Adequacy Review Report

Project Assessment 2010-0267

Victoria Gold Corporation

Eagle Gold Mine

YESAB

Yukon Environmental and Socio-economic Assessment Board

March 29, 2011

Prepared by
Executive Committee
Yukon Environmental and Socio-economic Assessment Board

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1.0 INTRODUCTION

The Executive Committee has concluded the adequacy review of the proposal for the "Eagle Gold Mine" submitted by Victoria Gold Corporation (VIT) on December 20, 2010. This Adequacy Review Report includes a request for supplementary information that is required in order for the proposal to be deemed adequate.

A proposal is deemed adequate if the Executive Committee determines the proposal:

- has taken into account the matters referred to in paragraphs 42(1)(b),(c) and (e) to (h) of the *Yukon Environmental and Socio-economic Assessment Act* (Act);
- contains sufficient information to enable the Executive Committee to prepare a statement of the scope of the Project under s. 34 of the Executive Committee *Screening Rules*;
- contains sufficient information to enable the Executive Committee to commence the screening; and
- complies with the applicable rules.

The *Screening Rules* provide the proponent 180 days to either submit the requested supplementary information or to advise the Executive Committee in writing, when it will be submitting the supplementary information. All supplementary information must be provided to the Executive Committee within two years from the date the proposal was submitted to the Executive Committee. The form and content of the supplementary information submission should comply with all applicable rules and requirements of the Board, including the general filing requirements.

For questions or comments regarding this report, please contact Nathan Aasman, YESAB Senior Assessment Officer assigned for this Project, by telephone (867) 668-6420, by email at nathan.aasman@yesab.ca, or in person at Suite 200 – 309 Strickland Street, Whitehorse, Yukon.

1.1 ACKNOWLEDGEMENTS

The Executive Committee acknowledges the efforts and contributions of various governments, technical experts, and assessment staff in the review of the Eagle Gold Mine proposal and preparation of this adequacy review report. We thank the following for their time, effort, and contributions.

Yukon Government

Comments and input related to the adequacy of information provided in the proposal.

Environment Canada

Comments and input related to the adequacy of information provided in the proposal.

EcoMetrix Incorporated

Retained by the Executive Committee to provide technical support and professional input on the adequacy of information related to mine design and engineering, waste management, mine site water balance, and water quality.

AMEC Americas Limited

Retained by the Executive Committee to provide technical support and professional input on the adequacy of information related to the production, transport, storage, and use of cyanide.

Assessment Team

Katrine Frese, Patrick Sack, Loralee Johnstone, Keith Maguire, Michael Muller, Nathan Aasman, Cathy McFadyen, Ken McKinnon, and Stephen Mills. Review of the proposal, research and synthesis of information, as well as drafting and editing the adequacy review report.

1.2 Summary of Adequacy Review

Comments and input on the adequacy of information in the proposal were received from various sources including Yukon Government, Environment Canada, and technical experts retained by the Executive Committee. The Executive Committee took into account all information provided when developing this report.

In general, we found the Eagle Gold Mine proposal contained a significant amount of information and detail presented in a manner that was relatively clear and concise. We recognize the effort and work that Victoria Gold Corporation put into developing the proposal. The company deserves commendation for their thorough and meticulous efforts to fulfill the consultation requirements under the Act with both the First Nation of Na-Cho Nyak Dun and the citizens of Mayo. Information with regards to consultation, socio-economic baseline, wildlife and wildlife habitat baseline, as well as the effects assessment approach presented in Section 6 of the proposal, was well developed.

Although much of the information contained within the proposal is considered adequate, there remain some key aspects that require further information in order to commence the screening. The Executive Committee, along with its technical experts, has concerns with overall mine site water management. Many of these concerns were also identified by Yukon Government and Environment Canada.

Of major concern are uncertainties with regard to water quality discharge from the Project site and the potential effects to the downstream receiving environment. The mine water treatment process and water quality objectives have not been clearly defined. Further increasing uncertainties are questions related to water baseline data, water models developed for the Project, and the overall water management plan.

Appropriate and sufficient baseline data is critical in order to develop accurate water balance and water quality models. We have some concerns with regard to meteorological baseline data for the Project with regard to the short period of record for on-site data as well as the changing climate in Yukon. Parts of Yukon have experienced record high winter snowpack and summer rainfall events as well as increases in temperatures that have proven difficult to manage at other mine sites in Yukon. Water quality baseline data is also critical because, in many cases, it is the “standard” against which the Project will be measured. For this reason, it is important the baseline data be as representative and complete as possible.

Models developed using the baseline data must be well defined and presented in order to understand water management needs. We require further information and clarification on the models developed for the surface water balance, groundwater, and water quality. Robust models will inform the development of water management plan.

All of this information informs water quality objectives in the receiving environment and drive water treatment planning/objectives. Additional information is required in these areas in order for us to have an adequate understanding of overall mine site water management and most importantly, be able to identify potential significant adverse effects and make recommendations to mitigate those effects.

To enable the Executive Committee to commence the screening, further information is required from the proponent. The following sections of this report specify the supplementary information required.

2.0 WATER QUANTITY AND QUALITY

2.1 SITE SPECIFIC WATER QUALITY OBJECTIVES AND RECEIVING ENVIRONMENT

Section 6.5 of the proposal outlines the proposed process for defining Site Specific Water Quality Objectives (SSWQO) for the receiving environment. SSWQO are proposed to be used in determining the significance of potential Project effects to water quality. Appendix 25 (Technical Data Report: Water Quality Model) predicts that several parameters will exceed Canadian Council of Ministers of the Environment Water Quality Guidelines (CCME WQG) and/or British Columbia Water Quality Guidelines (BC WQG) and will, therefore, require establishment of SSWQO. Section 6.5.1.9 of the proposal states, *"SSWQO will be proposed following the CCME guidance on setting SSWQO (Background Concentration Procedure) based on two standard deviations of the mean baseline values"*. CCME recommends several statistical procedures to derive SSWQO based on the background conditions including the mean plus two standard deviations, various percentiles (50^{th}, 90^{th} or 95^{th}), and median concentration (CCME 2003). Other methods to determine SSWQO include: the recalculation method to account for the aquatic species that occur in the watershed; the water effect ration procedure to account for the site-specific chemical characteristics and associated influence on toxicity; and the biotic ligand modeling approach based on predictive metal speciation models.

SSWQO set acceptable concentrations for various parameters (e.g., dissolved oxygen, total suspended solids, cyanide and many metals) in the receiving environment and drive the water treatment planning/objectives. The Eagle Gold property has baseline concentrations of several metals (e.g., arsenic) that exceed CCME WQG and BC WQG which highlights the need for the development of SSWQO.

The receiving environment for the Project is the portion of Haggart Creek downstream of the Mine Water Treatment Plant (MWTP) discharge. Appendix 25 (Technical Data Report: Water Quality Model) defines Mixing Point B (W4) in Haggart Creek immediately downstream of the MWTP discharge and Mixing Point C (W29) also located in Haggart Creek immediately downstream of the confluence with the Eagle Creek and the Platinum Gulch Waste Rock Storage Area (WRSA) discharges. The Water Quality Model predicts water quality parameters in the receiving environment at these two mixing points. The conclusion of the proposal is that the selected water quality guidelines are exceeded at Mixing Point C (W29), the furthest downstream point in the model.

Given some water quality parameters exceed SSWQO, CCME WQG, and BC WQG at Mixing Point C (W29), it is unclear where, in the receiving environment, Project effects on water quality will meet guidelines. The Executive Committee requires additional information regarding the methods proposed to derive SSWQO and the point at which these objectives will be met in the receiving environment. Therefore, please provide the following information:

- R1. A rationale showing why the mean plus two standard deviations is considered the preferred measure to derive the Site Specific Water Quality Objectives (SSWQO) for the Project. Discuss how the SSWQO would change if derived using different methods.
- R2. Identify with supporting rationale, the point in the receiving environment where SSWQO will be met (i.e., compliance point).

R3. A discussion of the potential environmental effects in the receiving environment to the point where SSWQO will be met (i.e., compliance point).

R4. An updated Surface Water Balance Model and Water Management Plan (according to Sections 2.5 and 2.6 of this report) that includes the point at which SSWQO will be met (i.e., compliance point).

2.2 WATER TREATMENT PROCESS

Appendix 20 (Mine Water Treatment Technical Memorandum) presents water treatment options with a commitment to a planning-level treatment concept for the Project. This water treatment concept consists of ten steps that can be simplified to adjusting the pH, coagulating metals, removing metals, and fine-tuning the effluent prior to discharge.

The water treatment process is the ultimate control on the quality of water leaving the mine site. Though Appendix 20 (Mine Water Treatment Technical Memorandum) lists various treatment options and technologies and provides a treatment concept it does not provide tests to evaluate their use in the context of anticipated effluent inputs. The Executive Committee requires better definition of the water treatment process in order to be confident that it will perform as expected. Therefore, please provide the following information:

R5. A proposed water treatment system, described in sufficient detail that will allow effluent quality and quantity objectives to be met. Elaborate on the technical and economic feasibility of the proposed water treatment plan for all stages of the Project. Details should include:

a. predictions for the full suite of water quality parameters required under the Metal Mining Effluent Regulations, including toxicity testing and radium 226; and

b. a demonstration that water treatment objectives result in compliance with Site Specific Water Quality Objectives.

R6. Details on the Mine Water Treatment Plant waste generation and disposal plan (i.e., sludge disposal).

2.3 METEOROLOGICAL BASELINE DATA

The climate baseline information provided in Section 4.1 of the proposal and related appendices (Appendix 7 [Environmental Baseline Report: Climate] and Appendix 14 [Environmental Baseline Report: Hydrology]) is comprised of on-site data as well as regional historical data from the Dawson, Klondike, Mayo, Keno Hill, and Elsa/Calumet weather stations.

The proponent has established two on-site meteorological stations. The higher elevation “Potato Hills station” (1420 m) was established in August 2007 (with previous 1993-96 data from Strata Gold available), whereas the “camp station” (823 m) was not established until August 2009. While the meteorological stations continue to be operational, the data presented in the proposal ends in October 2009 with only three months of useable data for the camp station. Furthermore, only one winter of snow data from the site was included in the proposal.

Climate trends at Mayo suggest that summer, winter and annual temperatures have increased by approximately 1.5, 2.0 and 1.5°C respectively since 1925. Parts of Yukon have experienced both record high winter snowpack and summer rainfall events in recent years resulting in significant flooding. During this adequacy review, Yukon Government has indicated that climate models predict precipitation will increase by 11 percent by 2030 and temperatures will increase by 2 to 5°C by 2050. Summer and annual precipitation will increase by approximately 25 and 20 percent respectively and winter precipitation remains unchanged.

Precipitation is a critical source of water input when modeling surface water and groundwater. Precipitation data is used to define design storm events, which then determine the design basis for on-site infrastructure (e.g., capacities of various ponds, diversion ditches).

The proponent developed precipitation estimates for the site using Project site rainfall and snow surveys augmented with regional meteorological station data. Annual precipitation estimates for the site are based on the relationship between precipitation and elevation using central Yukon regional stations. A log Pearson III theoretical probability distribution was used to obtain precipitation estimates at various return periods using the regional data. Estimates were provided for mean annual and 20-year wet and dry return periods. The Executive Committee is concerned about the degree of conservatism applied to those estimates and the statistical distribution chosen.

The annual distribution of precipitation across the Project site was based on data from the Keno Hill station (1473 m) that operated from 1974 to 1982. This station is similar in elevation to the upper Potato Hills station (1420 m), however, mine infrastructure (e.g., open pit, WRSAs, Heap Leach Facility [HLF]) are not located at that elevation. The median elevation of the Project site is 1076 m, which is 397 m lower than the Keno Hill station. The Executive Committee is not satisfied that the Keno Hill data is representative for the Project site. The difference in elevation may skew the distribution between rainfall and snowfall and therefore affect the Surface Water Balance Model. Furthermore, the Keno Hill station has only eight years of records with high data variability and has not operated for 30 years, during which time changes in precipitation patterns were observed at other meteorological stations.

During this adequacy review, uncertainties with respect to the use of meteorological data for predictions of precipitation for the Surface Water Balance Model and any other modeling were identified by Environment Canada, Yukon Government, and technical experts retained by the Executive Committee. The Executive Committee has concluded that the Yukon climate characteristics and predictions have not been sufficiently described in the proposal to estimate or predict the potential impacts of precipitation. Therefore, please provide the following information:

R7. Confirm that on-site meteorological data collection is ongoing. If so, provide raw and processed data from October 2009 to present and recalculate precipitation estimates and measures of variability. Provide raw data in digital format.

R8. Given Yukon Government comments during this adequacy review that independent estimates of mean annual precipitation for the Project site yielded values ten percent higher than those provided in the proposal, provide a discussion on the discrepancy between estimates of mean annual precipitation for the Project site meteorological stations.

R9. Further rationale on the appropriateness of using the Keno Hill station data to model seasonal precipitation at the Project site.

R10. Further explanation as to how the precipitation factors were defined (1.55, 1.40 and 1.0 for wet, average and dry years respectively). Provide the results from a sensitivity analysis to inform how conservative these factors are. Provide details as to how this analysis considers climate change.

R11. Given the generally wide range of estimates provided by various possible distributions, provide a discussion of the reasoning behind the selected log Pearson III probability distribution for precipitation.

R12. Given Yukon Government comments during this adequacy review that it may be prudent to use 50 or 100-year return periods for annual precipitation, provide a rationale for using 20-year wet and dry return periods.

2.4 WATER BALANCE SCENARIOS

Predictions of precipitation frequency and magnitude occurring within the Project lifetime were presented in seven water balance scenarios in Section 4 of the proposal and Appendix 21 (Surface Water Balance Model). The water balance scenarios were assembled from a combination of modeled potential hydrologic scenarios (average, wet, and dry years), artificially created hydrologic events (design storms or droughts), and process facility upset conditions for the five phases of the Project: construction, operation, closure, reclamation, and post closure. The three main hydrologic scenarios, based on annual precipitation amounts are:

- “average year” with a two-year return period;
- “wet year” with a 20-year return period; and
- “dry year” with a 20-year return period.

Little rationale is provided on the chosen definitions and methodologies used to determine the hydrologic scenarios and design events. The Executive Committee is concerned that the design criteria presented in the proposal may not result in sufficiently robust mine site infrastructure, mine site water management, and operational strategies. Therefore, please provide the following information:

R13. A discussion of the selected water balance scenarios presented in Table 3.4-1 of Appendix 21 (Surface Water Balance Model) including:

a. a rationale for each scenario applied, explaining the basic assumptions and definitions of the parameters included, and the related limitations and uncertainties;

b. a description as to how the water balance scenario outcomes would change with more severe design criteria (e.g., 50 and 100-year return periods for wet and dry hydroclimatic conditions); and

c. clarification of Scenario 6: Dry Year + a 50-year drought (i.e., is this equal to a 70-year return period drought event?).

R14. Further rationale and details on the selection of the 1 in 100-year, 24 hour storm event as an appropriate design criterion for the Project. A discussion on the consequences of exceeding this criterion should be included.

R15. The information provided in Table 3.4-2 in Appendix 21 (Surface Water Balance Model) appears to be different from the information given on page 3-21 of the same Appendix. Confirm the correct return periods and annual occurrence probabilities for average, wet and dry years.

2.5 SURFACE WATER BALANCE MODEL

Appendix 21 of the proposal outlines the Surface Water Balance Model used for the Project. It is not possible to review the actual site Surface Water Balance Model without having access to the fully operational model (full Excel worksheets). A working model will allow the Executive Committee to evaluate inputs, mass balances, results, relationships, etc.

The Executive Committee has identified several concerns regarding the Surface Water Balance Model. The model was validated using only 15 months of data from the Potato Hills station and three months of data from the camp station. The model may be more robust if the existing on-site baseline data from Strata Gold was used for validation.

The Surface Water Balance Model is designed using a monthly time step. Risks associated with this approach may be that events such as rain on snow during spring freshet are not adequately captured and are artificially “smoothed” out by the averaging process. Furthermore, flow data from hydrology sample locations included in the proposal do not capture annual minimum flows and peak flows, thereby missing important annual hydrograph characteristics. The majority of records begin in spring and end in fall, with no measurements taken during winter low flow period.

To fully understand uncertainties and limitations associated with the Surface Water Balance Model and to be able to validate the model, the Executive Committee requires additional information. Therefore, please provide the following information:

R16. The working Surface Water Balance Model (full Excel worksheets).

R17. A modeling report that describes the working Surface Water Balance Model including:

a. discussion on sections of the Excel workbook;

b. construction of the model;

c. inputs and calibration of the model;

d. model validation; and

e. model uncertainties and strengths/weaknesses.

R18. Rationale on why Strata Gold baseline data was not used to validate the model.

R19. An updated Surface Water Balance Model using the most current information available.

R20. Rationale on how the model accounts for peak events that may occur over time periods of less than one month, particularly during spring freshet, extreme weather events, and winter low water flows.

R21. Annual maximum and minimum flow data at hydrology sample locations with a focus on winter low flow measurements. Discuss any operational or design constraints based on this flow data.

R22. A description of low flow conditions in the study area using standard hydrologic techniques rather than projections using the Surface Water Balance Model as presented in the proposal.

R23. A stage-discharge rating curve using at least five stage-discharge points over the entire range of flows. Describe the method and/or software used.

2.6 Water Management Plan

The Water Management Plan (WMP) presented in Appendix 18 (Water Management Plan) results from, and refers to, modeling but does not display relevant methodology for achieving the results nor direct references to the location of the model within the proposal. In order to have a clear understanding of the WMP explicit references to which model and/or Appendix information came from are required.

The WMP does not include a discussion of surface water quality monitoring during construction and operation, and only a limited discussion of monitoring during reclamation and closure. At all stages of the Project life, operating procedures need to incorporate inspection and monitoring activities to implement the Surface Water Balance Model results, and prevent overtopping of ponds and impoundments, and any unplanned discharge of contaminants to the environment. The WMP should consider the uncertainties of the water quality and quantity modeling and natural variability, especially regarding water management strategies involving treatment and mixing of waters.

The proposal contains a set of technical drawings outlining the WMP for various components and phases of the Project (Figure 3.1-1ff in Appendix 18 [Water Management Plan]). In order to have a clear understanding of the relationships and implications of the proposed WMP, the Executive Committee requires a technical drawing of the WMP for the entire site, for each phase of the Project.

Details omitted from the WMP lead to uncertainties in the use of the predictions made by the Surface Water Balance Model, the design of associated infrastructure, and operational strategies. The Executive Committee requires additional information regarding the WMP in order to address these uncertainties and provide a clear understanding of proposed water management for the Project. Therefore, please provide the following information:

R24. Discuss how the results from the updated Surface Water Balance Model (R19 in Section 2.5 of this report) will affect the individual components of and overall Water Management Plan and mine plan.

R25. A technical drawing of the Water Management Plan for the entire site, for each phase of the Project (i.e., baseline, construction, operation, closure and reclamation). These drawings should include modeling estimates for minimum/maximum and average values for water flow, water consumption, water storage, water release, etc.

R26. An outline and rationale for planned monitoring activities that will be used to validate and adjust the Surface Water Balance Model for the construction, operation, closure, reclamation, post-closure phases of the Project.

2.7 GROUNDWATER MODEL

Appendix 15 (Environmental Baseline Report: Hydrogeology) presents data from 1995 and 1996 and a relatively short period from July and August 2009 for groundwater levels and groundwater quality. Appendix 22 (Groundwater Model Report) outlines the computational model predictions of groundwater flow and quality for various phases of the Project. During this adequacy review, Yukon Government and Environment Canada identified deficiencies with respect to the baseline data used and modeling approach. This leads to uncertainties as to how the model can be used with reasonable confidence to simulate future conditions.

No wells display a full year of monthly observations and very few observations were made in the winter or spring. The available data provides a basic framework for analysis, but seasonal groundwater level data and hydro-geochemistry were not adequately addressed. The data does not include sufficient observations to establish seasonal trends. The proposal includes recent borehole logs and groundwater well construction logs for work conducted in 2009. However, other (older) borehole logs and/or well logs were not included in Appendix 15 (Environmental Baseline Report: Hydrogeology) or accompanying supporting documents.

The hydraulic testing information presented consists of packer test and slug test results. While useful for localized estimates of hydraulic conductivity, these tests do not measure conductivity over larger areas as a pumping test would, nor do they provide information on boundary conditions. Furthermore, it is not clear from the information presented whether automated devices capable of recording water levels and/or physical parameters (e.g., temperature, electrical conductivity) are currently deployed at the site.

Appendix 15 (Environmental Baseline Report: Hydrogeology) makes broad statements concerning the depth of groundwater and the presence of artesian conditions in different areas of the Project site. However, no hydrogeological cross-sections of the Project site were provided.

The Groundwater Model was presented in Appendix 22. There are relatively few groundwater monitoring wells and a short period of record for model calibration. It is not clear if the model is calibrated sufficiently for use in making predictions for water levels, water balances, and contaminant transport under different site operational scenarios.

The Executive Committee requires additional information to reduce uncertainties with respect to hydrogeology. A better understanding of the results and interpretation of groundwater modeling is required. Therefore, please provide the following information:

R27. Confirm whether on-site hydrogeological data collection is ongoing. If so, provide a summary table, by drainage basin, which includes groundwater level observations, hydraulic testing, and groundwater chemistry. Provide all available data and update the

Ground Water Model accordingly. If supplementary data is not available, provide rationale and discuss confidence/uncertainties of the current model and seasonal changes in groundwater flow.

R28. Clarify whether automated devices capable of recording water level and/or physical parameters (e.g., temperature, electrical conductivity) are currently deployed or are planned to be deployed at the Project site.

R29. The working Ground Water Model (full Excel worksheets).

R30. A modeling report that describes the working Ground Water Model including:

a. construction of the model;

b. inputs and calibration of the model;

c. model validation; and

d. model uncertainties and strengths/weaknesses.

R31. Raw hydrogeological data used in the Ground Water Model including all well logs. Provide raw data in digital format.

R32. A description of how the rock quality (i.e., bedrock competency and degree of fracturing) has been determined and subsequently been integrated in permeability and hydraulic conductivity determination.

R33. Hydrogeological cross-sections for key areas of the Project site, particularly the water table relative to the Heap Leach Facility, Waste Rock Storage Areas, and open pit. Include a discussion on the interaction between the above-mentioned Project components and the groundwater and surface water system.

R34. An analysis of groundwater flux out of each basin.

2.8 WATER QUALITY BASELINE DATA

Water quality baseline data is summarized in Section 4.1.12 of the proposal and is detailed in Section 6.5.1.2 and Appendix 16 (Environmental Baseline Report: Water Quality and Aquatic Biota). This baseline data was collected between 1993 and 1996 and between 2007 and 2010.

The proposal and Appendix 16 (Environmental Baseline Report: Water Quality and Aquatic Biota) indicate the Dublin Gulch watershed and the upper reaches of the Haggart Creek watershed have been heavily impacted by placer mining activity (e.g., vegetation stripping and creek re-routing). Ironrust and Lynx creeks were identified as two drainages not impacted by placer mining. The Proposal indicates that all data from all locations were considered when characterizing baseline concentrations for water quality parameters and that the SSWQO will be derived using this data set. SSWQO will be derived for all parameters that are “naturally” elevated above acceptable levels defined by water quality guidelines such as CCME WQG or BC WQG.

Section 4.1.12.2 of the proposal indicates total suspended solids (TSS) and some metals data (e.g., aluminum, arsenic, copper, iron, lead) were up to ten times higher in 1995 and 1996 (historical data set) compared to other years, exceeding CCME WQG in many cases. In addition, high concentrations of total metals (e.g., aluminum, arsenic, cadmium, copper, iron, lead) are often associated with high TSS levels (i.e., Sections 6.5.1.12 and 6.5.2.3 of the proposal and Figure 3-3 of Appendix 16 [Environmental Baseline Report: Water Quality and Aquatic Biota]). The proposal does not discuss the treatment of the data points with high TSS in the context of the baseline water quality data set and development of SSWQO.

The proposal states *"For arsenic, and for other parameters that exceed CCME WQG, a SSWQO will be proposed, following the CCME guidance on setting SSWQO (Background Concentration Procedure) based on two standard deviations of the mean baseline values (based on all data, year-round), to cover natural variability in the baseline"* (proposal page 6-84). SSWQO developed based on a data set including occasionally high TSS and associated metals concentrations may not be protective of the receiving environment on a year-round basis.

The Executive Committee believes baseline water quality must be clearly defined as it has been used to predict future water quality and will be used to derive SSWQO. Furthermore, it is important to have a clear understanding of waters previously impacted by other activities and those in a more natural state. Therefore, please provide the following information:

R35. Missing raw data and summary statistics from Appendix 16 (Environmental Baseline Report: Water Quality and Aquatic Biota):

- a. Appendix A2 (raw data);
- b. Appendix A3 (summary statistics);
- c. Appendix A4 (in-situ data); and
- d. Appendix A5 (field methods and QA/QC details).

R36. In Appendix A (Water Quality) of Appendix 16 (Environmental Baseline Report: Water Quality and Aquatic Biota) distinguish which water quality stations in Table 2-1 are likely affected by current or historic placer mining activities.

R37. Characterize those water quality stations that may have significantly greater concentrations of contaminants of potential concern due to historical anthropogenic sources versus natural sources (e.g., using Kruskal-Wallis, pair-wise Mann-Whitney U tests). Please include the following:

- a. discuss the occurrence of high TSS and associated high metals concentrations. Provide descriptive statistics and rationale for including or excluding these data from the dataset used to derive SSWQO; and
- b. discuss the implications of keeping data from stations that may not be representative of "natural" baseline when deriving SSWQO.

2.9 WATER QUALITY PREDICTIONS

Water quality predictions are summarized in Section 6.5.1 of the proposal and detailed in Appendix 8 (Geochemical Characterization and Water Quality Predictions) and Appendix 25 (Technical Data Report: Water Quality Model). The predictions for water quality maximums in the proposal (such as those presented in Tables 6.5-15 and 6.5-16) do not include cyanide. Furthermore, maximum predicted cyanide concentrations in the event ponds are not presented. Therefore, please provide the following information:

R38. An estimate of the maximum concentrations of cyanide at Mixing Point B (W4) and Mixing Point C (W29).

2.10 WATER QUALITY MODEL

The Water Quality Model is summarized in Section 6.5.1 of the proposal and uses data presented in Appendices 8 (Geochemical Characterization and Water Quality Predictions), 15 (Environmental Baseline Report: Hydrogeology), 21 (Surface Water Balance Model Report), and 25 (Water Quality Model Technical Data Report). Behaviour of, and outputs from, the Water Quality Model are difficult to understand. A working model (full Excel worksheets) will allow the Executive Committee to evaluate inputs, results, relationships, etc.

The model combines the chemical predictions such as waste rock characterization and the hydrological predictions such as precipitation to predict source terms. The output from the Water Quality Model predicts how water quality from the mine site will vary over time and provides a water management tool. Section 2.8 of Appendix 25 (Technical Data Report: Water Quality Model) provides a qualitative description of the conservative assumptions in the Water Quality Model. A quantitative description of the conservative assumptions would allow for much clearer understanding of the model.

The Executive Committee has determined that additional information is required for a clear understanding of the predicted water quality from the Project. Therefore, please provide the following information:

R39. A quantitative description of the conservative assumptions in the Water Quality Model, in particular, how these assumptions relate to source loadings and hydrologic conditions.

R40. The working Water Quality Model (full Excel worksheets).

R41. A modeling report that describes the working Water Quality Model including:

a. discussion on sections of the Excel workbook;

b. construction of the model;

c. inputs and calibration of the model;

d. model validation; and

e. model uncertainties and strengths/weaknesses.

R42. Raw water quality data used in the Water Quality Model. Provide data in digital format.

3.0 GEOCHEMISTRY

3.1 GEOCHEMICAL CHARACTERIZATION

Section 4.1.4 and Appendix 8 (Geochemical Characterization and Water Quality Predictions) of the proposal describe the efforts to characterize the potential acid rock drainage and metal leaching (ARD/ML) of the various lithologies excavated during the Project life. Table 4.1-1 in the proposal summarizes efforts made to characterize the four lithologies identified within the open pit, as well as one metallurgical composite sample that represents the ore material. Because the mineralization at the Eagle Gold Property is found in sheeted veins that cross-cut all four lithologies, each lithology is partially made up of ore and partially made up of waste.

Each lithology was characterized without an ore or waste modifier. This distinction is important because the modifier denotes the permanent disposal location (i.e., HLF or WRSAs). The Executive Committee is concerned that subsequent modifications of ore (e.g., crushing and grinding of ore) may change the geochemical behaviour of ore compared to waste materials.

The geological cross-sectional diagrams included in the proposal and the appendices are incomplete. As cross-section and long-sections are the primary visual means of communicating geological information, these diagrams are important in determining the spatial representativeness of the geochemical sampling.

The Executive Committee has determined that additional information is necessary in order to have a clear understanding of the geochemical characterization of ore and waste rock. Therefore, please provide the following information:

R43. Rationale as to why lithologies have not been further split into ore and waste categories during the characterization process. Demonstrate that this further classification is not needed to adequately characterize the material in each mine component, particularly each Waste Rock Storage Area and the Heap Leach Facility.

R44. Complete cross-section and long-sectional diagrams of the deposit similar to those utilized in Appendix A of Appendix 8 (Geochemical Characterization and Water Quality Predictions). In addition to the data already shown on these sections, revised diagrams should include:

  a. all four lithologies. If certain lithologies are too spatially restricted to be shown at the scale of the section, a representative enlargement at an appropriate scale should be used;

  b. ore body outline; and

  c. any other data that will increase understanding of the deposit geology.

3.2 WASTE ROCK MANAGEMENT

The Executive Committee recognizes that the majority of waste rock will be disposed of in the WRSA where seepage will be collected and managed. However, the proposal indicates that waste rock and blast rock fill will be used as construction material for various mine site infrastructure including site road and HLF construction. However, Section 6.5 of the proposal states, *"The waste [rock] will be transported to waste rock storage areas"* (page 6-71).

The use of waste rock as construction material outside of the WRSAs could result in uncontained effluent and as a result become a non-point source of contamination difficult to manage. In order for waste rock to be used as construction material, the characterization must show that this material will produce acceptable quality drainage.

The Executive Committee requires additional information in order to assess the potential effects associated with using waste rock as construction material. Therefore, please provide the following information:

R45. Clarify if you are planning to use waste rock as construction material. If yes, please provide a Waste Rock Management Plan that includes the following:

a. field characterization methods and criteria for the designation of rock acceptable for use as construction material; and

b. describe the monitoring/management that will ensure this material will not adversely affect site water quality.

4.0 CYANIDE USE AND MANAGEMENT

4.1 CYANIDE DETOXIFICATION PROCESS

The proposal outlines the Degussa peroxide process for detoxifying residual cyanide. This process involves two detoxification stages. The initial stage oxidizes cyanide into cyanate and oxidizes weak acid dissociable metal cyanide complexes into cyanate and metal hydroxides. The metal hydroxides are treated further with copper to precipitate residual iron cyanide. The second stage, which is more complex, involves the addition of acid to break down cyanate (produced in the first stage) into carbon dioxide and ammonia. Ammonia is then reduced to levels less than one mg per litre by air stripping.

The second stage of the cyanide detoxification process is complex and not adequately described in the proposal. The Executive Committee requires additional information in order to have a complete understanding of the cyanide detoxification process. Therefore, please provide the following information:

R46. Additional description of the second stage of the cyanide detoxification process (i.e., the acidification to breakdown cyanate and, in particular, air stripping to remove ammonia).

4.2 TRANSPORTATION OF CYANIDE

The transportation of cyanide is one of the higher risk elements of the cyanide supply chain. The Project is located off the Silver Trail (Highway 11), northeast of Mayo. Driving distance to the Project from Mayo is approximately 85 km. Access to the Project from the Silver Trail is via the existing South McQuesten Road and the Haggart Creek Road, divided by the South McQuesten River. Both roads are public roads, regulated under the *Yukon Highways Act.* However, the Department of Highways and Public Works maintains the South McQuesten Road only during summer and considers the Haggart Creek Road a “public unmaintained road”.

The proponent has presented a conceptual Cyanide Transportation Management Plan in Appendix 30 (Conceptual Environmental Management Plans). The Executive Committee recognizes the mitigation measures presented in this plan. However, given the nature and risks of transporting cyanide and the transportation route, the Executive Committee requires additional information in order to predict potential effects associated with transporting cyanide. Therefore, please provide the following information:

R47. A detailed Cyanide Transportation Management Plan. Details should be Yukon-focused, and in particular the Silver Trail to the Project site, including:

a. evaluation of transportation route, including community involvement;

b. storage and security during shipment;

c. interim loading, storage, and unloading during shipment;

d. safety and maintenance of the means of transportation throughout transport;

e. transport to the Project;

f. task and safety training for transporters and handlers throughout transport; and

g. security and emergency response throughout transport.

4.3 Cyanide Handling Storage and Use

Bulk sodium cyanide (NaCN) will be stored in the adsorption, desorption and recovery (ADR) building (93 × 63 m concrete foundation) which will include a 300 mm high curb-wall to contain spills and fugitive releases. Overflow and spills will report to a floor sump that will gravity drain to the Events Ponds.

NaCN storage will be indoors on concrete slabs located adjacent to the adsorption area in the ADR building. NaCN briquettes packed in plywood boxes will be stored in 1 000 kg “bulk bags”. Daily consumption is estimated to be approximately 6 to 8 tonnes. The proposal indicates a minimum of two weeks on-site storage of NaCN or approximately 84 tonnes. Concrete berms will be used to separate each of the chemical storage areas to prevent interactions and maintain a minimum of 110 percent containment in the event of a spill.

The unloading and mixing process for solid cyanide is a key part of the on-site management of NaCN. Spills to the environment or worker exposure can occur in moving the NaCN briquettes from the vehicles used to transport the solid cyanide to the storage area, in the process for mixing the solid cyanide with water in the NaCN mix tank, and at the liquid NaCN storage tank. In addition, solid cyanide needs to be stored to prevent contact with water and possible release of hydrogen cyanide gas.

Given the risks and potential effects associated with cyanide handling, storage, and use, the Executive Committee requires additional information. Therefore, please provide the following information:

R48. Clarification regarding handling, storage, and use of cyanide at the Project site. Details should include:

a. description of unloading process and area for solid sodium cyanide (NaCN);

b. details on storage of solid NaCN in bulk bags;

c. the process for moving: the solid NaCN from the unloading area to the storage area in the adsorption, desorption and recovery building; the solid NaCN from the storage area to the NaCN mix tank; and the 20 percent NaCN from the mix tank to the liquid NaCN storage tank;

d. use of level indicators and high-level alarms for the liquid NaCN mix and storage tanks;

e. ventilation requirements for the solid NaCN in the cyanide storage area within the adsorption, desorption and recovery building; and

f. ambient air monitoring requirements within the solid NaCN storage area, liquid NaCN mixing area and liquid NaCN storage area to protect workers.

4.4 Quality Assurance and Quality Control

The Executive Committee recognizes the commitments presented in the conceptual Environmental Monitoring Plan in Appendix 30 (Conceptual Environmental Management Plans) of the proposal. However, given the nature and risks associated with the use of cyanide the Executive Committee requires additional information on monitoring and sampling procedures, sampling locations and frequencies, and analytical protocols.

Facilities for the management of cyanide should be constructed in accordance with generally-accepted engineering standards and specifications applicable in the jurisdiction. Quality Assurance and Quality Control (QA/QC) programs are needed during the construction of new facilities to ensure structural integrity and the ability to safely contain process solutions and solids, including cyanide. Qualified personnel need to review facility constructions and document that the facility has been built as proposed and approved.

Given the nature of cyanide use and management and potential risks associated with improper construction of cyanide related infrastructure, the Executive Committee requires some description of QA/QC programs associated with the Project. Therefore, please provide the following information:

R49. A more detailed description of what will be included in the environmental monitoring programs and environmental monitoring procedures for cyanide.

R50. Describe Quality Assurance and Quality Control programs that will be implemented during construction of infrastructure to manage cyanide including the Process Plant, conveyance infrastructure, events ponds, and Heap Leach Facility.

R51. A more detailed description of what will be included in the environmental monitoring plans and programs related to cyanide.

4.5 EMERGENCY RESPONSE PLAN

The proponent has presented a conceptual Emergency Response Plan (ERP) outlined in Appendix 33 (Conceptual Emergency Response Plan). The ERP provides an overview of the information and procedures for emergency response. The proponent commits to developing a comprehensive ERP as Project design advances. The Executive Committee recognizes the commitments presented in the ERP. However, given the nature and risks associated with the use of cyanide the Executive Committee requires additional information. Therefore, please provide the following information:

R52. A more detailed description of what will be included in the Emergency Response Plan for emergencies related to cyanide. Details should include:

a. potential cyanide failure scenarios appropriate for the site-specific environmental and operating circumstances;

b. specific response actions such as clearing site personnel and advising potentially-affected communities;

c. use of cyanide antidotes and first aid measures for cyanide exposure; and

d. control of releases at their source and containment, assessment, mitigation and future prevention of releases.

4.6 WORKER HEALTH AND SAFETY

The proposal did not address in detail the potential effects on worker health and safety due to the use of cyanide. Rather, the proponent has indicated that potential health effects to workers at the Project are governed by territorial health and safety legislation and applicable codes of practice. The proponent has presented a conceptual Occupational Health and Safety Plan in Appendix 30 (Conceptual Environmental Management Plans). However, details are limited. Given the nature and risks associated with the use of cyanide the Executive Committee requires additional information. Therefore, please provide the following information:

R53. An annotated list of worker exposure scenarios. For example, describe how cyanide-related tasks such as unloading, mixing, plant operations, entry into confined spaces and equipment decontamination prior to maintenance will be conducted to minimize worker exposure.

R54. Outline procedures that restrict hydrogen cyanide gas formation during mixing and production activities. In your response explain how worker health and safety will be monitored and what measures will be utilized in exposure situations.

5.0 MINE SITE INFRASTRUCTURE DEVELOPMENT

5.1 CAMP

The proposal outlines the camp facilities and administration buildings in Sections 5.1.1.2 and 5.4.2.3. The camp will be located just north of the Dublin Gulch Area and south of Fischer Gulch to accommodate a mine workforce of approximately 200. Section 5.4.2.3 of the proposal provides a cursory description of accommodations infrastructure, water source, potable water treatment, and wastewater/sewage treatment and disposal.

The Executive Committee is aware of a recent VIT proposal assessed by the Mayo Designated Office (Project #2010-0226) for a 100 person camp located within the Dublin Gulch area. The assessed 100 person camp appears to overlap with the laydown area and diesel tank farm proposed for this Project. The scope of Project #2010-0226 included a description of accommodations infrastructure, water source, potable water treatment, and wastewater/sewage treatment and disposal.

The relationship between the proposed 200 person camp and the assessed 100 person camp is unclear. For example, it is not clear if the groundwater water well assessed for the 100 person camp will be used for the 200 person camp. The Executive Committee does not have sufficient details about the proposed 200 person camp and related infrastructure to scope the Project and further understand potential effects to environmental quality and health and safety. Therefore, please provide the following information:

R55. A clear description of the proposed camp infrastructure and utilities. The description should include:

   a. identification of any infrastructure and/or utilities that will be used for the proposed 200 person camp that was already assessed as part of the Project #2010-0226;

   b. description of how the infrastructure/utilities will be modified or moved to accommodate an increase in workforce and new camp location; and

   c. develop an overview map of the camp facilities and administration buildings which describes the location of various infrastructure and utilities (e.g., water well, water treatment facility, water distribution, membrane biological reactor, etc.) for the camp.

R56. Identify if the existing water license and/or mining land use permit will require amendments to enable the modification to the camp infrastructure and utilities.

5.2 SOLID WASTE MANAGEMENT

Solid waste will be generated during all phases of the Project requiring appropriate solid waste management and disposal. Section 5.4.3 of the proposal summarizes various waste types that will be generated during the construction phase of the Project. However, the volume of waste material is not provided and the section does not discuss solid waste generation during any other phase of the Project (e.g., operation, closure, reclamation).

The proposal indicates that solid waste generated as a result of the Project will be disposed of at the Village of Mayo (VoM) landfill. Section 6.11.6.18 – 6.11.6.21 of the proposal characterizes the potential effects to the capacity of the VoM landfill as a result of waste disposal from the Project. The section indicates, *"A Construction Waste Management Plan has been developed for the Project and is set out in Section 5.4.3"*. However, this is not an accurate representation of the summary table provided in that section. The effects characterization uses the estimate of waste volume generated by a 200 person camp during operation and concludes that the quantity of waste from the 200 person camp may lead to a "moderate to substantial" impact to the capacity of the VoM landfill. Mitigations were discussed that may include incineration of certain waste types and/or increasing the capacity of the VoM landfill site. However, the effects assessment concludes that further dialogue with VoM and Yukon Government are required before any mitigations are committed to.

Appendix 30 (Conceptual Environmental Management Plans) of the proposal discusses the further development of a "Waste Management Plan". This section does not provide any further description of waste generation, management or disposal but identifies that a future plan will be developed.

The Executive Committee requires further description of generated waste types and volumes during all phases of the Project to understand if additional Project activities (e.g., incinerator) should be included in the scope of the Project. The Executive Committee also requires further detail in the storage, handling and eventual disposal of all generated waste types for all phases of the Project to understand the potential effects to environmental quality, health and safety, and community infrastructure. Therefore please provide the following information:

R57. Identify and estimate solid waste generation types and volumes for all Project phases and outline the storage, handling, and disposal procedures for each type.

5.3 BORROW MATERIALS FOR ON-SITE USE

The proposal indicates various sources and volumes of materials necessary for the construction of mine site infrastructure. The construction of the Heap Leach Facility (HLF) will require the largest amounts of borrow materials approximately 2.75 million cubic metres of cobble/boulder, sand/fine gravel, clay/silt, and fine/medium sand. The proponent will clear overburden and, if required, blast bedrock for infrastructure pads. Gravel and broken blast rock will be used as fill. On-site access roads will be built up using local borrow or suitable material from mining operations. Other mine site infrastructure such as the Dublin Gulch Diversion Chanel, sediment/event control ponds, will require additional granular resources. However, the proposal does not outline these requirements.

The majority of borrow materials for the Project will be sourced from existing placer spoils, overburden, and silt borrow pits. Some of the required 300 000 m^3 of fine/medium sand for the HLF may need to be imported to the Project site. The proponent has indicated that a preliminary study on the availability of borrow materials was undertaken. However, this study noted that further work is required to confirm and quantify the materials. Furthermore, the proponent indicates that the need for and location of on-site borrow materials will be determined during the Feasibility Engineering Stage of the Project, which is to commence in early 2011.

The Executive Committee recognizes that borrow materials may be available in sources identified in the proposal. However, the proponent has not demonstrated that sufficient appropriate borrow materials are available to meet their mine site construction needs. Therefore, please provide the following information:

R58. Identify the sources for each type of borrow materials and estimate volumes within those sources. If bedrock will be crushed, material should be characterized consistent with R45 in Section 3.2 of this report.

5.4 Clearing and Grubbing

The proposal indicates that trees greater than 150 mm in diameter will be salvaged during general Project site preparation. There are no details on how trees will be salvaged and managed in a manner that to allow for further use. The Executive Committee requires additional information in order to understand how trees will be salvaged. Therefore, please provide the following information:

R59. Estimate volumes of salvageable timber and detail its management during construction.

6.0 HAGGART CREEK ROAD

6.1 Borrow Materials for Upgrades

The Project requires upgrades to the Haggart Creek Road (HCR) including three sections to be realigned, general upgrades along length of HCR, construction of pullouts, and construction of three staging areas. Approximately 37 000 m^3 of borrow materials are required for upgrades. The proposal indicates that this material will be sourced from ditch cuts, side borrow cuts, and borrow pit development. The proponent indicates that the locations and volumes of required borrow pits will be determined after a late 2010 geotechnical investigation of the HCR. Furthermore, Section 5.4.2.1 of the proposal indicates that *“environmental effects of borrow pits will be assessed in the above noted application for road upgrades in 2011.”* It is uncertain what application is referenced in that statement.

The Executive Committee recognizes that borrow materials may be available in sources identified in the proposal. However, the proponent has not demonstrated that sufficient appropriate borrow materials are available to meet the HCR upgrade needs. Therefore, please provide the following information:

R60. Identify the sources for suitable borrow materials and estimate volumes within those sources. If bedrock will be crushed, material should be characterized consistent with R45 in Section 3.2 of this report.

6.2 Road Design and Management

The HCR is designed as a two-way one-lane radio-controlled access road. Design aspects include an entrance sign and pullout, kilometre markers at one-kilometre intervals, radio calling protocol, and construction of regular pullouts along the HCR. Pullouts have not been identified on HCR figures and the proponent has not identified how pullout locations will be determined.

The HCR is a public un-maintained road under the *Yukon Highways Act*. Although traffic volume data along the HCR is unavailable, the proponent has demonstrated that it is relatively low. However, members of the public do use the HCR for various activities. Furthermore, it is understood that the public uses the South McQuesten Road up to the South McQuesten River Bridge (the start of the HCR) more frequently. It is conceivable that after upgrades to the HCR are completed public traffic may increase.

The Project will significantly increase traffic along the HCR. During operation it is estimated there will be up to 1 944 trucks per year (round trip including 156 cyanide shipments) and 200 buses per year (round trip). During construction, traffic volumes may be higher.

The proponent has presented a conceptual Traffic and Access Management Plan in Appendix 30 (Conceptual Environmental Management Plans). Given the increase in traffic on a public road, the Executive Committee requires additional detail on how the design and management of the two-way one-lane radio-controlled HCR will maintain safe public access. Therefore, please provide the following information:

R61. A more detailed description of what will be included in the Traffic Management Plan. Details should include:

a. locations of pullouts along the Haggart Creek Road. Alternatively, if pullout locations are not confirmed at this time, provide the design basis and identify areas where regular pullout locations could be constructed; and

b. details on how the two-way one-lane radio-controlled Haggart Creek Road design and management will allow safe public use. Particular attention should be given to public users who do not have access to two-way radios.

7.0 MINE DESIGN AND ENGINEERING

7.1 OVERLAND ORE CONVEYOR SYSTEM

The Project involves conventional open pit mining methods at a daily mining rate of 26 000 tonnes per day. A system of overland conveyors will transport ore between primary and secondary crushers, the high pressure grinding roll unit, and the HLF. The proposal indicates that conveyors will be fitted with covers along their entire lengths, with dust suppression at their discharge chutes.

Section 5.6.3.4 of the proposal states soil contamination may occur from dust deposited from the conveyor system. Section 6.4.3.1 identifies dust deposition from mine activities as the primary effect mechanism on soil contamination. In contrast, various figures within the proposal (Figures 5.4-5 through 5.4-7) indicate enclosed conveyors.

It is uncertain to what extent the covered conveyor system is intended to limit dust deposition. In order to understand the potential effects of dust deposition along the conveyor system, the Executive Committee requires additional information. Therefore, please provide the following information:

R62. Details on how the covers will reduce or limit dust deposition along the conveyor system.

7.2 GEOTECHNICAL STABILITY OF MINE SITE INFRASTRUCTURE

The proponent proposes to construct the HLF, the Eagle Pup Waste Rock Storage Area (WRSA) and the Platinum Gulch WRSA in Ann Gulch, Eagle Pup, and Platinum Gulch respectively. The proposal identifies that mass wasting events are common in areas such as the Dublin Gulch watershed. Furthermore, the risk of mass wasting may increase due to disturbances such as vegetation clearing, road construction, etc.

Section 6.4.1.4 and Figure 6.4-3 of the proposal identifies 179.9 ha of permafrost within the Project footprint. The design and construction of mine site infrastructure includes soil and overburden stripping, effectively removing 132.7 ha of permafrost. After construction there will be 47.2 ha of permafrost as well as 20.3 ha of other "geohazard areas" (e.g., seepage, flooding, gullying, rockfall/slides, etc.) remaining within the Project footprint. These remaining areas have been identified in Figure 6.4-5 of the proposal.

The proposal states *"Mine design mitigation measures will be developed further and in greater operational detail during feasibility stage and provide the opportunity for addressing remaining issues posed by permafrost"* (page 6-29). Table 6.4-4 of the proposal states the following mitigation for remaining permafrost: *"Safety margin has been built in to account for potential reduction in stability due to removal of frozen layers"*. Section 5.4 of the proposal also indicates that confirmatory geotechnical drilling will be conducted in the HLF, event ponds, WRSAs, and plant site in 2012.

The Executive Committee requires further information regarding the geotechnical stability within the Project footprint in order to address potential affects related to terrain instability. Therefore, please provide the following information:

R63. Permafrost observations (e.g., borehole, cut banks) used to characterize and define spatial boundaries of permafrost in Figures 6.4-3 and 6.4-5 of the proposal.

R64. A plan to measure/monitor and manage potential issues associated with remaining permafrost and geohazard areas identified in Figure 6.4-5 of the proposal.

R65. Based on your response to R63 and R64, provide a discussion of, and rationale for, the geotechnical design basis for mine site infrastructure. This discussion should include:

a. a focus on infrastructure such as the Heap Leach Facility, Waste Rock Storage Areas, and water diversion and impoundment structures; and

b. a description of, and rationale for, the safety margin identified in Table 6.4-4 of the proposal.

7.3 HEAP LEACH FACILITY

As indicated in Section 5.1.1.1 of the proposal, the HLF consists of a double liner system in the upper reaches of the facility and a triple liner in the lower reaches. The lower reaches of the facility act as an "in-heap pond" for primary storage of pregnant leach solution. The in-heap pond will have a capacity of 435 000 m^3 but will typically be operated at approximately 60 000 m^3. Cyanide process solution will be applied to the heap and collected using a solution collection system. Pumps withdraw pregnant leach solution from the in-heap pond into the process plant at the toe of the HLF. Any excess process or pregnant leach solution is pumped from the in-heap pond into lined event ponds for storage. These lined event ponds will not be constructed with overflow spillways.

It is critical that the design and construction of the HLF and associated infrastructure prevent the release of process or pregnant leach solution to the environment. Potential concerns with geotechnical stability of the HLF are addressed under Section 7.2 of this report. The Executive Committee requires additional information on the design and engineering basis of the HLF and event ponds in order to understand the risks and potential effects associated with their use. Therefore, please provide the following information:

R66. A Project development schedule in order to understand the work and sequencing of events needed to construct the Heap Leach Facility. The schedule should include pre-production development work required to bring the Heap Leach Facility into production and seasonality of construction activities.

R67. Design basis information for the proposed Type 1 (triple PVC composite) and Type 2 (double PVC composite) liner systems to be installed in the Heap Leach Facility. This may include:

   a. projected loadings, and potential for punctures, differential settlement and other damage to the liners/liner system;

   b. projected leakage rates for normal/maximum in-heap pond head conditions; and

   c. required liner strength and thickness.

R68. Note 3 on Figure 5.4-8 in Section 5 of the proposal indicates that joint and low friction skin details will be developed during the feasibility study. Please confirm the status of development for these details and provide the results if available.

R69. An estimate of the volume of in-heap pond and event ponds storage that may be taken up by a 1 in 100-year 24 hour storm event including the following:

   a. how the event pond design accounts for the amount of solution storage available at the start of the design event, reduced volume due to ice or sediment build-up, and run-off reporting to the event ponds;

   b. consideration of a sequence of events, such as a 1 in 100-year 24 hour storm event followed by a typical precipitation event;

   c. adsorption, desorption and recovery plant, cyanide destruction plant and/or water treatment plant could be operated to help manage the 1 in 100-year 24 hour storm event flow; and

   d. consideration of the possibility that snow melt may occur faster on southward facing areas of the Heap Leach Facility.

R70. In the unlikely event of capacity being reached for all process leach solution storage (all ponds), discuss management options using all mine site infrastructure. This should include an estimate of the time required to return to normal operational conditions.

7.4 PERMEABILITY DESIGN CRITERIA

The Project includes several lined and un-lined mine components designed to manage mine site contact water. Lined seepage collection ponds will collect seepage from rock drain collections systems below the Platinum Gulch and Eagle Pup WRSAs. A series of un-lined drainage ditches will convey water from these ponds to the open pit sump, events pond, or water treatment plant. The rock drain collection systems and drainage ditches are not lined and are controlled by the permeability and hydraulic conductivity of the proposed construction materials. Section 6.5.3.1 of the proposal recognizes a certain amount of seepage from the WRSAs (assumed constant of 8.4×10^{-5} m^3/d) will report to groundwater rather than the seepage collection ponds. There is no discussion on the potential seepage from other mine site infrastructure such as drainage ditches, ponds, etc.

The Executive Committee requires additional information regarding design permeability to demonstrate that predicted seepage collection can be achieved and to predict potential effects associated with mine water seepage. Therefore, please provide the following information:

R71. A clear description of how proposed design permeability and seepage collection will be achieved through the construction of various mine site infrastructure such as rock drain collection systems, drainage ditches and ponds etc.

8.0 CLOSURE

8.1 COVER DESIGN BASIS AND PERCOLATION PREDICTIONS

“Store and release” covers or caps constructed of natural materials are proposed for the WRSAs and HLF with the goal of limiting infiltration of precipitation to ten percent. However, natural material covers that only allow ten percent infiltration to occur have not been demonstrated consistently at other mine sites. Furthermore, Table 2.0-1 and Section 2.1.1 in Appendix 24 (Conceptual Closure and Reclamation Plan) indicates that over 12 percent of the surface of Eagle Pup WRSA and over 16 percent of the surface of Platinum Gulch WRSA will be so steep as to preclude soil capping and re-vegetation. The Executive Committee notes that the proposal also uses a 20 percent infiltration rate in water modeling. Given that current methods of cover design are based on experience in temperate zones and should not be considered best practice in cold regions (MEND 1999), sufficient detail on the cover design and additional empirical evidence is required to support that a design basis of ten percent infiltration is likely to be achievable.

The Executive Committee agrees that using the closure performance of the Platinum Gulch WRSA to inform closure decisions for Eagle Pup WRSA and the HLF is a good approach. However, VIT has not provided adaptive management options, and their likelihood of success, if the closure performance of Platinum Gulch WRSA does not meet expectations. Therefore, please provide the following information:

R72. Supporting documentation and additional design detail to support a design basis for ten percent infiltration rate for all proposed covers.

R73. Details on adaptive management options for long-term Waste Rock Storage Area management if the closure performance (particularly seepage water quality) of Platinum Gulch Waste Rock Storage Area does not meet expectations.

8.2 CLOSURE COST ESTIMATION

An estimation for closure and reclamation cost is presented in Table 2.9-2 of Appendix 24 (Conceptual Closure and Reclamation Plan) and on page 14-9 and Table 16-1 of the "Pre-feasibility Study on the Eagle Gold Project, Yukon Territory, Canada". VIT has proposed $15 million to cover closure and reclamation costs after mine operations cease, and this amount has been estimated to cover costs associated with final infrastructure/facilities decommissioning, site preparation, soil hauling and replacement, re-vegetation treatments, reclamation monitoring and water treatment/monitoring. While the Executive Committee appreciates that detailed engineering will allow for more precise closure cost estimates, insufficient detail and rationale was provided in support of the accuracy of the current closure cost estimates. Therefore, please provide the following information:

R74. Additional details and rationale for the estimated closure and reclamation costs.

8.3 WETLANDS AS AN EFFLUENT TREATMENT OPTION

The proposal and Appendices 24 (Conceptual Closure and Reclamation Plan) and 28 (Wetland Treatment Memorandum) describe the use of constructed/engineered wetlands as a water treatment option, particularly to provide passive treatment of the post-closure effluent.

Wetlands use biotic processes to remove potential contaminants from effluent. The rates of these processes generally slow down with decreasing temperature, as does the resulting efficiency of the water treatment process. The Executive Committee notes that the examples of effective engineered wetlands (e.g., page 8 of Appendix 28 [Wetland Treatment Memorandum]) have a most northerly latitude of about 49°N. The Eagle Gold Project has an approximate latitude of 64°N with much colder annual temperatures and longer winters. It is unclear how the colder climate will influence constructed wetland water treatment effectiveness.

Environment Canada has noted that the use of wetlands for treating arsenic-rich effluent has not been demonstrated. Arsenic mobilization has been demonstrated to be greatly enhanced due to the increase in natural organic matter. The proposed system may in fact increase the mobility of arsenic in the system and not reduce it (Redman et al. 2002).

The Executive Committee requires additional information in order to support the use of wetlands as an effluent treatment option. Therefore, please provide the following information:

R75. Identify and provide supporting documentation for the cited pilot, demonstration, and full-scale wetland water treatment systems that have been successful for similar water quality and climatic conditions.

R76. Identify input water quality required for the wetland treatment systems to achieve water quality objectives at end-of-pipe.

R77. Supporting documentation regarding the proposed use of wetlands to decrease arsenic in effluent.

8.4 WALK-AWAY SCENARIO POST-CLOSURE

VIT has committed to maintain the Mine Water Treatment Plant (MWTP) until discharge effluent meets licensing requirements (Sections 4 of the proposal and 5.3.1 in Appendix 24 [Conceptual Closure and Reclamation Plan]). However, the effluent quality predictions from the HLF and Eagle Pup WRSA both suggest elevated levels of metals during the post-closure scenario in the short-term and long-term (Tables 13 and 14 in Appendix 8 [Geochemical Characterization and Water Quality Predictions]). Of particular note are predicted post-closure effluent concentrations of arsenic above MMER. It is unclear how likely the effluent (i.e., runoff and seepage) from the HLF, pit walls and WRSAs will require perpetual active treatment. The Executive Committee is concerned that proposed water treatment for the mine components described in Appendix 18 (Water Management Plan) does not support a walk away scenario. Therefore, please provide the following information:

R78. Additional rationale and detail in support of a “walk-away” closure scenario that is likely to achieve water quality objectives without active water treatment.

9.0 FISH AND WILDLIFE

9.1 FISH BASELINE DATA

Fish baseline data was presented in Section 4.1.12.6 of the proposal and Appendix 5 (Environmental Baseline Report: Fish and Fish Habitat). The Project relies on fish baseline data and interpretations to design the fish habitat compensation plan. While non-fish bearing sites have been identified, Catch per Unit Effort (CPUE), or raw data/field reports in order to calculate CPUE, were not presented at these sites. An understanding of the CPUE would provide confidence in identification of non-fish bearing streams.

Section 3.2.4 of Appendix 5 (Environmental Baseline Report: Fish and Fish Habitat) refers to fish sampling done in 2010. However, no details were provided on the methodology, data, or results from fish sampling efforts conducted in 2010.

Chinook salmon were not found in Haggart Creek during any of the four sampling programs conducted by the proponent. However, the proposal identifies that previous studies have reported the presence of Chinook salmon in Haggart Creek. Furthermore, Chinook salmon were observed at the HCR crossing of the South McQuesten River in August 2009.

The Executive Committee requires additional information regarding fish baseline data in order to have confidence in the results and outcomes of the data collected. Therefore, please provide the following information:

R79. Sampling methodology and Catch per Unit Effort for fish baseline information provided in the proposal. Provide sampling effort for non-fish bearing sites.

R80. Methodology, data, and results from the 2010 fish sampling program and update the fish baseline accordingly.

R81. If available, a description and discussion of Chinook salmon run strength in the South McQuesten River.

9.2 FISH HABITAT

The Executive Committee recognizes the efforts to advance the planning of fish habitat compensation measures and acknowledges ongoing discussions between VIT and Fisheries and Oceans Canada. The water flows in the Dublin Gulch watershed downstream of Stewart Gulch until the confluence with Haggart Creek are proposed to be re-configured through diversion channels and ponds with the main flows from Dublin Gulch being diverted into Eagle Creek. As a result, the Project will divert current Dublin Gulch flows into Eagle Creek that will then flow into Haggart Creek approximately 1.5 km downstream. Also included in this plan is the removal of an existing fish barrier on lower Dublin Gulch that prevents fish passage upstream. Furthermore, VIT proposes to create/improve fish habitat throughout the portion of Eagle Creek that flows parallel to Haggart Creek.

Predictions of chemical changes of Haggart Creek have been included the proposal but not for mechanical changes to the Haggart Creek channel. Mechanical change to Haggart Creek such as erosion of cut-banks or deposition of sediment due to low flow conditions may affect aquatic biota and habitat. Therefore, please provide the following information:

R82. Prediction of Project-related changes to that portion of Haggart Creek between the current in-flow of Dublin Gulch downstream to the in-flow of Eagle Creek. Include analysis and discussion on:

a. changes in channel morphology due to Project effects on the Haggart Creek hydrologic flow regime; and

b. the effects on fish and fish habitat. Please provide additional details to evaluate the importance of this habitat or describe the stream in this reach (i.e., does the stream braid or have multiple channels? Is there shallow off-channel habitat?).

R83. Predictions and a discussion on the effects on flow regime and fish and fish habitat in Eagle Creek and Haggart Creek with the proposed re-direction of water flows from Eagle Pup and Stuttle Gulch to the process plant.

9.3 WILDLIFE

The Executive Committee recognizes the commitment made by VIT in the proposal (Commitment 44 in the Table of Commitments) to reduce wildlife mortality in the HLF area, event ponds and ditches. Efforts to minimize wildlife exposure to cyanide over the mine site will decrease the risk of wildlife poisoning or mortality. The proponent commits to use bird-balls or a reasonable alternative to deter birds from landing on ponds. However, alternative deterrents are not identified and the effectiveness of the various potential methods is not described. Therefore, please provide the following information:

R84. Alternative wildlife deterrents that are available to the proponent and an evaluation of the different options.

10.0 CLARIFICATIONS

Please provide the following information to ensure the Executive Committee has the correct understanding of these items in the proposal:

R85. Define and provide a map of Eagle Creek as used in the proposal.

R86. Confirm that the lithology labelled “metavolcanics” in all Sections of Appendix 8 (Geochemical Characterization and Water Quality Predictions) should be “metasediments” as referred to in the proposal.

R87. Some entries in various tables in Appendix A (Water Quality) of Appendix 16 (Environmental Baseline Report: Water Quality and Aquatic Biota) are highlighted in green, red, or yellow. Please clarify the meaning of these highlighted values.

R88. The figure or correct the reference to Figure 5.6-1 in the proposal on page 5-52 (Section 5.6).

R89. Confirm our understanding that the reference to Appendix 14 (Environmental Baseline Report: Hydrology) in the third paragraph on page 5-52 of the proposal should read Appendix 24.

R90. In Appendix 21 (Surface Water Balance Model Report) please update the following information:

a. on page 2-1 the basic water balance equation is missing; and

b. on page 3-12 the equations deriving the rainfall:precipitation coefficient are missing.

R91. In Appendix 25 (Technical Data Report: Water Quality Model) please confirm that the missing equation on page 2 is supposed to be the equation found on page 6-89 of the proposal.

R92. Re-plot Figures 3-2 through 3-7 from Appendix 16 (Environmental Baseline Report: Water Quality and Aquatic Biota); the “CCME Guidelines” reference lines are missing and the values for “Dublin Gulch and tributaries” and “Lynx Creek” are not differentiable due to their similar symbology.

R93. Confirm that in Figure 4-2 of Appendix 16 (Environmental Baseline Report: Water Quality and Aquatic Biota) the potential effect levels (PEL) and the interim sediment quality guidelines (ISQG) are not meant to be on every plot. If they are, please re-plot the figure.

R94. Figure 3.2-2 in Appendix 18 (Water Management Plan) is missing. Please supply the correct figure.

Appendix A BIBLIOGRAPHY

Canadian Council of Ministers of the Environment (2003). *Canadian water quality guidelines for the protection of aquatic life: Guidance on the Site-Specific Application of Water Quality Guidelines in Canada: Procedures for Deriving Numerical Water Quality Objectives*: pp 146.

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Redman et al. (2002). Natural organic matter affects arsenic speciation and sorption onto hematite. *Environ. Sci. Technol*. 36: 2889-2896