

DECEMBER 21, 2011 ENGLISH TEXTUAL TRANSLATION OF GENERAL OBSERVATIONS OF
ECUACORRIENTES MIRADOR MINE CORRESPONDENCE TO ECUADORAN MINISTRY OF ENVIRONMENT
(MAE). RESPONSE TO REQUEST BY MINISTRY OF OCTOBER 25 2011

EIA Beneficio y Respuestas de MAE: Observaciones Generales

Introduction

These comments are the first in a series of comments that E-Tech will be providing to the Ministry of the Environment (MAE) at the request of Andres Iglesias on October 25, 2011. Ing. Iglesias provided specific priority concerns of MAE, and E-Tech is attempting to address these as well as provide our own observations.

We have asked a respected mining environmental engineer, James Kuipers of Kuipers and Associates in Montana, EEUU, to review the structural stability information on the Rio Quimi tailings facility. As you know, we have expressed concern that the location is extremely problematic based on topography, climate, seismicity, and potential discharges to the waterways.

We also believe that the amount of hydrologic information, including basic water balance information, is very limited in the EIA. It is our general opinion that the information presented by ECSA and Walsh to MAE has not provided a basis for the agency to evaluate potential environmental impacts from the Mirador Project, and we will identify questions for MAE to ask ECSA. It is our belief that at this point the Mirador Project is a long way from satisfying the requirements of Ecuadoran law and normativity and best international practices.

- Comentarios Generales

The document was prepared by Walsh in response to a June 10, 2011 letter Oficio No. MAE-DNPCA-2011-1252 from the Ministerio de Ambiente Ecuatorano (MAE) in response to concerns regarding the Ecuacorrientes (ECSA) Mirador Mine EIAs for Beneficio., Respuesta Observaciones del Estudio de Impacto Ambiental para la Fase de Beneficio del Proyecto Minero de Cobre Mirador, Agosto, 2011, appears disorganized and unprofessional

- Beginning on p. 11, the responses do not directly follow the questions posed by MAE, and in a number of cases the answers are mislabeled.
- The esquemas, graficos, and many of the cuadros appear to be screen shots from a computer rather than high-quality professional graphics. The quality of the graphics is so poor that details are difficult to see.
- There is no official Table of Contents, and the page numbers for the esquemas, cuadros y graficos are not included, making it more difficult to find them in the document. In some cases the graphic and the associated caption are on different pages.
- Even the Walsh logo isn't placed correctly, and the word "scientists" is partially obscured on every page.
- Although these are not technical issues, the lack of attention to detail makes one wonder about the quality and care taken with the answers to MAE's questions.

- Comentarios Generales Sobre Estabilidad Tecnica
 - Relying on haul trucks for compaction of the soil “liner” under the Rio Quimi tailings facility (see responses to question 12) is unreliable and will not result in even compaction of the soil liner. As a result, preferential pathways could develop for movement of contaminated seepage from the impoundment to groundwater resources.
 - The Rio Quimi tailings impoundment needs to contain tailings for perpetuity. Walsh acknowledges that the crest of the dam will likely require repair after a potential maximum-design earthquake to restore its height before the seismic event (see Walsh response to MAE question 15). This implies that repairs will also be needed in perpetuity (as acknowledged in the Walsh response to MAE question 36), and a large bond/financial assurance will be required for post-closure maintenance.
 - Also in response to MAE question 15, Walsh states that there is no potential for mud flows or landslides to be initiated from the seismic load. Given the high seismic risk, there cannot be “no” potential. Walsh should calculate the potential for damages such as landslides from seismic load.
 - In response to MAE question 70, Walsh calculates the downstream transport of tailings that would result from a total collapse of the Rio Quimi tailings dam at its maximum height of 60m. Using the Tailings Flow Slide Calculator tool, they calculate that there would be enough potential energy to transport the tailings in a straight-line distance of approximately 1,000m from the dam. However, because there is only a 180-m straight-line distance downstream of the dam, Walsh concludes that the tailings would only travel to the mouth of the Rio Quimi and not affect the Rio Zamora (see also Annex A Cartografico, Respuestas de EIA Beneficio, Figura 9 de 10, Modelo Conceptual de Colapso de Relavera.), from a combination of the extent of the initial event and the secondary runoff combined. The slope of the bed using in the analysis (50%) provides an indication of how steep Rio Quimi is in the vicinity of the proposed mine. The tool does not appear to include longer-term transport of tailings into the Rio Zamora. Walsh should be asked to run a surface water transport model that would predict the extent of downstream transport of tailings in the Rio Zamora as a result of collapse of certain percentages of the tailings material.
- Drenaje Acido
 - The EIA Beneficio and the Walsh Respuesta Observaciones discuss the potential for water contamination by acid drainage and heavy metals during the beneficiation phase. Tables 7.1-2 and 7.1-3 in the EIA Beneficio provide a summary of the area of influence during the construction and operation phases, but the tables are not discussed at all in the text. Cuadro 7.1-3, on p. 17 of Chapter 7, shows direct (D) and indirect (I) areas of influence for the element “Alteracion de la calidad del agua” throughout much of the operacion general e especifica, yet the areas of influence for “Contaminacion por drenaje acido de mina” and “Contaminacion por metals pesados” have only limited direct and indirect areas of influence. How can this be the case when the water contamination is caused by heavy metals and acid drainage? A much more detailed explanation of the tables should be included in the EIA. In addition, the tables should be

made more readable – the column headings are often not repeated, and it is not clear what the table entries refer to. A key should be included at the bottom of each page that defines D, I, R, and any other abbreviations.

- Walsh responds to MAE's question 33 about water treatment in Respuesta 32, p. 35. Walsh includes two tables (Cuadro R32-1, Calidad de Agua del Embalse Previa su Descarga, and Cuadro R32-2, Resultados con Adicion de Cal Hidratada) that list the water quality of tailings water before and after treatment with lime (cal). The water from flotation operations is usually basic (pH>10), not acidic, as listed in Cuadro R32-1, which lists the pH of tailings impoundment water as having a pH of 3.1. Walsh then provides a rudimentary esquema, Esquema R32-1, that depicts the treatment process for tailings water before it is discharged. Walsh has not provided a detailed description of water treatment at every phase of the beneficiation process, as requested by MAE. Walsh needs to describe in detail why they think the pH of water in the relavera will be acidic, rather than basic, and the detailed treatment plans for this and any other water that will be affected by mining.
- No detailed information on the results of geochemical testing was included in the EIAs. Walsh lists four studies on acid drainage that were not provided as part of the EIA. MAE should provide these studies in searchable, electronic format to E-Tech:
 - 1. AMEC Earth & Environmental. Pruebas de Celdas Húmedas de Desechos de Roca. Burnaby British Columbia – Canadá. Mayo 2004 – Mayo 2005. Se realizan estudios a 99 muestras de 5,097 núcleos de perforación del Yacimiento Mirador para determinar su potencial de generación de drenajes ácidos de roca.
 - 2. Knight Piésold. Experimentos Intemperie del Sitio. Vancouver – Canadá. Octubre 2006. Determinan en la ubicación del Yacimiento las características que determinarán la calidad del agua superficial por la explotación del Yacimiento. 1) Velocidad de reacción de sulfuros y otros compuestos minerales, 2) Relación Agua/Roca, 3) Tiempo de contacto entre el agua y los minerales reactivos, 4) Efecto de dilución.
 - 3. SGS Lakefield Research. Caracterización de los Productos del Ciclo Cerrado de Flotación. Ontario – Canadá. Febrero 2007. Se realizaron análisis a 21 muestras de productos similares a los que se obtendrán de los procesos de flotación (relaves) para determinar sus características de lixiviación de metales y de potencial degeneración de drenajes ácidos de roca.
 - 4. Knight Piésold. Características de las rocas de desecho. Vancouver – Canadá. Abril. Este estudio realizó caracterizaciones de las rocas del Yacimiento Mirador, para identificar las unidades litológicas primarias, de las muestras representativas de cada unidad obtenidas de los Núcleos de Perforación de Exploración, y analizarlos para estimar su potencial de lixiviación de metales y potencial de generación de drenaje ácido de roca cuando son expuestos a condiciones de intemperie.
- Walsh includes a 1994 US EPA reference on acid drainage prediction as Anexo E in response to MAE's question 101 (which is labeled as "Repuesta 82" on p. 100). This

document is no longer relied upon by US EPA because it is outdated, and the agency is in the process of updated their acid drainage prediction guidelines, especially with respect to pruebas cineticas. Furthermore, Walsh does not directly answer MAE's question 101, which asks ECSA to ..."detallar ampliamente el programa de caracterizacion mencionado en el document, en el que se describa el period y frecuencia de muestreo del material, lo cual permitira identificar el material potencialmente generador de acida y cuantificar la calidad estimada del agua de drenaje..." Walsh responds that pruebas para "la identificación del material PGA es realizada en la Fase de Explotacion." However, ECSA has been conducting pruebas geoquímicas for several years already, and the results of these should be included and interpreted in either the EIA Explotacion or the EIA Benefecio.

- Summary
 - The EIA Benefecio does not contain enough information for a reasoned analysis of the potential effects of the proposed Mirador extraction and beneficiation process. Much more detailed information on the underlying modeling, predictions, testing, and monitoring results must be provided to MAE so that it can conduct an informed evaluation of the project.
 - Comments presented by Ann Maest, Phd with assistance of Dick Kamp, Director, E-Tech International