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Nunavut Water Board
P.O. Box 119
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Attention: Ms. Dionne Filiatrault, P.Eng.,
Manager of Technical Services

Dear Dionne:

Ulu Gold Mine Project
Review of Waste Rock and Ore Storage Plan

At the request of the Nunavut Water Board (NWB), Acres International Limited (Acres) has reviewed the Waste Rock and Ore Storage Plan at the Ulu Gold Mine Project, Nunavut (The Plan). The Plan was prepared by BGC Engineering Inc. (BGC) for Wolfden Resources Inc. (Wolfden), and submitted in March 2005. The Ulu gold mine project is an advanced mining exploration project operated by Wolfden. Wolfden purchased the Ulu property from Echo Bay Mines Ltd. (Echo Bay) in December 2003. The NWB Water License No. NWB1ULU0008 (Water License) was subsequently transferred from Echo Bay to Wolfden, as per NWB letter dated March 23, 2004. The Plan was prepared as partial fulfillment of Part D, Item 11 of the Water License.

Background

The Ulu project site is located approximately 530 km north of Yellowknife, NT, and approximately 150 km north of the Lupin Mine. The site consists of three main components: The Ulu Mine Site (the mine site), Camp 3 site, and an airstrip. The mine site is located to the north of Camp 3, in proximity of the ore body, and adjacent to Ulu Lake, West Lake, and East Lake. This site hosts the main camp facilities, a laydown area, a tank farm, a portal to the underground mine development, an existing waste rock pad and an ore storage pad. The Camp 3 site, which is the main staging area, contains a fuel tank farm and maintenance building. Camp 3 site lies adjacent to borrow pits and explosive magazine areas, and is located between an esker deposit and Reno Lake. The airstrip, approximately 1350 m long, is located between the Camp 3 site and the mine site.

The underground exploration program at the mine site started in 1996, and was developed via a portal and ramp to a depth of 155 m (155 m level). The proposed extension of the exploration program is intended to follow the original development to a depth of 315 m (315 m level). The Plan indicated that the new development (from 155 m level to 315 m level development) will yield approximately 106,000 tonnes of ore and 126,900 tonnes of waste rock over a two-year period. It was estimated that the previous development to the 155 m level yielded approximately 126,900 tonnes of waste rock (assumed to be approximately 50% of the proposed development to 315 m level), which was utilized to build the camp, waste rock and ore storage pads. Approximately 220 tonnes of ore was recovered in the early development to the 155 m level.

Under Part D item 11 of the Water License, which refers to the Conditions Applying to Waste Disposal, Wolfden is required to submit The Plan to address both permanent and temporary drainage management issues related to the waste rock and ore storage areas. The Plan must include complete descriptions of the proposed waste rock and ore storage areas, schedule of stockpiling, detail site map and plan, water drainage and disposal plans into the surrounding environment, water quality and monitoring, contingency and treatment requirements, and geochemical and thermal studies related to the waste rock and ore stockpiles.

Review and Comments on BGC's Waste Rock and Ore Storage Plan (The Plan)
In general, The Plan addressed all of the requirements for the development of the waste rock and ore storage areas, as indicated in the Water License, Part D, Item 11. The Plan proposed is short term and limited activities during the advanced exploration program to be carried out by Wolfden to reach the 315 m level of development. This means that additional plan(s) will be required for the next stage of mine development at Ulu, including a plan related to permanent development for waste rock, tailings and ore storage areas; or if no further development will be carried out at the end of the licensing period, a plan to address reclamation/remediation activities.

In regards to the details that were discussed or presented in The Plan, Acres provides the following comments:

1. Geo-chemical Characterization of the Waste Rock and Ore

A series of geochemical tests were performed on waste and ore rock samples taken from the Ulu site. Testing included Acid Base Accounting (ABA) to determine the potential for Acid Rock Drainage (ARD), and kinetic testing consisted of humidity cell and field column tests. Some of these tests were carried out in waste rock and ore samples, while others have only been carried out for ore samples. Humidity cell tests were performed at 4°C and 22°C in order to simulate field conditions.

Appendices I and II have adequately provided details about the geochemical characterization of the waste and ore rock samples. Based on the findings, discussion and interpretation, a number of important issues derived from the geochemical characteristics of the waste and ore rock samples taken from Ulu can be summarized as follows:

- Both ARD and metal leaching will likely not be a concern within the short term period of the proposed advanced exploration program to the 315 m level at Ulu, as these tests satisfy Water License requirements until the term expires in 2008. However, the long term plan requires caution in addressing ARD and metal leaching potential for future mine development at Ulu.
- Additional geochemical testing, including kinetic testing will be required to obtain additional representative rock samples at deeper levels, as the exploration program will advance from the 155 m level to 315 m level.
- For the purpose of the current waste rock and ore storage plan, the assumptions to use a Neutralization Potential Ratio (NPR) value of 3, and a sulphur content of 0.2% as delineation between the ARD and non-ARD rock would be sufficient.

- Based on INAC's "Guidelines for Acid Rock Drainage prediction in the North", Northern Mine Environmental Neutral Drainage Studies No. 1, September 1992, the assumption for Net Neutralizing Potential (NNP) needs to be stated if used as a parameter for initial screening criteria for ARD.
- Adequate data for baseline water quality has been established for the receiving environment, such as at the various lakes in the vicinity of the mine site and at Ulu creek. This data are presented in Appendix IV of the Plan, and has been used to predict the metal loadings into the environment, as the advanced exploration program progresses.

Considerable efforts have been made, discussed and presented to interpret the data obtained from the various tests in determining the geochemical characteristics of the waste and ore rock samples. While it is likely that field testing will provide data which is more site specific and representative for the proposed waste and rock storage areas, the limitation of sampling frequency will likely effect the data obtained from the field tests. Consequently, both the field and the laboratory data should be used with cautions and only as a tool to help the designer with The Plan. The designer must take into account the limitation, as well as the assumptions made in determining the anticipated metal loading or concentrations, and the proposed implementation of the waste rock and ore storage plan.

As an additional comment, the description of "tailings" samples in the humidity cell test for ore rock samples with particle sizes of less than 1.5 mm as reported in Appendix I is not correct. It is understood that the "tailings" material is generally referred to mine and crushed ore rock which has undergone a mining process to produce the mine product (in this case gold). The "tailings" samples that were used for the kinetic testing were not derived from a trial mining operation, but just simple ore material samples containing particle sizes or fractions that are less than 1.5 mm. The term "fine ore" would be more appropriate.

2. Impact Assessment

Section 5 of The Plan provides a comprehensive data presentation that ties the climatic, hydraulic and geochemical data to the site specific conditions at Ulu. It is understood that some of the data is not available for the Ulu site, and that this section provides the best or latest available information.

Acres provides the following comments in regards to The Plan's impact assessment for the Waste Rock and Ore Storage Areas. It would be helpful for the reader if some of the assessments were provided in greater detail in the Appendix to support the tables presented in this section.

- Table 4 – Explanation is required for the "Future surface area" in Column 4. The difference between this column and Column 2 is 3130 m^2 of ore pad area that originally contributes to the West Lake watershed (Table 2). Will The Plan to remove ore pad contribute to the West Lake be compensated with a new pad within the East Lake watershed? If this is true, why has the surface area used for the ore pad in the water balance results does not take into account the additional 3130 m^2 (Column 4, Table 5)?

- Table 5 - Detail explanation is required to derive the calculated evaporation loss in Table 5 for East Lake. Are values derived based on rates provided from Table 3 and lake area as shown in Section 5.3.2?
- Table 5 – Confirm how the "net output" is calculated for the East Lake's losses in Column 9.
- Table 6 – The reported values related to Arsenic and Zinc do not agree with statement provided in Page 18 - Second paragraph. Should it be Arsernic and Lead (Pb) instead of Arsenic and Zinc?
- Table 6 – Why does this table provide predicted values for year 1 to 3 and also for year 4 and onward? Would the initial concentrations for the waste rock apply for the existing concentrations (single values) as a result of the waste rock that are already in place at the three sites (waste rock, ore storage and camp site areas)? Should this table only show the values for Years 1-3?
- Table 6 - What assumptions were made to derive the predicted concentrations, as values from kinetic tests were pro-rated using calibration shown in Appendix III?
- The predicted values which are presented in Tables 6 and 7 need to show whether they are average or maximum values. It would also be helpful if supporting information or steps in determining these values shown in this table are presented in the Appendix, including assumptions made in the analysis.

The impact assessment provided in The Plan, have considered the potential components which contribute to the evaluation and prediction for the expected metal concentrations during and after the advance exploration program to the 315 m level. Despite the comments as provided above, the impact assessment presented in Section 5 determined reasonable or satisfactory results based on the various and available climatic, hydrological, geochemical, and physical environmental data from the mine site.

The proposed assessment, together with the contingency plans to overcome any unexpected conditions as discussed in The Plan, is considered to be sufficient in providing adequate details that can be implemented to meet Water License requirements. However, as stated in The Plan, continual geochemical testing and adequate monitoring program will be required. This will be used to assess the progress of The Plan and to provide direction in developing a sound mitigation plan.

3. Proposed Waste Rock and Ore Storage Plan

As indicated in The Plan's recommendations (Section 8), the proposed waste rock and ore storage plan presented in Section 6 lacks detail for actual construction and/or implementation and are mostly presented conceptually. Detail design, construction plan and drawings related to the waste rock and ore storage areas, including field surveys, final layouts, sources of construction materials, technical construction specifications, etc. will be required to implement The Plan.

Acres provides the following comments in regards to The Plan as presented in Section 6:

- Figures 11 and 12 do not provide adequate details with respect to location of the pond dykes and a small settling pond as indicated in Section 6.2. Will there be two or three containments or water ponds (i.e. two collection ponds plus a settling pond) in the area?
- Detail designs of the collection ponds, as well as settling pond will be required. Crest elevations and water containment capacity of these ponds need to be established.
- Table 9 – limits as provided in the Water License or other guidelines need to be included in the Table.
- Section 6.2 last paragraph. Confirm that 7300 m^3 of esker material quantity is sufficient for the water retention dikes. Would a volume for containment dikes be over 10,000 m^3? How many dikes for the ponds need to be built?
- Section 6.3 last paragraph. A reference is required discussing the geochemical properties of sand and gravel esker material.
- Figure 11 shows two existing waste rock pads. What is the plan for the smaller pad? Does the calculated pad area include the small pad?
- Figure 11 shows a plan to remove the ore pad located within the West Lake watershed to the existing area on the East Lake watershed (shown by shaded hatch pattern). This figure does not show that the area of 3130 m^2, as shown in Table 2, is compensated. How does this plan compare with the 'Future surface area" as indicated in Table 4?
- In regards to stockpiles, the separate stockpiling of PAG and NAG materials need to be shown in plan view and requires further discussion.
- No detailed plan is presented or discussed on remediation work for the area where the ore pad located in the West Lake watershed is to be removed.
- No detailed information about proposed pipelines (dimension, grade, foundations, etc.) is available.
- No detailed information is provided with regards to locations of the proposed monitoring program for water quality and thermal monitoring.

The Plan should be flexible to allow for potential changes due to additional geochemical test results during the exploration program advancement into deeper excavation levels, as well as for possible future changes in the mine development plans. It needs to provide flexibility if more potentially acid generating rock is encountered during screening in the advance exploration program, i.e. if the protocol to separate ARD and non-ARD waste rock requires revision. A number of preventive contingency plans were presented in The Plan, which are intended to reduce the metal concentrations that may enter the receiving environment. The preventive contingency plans consist of the promotion of permafrost aggradation, reducing the footprint area, and increasing the height of the ore/waste rock stockpiles. Another contingency plan is to reduce snow accumulation so that less leaching will occur through the ore/waste rock stockpiles. In addition to these preventive strategies presented in The Plan, contingencies need to include active removal of metal concentrations through treatment methods in cases where the actual metal concentrations are higher than the predicted values not satisfying guideline limit requirements.

4. Other Minor Details

- Table 3 – Unit for precipitation is missing (mm).
- Figure 9 – Monthly East Lake volumes are not shown (constant at 40,900 m^3).
- Figure 10 – Symbols are not defined. The figure appears to show the estimated monthly runoffs from waste rock, ore storage and camp pads, not just the waste rock as shown in the title.
- Page 21 - Safety factor is not 0.1 but should be written as 10.0.
- Section 6.4 last paragraph. This paragraph needs to refer to Table 9 not Table 10.

Summary

The Plan has addressed all issues which were described by the Water License's requirements. However, it does not provide the level of details required to carry out the field activities such as construction of the berms, dykes and pond(s), as well as initiating a water quality monitoring program. All of the proposed plans and activities are considered to be in conceptual stage, and would require final design for implementation. Various reviews in interpreting the laboratory and field kinetic test results are presented as background documents in The Plan, and have been helpful in assessing the site's geochemical conditions. However, the ultimate goal of The Plan needs to ensure that the ARD potential will not materialize within the time frame of the operation of the storage areas, and metal leaching can be managed to satisfy recommended guidelines prior to discharge into the receiving environment. Hence, The Plan must address this goal by providing adequate contingencies and/or mitigation measures. We agree with the recommendations which are presented in The Plan, particularly in relation to the following issues:

- Further kinetic test work, including additional field column leachate tests, to represent the ARD and metal leaching potentials for the materials recovered from the proposed deeper level during exploration development. In addition, laboratory kinetic tests should also be carried out on rock samples taken from the deeper excavation. These tests will allow segregation of NAG and PAG materials.
- Preparation of detail design, construction plan and drawings related to the waste rock and ore storage areas, including field surveys, final layouts, sources of construction materials, technical construction specifications. These design plan and drawings must be prepared by qualified geotechnical engineers and submitted for approval prior to construction.
- Monitoring requirements, such as thermistors, water quality measurements, and weather/ climatic station.
- Additional development of back-up plans, such as treatment process to remove or reduce metal leaching concentrations, such as Arsenic.
- Finalize waste and water management plans for the exploration phase.

In addition to the above, we would also stress the importance of the following issues, some of which were also mentioned in the Plan:

- The Plan is based on findings from the past and current data. Interpretation and assumptions were used to develop water runoff quality from the waste rock and ore storage areas prior to discharge into the receiving water bodies such as East Lake. Consequently, proper monitoring of water quality and the development of mitigation strategies and contingency plans to overcome and to modify The Plan, if required, will be critical factors for the success of The Plan. In addition to preventive contingency plans presented in The Plan, other alternatives including actively removing any excess metals due to leaching through the treatment process in the settling pond prior to discharge into East Lake should also be explored and further discussed in the Plan.
- The Plan assumes that the ore storage area will be used temporarily, and ore materials will generally be removed from the site for further mine processing. Similarly, waste rock which exhibits ARD potential is intended for removal into the underground workings during subsequent mining development. Considering the above, appropriate technology and discussions for use of permanent ore or waste rock areas were not presented in the Plan. Within the short term usage of the proposed ore and waste storage facilities at Ulu, the supporting documents included in The Plan provided adequate discussion and justifications that ARD will not likely be a problem, and metal leaching issues can be mitigated to meet the quality requirements in the receiving environment. However, any changes to the assumptions made in the Plan will require design changes and further review.
- The Plan mentioned that segregation of potentially acid generating and non-acid generating of the waste rock will be carried out in the field during the mine development, utilizing a protocol that includes involvement of field geologists, in addition to the supporting geochemical testing. Adjustments or modifications to the protocol will likely be required during the development to the 315 m level. It was assumed that acid generating waste rock will be hauled back into the underground mine workings in future operations. However, this may have further implications. In the future, if Wolfden decides that waste rock considered to be non-acid generating will be left permanently in the storage areas, then further reviews to the existing Plan, including additional design for proper site reclamation, will be required.

We trust that the above review and comments are suitable for your purpose. Should you have any further questions or concerns regarding the above, please do not hesitate to contact me.

Yours very truly,

RAH:sep

R. A. Halim, P.Eng.
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