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**Aynak Copper Mine**

**Executive Summary**

**April 2013**

**The Proposed Project**

The current project involves a two-phase development of the Aynak copper mine including a processing plant with a capacity of 30 ktpd of ore in phase I and 60 ktpd in phase II.

*Timing*. Based on the limited information available, the analysis concludes that the production copper concentrate could not start before the second half of 2015.[[1]](#footnote-1) The critical development path is determined by the completion of the concentrator plant. The early opening of the mine in a small area in the northeast of the proposed pit before the antiquities are completely removed would therefore not affect the project's timeline. The timeline could be accelerated if the mine owners source most of the equipment from China (as would be expected), given shorter delivery times compared to more traditional sources.

*Consumption*. Water and energy are the main inputs in the mining and copper extraction processes. Energy is mainly used to crush and grind the ore. Water is used in the flotation process. Based on standard Chilean parameters, fresh water consumption is estimated at 225 l/s for phase I and 723 for phase II. The project would require 52MW of power during phase I and 145MW during phase II. More detailed information on the proposed facilities to be built during phase II is needed to confirm consumption figures and the timeline for engineering and construction.

*Smelter*. Most primary copper producers do not smelt or refine their copper concentrate (cucons) production. Transport costs to a smelter in China, however, would price cucons produced by the Aynak facility out of the market. At the moment, there is no closer smelter with a capacity sufficient to treat the Aynak production. Aynak will produce surplus acid that will need to be used in other industries such as fertilizers or eventually other copper leaching operations, as the transport cost of exporting this acid would also be too high.

The proposed smelter of 200 ktpa of copper anodes would take about three years to complete from the end of the feasibility study to start-up. Construction would be in one phase. The capture of sulfur emission is estimated at only 85%, which is very low by western standards (in Chile the legal limit is now going up from 90% to 95%, and in developed countries is close to 98-99%). Once built, the smelter and refinery will need a constant supply of power. Any unplanned stoppage could severely damage equipment.

**Alternative Development**

The proposed alternative involves (i) building a processing plant with a capacity of only 10 ktpd of ore, or a third of size envisaged in phase I, (ii) relying on a mining contractor, and (iii) renting diesel generators to supply power.

*Timing*. Timing of construction and first production would not vary significantly compared to phase I. The critical path continues to be the plant’s construction. Assuming detailed engineering starts at the beginning of 2013, it would take 36 months to complete the facilities. This schedule could be shortened by six months if purchase orders for the plant’s equipment (crushers, mills, flotation cells, overland conveyor, etc.) are placed before detailed engineering is completed, which is usual in many mining projects.

*Consumption*. Water would be pumped from wells located near the Lugar River, 22 km from the processing plant, and transported by pipeline. Water requirements at the beginning of the project would be 7,000 m3/day instead of the 21,000 m3/day required to process 30 ktpd. The required 12.5 MW of energy would be supplied by four diesel generation units (three working and one stand by) provided by a contractor.

*Conclusion.* This alternative project would reduce the capex (including working capital) to $529 million—substantially lower that the $1,788 million estimated in 2009 for phase I—considerably reduce risks, and provide a much simpler development alternative. Once royalty and MJAM payments are included in cash flow projections, however, the project loses substantial economic value, with a negative accumulated cash flow of $570 million at the end of the eighth year of operation (assuming a copper price of $3 per lb). This option would therefore require a re-negotiation or deferral of the royalty and MJAM payments, in favor of an earlier development.

The construction of phase I starting two years after the onset of production (or year 6) improves project economics, even considering royalty and MJAM payments. Annual cash flow once phase I is fully operational is estimated at about $600 million, (which would bring down the negative accumulated cash flow to $75 million by the eight year of operation). This would allow for a pay-back period of five years, including capex, royalty and MJAM payments. It would be possible to build the smelter and refinery simultaneously with phase I. This option would allow the stockpiled oxide ore to get processed and reduce somewhat transport costs (as concentrates would be replaced by cathodes). It would however increase the capex by about $1.5 billion and delay the investment payback period.

1. This assumes that equipment is pre-ordered by the end of 2012, detailed engineering work completed by mid 2013, and archeological relocation completed by end 2013. [↑](#footnote-ref-1)