

Executive Summary

Rescan Environmental Services Ltd. was contracted by the Kitikmeot Inuit Association and Nunavut Tunngavik Inc. to conduct a technical review of the Tahera Diamond Corporation's application for a water license for the Jericho Diamond Mine.

Rescan made a total of 41 recommendations.

The more significant were:

- the water license should be renewed no more than 6 years after its effective date;
- the water surface of Carat Lake must not be allowed to fall below the lowest natural predevelopment water level;
- the Surveillance Network Program (SNP) should include two more water quality stations in the Contwoyto Watershed. Stations should be placed in Ash Lake and Key Lake, as well as in Lynne Lake;
- fish must be sampled at the Jericho Lake station (number SNP-13) so that the mine has a "farfield" fish station similar to the farfield stations for the other AEMP components, and the Jericho River station (SNP-14) should be sampled for all AEMP components, including fish;
- Tahera should conduct baseline toxicity tests on water of Long Lake, Lake C3 and Carat Lake prior to mine construction. Any effects observed in those tests can be factored out of tests on the PKCA effluent;
- discharge limits for the Jericho Mine must not be higher than those for any other diamond mine in Canada's north. Hence, Tahera's proposed limits for nitrite, total chromium, total nickel and total zinc should be lowered;
- Rescan recommends a pragmatic, empirical approach to discharging effluent from the PKCA. The discharge should be proportional to the flow measured continuously through the channel between Lake C3 and Carat Lake. At no time should the ratio of the natural flow to the PKCA discharge fall below the licensed flow. For example, if the minimum dilution factor is 10, then at no time should the PKCA discharge be greater than one-tenth the measured flow out of Lake C3. This will ensure that the effluent mixing zone is always upstream of the Lake C3 outlet;
- as a contingency measure to handle PKCA effluent that may have lower water quality than expected, Tahera must describe how it plans to construct and operate a water treatment plant at the western end of the PKCA;
- Tahera must describe the scientific rationale for the depths of overburden it plans to use for reclamation of the mine site;
- the reclamation budget must be revised to account for 20 years of monitoring while the pit lake fills, followed by years of water treatment while the pit lake flushes, plus the costs for maintenance of the Stream C1 diversion and for geotechnical inspections of dams, pit slopes and other structures; and
- the 10% contingency in the reclamation budget should be increased to 25% to account for the significant uncertainties in the final costs of mine closure.

Technical Review

The scope of the present water license application includes the potential extension of mine life through processing of kimberlite ore that is currently considered uneconomic. Increases in diamond prices and improvements in processing efficiency may convert this ore from a resource to a reserve. Potential extensions of mine life are one reason why this license should be renewed after 6 years (1 year of construction and 5 years of operation) (see Section 2.2).

2.2 Duration of Water License

Tahera has applied for a 10-year water license: 1 year for construction, 8 years of mine operation and 1 year for closure. Rescan agrees that Tahera should have one water license for Jericho, but recommends that it should be renewed 6 years after its effective date.

There are four reasons for this recommendation:

- ***rapid changes in the regulatory regime.*** Ten years without renewal is not appropriate for the fast pace of change in this industry. Diamond mining is a new business in Canada and little information on its environmental impacts are available from countries where diamond mining has been practised for decades (*e.g.*, South Africa and the former Soviet Union). Also, mining in the extreme conditions of Canada's sub-Arctic and Arctic regions places strains on mine operations that are unknown in other jurisdictions (*e.g.*, Australia). This meant there was little known about the physical and chemical properties of processed kimberlite effluent when the first Canadian diamond mines were being proposed. As a result, the regulatory regimes for the first diamond mines in Canada were based partly on precedence from metal mines rather than on empirical data. Now that empirical data are being collected from such diamond mines as EKATI and Diavik, there will undoubtedly be changes to the regulatory regime. A license renewal after 6 years will give the NWB an opportunity to evaluate the experience of Jericho and of other mines;

- ***modifications to the initial mine plan.*** Some aspects of the proposed mine plan may or may not be implemented depending on practical experience during construction and initial operation. Hence, the conditions under which the initial water license is granted may not be the same conditions under which the mine actually operates. An example are Ponds A, B and C, which are intended as water transfer bodies. According to Tahera, if the water quality of surface runoff meets water discharge criteria, then the three ponds will be built and their water will periodically be discharged over the tundra to Carat Lake, Lake C1 or the PKCA, depending on the proximity of a pond to a waterbody. In this case, the ponds will serve mainly as sedimentation ponds. However, if the water quality of surface runoff does not meet discharge criteria, then the ponds will not be built and surface runoff will be directed into the open pit where it will accumulate in the pit sump and then be pumped directly to the PKCA for storage and/or reclaim and eventual release into Stream C3. These two options may have significant effects on the expected water quality of the effluent discharged from the PKCA into Stream C3. For example, if surface runoff is discharged directly to receiving waterbodies, then it will not be available to dilute the concentration of contaminants in the PKCA. The result will be a decrease in the water quality of the PKCA effluent. A water license renewal after 6 years (or 5 years of operation) will enable the NWB to evaluate these modifications in mine design;

• ***comprehensive re-examination of environmental impacts***. Five years of operation will give the NWB (and intervenors such as KIA and NTI) an opportunity to conduct a full, comprehensive review of the history of water regulation on the Project site, and compare that review with the predictions of the EIS. The main advantage of a full technical review is that it will oblige Tahera, regulators and intervenors to apply more effort and resources. The result may be the identification of information or of links between phenomena that may not otherwise be caught by Tahera, regulators or intervenors; and

• ***incentive for Tahera to meet water license conditions***. After 5 years of operation, Tahera will still have an incentive to renew the water license because it will want access to the remaining 3 years worth of ore. Hence, license renewal should not occur later than 6 years after the effective date.

2.4.2 Receiving Environment Monitoring

2.4.2.2 SNP Station Locations

Tahera has proposed to monitor water quality of the receiving environment at 15 stations as part of its Surveillance Network Program (SNP) (Table 2.4-1). These stations do not provide adequate spatial coverage of the mine site because they do not include the two lakes in the Contwoyto Watershed – Ash Lake and Key Lake – that are closest to the PKCA and the waste dumps and which, therefore, are most likely to be impacted by water seeping from the PKCA and the waste dumps. Instead, Tahera proposes only to sample water quality in Lynne Lake, which is downstream of Key Lake. This does not provide sufficient early warning capacity.

Rescan recommends that the SNP station list be amended to include two additional water quality stations: one in Ash Lake (SNP-15) and one in Key Lake (SNP-16). The SNP station in Lynne Lake should be assigned the number SNP-17.