



Environment
Box 2703, Whitehorse, Yukon Y1A 2C6

YUKON WATER BOARD

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APPL. NO. QZ01-051

December 29, 2004

QZ01-051

Expatriate Resources Ltd

Yukon Water Board Secretariat
Suite 106, 419 Range Road
Whitehorse, Yukon
Y1A 3V1

Attn: Kelly Boutilier
Licencing Officer

Re: Intervention for Type B Water Licence Amendment Application QZ01-051, Expatriate Resources Ltd., Advanced Underground Exploration Program, Wolverine Property.

This intervention is submitted by the Government of Yukon (GY) and has been prepared by the Department of Environment in conjunction with the Department of Energy, Mines and Resources and the Executive Council Office, DAP Branch. The Government of Yukon is not intending to appear at a public hearing to make representations in connection with this matter, however reserves the right to participate should a hearing be convened by the Board. Comments are listed below for the Board's consideration.

A. Water Quality & Water Management Plan

The project is identified by the applicant as expected to produce acid rock drainage (ARD) and proposes measures to mitigate adverse effects. These include collection sumps, settling ponds, monitoring and water treatment. The Applicant proposes to meet CCME Guidelines (Canadian Council of Ministers of the Environment) for receiving waters as well as the Metal Mining Effluent Regulations (MMER) for discharge to the environment.

Recommendation

1. GY supports effluent standards recommended in Environment Canada's intervention, as standards prescribed for similar Yukon mining activities.

Rationale: As Environment Canada explains, MMER standards are the least stringent standards that can be applied to mining operations throughout Canada, however each jurisdiction may apply more stringent values. The effluent standards recommended in Environment Canada's intervention have been applied to Yukon mine sites and have been demonstrated to be achievable. These effluent standards are listed in the following table:

Recommended Effluent Standards

Arsenic	.05 mg/l
Cadmium	.02 mg/l
Copper	.20 mg/l
Lead	.20 mg/l
Nickel	.50 mg/l
Zinc	.50 mg/l
TSS	15 mg/l
Ammonia	2.50 mg/l
Selenium	.015 mg/l

Fish Bioassay: 96 hour LC₅₀ as per Environment Canada Method

2. The Licencee shall submit a detailed water management plan that shall include: (refer to Addendum 1, page 8 – Water Management Plan).

Rationale: Water use licence application QZ01-051 and accompanying materials contain only conceptual or preliminary methods and designs for water treatment and onsite works which cannot be finalized until field operations commence. Further details are therefore required by the regulatory authorities in order to adequately assess these concepts.

3. All drainage from the project must remain within the Go Creek/Money Creek system.

Rationale: The project location is at or near the height of land to both the Go Creek/Money Creek drainage and the Wolverine lake drainage. Unforeseen events such as winter glaciation or the blow-out of the portal plug may redirect portal flow away from treatment facilities and into the Wolverine lake system adversely affecting fish and other aquatic resources within the lake system. Such adverse effects would be more significant than effects to a small creek (Go Creek) and wetland system.

B. Acid Rock Drainage (ARD)

Part 3.2.6 identifies the amount of waste rock and ore to be extracted - 78,000 tonnes (32,500 m³) total: comprising 22,000 tonnes of ore, 3,000 tonnes of which will be taken for metallurgical test work and 56,000 tonnes of waste rock. Page 9 of the application, last paragraph states the majority of the waste rock has potential to generate acid drainage.

The Applicant proposes treatment by use of a water treatment plant and settling ponds and in the event a decision is made not to go into production, proposes construction of an engineered cover over acid generating material that is not backfilled into the portal.

Figure 2.12 of the November, 2004 'Wolverine Project Description Report', reference GLL 40-755 by Gartner Lee Ltd suggests a decision for a full scale mine would be made between January and April, 2006.

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The Applicant, however, proposes treatment both for 'long-term' and 'in perpetuity' as suggested in item 2 of their November 22, 2004 response, prepared by David Mchaina, to the Water Board letter dated November 15, 2004. Although GY realizes these are conceptual treatment plans that cannot be finalized without further onsite studies, **GY's position is that treatment in perpetuity is not desirable** and plans should be developed and implemented to treat ARD during normal courses of operations and closure.

Page 15 and 16 of this Mchaina document states the site could be placed in a state of 'temporary closure' and that 'permanent closure' would be a closure following any period of continuous temporary closure of five years. In other words potentially acid generating (PAG) waste rock could be left exposed to the elements for up to five years. Given that a permanent closure is defined in this document as only after five years of 'continuous temporary closures', further test mine works within a five year period could conceivably extend a temporary closure beyond five years.

Recommendation

4. The Licencee shall monitor water discharged from the portal, waste rock dump, ore stockpile and wash plant as per Schedule ___ of this licence and shall ensure all water discharged from the portal, waste rock dump, ore stockpile and wash plant is compliant with water quality standards as per Schedule ___ of this licence prior to release of waters to the receiving environment.

Rationale: GY supports the proposal for daily water quality and flow monitoring, given the unknowns of a new project. Given the ARD potential of waste rock and the ore body, drainage must be monitored and treated as required throughout the test program as well as during any care and maintenance time period following the test program.

C. Conceptual Designs, Final Plans and As Built Drawings

Addendum 1 describes plan outlines for water quality management, rock monitoring and testing, waste rock storage and closure. The Applicant outlines conceptual plans, however it is reasonable that regulatory authorities require final plans and as built drawings for onsite operations, complete with submission timelines.

Recommendation

5. Please refer to Addendum 1 for recommendations concerning requirement for plans.

Rationale: The Applicant has proposed industry standards for this project, however, further detailed onsite analysis must be conducted before finalizing plans. For example, the waste rock storage area should be engineered to ensure geotechnical and chemical stability, particularly in the foundation soils. Onsite geotechnical, geochemical and hydrological analysis should determine final plans from conceptual proposals, with as built drawings and reports submitted to the Board.

Figure 1a suggests drainage may be towards Wolverine Lake, although most topographic drainage should be to the Go Creek/Money Creek system. Assurance should be provided that drainage is directed only to Go Creek and cannot enter the Wolverine lake system. Drainage from a test program should be kept to one drainage and given the close proximity of drainage to Wolverine lake, ARD drainage to the lake may have more adverse effects on fish and other aquatic resources than the Go creek/Money creek system.

D. Temporary Closure, Care & Maintenance and Reclamation

It is difficult to determine from the application when to expect reclamation to take place. The application uses terms of a 'no-go' scenario for mine production, however does not address exactly when a no-go decision would be made. Other undefined timelines are temporary closure for the property, that may be several weeks or months (7.2) or could be up to five years and conceivably more; permanent closure, long-term treatment and treatment in perpetuity (November 22 Mchaina response to the Board).

Page 10 of the application describes the Applicant's plan for reclamation if a 'no-go' decision is made. The Applicant proposes back-filling the adit with ARD waste rock, flooding and plugging the opening, but provides for drainage, constructing a cover system over remaining ARD waste rock, and monitoring. Part 7 of the application, page 36 further elaborates on 'conceptual reclamation and closure.

As previously mentioned, a timeline in Figure 2.12 of the mine production project description cites a decision for mine production as early as 2006. Page 10 of the water use application, however, also refers to a 'no-go scenario' as 'negative development or deferral of development'. The issue therefore is, when would reclamation actually take place? The Applicant should answer this question upon completion of the underground exploration program.

Recommendation:

6. The Licencee shall submit a Care & Maintenance/Temporary Closure Plan within 60 days from the effective date of this licence and Final Closure Plan within eight (8) months of commencement of portal construction. Implementation of the final closure plan must commence within five years of the commencement of temporary closure and must substantially follow the schedule outlined in the plan.

Rationale: Addendum 1 provides recommendations for items included in a closure plan. The underground exploration program has conceptual designs, plans and mitigation, however expects to develop these after further onsite investigation. While the Applicant cannot provide complete answers to care and maintenance or closure plans without proven results from their underground exploration program, **GY's position is that a care and maintenance and closure plan with reclamation is required as part of this licence.** The recommended timelines provide sufficient time for the licencee to submit a plan for temporary closure after onsite investigation. Within eight months after commencement of portal construction, the licencee should have acquired sufficient knowledge in order to complete and submit a closure plan.

E. Security

Recommendation

7. Within 30 days of the effective date of this licence, the Licencee shall provide security for site reclamation in the total amount of \$64,000.00 in accordance with section 11(3) of the Regulations.

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Rationale: The advanced underground exploration program is to test an ore body for mining potential. The conceptual designs of earthworks, waste rock storage areas and mitigation measures appear not be finalized until onsite works begin.


There are uncertainties such as equipment availability after 2005/2006, conceptual designs for onsite works, proposal for water treatment in perpetuity, temporary closure for five or more years and available financial resources. The Yukon Water Board should ensure that the water use licence provides security to cover the cost total reclamation.

The Applicant suggests in Appendix A-1 of the application, part 1.0 Introduction, that the cost of water treatment would be a total of \$64,000.00 for initial capital costs and water treatment for one year. This is an initial security figure that would keep water quality in compliance for a one year period. Plans for closure or care and maintenance may require a reassessment of security.

F. Licence Expiry

Schedule 4 of the application does not have a recommended expiry date. GY suggests the licence has a ten year term.

A copy of this intervention has been forwarded to the Applicant, with an electronic copy forwarded to the Board via email. Also attached with this intervention and forwarded to the Applicant, is a copy the Department of Environment's response to the Department of Energy, Mines and Resources concerning terrestrial issues with the quartz mining licence amendment LQ00026.



Morris George
Environmental Assessment Analyst

encl.

cc. Expatriate Resources
Energy, Mines & Resources
ECO, DAP Branch

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ADDENDUM 1 – QZ01-051
PLANS AND DESIGNS TO BE SUBMITTED BY THE LICENSEE

Rock Storage Area

The Licensee shall provide a detailed design for a rock storage area as shown in preliminary design in figures 5, 6 and 7 of the application including but not necessarily limited to the following:

- Location
- Size and contained volume and tonnage
- Site assessment of the selected location including characterization of the foundation soils for permeability, presence or absence of permafrost and thaw stability of any permafrost (including the criteria used to establish thaw stability)
- Sections through the rock storage area clearly indicating side slopes, top contouring, cover material and thickness of all components.
- Details of base of rock storage area including permeability of base, use of liner and detailed specifications of liner, liner bedding and cover for liner
- Characterization of material proposed for use as a cover for the rock pile including geochemical stability, freeze thaw and slaking stability and compacted permeability
- Detailed specifications for all materials to be used in construction of the facility including details of compaction where appropriate
- Any appropriate QA/QC measures to be followed during construction
- Procedures for placement of rock on the pad including any plans for segregation of rock types based on ARD potential

A Professional Engineer licenced to practice in Yukon must seal the design and site assessment.

The licensee must submit detailed design and results of the site investigation by May 30, 2005 and shall construct the rock storage area in conformance with that design by June 30, 2005. Following completion of the rock storage area all rock waste must be placed on the pad. Any rock waste temporarily placed on the ground between commencement of underground operations and completion of the rock storage facility must be moved to the rock storage facility within 15 days of completion of the rock storage facility. For clarity, the Licencee is authorized to temporarily store rock from the underground excavation in the area shown on Figures 5 and 6 of the application, only until completion of the rock storage area. Storage may be directly on the ground, but the area must be cleaned up to the satisfaction of an Water Use Inspector when the rock is rehandled to the waste rock storage area.

Within 90 days of completion of construction of the rock storage facility the licensee shall submit as built drawings sealed by a Professional Engineer licensed to practice in Yukon. Upon completion of the underground program the licensee shall submit an updated as built report specifying the total amount of rock placed and providing an updated survey of the configuration of the facility

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Rock Monitoring and Testing Plan

The Licensee shall submit a detailed plan describing the procedures to be used for sampling and testing the geochemical characteristics of rocks encountered during underground excavation.

- Plans for the sampling of each rock type encountered including size and number of samples
- Plans for assessing the physical characteristics of each rock type including petrographic and hand specimen descriptions, mineralogical analysis, freeze thaw stability grain size characterization
- Plans for geochemical characterization of each rock type including whole rock and trace element chemistry
- Protocol for shake flask testing of each rock type
- Plans for assessing ARD/ML characteristics of the rock types including static and kinetic test protocols and test duration and plans for analysis of the test data
- If applicable, details of any proposed decision-making protocol involving segregation of rock materials in the rock storage area.

The plan must be submitted prior to commencement of underground excavation.

The licensee shall notify the Board forthwith of the commencement of underground operations. The Licensee shall notify the Board of completion of underground excavation and, separately if applicable, of cessation of dewatering operations.

Within 90 days of completion of the underground excavation the licensee shall submit an as built report with details of the final surveyed configuration of the workings showing all rock types encountered, structural observations and volume and tonnage of each rock type encountered.

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Water Management Plan

Within 60 days of the effective date of the licence the licensee shall submit a detailed water management plan that shall include but is not necessarily limited to:

- Reassessment of the site precipitation including consideration of Pelly Mountains Ecosystem precipitation and an appropriate correction for elevation of the site compared to monitored sites
- Assessment of daily precipitation for a mean annual, 1:20 and 1:100 year events
- Design for all ditches with typical cross sections and sizing for 1:50 year daily flood event
- Detailed site layout showing portal, path for portal discharge, shops, buildings, fuel tanks, generators, laydown areas, temporary and permanent rock storage areas, roads, ponds treatment areas and ditches
- Detailed designs for settling ponds and pre-settling ponds or holding ponds including location, sizing, side slopes, compaction specifications, material specifications including any liners to be used
- An assessment of the retention capacity of the ponds in terms of volume and retention time for various discharge rates
- Details of any water control structures such as gates, culverts or bypasses including operating procedures if relevant.
- Protocols for decisions related to water management activities including any tests to be used and turnaround time for results.
- Detailed design of water treatment plant as shown in application preliminary design
- Contingencies for expansion of treatment plant should quantities of water to be treated exceed expectations in the application
- Contingencies for modification of the treatment plant should water quality differ from substantially that predicted in the application, including consideration of treatment for arsenic and/or selenium
- Preliminary plan for handling any sludges produced by water treatment and a detailed plan for assessment of sludge stability

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Final Closure Plan

Eight months after commencement of underground operations the licensee shall submit a detailed Final Closure Plan for all site facilities which provides specific measures to be undertaken for stabilization and restoration of the appurtenant undertaking including but not necessarily limited to:

- All surface facilities and disturbances
- Final configuration of the rock storage pad and plan for return of waste rock underground
- Placement of material returned to underground and provisions for mixing pH modifying materials if applicable
- Handling of portal discharge
- Security of portal opening
- Settling and holding pond stability including any contained sludges
- Seepage and runoff collection system
- Provisions for ongoing water collection and treatment if needed to maintain discharge standards
- Monitoring of discharge, receiving environment and all physical structures remaining on site
- Maintenance of ponds, covers, ditches culverts etc
- An updated water quality model and assessment of impact of closed site
- A schedule for completion of closure measures described in the plan, including ongoing monitoring
- Cost estimate for a third party to complete the decommissioning and restoration measures included in the plan
- A proposal from the licensee for revision of financial security in light of the cost estimate and of any restoration work already completed by the licensee

Implementation of the final closure plan must commence within five years of the commencement of temporary closure and must substantially follow the schedule outlined in the plan.

Three years after notice of completion of underground excavation the licensee shall submit an updated Final Closure Plan that details and work completed to date and provides any necessary revisions to the remaining measures required for final closure.

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Temporary Closure Plan

Within 60 days of the effective date of the licence the licensee shall submit a temporary closure plan detailing all measures to be taken in the event of a temporary cessation of the appurtenant undertaking or after completion of underground excavation and prior to final closure.

The licensee shall notify the Board forthwith of any period of temporary closure. Temporary closure shall be deemed to have commenced upon notice of completion of underground excavation.

Interim Water Treatment

Within 30 days of the effective date of the licence the licensee shall submit a contingency plan for interim water treatment should water quality require treatment prior to completion of the water treatment plant described in the licence. The interim plan must detail all materials and chemicals to be on hand and provide procedures to implement the treatment system. The interim plan shall be consistent with the interim treatment described in the licence.

Updated Spill Contingency and Emergency Response Plan

The licensee shall submit an updated Spill Contingency and Emergency Response Plan within 15 days of the effective date of the licence

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