China-wide G.I.S. database development for exploration targeting and property evaluation in the numerous gold belts throughout China.
- Also charged to convert all Jinshan native copper data and projects from ArcGIS format to MapInfo format.

- Organized and participated in the grass root exploration work for Au and Cu properties in 3 different areas of Xinjiang, Tibet, and Gansu of Northwestern China in 2005 for Ivanhoe Mines and Jinshan Gold Mines. I had collected the geological, geochemical, and geophysical data from all different sources; compiled and analyzed all the data in MapInfo and ArcView for the field working targets selection purposes.
- Involved in the CSH mine site facility set up and operation, processing plant foundation and leaching pad solution pond construction.
- Involved to get the 217 gold deposit reserve evaluation approval from the Federal Ministry of Land and Resources of China.
- Reviewed and edited the CSH gold deposit reserve report and maps; and submitted them to the Bureau of Land and Resources of Inner Mongolia, China.
- Involved in acquiring the CSH gold mine land usage certification, power line and water pipeline route selection and negotiation with the local government and utility supply company.

2002 – 2010 Under Behre Dolbear, CME, Moose Mountain, and CBM Solution, Vancouver, British Columbia, Canada, Consulting Geologist

Responsibilities and Accomplishments

- In 2010, completed a NI 43-101 Independent Technical Report (ITR) on a Peridotite Project in Henan Province, China for the Canada Affluen Investment Group Ltd.
- In 2010, prepared a technical review report on the First Coal Property in British Columbia, Canada for the Tianjing Renai Group.
- In 2010, helped Behr Dolbear Australia to complete a technical review report on coal washing and coke plant in Heilonjiang Province, China.
- From 2004 to 2009, worked for the several Canadian and Chinese junior mining companies to review their gold, lithium, and poly-mental properties in Xinjiang, Sichuan, Hunan and Hebei of China such as Hunan Pingcha Gold Mine, China Mineral Holding Ltd., Zhong Chuan International, Tri-River Ventures, Dejie Gold Company, etc.
- From 2004 to 2006, worked for the Canadian Sinosun Energy Inc. as a consultant to collect the geology data and samples for the Lower Carboniferous anthracite coal in Zhaotong City, Yunan Province and the Early Jurassic coal in Jixi City, Heilongjiang Province. I have managed two coal drilling projects for Sinosun Energy Inc in Xinjiang and Inner Mongolia.

- In 2006, involved in field mapping, data collection, and compilation for the Mongolian gold and coal resources and geology information using MapInfo and ArcView software and field reconnaissance
- Involved in preparing a NI 43-101 report of a Mongolian Coal project for Vancouver based Gobi Gold Inc together with Moose Mountain Technical Service.
- In 2005 and 2006, worked for the Calgary based CBM Solutions, Vancouver based Ivana Ventures and Christina Ventures on their CBM and coal projects in Canada and China.
- Involved in the core logging and CBM desorption work both on the well site and in the laboratory for the Coal Bed Methane projects in Calgary, Canada.
- Reviewed, collected and translated all the geology, coal, and CBM data for the Late Jurassic CBM project in Xinjiang, Northwestern China and the Permian-Carboniferous CBM project in Huaibei area of Anhui Province in East China, and submitted two CBM data reviewing and field visiting reports for the final NI 43-101 report together with CBM solution.

5/1999 to 2003 Colonia Pipeline Inc., Atlanta, Georgia, USA, GIS Application Developer

Responsibilities and Accomplishments

- Involved in the pipeline construction project from Atlanta, Georgia to Nashville, Tennessee
- Involved in route selection in the office using ArcView GIS software, field GPS surveying, and geo-related data collection, and pipeline construction and risk sheet generation and pipeline data management for the Colonial Pipeline Company

1/1998 –6/1999 Geology Survey of Canada, Vancouver, British Columbia, Canada, Contract Geologist/GIS Expert

Responsibilities and Accomplishments

- Developed a useable and easily queriable database and customized ARC/INFO interface for the Hoodoo Mountain volcano complex. I had integrated all the data sets under ARC/INFO format; built a clean ARC/INFO geology coverage, a look up table and other related coverage and files
- Produced the paper and digital color and white geological map to GSC standards as Open file (GSC Open File 3321)
- Developed TIN and Lattice three-dimensional model; draped geology and topography on these models for view and analysis purpose
- Submitted a project report and digital geology map for the Hoodoo Mountain volcano complex

5/1996 – 1/1997 CME and Company, Inc., Vancouver, British Columbia, Canada, Consulting Geologist

Responsibilities and Accomplishments

- Worked on a gold mineral exploration projects in Mali as a field geologist
- Involved core logging, sample description, mineral and alteration identification; assay data analysis and interpretation, construct column maps and geological sections by Excel and mining software
- Found an anticline structure in the property based on the core logging data
- Worked on several gold exploration projects in Shandong and Guizhou for the Vancouver based junior company in China as a consulting geologist
- Conducted the field visiting, mapping, trenching, report writing, etc.

11/1995 – 5/1997 University of British Columbia, Canada, Vancouver, British Columbia, Canada, Geology Department, Research Associate

Responsibilities and Accomplishments

- Worked on the coal, oil-source rock and charcoal research projects using Micro-FTIR, Rock Eva, Microscope, SEM, and microphotography, processed and analyzed chemical data under supervision of Marc Bustin.
- Collected most coal samples, fungi decayed woods, normal woods, and lighting produced modern charcoal
- Made all the studied charcoal using an electric oven in the laboratory
- Polished and photographed all of the coal and charcoal pallet
- Published 4 papers together with Marc Bustin on the well known international journal of Coal Geology and presented one papers on the international coal and organic petrology conference

8/1994 – 10/1995 West Virginia University, Morgantown, West Virginia, USA, Geology Department, Post-Doctoral Research Fellow

Responsibilities and Accomplishments

- Worked on the West Virginian Pennsylvanian coal and Southern China Permian coal using Micro-FTIR, X-ray, and Microscope under supervision of Jack Renton, including coal sample collection, preparation and analysis, and report writing
- Coordinated a joined research program on China coal geology and structure between China University of Mining and Technology and West Virginian University

- Published one papers together with Jack Renton on the well-known international journal of Coal Geology and presented one papers on the international coal and organic petrology conference

4/1994 – 7/1995 Penn State University, University Park, Pennsylvania, USA, Geology Department, Visiting Scholar of Coal Geology

Responsibilities and Accomplishments

- Worked on the Southern China Permian coal using Microscope and MC/GC under supervision of Professor Alan Davis, including coal sample collection, preparation, analysis, and report writing
- Participated in the coal sample collection, preparation, and storage, maceral identification and statistics under microscope for Coal Sample Bank of U.S. Energy Department at Pennsylvanian State University

1/1989 – 3/1994 China University of Mining and Technology, Beijing, China, Lecture/Associate Professor, Director of Geology and Survey Department, Director for Coal Geologist Association of China (1993-1997)

Responsibilities and Accomplishments

- Work on four coal geology and petroleum exploration and research projects in Xinjiang, Shandong, Guizhou, Sichuan, and Yunnan Provinces in China as a principal investigator
- Teaching coal geology, mine geology, and paleobotany courses to the college and graduate students

AWARD/HONOR

- Young Geologist Award of Geology Association of China — 1992

EDUCATION

- British Columbia Institute of Technology, Burnaby, British Columbia, Canada, Diploma Received: Advanced GIS Program — May 1998
- China Institute of Mining and Technology, Beijing, China, PhD in Geology and Exploration Engineering — December 1987
- Nanjing University, Nanjing, China, BS in Geology — June 1982

PUBLICATIONS

The Professional Geologist System in Canada, The Symposium of New Progress of Coal Geology of China, Beijing, 2009.

The Detailed Exploration Report of Dadiangou Gold Deposit from Liangdang County, Gansu Province, China, 2009.

Registered Geologist System Good for the Mining Capital Market, Geological Exploration Herald, Beijing, 2008.

Technical Report on the Phase I, Phase II, and Phase III Drilling Programs, Dadiangou Property, Gansu, China, Canadian NI 43-101 Geology Report, 2008.

Technical Report on the Phase I Drilling Programs, Dadiangou Property, Gansu, China, Canadian NI 43-101 Geology Report, 2007.

The Petrological Characteristics and Origin of Maceral Lopinite from the Late Permian Coal in Southern China, 23rd Annual Meeting of Tsop, Beijing, 2006.

Coalbed Methane Development in Canada: Unique Challenges and Opportunities, 23rd Annual Meeting of Tsop, Beijing, 2006.

GIS Applications in Hoodoo Mountain Volcano from North British Columbia, Canada. Guizhou Geology, 4, 2004.

Map of Geology of the Quaternary Hoodoo Mountain Volcanic Complex and Adjacent Paleozoic and Mesozoic Basement Rocks, GSC Open File 3321, May 5, 1988.

Micro-FTIR Spectroscopy, Scanning Electron Microscopy and Reflectance of Modern Charcoal and Fungal Decayed Woods: Implications for Studies of Inertinite in Coals, Inter. J. of Coal Geology, 37, 1997.

FTIR Microspectroscopy of Particular Liptinite- (Lopinite-) Rich, Late Permian Coals from Southern China. Inter. J. of Coal Geology, 29, 1996.

ROBERT E. CAMERON, Ph.D.
CONSULTANT Geostatistician

Dr. Robert E. Cameron has over 30 years of experience in geostatistical analysis of ore reserves, computerized mine planning, mine design, computerized studies for mine production optimization, ultimate pit limit optimization, mine efficiency studies, equipment selection and utilization and operations research. He has completed geostatistical estimations or resource and reserve reviews or audits on over 100 properties worldwide during his career. Most recently, Dr. Cameron served as the Vice President, Technical Services for Frontier Mining Ltd. and was responsible for overseeing all technical, engineering, and review for project development for Frontier Mining in Kazakhstan. His responsibilities also included ex-pat oversight of the day-to-day operations of the Naimanjal Mine, a heap leach gold project in Kazakhstan as well as initial geostatistical resource and reserve assessment of potential mine acquisitions for Frontier Mining in China, Indonesia, and Central Asia. Dr. Cameron also had responsibility for supervising, reviewing and quality assurance of all ore reserve work performed by Behre Dolbear as their Director and Vice President of Geostatistics and Mine Planning from 1992 to 1999. Currently, Dr. Cameron is a Registered Member of the Society of Mining, Metallurgy and Exploration and a Member and Qualified Person of the Mining and Metallurgical Society of America in mining and ore reserves. He routinely reviews and audits geostatistical calculations, ore reserves statements, minerals resources statements, computerized minerals models, mine designs, and their forward looking cash flow projections.

He has extensive experience in geostatistics, computerized mine planning and ore reserve estimation using classical and geostatistical ore reserve modeling, selection of mining related computer software, ore reserve audits, computer applications, mineral commodity studies, computer modeling of commodities, and remediation of abandoned mine sites. Additionally, he has a vast knowledge of the full range of mine planning computer software including Techbase, Datamine, MedSystem, Gemcom, Surpac, Vulcan, and Whittle pit optimization. In addition, he has a wide range of knowledge in computer applications, programming, database development and design, computer communications, web site design and network design and implementation.

Dr. Cameron holds B.S., M.S., and Ph.D. degrees in Mining Engineering from the University of Utah and wrote his M.S. thesis on the geostatistical analysis of coal quality and his Ph.D. thesis on the development of the oil shale industry in Utah.

CORPORATE EXPERIENCE

1999 – Present	Robert Cameron Consulting, President and CEO
2007 – 2008	Frontier Mining Ltd., Vice President, Technical Services
1992 – 1999	Behre Dolbear & Company, Inc., Vice President and Director of Geostatistics and Mine Planning
1989 – 1992	Colorado School of Mines, Department of Mining Engineering, Associate Professor
1990 – 1991	U.S. Bureau of Mines, Pittsburgh Research Center, Mining Engineer (Faculty Member)
1985 – 1989	Colorado School of Mines, Department of Mining Engineering, Assistant Professor
1984 – 1985	Terra Tek, Inc., Research Engineer
1980 – 1984	Robert Cameron Consulting, Computer Consultant
1979 – 1984	The University of Utah, Computer Specialist
1978 – 1984	The University of Utah, Teaching and Research Assistant, Mining Engineering

SPECIFIC PROJECT EXPERIENCE

Client	Project/Mine	Description of Work
Carbones de Colombia, S.A.	Review of Carbocol Operations, Columbia Review of Exxon's Resource Ranking Study	Resource and reserve review and mine plan optimization
Societe Generale/ Buchalter, Nemer, Fields & Younger	P.W. Gillibran Aggregate and Sand, Ventura, California	Resource, Reserve, Mine Design and cash flow projections
Ryan Lode Mines, Inc.	Ryan Lode Project, Alaska	Resource and Reserve Review
Jeppson and Lee	Beartrack Project Litigation	Resource, Reserve, Mine Design Review and Cash Flow Projections
Independence Mining	Jerritt Canyon Mines	Resource and Reserve Review
Celebration Mining	Vipont Silver Project	Resource and Reserve Review
Viceroy Mining	Castle Mountain Mine — Haulage Study	Mine Design and Haulage Optimization
IL Minerals	Doby George Project	Resource and Reserve Review
Gem River Mining	Dry Cottonwood Creek Sapphire Project	Resource, Reserve, Mine Design review for IPO

Client	Project/Mine	Description of Work
Tennessee Mining	Conrich Buffalo Mountain Peewee Jellico/Fork Mountain	Resource, Reserve and Royalty Payment Review
Texaco	McKittrick Oil Bearing Diatomite Deposit	Mine Design, Optimization and Resource Review
European Bank for Reconstruction and Development	Baia Mare Gold Tailings Project, Romania	Resource and Reserve Review
ING Capital/Nevada GoldFields	Nixon Fork, McGrath, Alaska	Resource and Reserve Review
Rice, Volland and Gleason	Valuation of State Lands — Mental Health Trust, Alaska	Expert Witness on Royalty and Minerals value
Osiris Gold	Red Mountain, Silverton, Colorado	Resource, Reserve, Mine Design and Cash Flow Projections
Kennecott Minerals	Red Beryl Project, Utah	Resource Estimate
Barclays Bank	Leonor Copper Project, Chile	Feasibility Study Review
International Precious Metals Corp.	Black Rock Project, Arizona	Technical assessment of projected processing and resource
U.S. Steel Minnesota Ore Operations	U.S. Steel	Resource review
Komis Gold	Komis Gold Project	Resource estimate
Glencore International AG	Dalpolimetall Due Diligence Dalpolimetall Feasibility Study Endako Cerro De Pasco	Due Diligence, Feasibility Studies, Resource and Reserve Estimates, Mine Design Review and Cash Flow Analysis Support
North American Palladium Ltd.	Lac des Iles Mines PgM Operation, Geostatistical Calculation of Platinum Group Metals Reserves	Resource and Reserve Estimates
Cornucopia Resources Ltd.	Mineral Ridge Gold	Resource and Reserve Review
Banque Paribas	Construction Monitoring	Resource and Reserve Review
Electra Gold Inc.	Pine Cove Project	Resource and Reserve Review
Philex Gold Inc.	Reserve Review of all Gold Operations, Philippines	Resource and Reserve Review

Client	Project/Mine	Description of Work
Philippines Gold	Masbate Project, Philippines	Resource and Reserve estimate
Cordilleras Silver Mines	El Ocote Silver Deposit, Honduras	Resource and Reserve Review
Namibian Copper Joint Venture (PTY) Ltd.	Haib Porphyry Copper Project, Namibia	Resource and Reserve Review
Dresdner Kleinwert Benson	Aginskoye Gold Project	Resource and Reserve Review
Morris B Hecox, Jr.	Mesquite Mine Royalty Payment Review	Royalty Payment Review
Kinross Gold Corporation	El Dorado Reserves Fort Knox Kubaka Refugio Aginskoe	Resource and Reserve Estimates, Mine Design Review and Cash Flow Analysis Support
Minera Las Cristinas, C.A	Las Cristinas	Resource and Reserve Review
Cornucopia Resources Ltd.	Mineral Ridge Project Audit	Resource and Reserve Review
Arizona Department of Revenue	Valuation of Asarco's Ray Copper Complex	
Gold Capital/U.S. Gold	Tonkin Springs	Resource and Reserve Review
Canadian Imperial Bank of Commerce	Bajo de la Alumbrera Copper/Gold Deposit, Argentina	Resource and Reserve Review
Clifton Mining Company	Review of Gold Hill, Reserves and Business Plan	Resource and Reserve Estimates and 43-101 Filing Support
Greater Lenora Resources Corporation	Greater Lenora Box Mine Athona Mine	Resource and Reserve Estimates and Review
Atlas Corporation	Commonwealth Mine Prefeasibility Doby George Gold Bar	Resource and Reserve Estimates and Review
American Consolidated Mining	ACU Kiewit Zone Evaluation	Resource and Reserve Review
The Toronto Dominion Bank	Fort Knox	Resource and Reserve Review and Completion Test Technical Support

Client	Project/Mine	Description of Work
Servicios Industriales Penoles	La Herradura Project, Mexico	Resource and Reserve Review
CalResources LLC	South Belridge Diatomite Deposit	Resource and Reserve Review
TVX Bohemia Dulni A.S.	Kasperske Hory Gold Project	Resource and Reserve Review
Quest International Management Services	Atlanta Mine Feasibility Study	Resource and Reserve Review
Cornucopia Resources Ltd.	Mineral Ridge II — Dresner	Resource and Reserve Review
U.S. Steel Minnesota Ore Operation	Minntac's East Pit — Haulage Study	Haulage Study
Alumax, Inc.	Venezuela Alumina	Resource and Reserve
Pacific Nickel LTD	NONOC Nickel Technical Due Diligence	Resource and Reserve
South American Gold & Copper	El Pimenton, Chile	Resource and Reserve
Royal Gold Inc	Long Valley Project Review	Resource and Reserve
Wheaton River Minerals Ltd.	Golden Bear Mine — Due Diligence	Resource and Reserve
TVX Gold	Olympias Mine, Greece 1997 Review 1998 Review Skouries Mine, Greece 1997 Review 1998 Review	Resource and Reserve Review to Support Stock Exchange Filings
RFC Services Inc.	RFC-Soledad Mountain	
Lavery Debilly, Barristers & Solicitors	Confidential	Expert Witness Testimony
Apex Silver Mines Corporation		Audit of Prefeasibility Study
Banque Paribas	Amayapampa	
Standard Bank of London	San Gregorio Mine Uruguay	Resource and Reserve Review
Director	Pueblo Viejo Privatization	
Metallica Resources	Metallica's San Pedro	Resource and Reserve Review
Mr. Marc C.H. Waaldijk	Gross Rosebel, Suriname	

Client	Project/Mine	Description of Work
Gold Reserve Corp	Brisas de Ciyuni	Resource and Reserve Review
Toronto Dominion Bank	Fort Knox	Completion Test
Stillwater Mining Company	Stillwater Mine, Platinum-Palladium Reserves 1995 Review 1997 Review 1998 Review	Resource and Reserve Review, Mine Design Review
Francisco Gold Corporation	El Sauzal Conceptual Overview	Project Concept Review
Parker, Poe, Adams, & Bernstein LLP	Valuation Review — MICA Property	Valuation Review
Crowley, Haughey, Hanson, Toole & Dietrich	Crown Butte Mines, Inc.	Resource and Reserve Review, Mine Design Review and Valuation
Newmont Gold Company	Review of Reserves and Valuation of Several Properties	Resource and Reserve Review for SEC Filing Support
Morgan Stanley and Company	Mining Lectures	
AMT (USA) Inc.		
COEUR	Kensington Project — Alaska	Resource Evaluation and Mine Design Review
Mayer, Brown & Platt	Pegasus Gold Ore Reserve Group	Resource Evaluation and Support for Litigation
Vaminco Dominica	Las Salinas Mine — Mine Planning	Mine Design
Cyprus Amax	Mount Emmons	Resource Evaluation and Mine Design
Sunshine Mining	Pirquitas	Resource and Mine Design Review
US Colbalt	Jefferson Mine	Resource Evaluation
Frontier Mining	Naimanjal, Baltemir, Yubiliny, etc.	Resource and Reserve Estimates, Mine Design Review and Cash Flow Analysis. Managed and Provided Oversight of Kazakhstan Operations. Technical Evaluations of Potential Property Acquisitions
St. Genevieve Resources	Emerald Isle	Resource and Reserve Review

Client	Project/Mine	Description of Work
US Energy	Mount Emmons	Resource and Reserve Review and Support
Kobex	Luck Jack Molybdenum	Resource Evaluation and 43 – 101 Filing Support
Northern Dynasty	Pebble Copper Project	Resource and Reserve Review
Southwestern Resources	Sierra Mojada	Resource and Reserve Review
Duluth Metals	Nokomis Deposit, Other Properties	Resource and Reserve Review, Mine Design, Cash Flow Projections and Technical Review for Property Acquisitions

PROFESSIONAL ASSOCIATIONS

- International APCOM Executive Committee Member, 1985-1992
- SME Book Publishing Committee, 1989-1993
- Reviewer for SME in Geostatistics, 1989-1992
- Reviewer for SME in Operations Research, 1987-1996
- Society for Mining, Metallurgy and Exploration, Registered Member
- Mining and Metallurgical Society of America, Member and Qualified Person in Mining and Ore Reserves
- Prospectors & Developers Association of Canada, Member

EDUCATION

- The University of Utah, Ph.D. Mining Engineering — 1985
- The University of Utah, M.S. Mining Engineering — 1980
- The University of Utah, B.S. Mining Engineering — 1977

ACADEMIC EXPERIENCE

Courses Taught

- Mine Surveying Theory and Practice
- Mine Safety
- Mining Engineering Laboratory
- Mine Valuation

- Mine Systems Analysis
- Geostatistical Ore Reserve Estimation
- Microcomputers in Mining
- Computer Graphics
- Advanced OR Techniques in Mining
- Geostatistical Estimation Theory
- Advanced Mining Geostatistics
- Advanced Ore Reserve Estimation
- Introduction to Programming (Fortran)
- Introduction of AutoCAD
- Introduction to Database Design for Mining

Research Projects

- Modified Tree Graph Algorithm for Ultimate Pit Limit Analysis
- Dynamic Network Planning to Define Optimal Production Time Completion
- Heuristic Nonlinear Constrained Maximization of Ore Reserve Tonnage by Blending for Multiple Mining Areas Using Cutoff Grade as the Discriminator
- Probabilistic Risk Analysis in Evaluation of Gold Placer Deposits in Puno Peru
- Cokriging Gold-Silver Auriferous Mineralization: A Multivariate Geostatistics Approach
- Optical Discrimination of Ore Veins
- Optimizing Ultimate Pit Limits by Using Transportation Algorithm
- Development of an Automatic Time Study System for a Jeffrey 1060 Drum Miner
- Mine Management Decision Support Using Existing Monitoring Systems
- Development of an Underground In Situ Stope Leaching Site at the Edgar Experimental Mine

Short Courses

- Pit Optimization Methods
- Introduction to Mining
- Introduction to Reserve Estimation Methods
- Geostatistical Ore Reserves and Mine Planning
- Due Diligence and Project Review

PUBLICATIONS/PRESENTATIONS

Cameron, R.E., *Geostatistical Analysis of Coal Quality in a Western Coal Seam,* M.S. Thesis in Mining Engineering, The University of Utah, 1980.

Cameron, R.E., *Development of an Integrated Computer Package for Oil Shale Information Retrieval and Feasibility Analysis of Public Lands,* Ph.D. Dissertation in Mining Engineering, The University of Utah, 1985.

Lever, P.A.J., R.H King and R.E. Cameron, *Adapting the Intelligent Decision Support System to Variable Mining Conditions,* Preprint for 1990 AIME meeting in Salt Lake City, AIME.

Lever, P.A.J., R.H King and R.E. Cameron, "Algorithms for Adapting to a Dynamic Mining Environment", *Proceedings Seventh Annual Workshop, Mineral Technology Center, Mine Design and Ground Control,* Blacksburg, Va., 1989.

Lever, P.A.J., D.R. Schricker, R.H King and R.E. Cameron, "Electrical Transducer Data Analysis for Coal Mine Management Reports", *Fifth Annual Technical Workplan Status Report — Generic Mineral Technology Center in Mine Systems Design and Ground Control,* Blacksburg, VA. 1987.

Schricker, D.R., P.J.A. Lever, R.H. King and R.E. Cameron, "Intelligent Decision-Support System for Mine Managers", *Mining Engineer,* New York, AIME, 1990.

Schricker, D.R., P.J.A. Lever, R.E. Cameron and R.H. King, "Pattern Classification of Continuous Mining Duty Cycle Data for an Intelligent Decision Support System", *Proceedings of the First Canadian Conference on Computer Applications in the Mineral Industry,* A.A. Balkema, Rotterdam, 1988.

Huttagosol, Panlop, and R.E. Cameron, *Modified-Tree Graph Algorithms for Ultimate Pit Limit Analysis*, Preprint for 1989 AIME meeting in Las Vegas, AIME.

Lever, P.J.A., R.H. King, D.R. Schricker, and R.E. Cameron, "Knowledge Representation Concepts for an Intelligent Decision Support System", *21st Application of Computers and Operations Research in the Mineral Industry,* AIME, 1989

King, R.H., P.J.A. Lever and R.E. Cameron, "Intelligent Analysis of Mining Equipment Sensor Data, "*Advances in Mining Equipment Performance Monitoring,* McGill University, 1990.

Lever, P.J.A., R.H. King, D.R. Schricker, and R.E. Cameron, *Pattern Recognition and Knowledge Representation Techniques for Better Management Information from Monitoring Systems*, Preprint for 1989 AIME meeting in Las Vegas, AIME, 1989.

King, R.H., D.R. Schricker, P.J.A. Lever and R.E. Cameron, *AI Techniques to Improve Management Information from Monitoring Systems,* Preprint for 1989 AIME meeting in Las Vegas, AIME, 1989.

McCarter, M.K., D.J. Green and R.E. Cameron, "Real-Time Slope Monitoring Using a Dedicated Home Computer", *Transactions of AIME,* New York, AIME, 1985

Procarione, J. and R.E. Cameron, "Computer Facilities and the Education of Mining Engineers", Proceedings *of the Second Conference on the Use of Computers in the Coal Industry,* New York, AIME, 1985.

Cameron, R.E., *Idaho Springs Tunnel Detection Test Facility*, CSM Mining Department, Golden, Co. 1988.

Bakhtar, K., A. Black and R. Cameron, " Load Response of Modeled Underground Structures", *Proceedings of the 26th US Rock Mechanics Symposium,* Rapid City, 1985.

Bakhtar, K., A.H. Jones, and R Cameron, "Use of Rock Simulant for Rock Mechanis Studies", *Proceedings of the 27th US Rock Mechanics Symposium, Tuscaloosa*, 1986.

Bakhtar, K., A. Black and R. Cameron, *Dynamic Loading Experiments on Model Underground Structures,* Defense Nuclear Agency, Strategic Structures Division, Washington, D.C., Terra Tek Report, 1985.

Bakhtar, K., A. Black and R. Cameron, *Scale Model Testing of Tunnel Intersections and Large Cavities: Progress Report,* Defense Nuclear Agency, Strategic Structures Division, Washington, D.C., Terra Tek Report, 1985.

Schricker, D.R., P.J.A. Lever, R.H. King and R.E. Cameron, "Progress Toward an Intelligent Decision Support System for Mine Managers", *Sixth Annual Technical Workplan Status Report-Generic Mineral Technology Center in Mine System Design and Ground Control,* Blacksburg, Va. 1988.

Cameron, R.E., *Final Report for Investigation and Geophysical Testing on Excavation of a Tunnel Test Site Under BRDEC Tunnel Detection Program,* CSM Mining Department, Golden, Co., 1988.

Cameron, R.E. and B.E. Carlson, *Mine Safety and Underground Lab Course Notes,* Unpublished Text, CSM (1987-1991).

Cameron, R.E., *Mine Surveying Theory and Practice Course Notes*, Unpublished Text, CSM (1986-1991).

Suboleski, S.C., R.E. Cameron, E.K. Albert, "Chapter 8.3 — Systems Engineering", *Mining Engineering Handbook,* SME, Littleton Co.,

In addition, R.E. Cameron has authored, co-authored or contributed to over 80 confidential scoping studies, pre-feasibility, feasibility reports, project evaluations, reviews and assessments of mining properties.

MARK A. ANDERSON
SENIOR ASSOCIATE Mineral Processing

Mr. Mark A. Anderson has more than 40 years of diversified industry experience in both technical and managerial roles, including project feasibility, mine operations, and project due diligence. His experience includes evaluation of base and precious metal properties with emphasis on processing, metallurgy, project management, and feasibility analysis. His responsibilities have included construction, management, and operation of a 9 million tonne per year open pit copper/ molybdenum mining operation with a 28,000 tonne per day concentrator, and milling and smelting operations at a 21,500 tonne per day copper ore mining and processing operation with byproduct gold.

Prior to joining Behre Dolbear, Mr. Anderson was the general manager of Asamera Minerals Inc.'s U.S. operations where he had combined management responsibility for the underground operations at the Cannon Gold Mine in Wenatchee, Washington and the Gooseberry Mine in Nevada, which produced gold and silver at an average annual rate of 170,000 ounces of gold and 500,000 ounces of silver. He also served as vice president of operations for Marathon Oil Company/Centennial Gold Corporation where he managed exploration, laboratory, and pilot plant operations associated with the development of exploration targets in Colorado. He was also a key participant in mining finance arrangements with investment houses.

Specific experience includes:

- Evaluations of precious and base metal properties with emphasis on processing, project management, independent engineering, and feasibility analyses.
- Operations management of copper, gold, and molybdenum mining and processing operations.
- Managed exploration, laboratory, and pilot plant operations associated with the development of exploration targets in Colorado. Participated in mining finance arrangements with investment houses abroad.
- Expert witness testimony for copper and molybdenum operations.

CORPORATE EXPERIENCE

2008 – Present	Behre Dolbear & Company (USA), Inc., Senior Associate
1991 – 2008	Behre Dolbear & Company (USA), Inc., Chairman of the Board and Senior Associate
1986 – 1991	Asamera Minerals US, Inc., General Manager, U.S. Operations
1984	Ralph M. Parsons Company, Senior Project Manager
1980 – 1984	Anaconda Minerals Company, Project Manager and Mill Manager, Nevada Moly Project
1978 – 1980	Climax Molybdenum/AMAX, Plant manager
1964 – 1978	Kennecott Copper Corporation, Nevada Mines Division, Reduction Plant Superintendent
1962 – 1964	Aerojet General Corporation, Development Engineer
1961 – 1962	U.S. Bureau of Mines, Research Engineer

RELEVANT EXPERIENCE

Copper/Molybdenum

- Design responsibility for the construction of a 3,000,000 TPY copper leach and electrowinning facility.
- Project Manager for due diligence and independent engineer role on a Copper SX/EW operation in Nevada.
- Design, start up, and operation of a 28,000 TPD molybdenum/copper concentrator and concentrate ferric chloride leach facility. Project came on-line under budget, with favorable results in operating costs and concentrate quality.
- Managed the operation of a multi-product molybdenite conversion plant, producing over 40,000,000 pounds of moly per year. Responsible for all plant-related activities and personnel, including working successfully with a highly militant UAW represented work force. Annual operating and capital budgets of over $50,000,000.
- Mr. Anderson spent 10 years as chief metallurgist and mill superintendent for Kennecott, Nevada Mines Division where he managed ore processing operations which recovered by-product molybdenite from 1,500 TPD of copper concentrates. He also managed the development of specific flowsheets utilizing heat treatment, cyanide, hydrogen peroxide, Noke's reagent and sodium hydrosulfide to modify the selective flotation of molybdenite.
- He managed the smelting and milling operations of Kennecott's Nevada Mines Division from 1976 to 1978. Operations include a two reverberatory, three converter operation and a mill capable of processing 21,500 TPD ore.
- From 1964 to 1976, various positions were held in Kennecott's Nevada Mines Division, including industrial engineer in the Mines and Reduction Plants, Concentrator metallurgical engineer, and mill superintendent.

- Mr. Anderson's experience includes design and start up of a molybdenum/copper concentrator, plant manager for a molybdenum/sulfide conversion plant, and mill superintendent for a copper/molybdenum concentrator; project manager for a due diligence and optimization study for large underground mine using blast hole stoping with an underground concentrator. Mr. Anderson has general open pit and concentrate experience in the design, construction, operation, and management of large copper and molybdenite projects with mining and milling rates ranging from 21,500 to 40,000 TPD. He also has conducted due diligence analysis of ferro-moly production in the United Kingdom and Spain, molybdenite conversion facilities in the Netherlands, and small boutique molybdenum production facilities in Sweden and Italy.

- While at Anaconda, he managed the design, construction, and start up of a 22,000 TPD molybdenum concentrator producing over 13 million pounds of molybdenum per year and by-product copper. The process operations included the production of concentrates, concentrate upgrading by ferric chloride removal of copper and lead contaminants, and the design of a 24 million pound multiple hearth roaster facility to receive Tonopah and Butte copper concentrates.

- He also served as plant manager for the operation of four, multiple hearth roasters processing over 40 million pounds of molybdenum per year. Products produced were molybdic oxide, ferromolybdenum, pure sublimed oxide and lubricant grade molybdenum di-sulfide. Mr. Anderson directed capital expansions and managed strategic planning for the principal conversion plant of Climax Molybdenum Company/AMAX.

Precious Metals

- Heap Leach consulting and advisory roles including recent experience on a 5,000 TPD heap leach on North Sulewiesi, Indonesia.

- While at Behre Dolbear, Mr. Anderson has acted as independent engineer on open pit and underground gold projects located in Alaska, Canada, Venezuela, and Chile. He has worked with several lending institutions in developing completion criteria applicable to a wide range of project sizes, complexity, and geographic locations.

- He has managed project engineering for the design of the Aurora Gold Project of Hanna Mining Company (Siskon). The project was completed under budget on a fast-track basis in less than four months.

- Mr. Anderson has extensive experience in metallurgical processing with experience in all forms of gold processing and recovery including heap leaching, flotation/concentration, cyanidation and bioleaching. Mr. Anderson has hands-on experience with the treatment of refractory gold ores and is unexcelled in his knowledge of processing operating and capital costs.

- He was project manager responsible for the design and construction package for a gold milling and leach circuit to accommodate ores from underground and open pit operations in Nevada.

- Mr. Anderson was project manager responsible for design and construction package for a flotation concentrate autoclave plant to treat refractory ores at a 1,500 STPD underground gold mining operation in Washington.
- Mr. Anderson was general manager of operations, responsible for managing U.S. operations for an international mining company producing over 150,000 ounces of gold per year from underground operations in Washington and Nevada. As vice president of operations, he was responsible for managing exploration, mining, and metallurgical operations on a 100 square mile placer gold project utilizing gravity separation pilot plant treatment of major bulk sample tonnages in Colorado.
- As president, Mr. Anderson directed a company buy-out team active in the pursuit of a major U.S. mining operation producing over 150,000 ounces of gold per year. He successfully assembled a financing package consisting of equity and bank financing for a $17 million purchase. The resulting negotiations for purchase were unsuccessful.
- Project manager responsible for metallurgical evaluation of treatment methods for use on highly refractory gold ores containing massive sulfides and arsenic in South Carolina.
- Mr. Anderson was project manager responsible for feasibility study to determine project production capability and economics for an 11,000 STPD open pit gold operation utilizing heap leach gold recovery under arctic conditions in Alaska.
- He was project manager responsible for feasibility study to determine project production capability and economics for a 2,000 STPD open pit gold operation utilizing heap leach gold recovery in Nevada.
- As metallurgical engineer, Mr. Anderson was responsible for evaluation of design and operating criteria for a major international bank, contemplating financing on a 14,000 STPD open pit gold operation utilizing heap leaching technology in Chile.
- Metallurgical engineer responsible for forensic metallurgical evaluation of historical gold mining operations which have been associated with a current day Superfund site in Colorado.

Due Diligence

- Mr. Anderson has extensive experience in the preparation of due diligence technical audits and has extensive experience in the valuation of metallurgical test work, process flow sheet design, and concentrator operations in base and precious metals mines. In addition, he has extensive experience in the evaluation of capital and operating costs for plants in remote locations.
- He is very familiar with the requirements for due diligence of feasibility studies as well as serving as an Independent Engineer in the construction of precious and base metals projects. He managed a due diligence review of a precious metals project in northern Canada and also acted as the Independent Engineer on the Andacollo Gold Project, Leonor Copper Project, in Chile and the Las Cristinas Project in Venezuela.

Feasibility Studies and Valuations

- Mr. Anderson brings considerable diversified experience in project feasibility, mine operations, proposal evaluation, and asset valuations. He is very familiar with the criteria for asset valuations and has served as a third-party independent engineer and owner's agent for property sales, joint ventures, and royalty agreements. While at Behre Dolbear, he completed a study for a mica property in Zimbabwe. He has managed similar valuations, completion testing, and acquisition evaluation reviews of precious metals projects in Canada and acted as an independent engineer for the Andacollo Gold Project in Chile, and the Nixon Fork gold project in Alaska.

Base Metals

- Mr. Anderson has extensive experience in the valuation of metallurgical test work, process flow sheet design, and concentrator operations for base metal mines. He has considerable experience in the capital and operating cost estimates for plants in remote northern locations.

Industrial Minerals

- Mr. Anderson has conducted project financing due diligence on projects in Zimbabwe for the processing and sale of mica and vermiculite. In addition he was project manager on an iodine and sodium sulfate project in the north of Chile and will serve as Independent Engineer.

SPECIFIC PROJECT EXPERIENCE

- North Lanut Gold, Indonesia, Avocet Mining — Mr. Anderson provided project optimization and general consulting services for a 4,000 TPD heap leach gold operation.
- Nui-Phau Tungsten, Vietnam, Tiberon — Mr. Anderson provided metallurgical evaluation of laboratory and pilot plant testing for the Nui-Phau copper/tungsten/bismuth/fluorite project in Vietnam.
- Mesaba Project, State of Minnesota — Mr. Anderson was project manager of a complete project due diligence involving the application of the CESL process to copper/nickel ores in northern Minnesota.
- Butler Taconite Project, MSI — Mr. Anderson furnished process engineering advice on the completion of an integrated iron mining, processing, direct reduction and steel production facility located at Nashwauk, Minnesota.
- Leonor Copper Project, Chile, Equatorial Mining N.L. — Mr. Anderson was Behre Dolbear's Independent Engineer on Equatorial Mining N.L.'s Leonor SX-EW copper project, which forms a significant part of the El Tesoro project.
- Komis Gold Project, Saskatchewan, Rothschild Bank — Mr. Anderson was the due diligence Project Manager and Independent Engineer on this underground gold project. Nixon Fork, Alaska, ING Capital Corporation — Mr. Anderson served as Metallurgical Consultant and Independent Engineer on this underground gold project.

- Pimenton, South American Gold & Copper, Chile — Mr. Anderson served as metallurgical consultant on a proposed mill expansion for this underground mine and surface concentrator operation.

- Equatorial/AMP Valuation — Mr. Anderson conducted a technical due diligence and evaluation of the Mineral Park and Tonopah Projects for acquisition analysis.

- Credit Suisse/1st Boston, Minera Las Cristinas, C.A., Las Cristinas — Mr. Anderson served as due diligence Project Manager and Independent Engineer for the Placer Dome, Las Cristinas Project. The assignment also included the development of completion criteria.

- Rothschild Denver Inc., Confidential Due Diligence Study, British Columbia — Mr. Anderson performed metallurgical engineering due diligence on a propose acquisition evaluation.

- Arizona Department of Revenue, Valuation of Asarco's Ray Copper Complex — Mr. Anderson performed metallurgical due diligence and delivered expert witness testimony in this evaluation.

- Gold Capital/U.S. Gold, Gold Capital, Tonkin Springs — Mr. Anderson performed metallurgical due diligence on this proposed project in Nevada.

- Woodward Clyde, Cyprus Climax Metals Risk Assessment — Mr. Anderson developed engineered risk assessment profiles for all of the active Cyprus Amax and Cyprus Climax operations including those in Arizona, Colorado, Iowa, Pennsylvania, Illinois, England and the Netherlands.

- The Toronto Dominion Bank, Fort Knox, Alaska — Mr. Anderson developed metallurgical due diligence information and completion criteria for the project.

- GoldBanks Mining Co., GoldBanks Kinross, Nevada — Mr. Anderson served on a project due diligence team evaluating this potential open pit property in Nevada.

- Barclays Capital/Equatorial Mining, Tonopah Project — Mr. Anderson served as Project Manager, Metallurgical Consultant and Independent Engineer for this 20,000 ton per year copper SX/EW operation in Nevada.

- ABN AMRO Bank N. V., Aguas Blancas Project — Mr. Anderson has served as Project Manager and Independent Engineer for this iodine and sodium sulfate production facility located in the Chilean Atacama desert.

- International Precious Metals, Arizona — Mr. Anderson developed metallurgical and analytical programs which ultimately proved the lack of economic or technically extractable platinum and gold from this project.

- Royal Gold Inc., Long Valley Project Review, Nevada — Mr. Anderson provided the metallurgical engineering review of this proposed gold project. Barclays Bank, Wheaton River Minerals Ltd., Golden Bear Mine, Due Diligence, British Columbia — Mr. Anderson provided metallurgical engineering due diligence and served as both Project

Manager and Independent Engineer for this open pit, heap leach gold project. Glencore International AG, Endako Due Diligence — Mr. Anderson provided metallurgical engineering due diligence on this proposed acquisition target.

- Lavery Debilly, Barristers & Solicitors, Expert Witness Testimony — Mr. Anderson prepared expert metallurgical engineering testimony in support of this confidential project.
- European Bank of Reconstruction and Development, Aural, Baia Mare-Romania — Mr. Anderson provided metallurgical engineering due diligence, contract review and Independent Engineer services for this tailings reclamation project.
- Standard Bank of London, San Gregorio Mine Uruguay — Mr. Anderson provided metallurgical engineering due diligence on this open pit gold mining property.
- Pueblo Viejo Privatization — Mr. Anderson provided metallurgical engineering support on the evaluation of refractory gold recovery flow sheets for the proposed modernization program.
- Metallica Resources, San Pedro Project, San Luis Potosi, Mexico — Mr. Anderson served as Project Manager and provided metallurgical engineering due diligence on this proposed financing of an open pit silver heap leach project.
- Government of Suriname, Mr. Marc C.H. Waaldijk, Gross Rosebel, Suriname — Mr. Anderson provided metallurgical engineering and capital costs estimated services in support of this project valuation in Suriname.
- M.I.M. Exploration Pty, Ltd M.I.M, Venezuela — Mr. Anderson provided project operations, infrastructure and socio economic consulting for possible acquisitions.
- Crowley, Haughey, Hanson, Toole & Dietrich, Crown Butte Mines, Inc. — Mr. Anderson provided metallurgical engineering, cost estimation and infrastructure review for this valuation of a project being expropriated by the U.S. Government.
- COEUR, The Precious Metals Company, Kensington Project, Alaska — Mr. Anderson served as Project Manager and provided metallurgical engineering support for this project evaluation and due diligence for an underground operation in Alaska.
- Placer Dome Technical Services, Limited, Alderbaran — Mr. Anderson provided metallurgical engineering and sampling protocol evaluations for this exploration project.
- Saudi Arabia Government, Behre Dolbear International, Ltd., Ma'aden — Mr. Anderson provided concentrator operations, metallurgical engineering and cost estimating services in developing operating procedures for government of Saudi Arabia national mining company, Ma'aden. Ma'aden, Operations Assessment, Mahd/Sukhay — Mr. Anderson provided metallurgical engineering, operating cost and capital cost improvement services in an evaluation of the Mah'd and Sukaybarat mines in Saudi Arabia.
- Alfers & Carver/Cyprus Amax, Mount Emmons Pre-Feasibility — Mr. Anderson served as Project Manager and provided metallurgical engineering, capital cost, and operating cost support in the development of a pre-feasibility study for the operation of the Mount Emmons project.

- Kinross Gold USA, Inc., Engineered Risk Assessment — Mr. Anderson has served on a team evaluating the engineered risk of Kinross Gold properties in Idaho and Ontario, Canada. The assessments included tailings impoundments, waste dumps, water systems, storm water systems, water treatment plants, and special project facilities.

PROFESSIONAL AFFILIATIONS/RECOGNITION AND AWARDS

Mr. Anderson qualifies as a competent person under current Canadian security regulations of AIME, Trustee.

- SME, President, 1992 to 1993; Board of Directors; MPD Chairman, 1984
- Mining and Metallurgical Society of America
- National Society of Professional Engineers
- Northwest Mining Association, President, 1990 to 1991; Trustee 1986 to 1992
- Paul Harris Fellow — 1989
- Who's Who in the West — 1986
- Mill Man of Distinction — 1984

EDUCATION

- Michigan Technological University, B.S. Metallurgical Engineering — 1961

SCOTT MERNITZ, Ph.D.
SENIOR ASSOCIATE Environmental Due Diligence

Dr. Scott Mernitz has over 25 years of expertise in environmental due diligence involving minerals projects, including fatal flaw and risk/liability analyses, agency negotiations and conflict resolution, and sustainability issues. This work has addressed projects involving precious and base metals, industrial minerals, and energy fuels such as uranium, coal, coal bed methane, oil and gas, and oil shale. Field reviews have been performed throughout North, Central, and South America, the Caribbean, Africa, Australia and the Middle East. His desktop study experience includes additional projects in Africa, Greenland, Europe, and Australia. Dr. Mernitz's experience also consists of U.S. NEPA project management; international EIA reviews and support documents; mining, solid, and hazardous waste management; environmental regulations and permitting; energy, mineral, and water resources planning; and environmental impact assessments.

Dr. Mernitz has project management and principal investigator experience in several major interdisciplinary environmental baseline studies, environmental permitting, mining waste regulatory policy, and third-party EIS and EA projects under U.S. National Environmental Policy Act (NEPA) requirements. Further, he has reviewed, critiqued, summarized and translated international Environmental Impact Assessments (EIAs), and served as Project Director for several supporting documents to Australian EIAs during his term in Perth.

He has other in-depth experience in Environmental Site Assessments (ESAs) for mining properties and support facilities, hazardous waste/mining waste Remedial Investigation/Feasibility Studies (RI/FSs), and technical oversight projects under U.S. waste management laws and regulations. He is one of Behre Dolbear's specialists in the application of the Equator Principles to global mining project reviews for banks, mining companies, and governments. His credentials include a Bachelor of Arts Degree in Geography from Elmhurst College, Illinois; the Master of Arts Degree in Geography and Environmental Conservation from the University of Colorado, Boulder; and the Doctor of Philosophy Degree in Land Resources (Mediation of Environmental Disputes) through the interdisciplinary Institute of Environmental Studies, University of Wisconsin, Madison.

Dr. Mernitz's specific project experience includes:

- Environmental and sustainability reviews for three coal/coke projects in Colombia, for prospective investors.
- Environmental/social sustainability review task leader, privatization Technical Advisory for the Arab Potash Corporation, including eight potash, salt, brine, fertilizer, and specialized salts production facilities on the Dead Sea and Red Sea, Jordan, for the Government of Jordan and Hong Kong Shanghai Bank (HSBC).
- Principal investigator, environmental and sustainability issues, conceptual reclamation and closure planning for revitalization of the coal industry, Nigeria, for the United States Trade and Development Agency and the Nigeria Ministry of Solid Minerals Development.
- Project management, environmental and sustainability technical review of field operations, environmental documentation for a gemstone mine in Brazil, and mineral resource/ business plan/loan analysis for an international investment bank.

- Project director, channel iron (pisolite) project development, EIA process, Phil's Creek and Iron Valley Projects, for Iron Ore Holdings, Pilbara region, Western Australia.
- Project director, three nickel metallurgical process modification projects, Environmental Scoping Studies, for BHP Billiton Nickel West: Mt. Keith, Ravensthorpe, Kalgoorlie Nickel Smelter, Western Australia.
- Project director, existing gold mine data review and gap analysis, EIS forward planning, for Goldfields Mining St. Ives project, inland salt lake area, Goldfields region, Western Australia.
- Project manager, initial environmental baseline studies planning, EIA forward planning, meteorology/dust monitoring for MCC (China Metallurgical Group, Beijing and Perth), Cape Lambert Iron Ore Project, northern Pilbara, Western Australia.
- Principal investigator and environmental/risks team leader, Pre-Feasibility Study for Port Enhancement Project, Esperance Port Authority and Government of Western Australia, including iron ore and nickel commodity movements.
- Principal investigator, Chevron Wheatstone LNG (Liquefied Natural Gas) project EIS/ERMP, sections on Environmental Consequence definitions, Cumulative Effects, Management Commitments, Relationships to Other Projects, Environmental Management Program structure, and Sustainability, Onslow vicinity, Western Australia.
- Principal investigator, BHP Billiton Yeelirrie uranium project EIA, section on Environmental Management Program structure, Western Australia.
- Project director, mineral sands process plant modifications, Environmental Scoping Study, for Iluka Corp., Western Australia.
- Project director, water supply pipeline routing, two Environmental Scoping Studies, for coal mine and power plant projects, Western Australia.
- Project manager and technical writer for several disciplines, coal bed methane third-party EA for BLM and Redstone Resources, Powder River Basin, Wyoming.
- Environmental/social sustainability review, privatization Technical Advisory for the Jordan Phosphate Mining Company, including three open pit mines with processing facilities and fertilizer and specialized production facilities on the Red Sea, for the Government of Jordan and Hong Kong Shanghai Bank (HSBC).
- Fairness opinion, environmental, sustainability, and community benefits, revitalization of copper and cobalt mining and processing facilities, Democratic Republic of the Congo (DRC), for a mining company.
- Environmental and water supply availability review, coal-fired power plant siting study, eight states in western United States, including Wyoming.
- Principal investigator, definitional mission report for the United States Trade and Development Agency regarding prospective mineral investments and reclamation/closure equipment and advisory opportunities in Romania and Bulgaria, including uranium mine and process plant reclamation, and coal bed/coal mine methane opportunities.

- Equator Principles review and reclamation/closure SOPs development, copper project in advanced exploration/early development stage for Penoles and a financial institution, northern Sonora State, Mexico.
- Environmental Constraints Chapter, Jordan Oil Shale Technology Assessment, for the Government of Jordan and United States Trade and Development Agency.
- Environmental Site Assessments (under ASTM guidance), and environmental permitting and liability analyses for precious metals, energy fuels, industrial minerals, and mining support facilities throughout the United States, including Alaska.
- Environmental due diligence and technical review of EIA (Environmental Impact Assessment) and SIA (Social Impact Assessment), gold project in Suriname; with a site visit to a comparable project in Guyana.

CORPORATE EXPERIENCE

2010 – Present	Behre Dolbear & Company (USA), Inc., Senior Associate
2008 – 2009	URS Australia Pty Ltd, Perth, Principal Environmental Scientist, Terrestrial Environment Group
2001 – 2008	Behre Dolbear & Company (USA), Inc., Senior Associate
Jun – Dec 2000	Brown and Caldwell, Geosciences Group Leader
1997 – 2000	Behre Dolbear & Company (USA), Inc., Associate
1991 – 1996	Woodward-Clyde Consultants, Senior Project Manager and Environmental Permitting Specialist
1980 – 1991	Camp Dresser and McKee Inc., Senior Project Manager and Regulatory/Permitting Specialist
1977 – 1980	State of Colorado Department of Natural Resources, Assistant Study Coordinator, Mining Project Regulatory Coordination, Public Participation, Water Resources and Energy Development Projects
1976 – 1977	State of Colorado Land Use Commission, Land Use Regulatory, and Mediation Specialist
1975 – 1976	State of Wisconsin Department of Natural Resources, Coastal Zone Management (Great Lakes) Specialist
1973 – 1974	University of Wisconsin Research and Development Center for Cognitive Learning, Environmental Education Specialist
1971 – 1973	United States Army Finance Service, Panama Canal Zone and Republic of Panama

PROFESSIONAL ASSOCIATIONS

- Mining and Metallurgical Society of America — Qualified Professional (QP), Environmental Science and Sustainability
- Colorado Mining Association
- American Arbitration Association Commercial Panel
- American Institute of Professional Geologists (Associate)
- Society of Mining, Metallurgy, and Exploration (SME — past affiliation)

EDUCATION

- Elmhurst College, Illinois, B.A. Geography (Earth Sciences, Climate) and History — 1969
- University of Colorado, Boulder, M.A. Geography (Earth Sciences, Environmental Conservation, Historical Geography) — 1971
- University of Wisconsin, Madison, Ph.D. Environmental Studies, Conflict Resolution (Mediation of Environmental Disputes) — 1978

PUBLICATIONS/PRESENTATIONS

Dr. Mernitz has published and presented throughout his career regarding the practice of environmental impacts assessment, mining regulation and regulatory policy, conduct of mining/environmental project reviews, environmental conflict resolution, sustainability, and related topics. A few select titles include:

- **"The Impact of Coal Mining on Marshall, Colorado, and Vicinity: An Historical Geography of Environmental Change."** *Unpublished M.A. Thesis, Department of Geography, University of Colorado, Boulder. 1971.*
- **"Mediation of Environmental Disputes: A Sourcebook."** *Praeger Publishers/CBS Inc., New York. 202 pages, 1980.*
- **"Mining Waste as Hazardous Waste: The Technical and Policy Issues."** *(with D. Derkics and L. Brown), Proceedings of the 6th National Conference on Hazardous Waste and Hazardous Materials. HMCRI. New Orleans, Louisiana. 12-14 April: 630-635, 1989.*
- **"The Complex Third-Party EIS, and How to Make it Simple."** *(with R. W. Bell), Proceedings of Current and Future Priorities for Environmental Management, 18th Annual Conference of the National Association of Environmental Professionals. Raleigh, North Carolina. 24-26 May: 298-300, 1993.*
- **"Acid Mine Drainage and Political Conflicts in the Third-Party EIS."** *(with R. E. Moran), Proceedings of Water Resources at Risk, Annual Conference of the American Institute of Hydrology. Denver, Colorado. 14-18 May: RA-36 to RA-39, 1995.*

- **"Environmental Issues in Latin American Gold Projects, and a Comparison to NEPA Mining Reviews in the United States."** *(with G. Van Riper and K. Kloska), Proceedings of Environment in the 21st Century, 24th Annual Meeting of the National Association of Environmental Professionals, Kansas City, Missouri. 20-24 June 1999.*

- **"Environmental Geology and Sustainability."** *The Professional Geologist. March-April: 41-43, 2005.*

- **"Strategies for Oil Shale Development in Hashemite Kingdom of Jordan."** *(with T. A. Sladek and J. Jaber), Presented to 27th Oil Shale Symposium, Colorado School of Mines, Golden, CO. Prepared for U. S. Trade and Development Agency and Jordanian Ministry of Planning and International Cooperation. October 16, 2007.*

WILLIAM F. JENNINGS, P.E. Valuation and
PRINCIPAL, SENIOR ASSOCIATE Mineral Economics

Mr. William F. Jennings has over 30 years of experience with consulting firms and, early in his career, with the United States Geological Survey. He has specialized in the economics and valuation of mineral properties, with emphasis on base metals, precious metals, and coal, both in North America and overseas. On valuation and feasibility projects, Mr. Jennings prepares economic analysis models and determines taxes, cash flow, discount rate, net present value, and rate of return. On projects where valuation is not amenable to standard cash flow net present value analysis, he performs valuations using other accepted techniques. On due diligence projects, he reviews and critiques the economic analyses prepared by others. Mr. Jennings has provided expert witness testimony intermittently since 1978. He has developed cost estimates for highway and rail transportation. He has performed studies of alternative coal supply for utilities and has edited a book on coal supply agreements. Mr. Jennings is a Registered Professional Engineer and a Certified Mineral Appraiser. Mr. Jennings has been a Behre Dolbear associate since 1989.

Mr. Jennings' recent project experience includes:

- Valuation of a gold mine as part of a potential takings litigation.
- Valuation of Newmont Canada Limited (Golden Giant and Holloway Mines) for Newmont Mining Corporation.
- Valuation of the North Rochelle coal mine in Wyoming and the Canyon Fuels mines in Utah for Arch Coal.
- Valuation of three properties in Greece for European Goldfields.
- Valuation of Stillwater Mining Company as part of the Norilsk transaction.
- Valuation of numerous properties as part of the Normandy — Franco-Nevada acquisition by Newmont Mining Corporation.
- Valuation of Minera Yanacocha S.A. gold mining operation in Peru for Newmont Mining Corporation.
- Valuation of Crown Butte Mines' New World property, Montana, for a public use taking.
- Valuation of operating mines of Pegasus Gold for a bankruptcy proceeding.
- Valuation of three of Newmont Gold's properties in Mexico and Indonesia, for tax basis purposes.
- Valuation of a portion of Huntington Ready Mix gravel quarry, Indiana, for a highway taking.
- Valuation of gravel quarry, Arizona, for a public use taking.
- Valuation of a turquoise property, Colorado, for a public use taking.

- Determination of project economics for feasibility of a mine in oil-bearing diatomite, California.
- Determination of project economics for feasibility study of Cornucopia's Mineral Ridge property.
- Determination of project economics for feasibility study of Atlanta Gold's Atlanta property.
- Due diligence review of economics of Atacama Minerals proposed iodine mine, Chile.
- Due diligence review of Apex Silver's proposed silver/lead/zinc mine, Bolivia.
- Coal geology and quality study of captive deposit, and alternative fuels cost and transportation analyses for proposed mine-mouth generating station in Wyoming.

CORPORATE EXPERIENCE

1989 – Present	Behre Dolbear & Company (USA), Inc., Senior Associate
1979 – 1989	Independent Consultant
1976 – 1979	NUS Corporation, Senior Engineer
1974 – 1976	Dravo Corporation, Mining Engineer
1968 – 1974	U.S. Geological Survey, Research Technician

PROFESSIONAL AFFILIATIONS

- Society for Mining, Metallurgy, and Exploration
- American Institute of Mineral Appraisers

REGISTRATIONS/CERTIFICATIONS

- Professional Engineer: Colorado

EDUCATION

- University of Colorado, M.S., Geology — 1974
- University of Colorado, B.S., Civil Engineering — 1969

PUBLICATIONS

"Data from Ground Magnetic Survey of the Ralston Dike, Jefferson County, Colorado," USGS Open File Report 75-97, 1975 (with Hasbrouck, W. P. and Botsford, M. L.).

"How to Negotiate and Administer a Coal Supply Agreement," McGraw-Hill, New York, 522 p., 1981.

"Mine Financial Feasibility Analysis Using Digital Computer Programs," Colorado Mining Association Yearbook 1978, p. 103-112. (Paper presented at 81st National Western Mining Conference of the Colorado Mining Association, 1978.)

"Regional Comparison of a Miocene Geomagnetic Transition in Oregon and Nevada," Earth and Planetary Science Letters, vol. 11, p. 391-400, 1971 (with Larson, E. E. and Watson, D. E.).

"The Effects of Contractual Structure on Coal Supply Agreements Between Utilities and Producing Companies," NUS Corporation's NUSletter, 1980 (with Lawton, Max R.).

JIANCHENG (JACK) SONG

CORPORATE EXPERIENCE

2009 – Present Minerals Companies (Western Mining, Sinom, Mylin, Jinhaoyuan etc.), Independent Senior Geologist

- Base in Beijing, Data review for gold projects worldwide, Evaluating gold exploration project include iron, gold and copper in Mongolia, Kirghizstan, Botswana and China etc.

2007 – 2009 Omega Gold Investment Ltd., Senior Geologist

- Manila Philippines (holding by Australia), Project generation (metallic mineral projects) in China, — Participated in gold exploration projects in Australia and Mongolia.

2006 – 2007 Great Wall Gold, Exploration Manager

- Verification of gold anomalies identified in the stream sediment survey in Qiubei area in Yunnan Province of China.

2004 – 2006 Gold Fields, General Manager

- Responsible for due diligence (gold) in Northeastern China, Supervised a +2000m drilling program of a gold project in Shandong Province, Managed a gold exploration project for the Gold Fields-Zijin Mining joint-venture in Fujian Province

2002 – 2004 Ivanhoe Mines Ltd., Senior Geologist

- Participated in the reconnaissance with international geologists in Inner Mongolia

2002 Pacific Minerals Inc., Chief Geologist

- Managed a 5000m drilling program at 217 ("Chang Shan Hao") gold project in Inner Mongolia.

2001 – 2002 General Minerals Corp., Assistant Exploration Manager

- Managed a +1500m drilling program, including core logging and sampling, in western Xinjiang of China.

1995 – 2001 Lianhui Industry Co., Deputy Director/Resource Consultant

- Responsible for the sales and financial sections at Shanshan Sodium Sulfide Factory, Supervised company's underground mining operation at Baogutu Gold Mine.

1982 – 1995 701 Geological Brigade, China National Nonferrous Metals Industry Corp. (CNNC)

- Explored for gold and copper in the Western Tianshan Mountain Belt and in West Jungar Basin area in Xinjiang

REGISTRATIONS/CERTIFICATIONS

- Short Course — Spoken English 02/1993 — 08/1993

EDUCATION

- China University of Geosciences (Wuhan), B.Sc (Geology) 1982
- Beijing Foreign Studies University

BERNARD J. GUARNERA
PRESIDENT AND CHAIRMAN
BEHRE DOLBEAR GROUP INC.

Mineral Property Valuation,
Mineral Development
and Lease Agreements

Mr. Bernard J. Guarnera has more than 40 years of experience with mining and consulting firms in the international mineral industry, focusing on the valuation of developed and undeveloped mineral properties, negotiations for sales and acquisitions, structuring of mineral development and lease agreements, and economic geology. Mr. Guarnera's valuation expertise spans all commodities and geographic areas, with recent emphasis on base and precious metals and past emphasis on energy minerals. He is a Certified Mineral Appraiser with the American Institute of Mineral Appraisers. Mr. Guarnera has lectured and instructed the mining engineering group of the Internal Revenue Service on mineral valuation techniques and has also presented seminars and instruction on mineral valuations to the American Institute of Rural and Farm Appraisers and financial institutions. Mr. Guarnera has provided expert witness testimony on mineral property values on several occasions.

While with Behre Dolbear & Company, Inc., Mr. Guarnera has participated in numerous recent mineral property valuations, including:

- Pebble copper-gold property, Alaska for acquisition purposes
- Oyu Tolgoi copper-gold property, Mongolia for loan collateralization
- Southern Peru Copper Company for resolution of a dispute
- Copper mines and smelter of ASARCO's Ray, Arizona complex for state tax purposes
- Crown Butte Resources' New World, Montana gold property for taking compensation
- Newmont Gold Company's acquisition of Normandy Mining Limited and Franco- Nevada Mining Corporation
- Copper mines, mills, smelter, and ancillary facilities of Exxon Coal and Mineral's Compañía Minera Disputada, S.A., Chile
- Arch Coal Company's acquisition of Triton Energy
- Baca Land Grant, New Mexico geothermal and undeveloped mineral resources for condemnation purposes
- Cogema, Inc.'s uranium properties in south Texas for divestiture purposes
- McDonald Seven-up Pete gold property in Montana for royalty purposes
- Kings Mountain, North Carolina mica property for estate division purposes
- Royalty value of a wollastonite property in New York
- Lega Dembi, Ethiopia gold mine for privatization purposes
- South Inkai, Kazakhstan uranium deposits for an IPO

CORPORATE EXPERIENCE

2011 – Present	Behre Dolbear Group Inc., Chief Executive Officer and Chairman of the Board of Director
2008 – 2011	Behre Dolbear Group Inc., President and Chairman
1991 – 2008	Behre Dolbear & Company, Inc., President, Chief Executive Officer, and Chief Operating Officer
1981 – 1990	Boise Cascade Corporation, Manager, mineral resources
1976 – 1980	Dames & Moore, Principal-in-Charge, economic geology and mining group
1968 – 1976	Texaco, Inc., Manager, coal and hard mineral exploration projects
1967	Amax Exploration, Inc., Field Geologist/Party Chief
1965 – 1966	Anaconda American Brass, Ltd., Field Geologist/Party Chief
1964	Quebec Cartier Mining Company, Ltd., Geologist/Engineer

PROFESSIONAL AFFILIATIONS

- American Institute of Mineral Appraisers
- American Institute of Mining, Metallurgical, and Petroleum Engineers — Legion of Honor
- Australasian Institute of Mining and Metallurgy — Chartered Professional
- Canadian Institute of Mining, Metallurgy and Petroleum
- Geological Society of America — Fellow
- International Mining Professionals Society — Past President
- Mining and Metallurgical Society of America — Qualified Professional Member
- Mining Club of New York
- Northwest Mining Association — Past President and Life Member
- Society of Economic Geologists — Fellow
- Society for Mining, Metallurgy, and Exploration — Resources and Reserves Committee

DIRECTORSHIPS

- Colorado Mining Association

COURSES/SEMINARS TAUGHT

- Valuation of Mineral Deposits — U.S. Internal Revenue Service — Mining, Engineering Section
- Valuation of Uranium Deposits — American Society of Farm Managers and Rural Appraisers
- The ABCs of Ore Reserves — Seminar for Financial Community in Denver, London, New York, and Toronto
- The Valuation of Mineral Properties — Seminar for Financial Community in London, New York, and Toronto
- Economics of the Minerals Industry — Boise State University Department of Geology and Geophysics

REGISTRATIONS/CERTIFICATIONS

- Professional Engineer: Texas #41852
- Professional Geologist: Idaho #510, Oregon #70
- Certified Mineral Appraiser #1995-3
- Chartered Professional (Geologist) — Australasian Institute of Mining and Metallurgy
- Qualified Professional Member — Mining and Metallurgical Society of America

EDUCATION

- Michigan Technological University, B.S. Geological Engineering — 1965
- Michigan Technological University, M.S. Economic Geology — 1967

APPENDIX 3.0

CASH FLOW SPREADSHEETS

Economic Analysis of
Toromocho Project
Prepared by Behre Dolbear & Co.
May 1, 2012 metal prices average of various forecasting companies; with copper cost per pound

		Pre-production year -3	Pre-production year -2	Pre-production year -1	Production year +1	Production year +2	Production year +3	Production year +4	Production year +5	Production year +6	Production year +7
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Production											
Waste (tonnes)		0	0	43,893,000	31,961,000	37,253,000	38,839,000	38,789,000	32,871,000	27,475,000	19,297,000
Low-grade mill material stockpiled (tonnes)		0	0	1,208,000	11,345,000	12,686,000	12,954,000	11,671,000	18,443,000	23,739,000	32,075,000
High arsenic material stockpiled (tonnes)		0	0	3,919,000	17,452,000	1,881,000	27,000	1,360,000	506,000	606,000	448,000
High-grade milling ore (tonnes)		0	0	980,000	38,245,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
total material moved (tonnes)		0	0	50,000,000	99,003,000	95,000,000	95,000,000	95,000,000	95,000,000	95,000,000	95,000,000
High-grade ore to mill (tonnes)		0	0	980,000	38,245,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
Low-grade ore to mill (tonnes)		0	0	0	0	0	0	0	0	0	0
total ore to mill (tonnes)		0	0	980,000	38,245,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
High-grade ore											
copper (%)		0.0000%	0.0000%	0.4835%	0.5860%	0.5950%	0.5950%	0.6250%	0.6090%	0.6180%	0.6050%
molybdenum (%)		0.0000%	0.0000%	0.0981%	0.0124%	0.0160%	0.0200%	0.0210%	0.0110%	0.0170%	0.0160%
silver (grams per tonne)		0.000	0.000	11.800	7.429	7.338	7.533	6.455	9.901	7.193	7.232
Low-grade ore											
copper (%)		0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
molybdenum (%)		0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
silver (grams per tonne)		0	0	0	0	0	0	0	0	0	0
contained metal											
copper (tonnes)		0	0	4,738	224,116	256,921	256,921	269,875	262,966	266,852	261,239
molybdenum (tonnes)		0	0	961	4,742	6,909	8,636	9,068	4,750	7,341	6,909
silver (grams)		0	0	11,564,000	284,122,105	316,854,840	325,274,940	278,726,900	427,525,180	310,593,740	312,277,760
metallurgical recovery											
copper (%)		0.00%	0.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
molybdenum (%)		0.00%	0.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%
silver (%)		0.00%	0.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%
recovered metal											
copper (tonnes)		0	0	4,028	190,498	218,383	218,383	229,394	223,521	226,825	222,053
copper (pounds)		0	0	8,879,228	419,976,461	481,451,199	481,451,199	505,726,049	492,779,462	500,061,917	489,542,816
molybdenum (tonnes)		0	0	625	3,083	4,491	5,613	5,894	3,087	4,771	4,491
molybdenum (pounds)		0	0	1,377,660	6,795,845	9,900,331	12,375,414	12,994,185	6,806,478	10,519,102	9,900,331
silver (grams)		0	0	8,094,800	198,885,474	221,798,388	227,692,458	195,108,830	299,267,626	217,415,618	218,594,432
silver (troy ounces)		0	0	260,254	6,394,316	7,130,983	7,320,482	6,272,894	9,621,677	6,990,074	7,027,973
copper/silver concentrates											
concentrate (dry tonnes)		0	0	15,198	718,862	824,086	824,086	865,637	843,476	855,942	837,936
concentrate (wet tonnes)	9.00%	0	0	16,566	783,559	898,254	898,254	943,544	919,389	932,976	913,351
copper grade of concentrate (%)		26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%
silver grade of concentrate (grams per tonne)		0.00	0.00	532.61	276.67	269.14	276.30	225.39	354.30	254.01	260.87
arsenic grade of concentrate (%)		0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%
zinc grade of concentrate (%)		9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%

Economic Analysis of
Toromocho Project
Prepared by Behre Dolbear & Co.
May 1, 2012 metal prices average of various forecasting companies; with copper cost per pound

		Pre-production year -3	Pre-production year -2	Pre-production year -1	Production year +1	Production year +2	Production year +3	Production year +4	Production year +5	Production year +6	Production year +7
		2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
molybdenum chemical grade oxide (tonnes)		0	0	625	3,083	4,491	5,613	5,894	3,087	4,771	4,491
molybdenum chemical grade oxide (pounds)		0	0	1,377,660	6,795,845	9,900,331	12,375,414	12,994,185	6,806,478	10,519,102	9,900,331
metal prices											
copper (US dollars per lb)		$ 4.37	$ 4.53	$ 4.18	$ 3.83	$ 3.84	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57
silver (US dollars per troy ounce)		$ 24.18	$ 37.90	$ 36.94	$ 35.28	$ 32.00	$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50
molybdenum tech oxide (US dollars per lb)		$ 16.64	$ 17.78	$ 18.66	$ 17.25	$ 18.50	$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17
chemical grade oxide premium	10.00%	$ 1.66	$ 1.78	$ 1.87	$ 1.73	$ 1.85	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52
moly chemical grade price (US dollar per lb)		$ 18.30	$ 19.56	$ 20.53	$ 18.98	$ 20.35	$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69

Economic Analysis of Toromocho Project
Prepared by Behre Dolbear & Co.
May 1, 2012
metal prices average of various forecasting companies; with copper cost per pound

	Production year +8	Production year +9	Production year +10	Production year +11	Production year +12	Production year +13	Production year +14	Production year +15	Production year +16	Production year +17	Production year +18
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Production											
Waste (tonnes)	31,851,000	43,933,000	40,429,000	38,017,000	47,649,000	51,820,000	50,916,000	50,917,000	49,892,000	49,912,000	50,962,000
Low-grade mill material stockpiled (tonnes)	19,932,000	6,048,000	10,901,000	13,782,000	4,171,000	0	903,000	837,000	1,760,000	997,000	833,000
High arsenic material stockpiled (tonnes)	37,000	1,839,000	480,000	21,000	0	0	0	66,000	167,000	911,000	25,000
High-grade milling ore (tonnes)	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
total material moved (tonnes)	95,000,000	95,000,000	94,990,000	95,000,000	95,000,000	95,000,000	94,999,000	95,000,000	94,999,000	95,000,000	95,000,000
High-grade ore to mill (tonnes)	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
Low-grade ore to mill (tonnes)	0	0	0	0	0	0	0	0	0	0	0
total ore to mill (tonnes)	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
High-grade ore											
copper (%)	0.5880%	0.6050%	0.5840%	0.5610%	0.5510%	0.5330%	0.4680%	0.4470%	0.4820%	0.4570%	0.4850%
molybdenum (%)	0.0180%	0.0280%	0.0240%	0.0230%	0.0180%	0.0220%	0.0120%	0.0160%	0.0190%	0.0210%	0.0220%
silver (grams per tonne)	6.494	5.377	5.843	6.804	8.105	7.144	8.571	6.367	6.668	5.193	8.057
Low-grade ore											
copper (%)	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
molybdenum (%)	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
silver (grams per tonne)	0	0	0	0	0	0	0	0	0	0	0
contained metal											
copper (tonnes)	253,898	261,239	252,171	242,240	237,922	230,149	202,082	193,015	208,128	197,333	209,423
molybdenum (tonnes)	7,772	12,090	10,363	9,931	7,772	9,500	5,182	6,909	8,204	9,068	9,500
silver (grams)	280,410,920	232,178,860	252,300,740	293,796,720	349,973,900	308,477,920	370,095,780	274,927,060	287,924,240	224,233,740	347,901,260
metallurgical recovery											
copper (%)	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
molybdenum (%)	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%
silver (%)	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%
recovered metal											
copper (tonnes)	215,814	222,053	214,346	205,904	202,234	195,627	171,770	164,062	176,908	167,733	178,010
copper (pounds)	475,787,067	489,542,816	472,550,420	453,939,702	445,848,085	431,283,175	378,687,666	361,695,270	390,015,929	369,786,887	392,443,414
molybdenum (tonnes)	5,052	7,859	6,736	6,455	5,052	6,175	3,368	4,491	5,333	5,894	6,175
molybdenum (pounds)	11,137,873	17,325,579	14,850,497	14,231,726	11,137,873	13,612,955	7,425,248	9,900,331	11,756,643	12,994,185	13,612,955
silver (grams)	196,287,644	162,525,202	176,610,518	205,657,704	244,981,730	215,934,544	259,067,046	192,448,942	201,546,968	156,963,618	243,530,882
silver (troy ounces)	6,310,794	5,225,306	5,678,159	6,612,048	7,876,345	6,942,456	8,329,198	6,187,377	6,479,885	5,046,497	7,829,699

Economic Analysis of Toromocho Project Prepared by Behre Dolbear & Co. May 1, 2012 metal prices average of various forecasting companies; with copper cost per pound		Production year +8 2021	Production year +9 2022	Production year +10 2023	Production year +11 2024	Production year +12 2025	Production year +13 2026	Production year +14 2027	Production year +15 2028	Production year +16 2029	Production year +17 2030	Production year +18 2031
copper/silver concentrates												
concentrate (dry tonnes)		814,391	837,936	808,851	776,996	763,145	738,215	648,189	619,103	667,579	632,954	671,734
concentrate (wet tonnes)	9.00%	887,686	913,351	881,648	846,925	831,828	804,654	706,526	674,823	727,661	689,919	732,190
copper grade of concentrate (%)		26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%
silver grade of concentrate (grams per tonne)		241.02	193.96	218.35	264.68	321.02	292.51	399.68	310.85	301.91	247.99	362.54
arsenic grade of concentrate (%)		0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%
zinc grade of concentrate (%)		9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
molybdenum chemical grade oxide (tonnes)		5,052	7,859	6,736	6,455	5,052	6,175	3,368	4,491	5,333	5,894	6,175
molybdenum chemical grade oxide (pounds)		11,137,873	17,325,579	14,850,497	14,231,726	11,137,873	13,612,955	7,425,248	9,900,331	11,756,643	12,994,185	13,612,955
metal prices												
copper (US dollars per lb)		$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57
silver (US dollars per troy ounce)		$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50
molybdenum tech oxide (US dollars per lb)		$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17
chemical grade oxide premium	10.00%	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52
moly chemical grade price (US dollar per lb)		$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69

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metal prices average of various forecasting companies; with copper cost per pound

	Production year +19	Production year +20	Production year +21	Production year +22	Production year +23	Production year +24	Production year +25	Production year +26	Production year +27	Production year +28	Production year +29
	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Production											
Waste (tonnes)	50,539,000	50,444,000	50,719,000	48,025,000	36,505,000	25,883,000	21,752,000	18,981,000	19,880,000	13,230,000	10,488,000
Low-grade mill material stockpiled (tonnes)	1,281,000	1,376,000	1,101,000	0	0	0	0	0	0	0	0
High arsenic material stockpiled (tonnes)	0	0	0	0	0	0	0	0	0	0	0
High-grade milling ore (tonnes)	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
total material moved (tonnes)	95,000,000	95,000,000	95,000,000	91,205,000	79,685,000	69,063,000	64,932,000	62,161,000	63,060,000	56,410,000	53,668,000
High-grade ore to mill (tonnes)	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
Low-grade ore to mill (tonnes)	0	0	0	0	0	0	0	0	0	0	0
total ore to mill (tonnes)	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000
High-grade ore											
copper (%)	0.5410%	0.4690%	0.4070%	0.3400%	0.3880%	0.3770%	0.3740%	0.4020%	0.3990%	0.4420%	0.4240%
molybdenum (%)	0.0250%	0.0290%	0.0300%	0.0270%	0.0100%	0.0110%	0.0130%	0.0160%	0.0180%	0.0220%	0.0250%
silver (grams per tonne)	7.562	6.562	6.057	9.183	6.057	6.435	5.766	5.474	4.979	7.270	7.581
Low-grade ore											
copper (%)	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
molybdenum (%)	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
silver (grams per tonne)	0	0	0	0	0	0	0	0	0	0	0
contained metal											
copper (tonnes)	233,604	202,514	175,743	146,812	167,538	162,789	161,493	173,584	172,288	190,856	183,083
molybdenum (tonnes)	10,795	12,522	12,954	11,659	4,318	4,750	5,613	6,909	7,772	9,500	10,795
silver (grams)	326,527,160	283,347,160	261,541,260	396,521,940	261,541,260	277,863,300	248,975,880	236,367,320	214,993,220	313,918,600	327,347,580
metallurgical recovery											
copper (%)	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
molybdenum (%)	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%
silver (%)	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%
recovered metal											
copper (tonnes)	198,563	172,137	149,381	124,790	142,408	138,370	137,269	147,546	146,445	162,227	155,621
copper (pounds)	437,756,468	379,496,827	329,328,803	275,114,971	313,954,731	305,053,953	302,626,468	325,282,995	322,855,510	357,649,462	343,084,552
molybdenum (tonnes)	7,017	8,139	8,420	7,578	2,807	3,087	3,649	4,491	5,052	6,175	7,017
molybdenum (pounds)	15,469,267	17,944,350	18,563,121	16,706,809	6,187,707	6,806,478	8,044,019	9,900,331	11,137,873	13,612,955	15,469,267
silver (grams)	228,569,012	198,343,012	183,078,882	277,565,358	183,078,882	194,504,310	174,283,116	165,457,124	150,495,254	219,743,020	229,143,306
silver (troy ounces)	7,348,664	6,376,875	5,886,122	8,923,933	5,886,122	6,253,458	5,603,332	5,319,570	4,838,534	7,064,901	7,367,128

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		Production year +19	Production year +20	Production year +21	Production year +22	Production year +23	Production year +24	Production year +25	Production year +26	Production year +27	Production year +28	Production year +29
		2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
copper/silver concentrates												
concentrate (dry tonnes)		749,295	649,574	563,703	470,906	537,387	522,152	517,997	556,778	552,623	612,178	587,248
concentrate (wet tonnes)	9.00%	816,732	708,035	614,436	513,288	585,752	569,146	564,617	606,888	602,359	667,274	640,100
copper grade of concentrate (%)		26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%
silver grade of concentrate (grams per tonne)		305.05	305.34	324.78	589.43	340.68	372.51	336.46	297.17	272.33	358.95	390.20
arsenic grade of concentrate (%)		0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%
zinc grade of concentrate (%)		9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
molybdenum chemical grade oxide (tonnes)		7,017	8,139	8,420	7,578	2,807	3,087	3,649	4,491	5,052	6,175	7,017
molybdenum chemical grade oxide (pounds)		15,469,267	17,944,350	18,563,121	16,706,809	6,187,707	6,806,478	8,044,019	9,900,331	11,137,873	13,612,955	15,469,267
metal prices												
copper (US dollars per lb)		$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57
silver (US dollars per troy ounce)		$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50
molybdenum tech oxide (US dollars per lb)		$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17
chemical grade oxide premium	10.00%	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52
moly chemical grade price (US dollar per lb)		$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69

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	Production year +30	Production year +31	Production year +32	Production year +33	Production year +34	Production year +35	Production year +36	Production year +37	Production year +38	Production year +39	Production year +40	Total
	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	
Production												
Waste (tonnes)	9,652,000	14,187,000	14,432,000									1,161,393,000
Low-grade mill material stockpiled (tonnes)	0	0	0	0	0	0	0	0	0	0	0	188,043,000
High arsenic material stockpiled (tonnes)	0	0	0	0	0	0	0	0	0	0	0	29,745,000
High-grade milling ore (tonnes)	43,180,000	43,180,000	17,715,000									1,352,340,000
total material moved (tonnes)	52,832,000	57,367,000	32,147,000	0	0	0	0	0	0	0	0	2,731,521,000
High-grade ore to mill (tonnes)	43,180,000	43,180,000	17,715,000	0	0	0	0	0	0	0	0	1,352,340,000
Low-grade ore to mill (tonnes)	0	0	25,465,000	43,180,000	43,180,000	43,180,000	33,038,000	0	0	0	0	188,043,000
total ore to mill (tonnes)	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	43,180,000	33,038,000	0	0	0	0	1,540,383,000
High-grade ore												
copper (%)	0.3720%	0.2810%	0.1660%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	
molybdenum (%)	0.0290%	0.0330%	0.0400%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	
silver (grams per tonne)	6.232	9.872	6.833	0	0	0	0	0	0	0	0	
Low-grade ore												
copper (%)	0.0000%	0.0000%	0.3660%	0.3660%	0.3660%	0.3660%	0.3660%	0.0000%	0.0000%	0.0000%	0.0000%	
molybdenum (%)	0.0000%	0.0000%	0.0080%	0.0080%	0.0080%	0.0080%	0.0080%	0.0000%	0.0000%	0.0000%	0.0000%	
silver (grams per tonne)	0	0	5.877	5.877	5.877	5.877	5.877	0	0	0	0	
contained metal												
copper (tonnes)	160,630	121,336	122,609	158,039	158,039	158,039	120,919	0	0	0	0	7,261,141
molybdenum (tonnes)	12,522	14,249	9,123	3,454	3,454	3,454	2,643	0	0	0	0	292,095
silver (grams)	269,097,760	426,272,960	270,704,400	253,768,860	253,768,860	253,768,860	194,164,326	0	0	0	0	10,559,651,311
metallurgical recovery												
copper (%)	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	0.00%	0.00%	0.00%	0.00%	
molybdenum (%)	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	0.00%	0.00%	0.00%	0.00%	
silver (%)	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	70.00%	0.00%	0.00%	0.00%	0.00%	
recovered metal												
copper (tonnes)	136,535	103,135	104,217	134,333	134,333	134,333	102,781	0	0	0	0	6,171,970
copper (pounds)	301,008,144	227,374,432	229,759,941	296,153,174	296,153,174	296,153,174	226,593,529	0	0	0	0	13,606,849,070
molybdenum (tonnes)	8,139	9,262	5,930	2,245	2,245	2,245	1,718	0	0	0	0	189,862
molybdenum (pounds)	17,944,350	20,419,433	13,073,573	4,950,166	4,950,166	4,950,166	3,787,484	0	0	0	0	418,572,725
silver (grams)	188,368,432	298,391,072	189,493,080	177,638,202	177,638,202	177,638,202	135,915,028	0	0	0	0	7,391,755,918
silver (troy ounces)	6,056,185	9,593,495	6,092,343	5,711,200	5,711,200	5,711,200	4,369,769	0	0	0	0	237,650,447

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		Production year +30	Production year +31	Production year +32	Production year +33	Production year +34	Production year +35	Production year +36	Production year +37	Production year +38	Production year +39	Production year +40	Total
		2043	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**	**2052**	**2053**	
copper/silver concentrates													
concentrate (dry tonnes)		515,227	389,190	393,274	506,917	506,917	506,917	387,854	0	0	0	0	23,290,454
concentrate (wet tonnes)	9.00%	561,597	424,217	428,668	552,539	552,539	552,539	422,760	0	0	0	0	25,386,595
copper grade of concentrate (%)		26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	26.50%	
silver grade of concentrate (grams per tonne)		365.60	766.70	481.84	350.43	350.43	350.43	350.43	0.00	0.00	0.00	0.00	
arsenic grade of concentrate (%)		0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%	
zinc grade of concentrate (%)		9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	
molybdenum chemical grade oxide (tonnes)		8,139	9,262	5,930	2,245	2,245	2,245	1,718	0	0	0	0	189,862
molybdenum chemical grade oxide (pounds)		17,944,350	20,419,433	13,073,573	4,950,166	4,950,166	4,950,166	3,787,484	0	0	0	0	418,572,725
metal prices													
copper (US dollars per lb)		$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	$ 2.57	
silver (US dollars per troy ounce)		$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50	$ 22.50	$22.50	$22.50	$22.50	$22.50	
molybdenum tech oxide (US dollars per lb)		$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17	$ 15.17	$15.17	$15.17	$15.17	$15.17	
chemical grade oxide premium	10.00%	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	$ 1.52	
moly chemical grade price (US dollar per lb)		$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69	$ 16.69	$16.69	$16.69	$16.69	$16.69	

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		Pre-production year -3	Pre-production year -2	Pre-production year -1	Production year +1	Production year +2	Production year +3	Production year +4	Production year +5	Production year +6	Production year +7
		2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
income from sales											
copper payment	97.50%	$0	$0	$36,187,295	$1,568,297,101	$1,802,553,288	$1,206,396,341	$1,267,223,048	$1,234,782,138	$1,253,030,149	$1,226,671,910
silver payment	95.00%	$0	$0	$ 9,133,088	$ 214,311,888	$ 216,781,884	$ 156,475,298	$ 134,083,107	$ 205,663,338	$ 149,412,826	$ 150,222,933
molybdenum oxide payment	100.00%	$0	$0	$28,277,858	$ 128,951,154	$ 201,471,738	$ 206,508,532	$ 216,833,958	$ 113,579,693	$ 175,532,252	$ 165,206,826
total payment		$0	$0	$73,598,241	$1,911,560,144	$2,220,806,911	$1,569,380,171	$1,018,140,113	$1,554,025,168	$1,577,975,227	$1,542,101,668
treatment charge (US$ per dry tonne cons)	$ 70.00	$0	$0	$ 1,063,882	$ 50,320,318	$ 57,686,036	$ 57,686,036	$ 60,594,575	$ 59,043,354	$ 59,915,916	$ 58,655,549
refining charge per Ib copper	$ 0.070	$0	$0	$ 621,546	$ 29,398,352	$ 33,701,584	$ 33,701,584	$ 35,400,823	$ 34,494,562	$ 35,004,334	$ 34,267,997
refining charge per ounce silver	$ 0.400	$0	$0	$ 104,102	$ 2,557,726	$ 2,852,393	$ 2,928,193	$ 2,509,158	$ 3,848,671	$ 2,796,029	$ 2,811,189
arsenic penalty											
penalty per increment	$ 2.50										
increment	0.10%										
penalty		$0	$0	$ 30,397	$ 1,437,723	$ 1,648,172	$ 1,648,172	$ 1,731,274	$ 1,686,953	$ 1,711,883	$ 1,675,873
zinc penalty											
penalty per increment	$ 2.50										
increment	1.00%										
penalty		$0	$0	$ 341,962	$ 16,174,388	$ 18,541,940	$ 18,541,940	$ 19,476,828	$ 18,978,221	$ 19,258,687	$ 18,853,569
subtotal, treatment and penalties		$0	$0	$ 2,161,889	$ 99,888,507	$ 114,430,126	$ 114,505,925	$ 119,712,658	$ 118,051,761	$ 118,686,851	$ 116,264,178
transport and handling											
copper cons, rail to port, per wet tonne	$ 17.90	$0	$0	$ 296,534	$ 14,025,710	$ 16,078,746	$ 16,078,746	$ 16,889,439	$ 16,457,070	$ 16,700,278	$ 16,348,977
port handling & loading, per wet tonne	$ 7.80	$0	$0	$ 129,216	$ 6,111,762	$ 7,006,381	$ 7,006,381	$ 7,359,644	$ 7,171,237	$ 7,277,216	$ 7,124,135
insurance, per dry tonne	$ 0.74	$0	$0	$ 11,247	$ 531,958	$ 609,824	$ 609,824	$ 640,571	$ 624,173	$ 633,397	$ 620,073
ocean freight, per wet tonne	$ 50.00	$0	$0	$ 828,308	$ 39,177,962	$ 44,912,699	$ 44,912,699	$ 47,177,205	$ 45,969,469	$ 46,648,820	$ 45,667,535
supervision & assaying, per dry tonne	$ 0.35	$0	$0	$ 5,319	$ 251,602	$ 288,430	$ 288,430	$ 302,973	$ 295,217	$ 299,580	$ 293,278
moly oxide, rail to port, per tonne	$ 17.90	$0	$0	$ 11,186	$ 55,178	$ 80,384	$ 100,480	$ 105,504	$ 55,264	$ 85,408	$ 80,384
port handling & loading, per tonne	$ 7.80	$0	$0	$ 4,874	$ 24,044	$ 35,028	$ 43,785	$ 45,974	$ 24,081	$ 37,217	$ 35,028
insurance, of net payable	0.00083	$0	$0	$ 23,471	$ 107,029	$ 167,222	$ 171,402	$ 179,972	$ 94,271	$ 145,692	$ 137,122
ocean freight, per tonne	$ 50.00	$0	$0	$ 31,245	$ 154,127	$ 224,536	$ 280,670	$ 294,704	$ 154,369	$ 238,570	$ 224,536
subtotal, transport and handling		$0	$0	$ 1,341,401	$ 60,439,371	$ 69,403,250	$ 69,492,417	$ 72,995,986	$ 70,845,150	$ 72,066,177	$ 70,531,067
net smelter return		$0	$0	$70,094,951	$1,751,232,265	$2,036,973,535	$1,385,381,829	$1,425,431,469	$1,365,128,256	$1,387,222,200	$1,355,306,423

Economic Analysis of Toromocho Project
Prepared by Behre Dolbear & Co.
May 1, 2012
metal prices average of various forecasting companies; with copper cost per pound

		Pre-production year -3	Pre-production year -2	Pre-production year -1	Production year +1	Production year +2	Production year +3	Production year +4	Production year +5	Production year +6	Production year +7
		2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Operating Costs											
unit costs											
mining per tonne of material moved		$0.000	$0.000	$ 1.196	$ 1.034	$ 1.114	$ 1.106	$ 1.300	$ 1.244	$ 1.383	$ 1.487
reclaim stockpile tonnage per tonne of stockpile moved		$0.000	$0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000
processing (milling) per tonne of ore milled		$ 0.00	$ 0.00	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28
moly plant per tonne of moly oxide produced		$ 0.00	$ 0.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00
processing infrastructure per tonne of ore milled		$ 0.00	$ 0.00	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06
processing G&A per tonne of ore milled		$ 0.00	$ 0.00	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42
annual cost											
mining ore and waste		$ 0	$ 0	$59,816,050	$102,330,788	$105,822,780	$105,030,100	$123,459,910	$118,208,405	$131,386,710	$141,295,210
reclaim from stockpile		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
milling		$ 0	$ 0	$ 5,174,400	$201,933,600	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400
moly plant		$ 0	$ 0	$ 2,257,128	$ 11,134,160	$ 16,220,481	$ 20,275,601	$ 21,289,381	$ 11,151,580	$ 17,234,261	$ 16,220,481
processing infrastructure		$ 0	$ 0	$ 58,800	$ 2,294,700	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800
processing G&A		$ 0	$ 0	$ 1,391,600	$ 54,307,900	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600
Centromin royalty	1.71%	$ 0	$ 0	$ 1,198,624	$ 29,946,072	$ 34,832,247	$ 23,690,029	$ 24,374,878	$ 23,343,693	$ 23,721,500	$ 23,175,740
total operating cost		$ 0	$ 0	$69,896,602	$401,947,219	$448,772,308	$440,892,530	$461,020,969	$444,600,479	$464,239,270	$472,588,230

Economic Analysis of Toromocho Project Prepared by Behre Dolbear & Co. May 1, 2012 metal prices average of various forecasting companies; with copper cost per pound

		Production year +8	Production year +9	Production year +10	Production year +11	Production year +12	Production year +13	Production year +14	Production year +15	Production year +16	Production year +17	Production year +18
		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
income from sales												
copper payment	97.50%	$1,192,203,443	$1,226,671,910	$1,184,093,216	$1,137,459,408	$1,117,183,839	$1,080,687,815	$ 948,896,618	$ 906,317,924	$ 977,282,414	$ 926,593,492	$ 983,365,085
silver payment	95.00%	$ 134,893,214	$ 111,690,917	$ 121,370,658	$ 141,332,527	$ 168,356,868	$ 148,394,999	$ 178,036,609	$ 132,255,173	$ 138,507,538	$ 107,868,873	$ 167,359,813
molybdenum oxide payment	100.00%	$ 185,857,679	$ 289,111,945	$ 247,810,238	$ 237,484,812	$ 185,857,679	$ 227,159,385	$ 123,905,119	$ 165,206,826	$ 196,183,105	$ 216,833,958	$ 227,159,385
total payment		$1,512,954,336	$1,627,474,771	$1,553,274,112	$1,516,276,746	$1,471,398,386	$1,456,242,199	$1,250,838,346	$1,203,779,922	$1,311,973,058	$1,251,296,324	$1,377,884,283
treatment charge (US$ per dry tonne cons)	$ 70.00	$ 57,007,377	$ 58,655,549	$ 56,619,571	$ 54,389,691	$ 53,420,178	$ 51,675,054	$ 45,373,218	$ 43,337,240	$ 46,730,537	$ 44,306,754	$ 47,021,391
refining charge per lb copper	$ 0.070	$ 33,305,095	$ 34,267,997	$ 33,078,529	$ 31,775,779	$ 31,209,366	$ 30,189,822	$ 26,508,137	$ 25,318,669	$ 27,301,115	$ 25,885,082	$ 27,471,039
refining charge per ounce silver	$ 0.400	$ 2,524,317	$ 2,090,122	$ 2,271,264	$ 2,644,819	$ 3,150,538	$ 2,776,982	$ 3,331,679	$ 2,474,951	$ 2,591,954	$ 2,018,599	$ 3,131,880
arsenic penalty												
penalty per increment	$ 2.50											
increment	0.10%											
penalty		$ 1,628,782	$ 1,675,873	$ 1,617,702	$ 1,553,991	$ 1,526,291	$ 1,476,430	$ 1,296,378	$ 1,238,207	$ 1,335,158	$ 1,265,907	$ 1,343,468
zinc penalty												
penalty per increment	$ 2.50											
increment	1.00%											
penalty		$ 18,323,800	$ 18,853,569	$ 18,199,148	$ 17,482,401	$ 17,170,771	$ 16,609,839	$ 14,584,249	$ 13,929,827	$ 15,020,530	$ 14,241,457	$ 15,114,018
subtotal, treatment and penalties		$ 112,789,371	$ 115,543,111	$ 111,786,214	$ 107,846,681	$ 106,477,144	$ 102,728,128	$ 91,093,660	$ 86,298,894	$ 92,979,293	$ 87,717,798	$ 94,081,796
transport and handling												
copper cons, rail to port, per wet tonne	$ 17.90	$ 15,889,585	$ 16,348,977	$ 15,781,492	$ 15,159,961	$ 14,889,730	$ 14,403,314	$ 12,646,812	$ 12,079,327	$ 13,025,136	$ 12,349,558	$ 13,106,205
port handling & loading, per wet tonne	$ 7.80	$ 6,923,953	$ 7,124,135	$ 6,876,851	$ 6,606,016	$ 6,488,262	$ 6,276,304	$ 5,510,901	$ 5,263,617	$ 5,675,757	$ 5,381,372	$ 5,711, 084
insurance, per dry tonne	$ 0.74	$ 602,649	$ 620,073	$ 598,550	$ 574,977	$ 564,728	$ 546,279	$ 479,360	$ 458,137	$ 494,009	$ 468,386	$ 497,083
ocean freight, per wet tonne	$ 50.00	$ 44,384,315	$ 45,667,535	$ 44,082,381	$ 42,346,259	$ 41,591,424	$ 40,232,721	$ 35,326,291	$ 33,741,137	$ 36,383,061	$ 34,495,972	$ 36,609,511
supervision & assaying, per dry tonne	$ 0.35	$ 285,037	$ 293,278	$ 283,098	$ 271,948	$ 267,101	$ 258,375	$ 226,866	$ 216,686	$ 233,653	$ 221,534	$ 235,107
moly oxide, rail to port, per tonne	$ 17.90	$ 90,432	$ 140,672	$ 120,576	$ 115,552	$ 90,432	$ 110,528	$ 60,288	$ 80,384	$ 95,456	$ 105,504	$ 110,528
port handling & loading, per tonne	$ 7.80	$ 39,406	$ 61,298	$ 52,541	$ 50,352	$ 39,406	$ 48,163	$ 26,271	$ 35,028	$ 41,595	$ 45,974	$ 48,163
insurance, of net payable	0.00083	$ 154,262	$ 239,963	$ 205,682	$ 197,112	$ 154,262	$ 188,542	$ 102,841	$ 137,122	$ 162,832	$ 179,972	$ 188,542
ocean freight, per tonne	$ 50.00	$ 252,603	$ 392,938	$ 336,804	$ 322,771	$ 252,603	$ 308,737	$ 168,402	$ 224,536	$ 266,637	$ 294,704	$ 308,737
subtotal, transport and handling		$ 68,622,241	$ 70,888,869	$ 68,337,975	$ 65,644,949	$ 64,337,947	$ 62,372,963	$ 54,548,333	$ 52,235,974	$ 56,378,135	$ 53,542,975	$ 56,814,960
net smelter return		$1,331,542,724	$1,441,042,791	$1,373,149,922	$1,342,785,116	$1,300,583,294	$1,291,141,108	$1,105,196,353	$1,065,245,055	$1,162,615,630	$1,110,035,551	$1,226,987,527

Economic Analysis of Toromocho Project Prepared by Behre Dolbear & Co. May 1, 2012 metal prices average of various forecasting companies; with copper cost per pound		Production year +8	Production year +9	Production year +10	Production year +11	Production year +12	Production year +13	Production year +14	Production year +15	Production year +16	Production year +17	Production year +18
		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Operating Costs												
unit costs												
mining per tonne of material moved		$ 1.480	$ 1.421	$ 1.504	$ 1.599	$ 1.522	$ 1.607	$ 1.587	$ 1.604	$ 1.636	$ 1.616	$ 1.730
reclaim stockpile tonnage per tonne of stockpile moved		$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000
processing (milling) per tonne of ore milled		$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28
moly plant per tonne of moly oxide produced		$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00
processing infrastructure per tonne of ore milled		$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06
processing G&A per tonne of ore milled		$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42
annual cost												
mining ore and waste		$140,601,615	$134,953,770	$142,865,530	$151,897,305	$144,565,015	$152,689,985	$150,805,783	$152,392,730	$155,462,729	$153,482,665	$164,382,015
reclaim from stockpile		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
milling		$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400
moly plant		$ 18,248,041	$ 28,385,841	$ 24,330,721	$ 23,316,941	$ 18,248,041	$ 22,303,161	$ 12,165,360	$ 16,220,481	$ 19,261,821	$ 21,289,381	$ 22,303,161
processing infrastructure		$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800
processing G&A		$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600
Centromin royalty	1.71%	$ 22,769,381	$ 24,641,832	$ 23,480,864	$ 22,961,625	$ 22,239,974	$ 22,078,513	$ 18,898,858	$ 18,215,690	$ 19,880,727	$ 18,981,608	$ 20,981,487
total operating cost		$473,515,836	$479,878,243	$482,573,915	$490,072,671	$476,949,830	$488,968,459	$473,766,801	$478,725,701	$486,502,077	$485,650,454	$499,563,463

Economic Analysis of Toromocho Project Prepared by Behre Dolbear & Co. May 1, 2012 metal prices average of various forecasting companies; with copper cost per pound		Production year +19	Production year +20	Production year +21	Production year +22	Production year +23	Production year +24	Production year +25	Production year +26	Production year +27	Production year +28	Production year +29
		2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
income from sales												
copper payment	97.50%	$1,096,908,270	$ 950,924,175	$ 825,215,649	$ 689,369,338	$ 786,692,068	$ 764,388,942	$ 758,306,272	$ 815,077,864	$ 808,995,194	$ 896,180,139	$ 859,684,115
silver payment	95.00%	$ 157,077,685	$ 136,305,709	$ 125,815,861	$ 190,749,059	$ 125,815,861	$ 133,667,668	$ 119,771,215	$ 113,705,798	$ 103,423,670	$ 151,012,268	$ 157,472,352
molybdenum oxide payment	100.00%	$ 258,135,665	$ 299,437,371	$ 309,762,798	$ 278,786,518	$ 103,254,266	$ 113,579,693	$ 134,230,546	$ 165,206,826	$ 185,857,679	$ 227,159,385	$ 258,135,665
total payment		$1,512,121,620	$1,386,667,255	$1,260,794,307	$1,158,904,914	$1,015,762,194	$1,011,636,302	$1,012,308,033	$1,093,990,488	$1,098,276,542	$1,274,351,792	$1,275,292,133
treatment charge (US$ per dry tonne cons)	$ 70.00	$ 52,450,665	$ 45,470,169	$ 39,459,188	$ 32,963,449	$ 37,617,112	$ 36,550,648	$ 36,259,794	$ 38,974,431	$ 38,683,577	$ 42,852,484	$ 41,107,360
refining charge per lb copper	$ 0.070	$ 30,642,953	$ 26,564,778	$ 23,053,016	$ 19,258,048	$ 21,976,831	$ 21,353,777	$ 21,183,853	$ 22,769,810	$ 22,599,886	$ 25,035,462	$ 24,015,919
refining charge per ounce silver	$ 0.400	$ 2,939,465	$ 2,550,750	$ 2,354,449	$ 3,569,573	$ 2,354,449	$ 2,501,383	$ 2,241,333	$ 2,127,828	$ 1,935,414	$ 2,825,961	$ 2,946,851
arsenic penalty												
penalty per increment	$ 2.50											
increment	0.10%											
penalty		$ 1,498,590	$ 1,299,148	$ 1,127,405	$ 941,813	$ 1,074,775	$ 1,044,304	$ 1,035,994	$ 1,113,555	$ 1,105,245	$ 1,224,357	$ 1,174,496
zinc penalty												
penalty per increment	$ 2.50											
increment	1.00%											
penalty		$ 16,859,142	$ 14,615,412	$ 12,683,310	$ 10,595,394	$ 12,091,215	$ 11,748,423	$ 11,654,934	$ 12,527,496	$ 12,434,007	$ 13,774,013	$ 13,213,080
subtotal, treatment and penalties		$ 104,390,815	$ 90,500,257	$ 78,677,368	$ 67,328,277	$ 75,114,382	$ 73,198,535	$ 72,375,907	$ 77,513,119	$ 76,758,128	$ 85,712,276	$ 82,457,706
transport and handling												
copper cons, rail to port, per wet tonne	$ 17.90	$ 14,619,499	$ 12,673,835	$ 10,998,403	$ 9,187,855	$ 10,484,964	$ 10,187,710	$ 10,106,641	$ 10,863,287	$ 10,782,218	$ 11,944,212	$ 11,457,796
port handling & loading, per wet tonne	$ 7.80	$ 6,370,508	$ 5,522,677	$ 4,792,600	$ 4,003,646	$ 4,568,867	$ 4,439,337	$ 4,404,011	$ 4,733,723	$ 4,698,397	$ 5,204,740	$ 4,992,782
insurance, per dry tonne	$ 0.74	$ 554,478	$ 480,685	$ 417,140	$ 348,471	$ 397,667	$ 386,393	$ 383,318	$ 412,015	$ 408,941	$ 453,012	$ 434,564
ocean freight, per wet tonne	$ 50.00	$ 40,836,589	$ 35,401,775	$ 30,721,796	$ 25,664,400	$ 29,287,609	$ 28,457,290	$ 28,230,840	$ 30,344,378	$ 30,117,928	$ 33,363,720	$ 32,005,016
supervision & assaying, per dry tonne	$ 0.35	$ 262,253	$ 227,351	$ 197,296	$ 164,817	$ 188,086	$ 182,753	$ 181,299	$ 194,872	$ 193,418	$ 214,262	$ 205,537
moly oxide, rail to port, per tonne	$ 17.90	$ 125,600	$ 145,696	$ 150,720	$ 135,648	$ 50,240	$ 55,264	$ 65,312	$ 80,384	$ 90,432	$ 110,528	$ 125,600
port handling & loading, per tonne	$ 7.80	$ 54,731	$ 63,488	$ 65,677	$ 59,109	$ 21,892	$ 24,081	$ 28,460	$ 35,028	$ 39,406	$ 48,163	$ 54,731
insurance, of net payable	0.00083	$ 214,253	$ 248,533	$ 257,103	$ 231,393	$ 85,701	$ 94,271	$ 111,411	$ 137,122	$ 154,262	$ 188,542	$ 214,253
ocean freight, per tonne	$ 50.00	$ 350,838	$ 406,972	$ 421,005	$ 378,905	$ 140,335	$ 154,369	$ 182,436	$ 224,536	$ 252,603	$ 308,737	$ 350,838
subtotal, transport and handling		$ 63,388,748	$ 55,171,010	$ 48,021,740	$ 40,174,243	$ 45,225,360	$ 43,981,468	$ 43,693,727	$ 47,025,346	$ 46,737,604	$ 51,835,916	$ 49,841,115
net smelter return		$1,344,342,057	$1,240,995,988	$1,134,095,199	$1,051,402,394	$ 895,422,452	$ 894,456,300	$ 896,238,399	$ 969,452,023	$ 974,780,810	$1,136,803,600	$1,142,993,312

Economic Analysis of Toromocho Project Prepared by Behre Dolbear & Co. May 1, 2012 metal prices average of various forecasting companies; with copper cost per pound		Production year +19	Production year +20	Production year +21	Production year +22	Production year +23	Production year +24	Production year +25	Production year +26	Production year +27	Production year +28	Production year +29
		2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Operating Costs												
unit costs												
mining per tonne of material moved		$ 1.732	$ 1.717	$ 1.854	$ 1.854	$ 1.854	$ 1.854	$ 1.854	$ 2.105	$ 2.105	$ 2.105	$ 2.105
reclaim stockpile tonnage per tonne of stockpile moved		$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$ 0.000
processing (milling) per tonne of ore milled		$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28
moly plant per tonne of moly oxide produced		$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00
processing infrastructure per tonne of ore milled		$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06
processing G&A per tonne of ore milled		$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42
annual cost												
mining ore and waste		$164,580,185	$163,093,910	$176,173,130	$169,135,477	$147,772,167	$128,074,157	$120,413,407	$130,834,857	$132,727,048	$118,730,301	$112,959,011
reclaim from stockpile		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
milling		$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400
moly plant		$ 25,344,501	$ 29,399,621	$ 30,413,401	$ 27,372,061	$ 10,137,800	$ 11,151,580	$ 13,179,141	$ 16,220,481	$ 18,248,041	$ 22,303,161	$ 25,344,501
processing infrastructure		$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800
processing G&A		$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600
Centromin royalty	1.71%	$ 22,988,249	$ 21,221,031	$ 19,393,028	$ 17,978,981	$ 15,311,724	$ 15,295,203	$ 15,325,677	$ 16,577,630	$ 16,668,752	$ 19,439,342	$ 19,545,186
total operating cost		$504,809,735	$505,611,363	$517,876,359	$506,383,319	$465,118,491	$446,417,740	$440,815,024	$455,529,767	$459,540,641	$452,369,604	$449,745,498

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May 1, 2012
metal prices average of various forecasting companies; with copper cost per pound

		Production year +30	Production year +31	Production year +32	Production year +33	Production year +34	Production year +35	Production year +36	Production year +37	Production year +38	Production year +39	Production year +40	Total
		2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	
Income from sales													
copper payment	97.50%	$ 754,251,158	$ 569,743,482	$575,720,972	$742,085,817	$742,085,817	$742,085,817	$567,786,735	$0	$0	$0	$0	$35,221,398,256
silver payment	95.00%	$ 129,450,956	$ 205,060,950	$130,223,839	$122,076,905	$122,076,905	$122,076,905	$ 93,403,816	$0	$0	$0	$0	$ 5,225,338,971
molybdenum oxide payment	100.00%	$ 299,437,371	$ 340,739,078	$218,158,712	$ 82,603,413	$ 82,603,413	$ 82,603,413	$ 63,201,750	$0	$0	$0	$0	$ 7,041,825,701
total payment		$1,183,139,486	$1,115,543,510	$924,103,523	$946,766,134	$946,766,134	$946,766,134	$724,392,301	$0	$0	$0	$0	$47,488,562,928
treatment charge (US$ per dry tonne cons)	$ 70.00	$ 36,065,891	$ 27,243,321	$ 27,529,146	$ 35,484,183	$ 35,484,183	$ 35,484,183	$ 27,149,756	$0	$0	$0	$0	$ 1,630,331,766
refining charge per lb copper	$ 0.070	$ 21,070,570	$ 15,916,210	$ 16,083,196	$ 20,730,722	$ 20,730,722	$ 20,730,722	$ 15,861,547	$0	$0	$0	$0	$ 952,479,435
refining charge per ounce silver	$ 0.400	$ 2,422,474	$ 3,837,398	$ 2,436,937	$ 2,284,480	$ 2,284,480	$ 2,284,480	$ 1,747,908	$0	$0	$0	$0	$ 95,060,179
arsenic penalty													
penalty per increment	$ 2.50												
increment	0.10%												
penalty		$ 1,030,454	$ 778,381	$ 786,547	$ 1,013,834	$ 1,013,834	$ 1,013,834	$ 775,707	$0	$0	$0	$0	$ 46,580,908
zinc penalty													
penalty per increment	$ 2.50												
increment	1.00%												
penalty		$ 11,592,608	$ 8,756,782	$ 8,848,654	$ 11,405,630	$ 11,405,630	$ 11,405,630	$ 8,726,707	$0	$0	$0	$0	$ 524,035,211
subtotal treatment and penalties		$ 72,181,997	$ 56,532,092	$ 55,684,480	$ 70,918,850	$ 70,918,850	$ 70,918,850	$ 54,261,625	$0	$0	$0	$0	$ 3,248,487,498
transport and handling													
copper cons, rail to port, per wet tonne	$ 17.90	$ 10,052,594	$ 7,593,492	$ 7,673,159	$ 9,890,456	$ 9,890,456	$ 9,890,456	$ 7,567,413	$0	$0	$0	$0	$ 454,420,044
port handling & loading, per wet tonne	$ 7.80	$ 4,380,460	$ 3,308,896	$ 3,343,611	$ 4,309,808	$ 4,309,808	$ 4,309,808	$ 3,297,532	$0	$0	$0	$0	$ 198,015,438
insurance, per dry tonne	$ 0.74	$ 381,268	$ 288,001	$ 291,022	$ 375,119	$ 375,119	$ 375,119	$ 287,012	$0	$0	$0	$0	$ 17,234,936
ocean freight, per wet tonne	$ 50.00	$ 28,079,873	$ 21,210,871	$ 21,433,406	$ 27,626,971	$ 27,626,971	$ 27,626,971	$ 21,138,024	$0	$0	$0	$0	$ 1,269,329,732
supervision & assaying, per dry tonne	$ 0.35	$ 180,329	$ 136,217	$ 137,646	$ 177,421	$ 177,421	$ 177,421	$ 135,749	$0	$0	$0	$0	$ 8,151,659
moly oxide, rail to port, per tonne	$ 17.90	$ 145,696	$ 165,792	$ 106,148	$ 40,192	$ 40,192	$ 40,192	$ 30,752	$0	$0	$0	$0	$ 3,398,523
port handling & loading, per tonne	$ 7.80	$ 63,488	$ 72,244	$ 46,255	$ 17,514	$ 17,514	$ 17,514	$ 13,400	$0	$0	$0	$0	$ 1,480,921
insurance, of net payable	0.00083	$ 248,533	$ 282,813	$ 181,072	$ 68,561	$ 68,561	$ 68,561	$ 52,457	$0	$0	$0	$0	$ 5,844,715
ocean freight, per tonne	$ 50.00	$ 406,972	$ 463,106	$ 296,504	$ 112,268	$ 112,268	$ 112,268	$ 85,899	$0	$0	$0	$0	$ 9,493,081
subtotal, transport and handling		$ 43,939,212	$ 33,521,432	$ 33,508,824	$ 42,618,309	$ 42,618,309	$ 42,618,309	$ 32,608,237	$0	$0	$0	$0	$ 1,967,369,049
net smelter return		$1,067,018,276	$1,025,489,986	$834,910,219	$833,228,976	$833,228,976	$833,228,976	$637,522,439	$0	$0	$0	$0	$42,272,706,381

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metal prices average of various forecasting companies; with copper cost per pound

		Production year +30 2043	Production year +31 2044	Production year +32 2045	Production year +33 2046	Production year +34 2047	Production year +35 2048	Production year +36 2049	Production year +37 2050	Production year +38 2051	Production year +39 2052	Production year +40 2053	Total
Operating Costs													
unit costs													
mining per tonne of material moved		$ 2.105	$ 2.164	$ 2.164	$ 0.000	$ 0.000	$ 0.000	$ 0.000	$0.000	$0.000	$0.000	$0.000	
reclaim stockpile tonnage per tonne of stockpile moved		$ 0.000	$ 0.000	$ 0.889	$ 0.889	$ 0.889	$ 0.889	$ 0.889	$0.000	$0.000	$0.000	$0.000	
processing (milling) per tonne of ore milled		$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 5.28	$ 0.00	$ 0.00	$ 0.00	$ 0.00	
moly plant per tonne of moly oxide produced		$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 3,612.00	$ 0.00	$ 0.00	$ 0.00	$ 0.00	
processing infrastructure per tonne of ore milled		$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.06	$ 0.00	$ 0.00	$ 0.00	$ 0.00	
processing G&A per tonne of ore milled		$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 1.42	$ 0.00	$ 0.00	$ 0.00	$ 0.00	
annual cost													
mining ore and waste		$111,199,420	$124,155,096	$ 69,573,341	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 4,400,870,601
reclaim from stockpile		$ 0	$ 0	$ 22,629,116	$ 38,371,302	$ 38,371,302	$ 38,371,302	$ 29,358,756	$ 0	$ 0	$ 0	$ 0	$ 167,101,779
milling		$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$227,990,400	$174,440,640	$ 0	$ 0	$ 0	$ 0	$ 8,133,222,240
moly plant		$ 29,399,621	$ 33,454,741	$ 21,419,449	$ 8,110,240	$ 8,110,240	$ 8,110,240	$ 6,205,329	$ 0	$ 0	$ 0	$ 0	$ 685,780,171
processing infrastructure		$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 2,590,800	$ 1,982,280	$ 0	$ 0	$ 0	$ 0	$ 92,422,980
processing G&A		$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 61,315,600	$ 46,913,960	$ 0	$ 0	$ 0	$ 0	$ 2,187,343,860
Centromin royalty	1.71%	$ 18,246,013	$ 17,535,879	$ 14,276,965	$ 14,248,215	$ 14,248,215	$ 14,248,215	$ 10,901,634	$ 0	$ 0	$ 0	$ 0	$ 722,863,279
total operating cost		$450,741,854	$467,042,516	$419,795,671	$352,626,558	$352,626,558	$352,626,558	$269,802,599	$ 0	$ 0	$ 0	$ 0	$16,389,604,911

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		Pre-production year -3	Pre-production year -2	Pre-production year -1	Production year +1	Production year +2	Production year +3	Production year +4	Production year +5	Production year +6	Production year +7
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
depreciation		$ 0	$ 0	$ 0	$ 584,613,704	$ 590,462,642	$595,418,686	$607,193,850	$618,000,382	$ 42,188,190	$ 48,792,839
employee profit sharing	8.00%	$ 0	$ 0	$ 15,868	$ 61,173,707	$ 79,819,087	$ 27,925,649	$ 28,577,332	$ 24,202,192	$ 70,463,579	$ 66,714,028
net income before taxes		$ 0	$ 0	$ 182,482	$ 703,497,634	$ 917,919,498	$321,144,963	$328,639,318	$278,325,204	$810,331,161	$767,211,326
income taxes											
loss carried forward		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
federal income tax	30.00%	$ 0	$ 0	$ 54,745	$ 211,049,290	$ 275,375,849	$ 96,343,489	$ 98,591,795	$ 83,497,561	$243,099,348	$230,163,398
net income after taxes		$ 0	$ 0	$ 127,737	$ 492,448,344	$ 642,543,649	$224,801,474	$230,047,523	$194,827,642	$567,231,812	$537,047,928
add back depreciation		$ 0	$ 0	$ 0	$ 584,613,704	$ 590,462,642	$595,418,686	$607,193,850	$618,000,382	$ 42,188,190	$ 48,792,839
net cash flow from operations		$ 0	$ 0	$ 127,737	$1,077,062,048	$1,233,006,291	$820,220,160	$837,241,373	$812,828,025	$609,420,002	$585,840,767
capital investments											
initial investments											
mine preproduction development		$ 12,648,243	$ 13,585,513	$ 48,644,224							
major mine equipment		$ 85,608,834	$ 66,123,959	$ 45,575,619							
support mine equipment		$ 18,837,698	$ 11,587,275	$ 10,028,635							
contingency, mine equipment		$ 5,681,326	$ 4,429,638	$ 5,058,036							
process and infrastructure		$ 783,976,680	$ 471,904,249	$ 417,366,071							
contingency, process and infrastructure		$ 62,531,289	$ 37,638,896	$ 33,289,815							
owner's cost		$ 209,992,423	$ 126,404,802	$ 111,793,775							
contingency, owner's cost		$ 16,235,507	$ 9,783,168	$ 8,701,325							
sustaining capital											
mine sustaining capital					$ 4,624,800			$ 34,095,600	$ 625,250	$ 18,532,000	$ 36,792,375
process sustaining capital					$ 25,897,822	$ 28,857,239	$ 24,392,770	$ 24,392,770	$ 53,019,962	$ 25,088,109	$ 25,088,109
general & administrative sustaining capital					$ 118,900	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450
relocation of Morococha		$ 35,000,000	$ 35,000,000	$ 30,000,000							
lime quarry and plant		$ 30,000,000	$ 30,000,000	$ 40,000,000							
relocate main highway		$ 25,000,000	$ 25,000,000	$ 25,000,000							
working capital				$ 56,000,000							
total capital investment		$ 1,285,512,000	$ 831,457,500	$ 831,457,500	$ 30,641,522	$ 29,244,689	$ 24,780,220	$ 58,875,820	$ 54,032,662	$ 44,007,559	$ 62,267,934
net cash flow		-$1,285,512,000	-$831,457,500	-$831,329,763	$1,046,420,526	$1,203,761,602	$795,439,941	$778,365,553	$758,795,363	$565,412,443	$523,572,833
life-of-mine											
net cash flow	$13,785,547,060										

Economic Analysis of Toromocho Project Prepared by Behre Dolbear & Co. May 1, 2012 metal prices average of various forecasting companies; with copper cost per pound		Production year +8	Production year +9	Production year +10	Production year +11	Production year +12	Production year +13	Production year +14	Production year +15	Production year +16	Production year +17	Production year +18
		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
depreciation		$ 50,679,913	$ 46,543,659	$ 69,205,682	$ 75,294,140	$ 68,832,310	$ 78,084,375	$ 75,966,952	$ 49,337,109	$ 48,451,434	$ 48,573,039	$ 40,215,435
employee profit sharing	8.00%	$ 64,587,758	$ 73,169,671	$ 65,709,626	$ 62,193,464	$ 60,384,092	$ 57,927,062	$ 44,437,008	$ 42,974,580	$ 50,212,970	$ 46,064,965	$ 54,976,690
net income before taxes		$742,759,217	$841,451,218	$755,660,699	$715,224,840	$694,417,062	$666,161,213	$511,025,593	$494,207,665	$577,449,149	$529,747,093	$632,231,939
income taxes												
loss carried forward		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
federal income tax	30.00%	$222,827,765	$252,435,365	$226,698,210	$214,567,452	$208,325,118	$199,848,364	$153,307,678	$148,262,300	$173,234,745	$158,924,128	$189,669,582
net income after taxes		$519,931,452	$589,015,853	$528,962,489	$500,657,388	$486,091,943	$466,312,849	$357,717,915	$345,945,366	$404,214,404	$370,822,965	$442,562,358
add back depreciation		$ 50,679,913	$ 46,543,659	$ 69,205,682	$ 75,294,140	$ 68,832,310	$ 78,084,375	$ 75,966,952	$ 49,337,109	$ 48,451,434	$ 48,573,039	$ 40,215,435
net cash flow from operations		$570,611,365	$635,559,512	$598,168,171	$575,951,528	$554,924,254	$544,397,223	$433,684,867	$395,282,475	$452,665,839	$419,396,004	$482,777,792
capital investments												
initial investments												
mine preproduction development												
major mine equipment												
support mine equipment												
contingency, mine equipment												
process and infrastructure												
contingency, process and infrastructure												
owner's cost												
contingency, owner's cost												
sustaining capital												
mine sustaining capital		$ 1,403,225	$ 8,132,350	$137,279,275	$ 33,121,850	$ 3,625,425	$ 54,142,550	$ 1,274,075	$ 1,795,800	$ 47,114,125	$ 10,410,925	$ 18,532,000
process sustaining capital		$ 32,424,916	$ 29,674,750	$ 29,676,050	$ 40,940,550	$ 25,945,911	$ 25,945,911	$ 25,945,911	$ 32,010,311	$ 22,519,902	$ 19,768,437	$ 19,768,437
general & administrative sustaining capital		$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450
relocation of Morococha												
lime quarry and plant												
relocate main highway												
working capital												
total capital investment		$ 34,215,591	$ 38,194,550	$167,342,775	$ 74,449,850	$ 29,958,786	$ 80,475,911	$ 27,607,436	$ 34,193,561	$ 70,021,477	$ 30,566,812	$ 38,687,887
net cash flow		$536,395,774	$597,364,962	$430,825,396	$501,501,678	$524,965,467	$463,921,312	$406,077,431	$361,088,913	$382,644,362	$388,829,192	$444,089,905
life-of-mine												
net cash flow	$13,785,547,060											

Economic Analysis of Toromocho Project Prepared by Behre Dolbear & Co. May 1, 2012 metal prices average of various forecasting companies; with copper cost per pound		Production year +19	Production year +20	Production year +21	Production year +22	Production year +23	Production year +24	Production year +25	Production year +26	Production year +27	Production year +28	Production year +29
		2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
depreciation		$ 68,450,945	$ 69,749,355	$ 61,384,226	$ 59,302,041	$ 65,144,746	$ 35,693,942	$ 33,280,207	$ 27,718,531	$ 23,764,843	$ 20,426,566	$ 29,690,077
employee profit sharing	8.00%	$ 61,686,510	$ 53,250,822	$ 44,386,769	$ 38,857,363	$ 29,212,737	$ 32,987,569	$ 33,771,453	$ 38,896,298	$ 39,318,026	$ 53,120,594	$ 53,084,619
net income before taxes		$709,394,866	$612,384,448	$510,447,845	$446,859,671	$335,946,478	$379,357,048	$388,371,714	$447,307,428	$452,157,300	$610,886,836	$610,473,118
income taxes												
loss carried forward		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
federal income tax	30.00%	$212,818,460	$183,715,335	$153,134,353	$134,057,901	$100,783,943	$113,807,114	$116,511,514	$134,192,228	$135,647,190	$183,266,051	$183,141,936
net income after taxes		$496,576,407	$428,669,114	$357,313,491	$312,801,770	$235,162,534	$265,549,934	$271,860,200	$313,115,199	$316,510,110	$427,620,785	$427,331,183
add back depreciation		$ 68,450,945	$ 69,749,355	$ 61,384,226	$ 59,302,041	$ 65,144,746	$ 35,693,942	$ 33,280,207	$ 27,718,531	$ 23,764,843	$ 20,426,566	$ 29,690,077
net cash flow from operations		$565,027,351	$498,418,469	$418,697,717	$372,103,811	$300,307,280	$301,243,876	$305,140,407	$340,833,730	$340,274,953	$448,047,351	$457,021,260
capital investments												
initial investments												
mine preproduction development												
major mine equipment												
support mine equipment												
contingency, mine equipment												
process and infrastructure												
contingency, process and infrastructure												
owner's cost												
contingency, owner's cost												
sustaining capital												
mine sustaining capital		$148,629,100	$ 20,529,725			$ 47,745,525					$ 48,223,175	
process sustaining capital		$ 19,768,437	$ 19,768,437	$ 27,808,381	$ 19,768,437	$ 19,768,437	$ 21,143,520	$ 28,229,484	$ 0	$ 0	$ 2,599,400	$ 67,471,326
general & administrative sustaining capital		$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 387,450	$ 377,200
relocation of Morococha												
lime quarry and plant												
relocate main highway												
working capital												
total capital investment		$168,784,987	$ 40,685,612	$ 28,195,831	$ 20,155,887	$ 67,901,412	$ 21,530,970	$ 28,616,934	$ 387,450	$ 387,450	$ 51,210,025	$ 67,848,526
net cash flow		$396,242,364	$457,732,857	$390,501,886	$351,947,924	$232,405,868	$279,712,906	$276,523,473	$340,446,280	$339,887,503	$396,837,326	$389,172,734
life-of-mine												
net cash flow	$13,735,547,060											

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		Production year +30	Production year +31	Production year +32	Production year +33	Production year +34	Production year +35	Production year +36	Production year +37	Production year +38	Production year +39	Production year +40	Total
		2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	
depreciation		$ 40,909,897	$ 55,481,318	$ 55,479,268	$ 45,312,703	$ 31,794,658	$ 14,879,536	$ 232,880	$ 0	$0	$0	$0	$ 4,476,550,080
employee profit sharing	8.00%	$ 46,029,322	$ 40,237,292	$ 28,770,822	$ 34,823,177	$ 35,904,621	$ 37,257,830	$ 29,398,957	$ 0	$0	$0	$0	$ 1,712,524,111
net income before taxes		$529,337,203	$462,728,860	$330,864,458	$400,466,537	$412,903,139	$428,465,051	$338,088,003	$ 0	$0	$0	$0	$19,694,027,279
income taxes													
loss carried forward		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$0	$0	$0	
federal income tax	30.00%	$158,801,161	$138,818,658	$ 99,259,337	$120,139,961	$123,870,942	$128,539,515	$101,426,401	$ 0	$0	$0	$0	$ 5,908,208,184
net income after taxes		$370,536,042	$323,910,202	$231,605,121	$280,326,576	$289,032,197	$299,925,535	$236,661,602	$ 0	$0	$0	$0	$13,785,819,095
add back depreciation		$ 40,909,897	$ 55,481,318	$ 55,479,268	$ 45,312,703	$ 31,794,658	$ 14,879,536	$ 232,880	$ 0	$0	$0	$0	$ 4,476,550,080
net cash flow from operations		$411,445,939	$379,391,520	$287,084,389	$325,639,279	$320,826,855	$314,805,072	$236,894,482	$ 0	$0	$0	$0	$18,262,369,175
capital investments													
initial investments													
mine preproduction development													$ 74,877,979
major mine equipment													$ 197,308,413
support mine equipment													$ 40,453,607
contingency, mine equipment													$ 15,169,000
process and infrastructure													$ 1,673,247,000
contingency, process and infrastructure													$ 133,460,001
owner's cost													$ 448,191,000
contingency, owner's cost													$ 34,720,000
sustaining capital													
mine sustaining capital			$ 55,999,850										$ 732,629,000
process sustaining capital		$ 84,338,833	$ 16,867,507										$ 838,890,065
general & administrative sustaining capital		$ 377,200	$ 377,200	$ 377,200	$ 377,200	$ 258,300	$ 140,425	$ 11,275					$ 12,876,050
relocation of Morococha													$ 100,000,000
lime quarry and plant													$ 100,000,000
relocate main highway													$ 75,000,000
working capital									-$56,000,000				$ 0
total capital investment		$ 84,716,033	$ 73,244,557	$ 377,200	$ 377,200	$ 258,300	$ 140,425	$ 11,275	-$56,000,000	$0	$0	$0	$ 4,476,822,115
net cash flow		$326,729,906	$306,146,964	$286,707,189	$325,262,079	$320,568,555	$314,664,647	$236,883,207	$ 56,000,000	$0	$0	$0	$13,785,547,060
life-of-mine													
net cash flow	$13,785,547,060												

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	Pre-production year -3 2011	Pre-production year -2 2012	Pre-production year -1 2013	Production year +1 2014	Production year +2 2015	Production year +3 2016	Production year +4 2017	Production year +5 2018	Production year +6 2019	Production year +7 2020	Production year +8 2021
year -3 to -1 (2011 to 2013) investments				$ 578,485,400	$ 578,485,400	$ 578,485,400	$ 578,485,400	$ 578,485,400			
year +1 investments				$ 6,128,304	$ 6,128,304	$ 6,128,304	$ 6,128,304	$ 6,128,304			
year +2 investments					$ 5,848,938	$ 5,848,938	$ 5,848,938	$ 5,848,938	$ 5,848,938		
year +3 investments						$ 4,956,044	$ 4,956,044	$ 4,956,044	$ 4,956,044	$ 4,956,044	
year +4 investments							$ 11,775,164	$ 11,775,164	$ 11,775,164	$ 11,775,164	$ 11,775,164
year +5 investments								$ 10,806,532	$ 10,806,532	$ 10,806,532	$ 10,806,532
year +6 investments									$ 8,801,512	$ 8,801,512	$ 8,801,512
year +7 investments										$ 12,453,587	$ 12,453,587
year +8 investments											$ 6,843,118
year +9 investments											
year +10 investments											
year +11 investments											
year +12 investments											
total annual depreciation	$0	$ 0	$ 0	$ 584,613,704	$ 590,462,642	$ 595,418,686	$ 607,193,850	$ 618,000,382	$ 42,188,190	$ 48,792,839	$ 50,679,913
loss carried forward determination											
net income before taxes	$0	$ 0	$182,482	$ 703,497,634	$ 917,919,498	$ 321,144,963	$ 328,639,318	$ 278,325,204	$ 810,331,161	$ 767,211,326	$ 742,759,217
cumulative net income before taxes	$0	$ 0	$182,482	$ 703,680,116	$ 1,621,599,614	$ 1,942,744,577	$ 2,271,383,896	$ 2,549,709,099	$ 3,360,040,260	$ 4,127,251,585	$ 4,870,010,802
cumulative loss	$0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
potential write-off	$0	$ 0	$182,482	$ 703,497,634	$ 917,919,498	$ 321,144,963	$ 328,639,318	$ 278,325,204	$ 810,331,161	$ 767,211,326	$ 742,759,217
cumulative potential write-off	$0	$ 0	$182,482	$ 703,680,116	$ 1,621,599,614	$ 1,942,744,577	$ 2,271,383,896	$ 2,549,709,099	$ 3,360,040,260	$ 4,127,251,585	$ 4,870,010,802
trial write-off	$0	$ 0	$ 0	($ 182,482)	($ 703,680,116)	($1,621,599,614)	($1,942,744,577)	($2,271,383,896)	($2,549,709,099)	($3,360,040,260)	($4,127,251,585)
actual write-off	$0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0

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		Production year +9	Production year +10	Production year +11	Production year +12	Production year +13	Production year +14	Production year +15	Production year +16	Production year +17	Production year +18	Production year +19
		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
	year -3 to -1 (2011 to 2013) investments year +1 investments											
		$ 10,806,532										
		$ 8,801,512	$ 8,801,512									
		$ 12,453,587	$ 12,453,587	$ 12,453,587								
		$ 6,843,118	$ 6,843,118	$ 6,843,118	$ 6,843,118							
		$ 7,638,910	$ 7,638,910	$ 7,638,910	$ 7,638,910	$ 7,638,910						
			$ 33,468,555	$ 33,468,555	$ 33,468,555	$ 33,468,555	$ 33,468,555					
				$ 14,889,970	$ 14,889,970	$ 14,889,970	$ 14,889,970	$ 14,889,970				
					$ 5,991,757	$ 5,991,757	$ 5,991,757	$ 5,991,757	$ 5,991,757			
		year +13 investments				$ 16,095,182	$ 16,095,182	$ 16,095,182	$ 16,095,182	$ 16,095,182		
			year +14 investments				$ 5,521,487	$ 5,521,487	$ 5,521,487	$ 5,521,487	$ 5,521,487	
				year +15 investments				$ 6,838,712	$ 6,838,712	$ 6,838,712	$ 6,838,712	$ 6,838,712
					year +16 investments				$ 14,004,295	$ 14,004,295	$ 14,004,295	$ 14,004,295
						year +17 investments				$ 6,113,362	$ 6,113,362	$ 6,113,362
							year +18 investments				$ 7,737,577	$ 7,737,577
								year +19 investments				$ 33,756,997
									year +20 investments			
										year +21 investments		
											year +22 investments	
												year +23 investments
total annual depreciation		$ 46,543,659	$ 69,205,682	$ 75,294,140	$ 68,832,310	$ 78,084,375	$ 75,966,952	$ 49,337,109	$ 48,451,434	$ 48,573,039	$ 40,215,435	$ 68,450,945
loss carried forward determination												
net income before taxes		$ 841,451,218	$ 755,660,699	$ 715,224,840	$ 694,417,062	$ 666,161,213	$ 511,025,593	$ 494,207,665	$ 577,449,149	$ 529,747,093	$ 632,231,939	$ 709,394,866
cumulative net income before taxes		$ 5,711,462,020	$ 6,467,122,720	$ 7,182,347,560	$ 7,876,764,622	$ 8,542,925,834	$ 9,053,951,427	$ 9,548,159,092	$10,125,608,241	$ 10,655,355,334	$ 11,287,587,274	$ 11,996,932,140
cumulative loss		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
potential write-off		$ 841,451,218	$ 755,660,699	$ 715,224,840	$ 694,417,062	$ 666,161,213	$ 511,025,593	$ 494,207,665	$ 577,449,149	$ 529,747,093	$ 632,231,939	$ 709,394,866
cumulative potential write-off		$ 5,711,462,020	$ 6,467,122,720	$ 7,182,347,560	$ 7,876,764,622	$ 8,542,925,834	$ 9,053,951,427	$ 9,548,159,092	$10,125,608,241	$ 10,655,355,334	$ 11,287,587,274	$ 11,996,982,140
trial write-off		($4,870,010,802)	($5,711,462,020)	($6,467,122,720)	($7,182,347,560)	($7,876,764,622)	($8,542,925,834)	($9,053,951,427)	($9,548,159,092)	($10,125,608,241)	($10,655,355,334)	($11,287,587,274)
actual write-off		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0

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		Production year +20	Production year +21	Production year +22	Production year +23	Production year +24	Production year +25	Production year +26	Production year +27	Production year +28	Production year +29	Production year +30
		2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
	year -3 to -1 (2011 to 2013) investments											
	year+1 investments	$ 14,004,295										
		$ 6,113,362	$ 6,113,362									
		$ 7,737,577	$ 7,737,577	$ 7,737,577								
		$ 33,756,997	$ 33,756,997	$ 33,756,997	$ 33,756,997							
		$ 8,137,122	$ 8,137,122	$ 8,137,122	$ 8,137,122	$ 8,137,122						
			$ 5,639,166	$ 5,639,166	$ 5,639,166	$ 5,639,166	$ 5,639,166					
				$ 4,031,177	$ 4,031,177	$ 4,031,177	$ 4,031,177	$ 4,031,177				
					$ 13,580,282	$ 13,580,282	$ 13,580,282	$ 13,580,282	$ 13,580,282			
		year +24 investments				$ 4,306,194	$ 4,306,194	$ 4,306,194	$ 4,306,194	$ 4,306,194		
			year +25 investments				$ 5,723,387	$ 5,723,387	$ 5,723,387	$ 5,723,387	$ 5,723,387	
				year +26 investments				$ 77,490	$ 77,490	$ 77,490	$ 77,490	$ 77,490
					year +27 investments				$ 77,490	$ 77,490	$ 77,490	$ 77,490
						year +28 investments				$ 10,242,005	$ 10,242,005	$ 10,242,005
							year +29 investments				$ 13,569,705	$ 13,569,705
								year +30 investments				$ 16,943,207
									year +31 investments			
										year +32 investments		
											year +33 investments	
												year +34 investments
total annual depreciation		$ 69,749,355	$ 61,384,226	$ 59,302,041	$ 65,144,746	$ 35,693,942	$ 33,280,207	$ 27,718,531	$ 23,764,843	$ 20,426,566	$ 29,690,077	$ 40,909,897
loss carried forward determination												
net income before taxes		$ 612,384,448	$ 510,447,845	$ 446,859,671	$ 335,946,478	$ 379,357,048	$ 388,371,714	$ 447,307,428	$ 452,157,300	$ 610,886,836	$ 610,473,118	$ 529,337,203
cumulative net income before taxes		$ 12,609,366,589	$ 13,119,814,434	$ 13,566,674,105	$ 13,902,620,583	$ 14,281,977,631	$ 14,670,349,345	$ 15,117,656,773	$ 15,569,814,073	$ 16,180,700,909	$ 16,791,174,028	$ 17,320,511,231
cumulative loss		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
potential write-off		$ 612,384,448	$ 510,447,845	$ 446,859,671	$ 335,946,478	$ 379,357,048	$ 388,371,714	$ 447,307,428	$ 452,157,300	$ 610,886,836	$ 610,473,118	$ 529,337,203
cumulative potential write-off		$ 12,609,366,589	$ 13,119,814,434	$ 13,566,674,105	$ 13,902,620,583	$ 14,281,977,631	$ 14,670,349,345	$ 15,117,656,773	$ 15,569,814,073	$ 16,180,700,909	$ 16,791,174,028	$ 17,320,511,231
trial write-off		($11,996,982,140)	($12,609,366,589)	($13,119,814,434)	($13,566,674,105)	($13,902,620,583)	($14,281,977,631)	($14,670,349,345)	($15,117,656,773)	($15,569,814,073)	($16,180,700,909)	($16,791,174,028)
actual write-off		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0

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		Production year +31	Production year +32	Production year +33	Production year +34	Production year +35	Production year +36	Production year +37	Production year +38	Production year +39	Production year +40	Total
		2044	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**	**2052**	**2053**	
	year -3 to -1 (2011 to 2013) investments											
	year +1 investments											$2,892,427,000
												$ 30,641,522
												$ 29,244,689
												$ 24,780,220
												$ 58,875,820
												$ 54,032,662
												$ 44,007,559
												$ 62,267,934
												$ 34,215,591
												$ 38,194,550
												$ 167,342,775
												$ 74,449,850
												$ 29,958,786
												$ 80,475,911
												$ 27,607,436
												$ 34,193,561
												$ 70,021,477
												$ 30,566,812
												$ 38,687,887
												$ 168,784,987
												$ 40,685,612
												$ 28,195,831
												$ 20,155,887
												$ 67,901,412
												$ 21,530,970
												$ 28,616,934
												$ 387,450
		$ 77,490										$ 387,450
		$ 10,242,005	$ 10,242,005									$ 51,210,025
		$ 13,569,705	$ 13,569,705	$ 13,569,705								$ 67,848,526
		$ 16,943,207	$ 16,943,207	$ 16,943,207	$ 16,943,207							$ 84,716,033
		$ 14,648,911	$ 14,648,911	$ 14,648,911	$ 14,648,911	$ 14,648,911						$ 73,244,557
			$ 75,440	$ 75,440	$ 75,440	$ 75,440	$ 75,440					$ 377,200
				$ 75,440	$ 75,440	$ 75,440	$ 75,440	$ 75,440				$ 377,200
					$ 51,660	$ 51,660	$ 51,660	$ 51,660	$ 51,660			$ 258,300
		year +35 investments				$ 28,085	$ 28,085	$ 28,085	$ 28,085	$ 28,085		$ 140,425
			year +36 investments				$ 2,255	$ 2,255	$ 2,255	$ 2,255	$ 2,255	$ 11,275
				year +37 investments				$ 0	$ 0	$ 0	$ 0	$ 0
					year +38 investments				$ 0	$ 0	$ 0	$ 0
						year +39 investments				$ 0	$ 0	$ 0
							year +40 investments				$ 0	$ 0
total annual depreciation		$ 55,481,318	$ 55,479,268	$ 45,312,703	$ 31,794,658	$ 14,879,536	$ 232,880	$ 157,440	$ 82,000	$ 30,340	$ 2,255	$4,476,822,115
loss carried forward determination												
net income before taxes		$ 462,728,860	$ 330,864,458	$ 400,466,537	$ 412,903,139	$ 428,465,051	$ 338,088,003	$ 0	$ 0	$ 0	$ 0	
cumulative net income before taxes		$ 17,783,240,092	$ 18,114,104,550	$ 18,514,571,087	$ 18,927,474,226	$ 19,355,939,276	$ 19,694,027,279	$ 19,694,027,279	$ 19,694,027,279	$ 19,694,027,279	$ 19,694,027,279	
cumulative loss		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	
potential write-off		$ 462,728,860	$ 330,864,458	$ 400,466,537	$ 412,903,139	$ 428,465,051	$ 338,088,003	$ 0	$ 0	$ 0	$ 0	
cumulative potential write-off		$ 17,783,240,092	$ 18,114,104,550	$ 18,514,571,087	$ 18,927,474,226	$ 19,355,939,276	$ 19,694,027,279	$ 19,694,027,279	$ 19,694,027,279	$ 19,694,027,279	$ 19,694,027,279	
trial write-off		($17,320,511,231)	($17,783,240,092)	($18,114,104,550)	($18,514,571,087)	($18,927,474,226)	($19,355,939,276)	($19,694,027,279)	($19,694,027,279)	($19,694,027,279)	($19,694,027,279)	
actual write-off		$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0