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Via Email

Re: NWB1JER0410/TR/H3 – Submission of Waste Rock Management Plan – Jericho Diamond Mine

On behalf of Environment Canada (EC), I have reviewed Part 1 of Tahera Diamond Corporation's (Tahera) Waste Rock Management Plan (Plan) for the Jericho Diamond Mine. This document summarizes waste rock and overburden disposal methods. The following specialist advice has been provided pursuant to Environment Canada's mandated responsibilities for the enforcement of the *Canadian Environmental Protection Act*, Section 36(3) of the *Fisheries Act,* the *Migratory Birds Convention Act*, and the *Species at Risk Act*.

The proponent intends to exploit 3.6 million tons of kimberlite reserves and resources (2.0 million tons of reserves and 1.6 million tons of resources) from the project area through an open pit mining operation. It is anticipated that the open pit will cover an area of 16 hectares, having a width of 400 m and length of 500 m. The waste rock has been shown to have low acid-generating and metal leaching potential and the overburden is a mixture of sand and gravel. These waste materials will be stockpiled in two separate dumps.

The waste dumps will not be lined. They will rest on bedrock foundations and their runoff will flow toward the open pit mine's sumps. Tahera may construct two separate ponds, one for each waste dump, to accommodate excessive precipitation runoff. Waste Dump Site 1 will store primarily waste rock and will not be employed until the third year of mining operations. This dump is anticipated is anticipated to have an area of 37.7 hectares and capability of holding 14 million tons of waste material. Waste Dump Site 2 will stockpile overburden and waste rock from the start of mining operations, having an area of 12.5 hectares and holding 2 million tons of waste material. The downstream slopes of the waste dumps are to have waste rock buttresses. A haul road will be constructed adjacent to the downstream toe (north side) of Waste Dump Site 2 to serve as a buttress.

Tahera has analyzed seepage that originates from a small development waste rock pile. The results reveal that dissolved metal concentrations are generally low with the exception of copper which exceeds the Canadian Council of Ministers of the Environment (CCME) guidelines. Testing has also shown that uranium levels surpass the CCME/Health Canada guidelines for drinking water. Extraction tests have indicated that enhanced leaching of uranium from granitic rocks was due to their mixing with kimberlite. Therefore, any waste rock that is inadvertently mixed with kimberlite will be segregated in a designated area in the center of the waste dump to

promote freezing. Sampling results of overburden discharge show that suspended sediments have low dissolved metal concentrations with slightly elevated aluminum and iron content. Ephemeral streams flow across the waste dump sites toward Carat Lake in spring and early summer, a natural water body north of the mine site.

The Plan states that the Jericho Diamond Mine is within a region of continuous permafrost. This conclusion was determined through an analysis of regional permafrost maps, site-specific thermal data, and monitoring results from the Lupin Mine. Gathered data suggests that permafrost reaches a depth of 450 m, except below large lakes. Mining operations are not expected to occur beyond a 300 m depth.

Environment Canada appreciates the opportunity to provide the Nunavut Water Board (NWB) with comments and recommendations regarding the Jericho Diamond Mine's Waste Rock Management Plan's design. The following areas of concern have been identified:

- The Plan states that waste rock dumps will maintain a "suitable buffer distance with the nearest large lake." Environment Canada recommends that the waste rock dumps be located such that runoff from the dumps cannot enter any waterbody, not just large lakes. Further, the Plan does not give any consideration to the siting of sumps and control ponds associated with the dumps. Waste rock sumps and associated sumps and control ponds shall be located above the high water mark of any water body and in such a manner that the contents cannot enter any water body frequented by fish.
- Section 3.3.4 of the Plan states that measures to control blasting residue and minimize suspended sediments are provided in the Explosives Management Plan. Environment Canada recommends that the Waste Rock Management Plan include contingency measures that can be implemented in the event that the control measures in the Explosives Plan are not as effective as predicted, and nitrogen and suspended sediments concentrations are elevated in seepage/runoff from the waste dump piles.
- Section 4.1 of the Plan makes reference to the creation of Pond A and Pond B only if the quantity of drainage from the waste dumps is significant. However, while the detailed design drawings submitted with the Plan include both ponds, they only indicate that the need for Pond B will be evaluated during the first year of operation and make mention of the timing for the creation of Pond A. Environment Canada requests clarification regarding the timing of the construction of these ponds, and what quantity of flow is required to trigger their construction.
- Section 4.1 of the Plan also indicates that drainage from Waste Dump Site 2 will be directed to a sump in the open pit. However, Section 5.3.2 of the Plan indicates that a haul road will be constructed adjacent to the downstream toe of Waste Dump Site 2 to act as a buttress. Environment Canada is unclear how any drainage will be directed to a sump in the open pit when a haul road will prevent direct access. Will a culvert or some similar access device be constructed?
- Section 5.2 of the Plan states that rock geochemistry will be confirmed through the weekly collection of samples during the construction period. Environment Canada requests confirmation that the results of these samples will be available to mine personnel in a timely manner to allow the results to be taken into consideration during rock placement.
- Section 5.3 of the Plan describes the construction methods of the waste dump piles. However, it is unclear as to whether the construction methods apply to both piles or only to Waste Dump Site 1. While the wording in the section refers to both waste dumps, the subheading 5.3.1 refers only to Waste Dump Site 1. Environment Canada requests clarification regarding whether both dump sites will follow the outlined construction

method. If not, information should be provided regarding the construction methodology for Waste Dump Site 2.

- The Plan should address whether global warming scenarios were taken into consideration for the design of the waste dumps, given that any visible sulphides or mixed granitic rock and kimberlite will be encapsulated below the active layer in the centre of the dump, where it is hoped they will remain frozen over time.
- Detailed design information regarding the construction of the haul road at the toe of Waste Dump Site 2 should be provided in the Plan.
- Section 7.0 should also address proposed monitoring of water quality in Ponds A and B. Environment Canada recommends that the water quality in Ponds A and B be monitored for the same parameters proposed for the annual seepage survey outlined in Section 7.4.
- Environment Canada recommends that the all water in sumps and Ponds A and B be tested for a full suite of parameters prior to any discharge to the environment. Erosion protection measures should be implemented at the discharge point to help prevent sedimentation of surrounding waterbodies.
- Tahera should ensure that project's Abandonment and Restoration Plan addresses post-closure monitoring of the waste dumps.

If there are any changes in the proposed project, EC should be notified, as further review may be necessary. Please do not hesitate to contact me if you have any questions or comments with regards to the foregoing at (867) 975-4631 or by email via david.abernethy@ec.gc.ca.

Regards,

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cc. Colette Spagnuolo, Environmental Assessment and Contaminated Sites Specialist