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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI

File: NWB1JER0410/H5

September 12th, 2006

By Fax: 1-416-777-1898

Greg Missal
Vice-President Nunavut Affairs
Tahera Diamond Corporation
130 Adelaide Street West, Suite 1900
Toronto, Ontario M5H 3P5

Subject: NWB review of the submitted TDC Waste Water Treatment Plant– Operation and Maintenance Manual (WWTP/OMM)

Dear Mr. Missal:

The Nunavut Water Board (NWB) requests further clarity on issues related to the Jericho Diamond Mine *Waste Water Treatment Plant* (**Part H, Item 5**). The following documents were consulted in reviewing the WWTP Design Amendment:

- *Jericho Mine Wastewater Treatment Plant – Operation and Maintenance Manual April 19, 2006* (received: April 25, 2006)

The NWB has retained the external expertise of Mr. Michael J. Whalley of Associated Engineering Alberta Limited (AE) to evaluate technical aspects of the presented manual. After a review of the above correspondence it has been determined that further clarity is needed. Please find below Mr. Whalley's review of the WWTP/OMM. Within Mr. Whalley's review the NWB has included highlighted bold text giving Tahera Diamond Corporation (TDC) direction in formulating a response.

Comments from the Review of Mr. Michael J. Whalley (AE) provided to the NWB

TECHNICAL OPINION OF THE OPERATIONS AND MAINTENANCE MANUAL

Due to the remote location of the facility it is important that the plant be well operated and maintained to avoid failures and fluctuations in the effluent quality. The Operations and Maintenance Manual will be one of the first resources to which an operator will turn for guiding information. It will also be an important tool for training of new wastewater treatment plant operators and an important means to ensure consistency and continuity of good operating and maintenance practices. When considering what information should be included in the manual, it is useful to think of the requirements of an operator new to the plant, confronted with an upset process or equipment failure. Will the manual provide him with the resources he needs to work through an operations crisis?

We recommend that the following additions or changes to the manual be incorporated before the manual is accepted.

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1. All relevant information should be incorporated into a single three ring, hard covered binder. This should include at least the following: Dillon's Operating and Maintenance Manual, P.J. Hannah's Operating and Maintenance Instructions, any relevant Tahera Standard Operating Procedures, all construction and vendor drawings, equipment manufacturer's data, contact information for suppliers of all equipment in the plant, lists of spare parts, lists of consumable items with identification numbers and sources of supply, control philosophy and operating procedures. The WWTP Design Plan – Addendum, January 30, 2006 could also be included to provide a more detailed process description. A master index should be prepared and sections provided with mylar tabs for easy location of information. **The NWB is in full agreement with Mr. Whalley's suggestion in this paragraph. The NWB requests that TDC re-submit the Manual as per Mr. Whalley's above advisement.**
2. Both a partial site plan and a process schematic drawing should be included in the manual. The partial site plan should show the sources of wastewater and all lift stations and collection piping. The process schematic should provide the reader with an overview of each element of the process and how they are interrelated. It should identify each piece of equipment in the system, preferably with an identification number. **The NWB requests that TDC include the partial plan and process schematic drawing in the Manual as suggested by Mr. Whalley.**
3. The Dillon O&M Manual does not contain a description of the control philosophy for the plant. It makes reference to four figures in the P.J. Hannah Operating Instructions but it is not clear whether these figures will provide a description of the control philosophy. If the operator is to effectively operate the plant he needs to understand how the designer intended it to be controlled. Despite committing in the WWTP Design Plan – Addendum, to providing meaningful discussion of the instrumentation and controls in the O&M document, Dillon has yet to do this. **The NWB requests detailed discussion on the control philosophy for the WWTP in the Manual in light of the above review.**
4. In Section 3.7 of the Dillon O&M Manual, it is clear that the PLC programming logic is not available. At a minimum, the O&M Manual should provide contact information to the company that prepared the PLC program. In the event that the programming needs to be changed or reloaded, the operator should have a contact. It is sometimes possible to make changes to the programming over a phone line. If this is possible, that should be discussed in the O&M Manual. **The NWB requests that the Manual contain the PLC programming logic information as suggested by Mr. Whalley.**
5. The O&M Manual should include a discussion of the power supply for the wastewater treatment plant and whether there is standby generation capability. A set of procedures should be provided for the operator to follow during and after a power failure. This could be added in Section 3.9 of the Dillon O&M Manual, Plant Upset Conditions. **The NWB requests that the TDC prepare a set of procedures for the power failure scenario and add them into the section of Plant Upset Conditions in light of Mr. Whalley's review.**

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6. Section 3.9, Upset Conditions should be expanded to handle items such as high water levels, failure of instruments, loss of building heat and several other non-routine conditions that may occur. The trouble shooting guides referred to in Section 3.9 are related to process upset conditions. Similar trouble shooting guides should be provided for each major piece of mechanical equipment to assist in diagnosing mechanical, electrical or instrumentation and controls problems. **The NWB is in full agreement with the review in this paragraph. The NWB requests that TDC provide trouble shooting guides for process upset conditions and major pieces of mechanical equipment in the Manual as per Mr. Whalley's above suggestion.**

In addition to the above, we comment on several less critical items that could improve the manual's usefulness.

7. In Section 3.8, Table 8: Process Monitoring provides a useful frame of reference to judge whether the process is operating within normal conditions. It would be helpful to provide guidance on what measures to take when conditions are observed to stray from the acceptable operating range.
8. In Section 3.8, Table 10: Plant Operations Monitoring – consider adding the date when UV lamps are installed and tracking the number of operating hours for the lamps. Also maintain a log for all mechanical repairs, parts replacement and recharging consumable items such as lubricants.
9. In Section 3.8, Table 10: Plant Operations Monitoring – add a line for volumes of grease pit contents collected and carried away for disposal.
10. In Section 3.9, Table 11 the upset condition of high fecal coliform could be included with appropriate remedial action.
11. In Section 4.0 include providing information to the Tahera Safety Officer after any emergency to assist in the preparation of an incident or accident report, as appropriate.

The NWB agrees with the above comments and requests that TDC address the items and provide relevant information in the Manual.

Further to Mr. Whalley's comments listed above the NWB requests clarity on the following points:

The Manual follows the Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories (1996) and covers vital issues (start-up, shut-down, upset conditions, and emergency response). However, the manual seems be too "thin" to provide the operator enough support to efficiently operate and maintain the wastewater treatment plant. Some points have to be clarified, and an "all-inclusive" manual is further required.

1. No drawings for plant layout and process design are provided in the manual submitted. Only references are given (design plan in 2005 and its addendum in 2006). The manual refers too often to the Operating and Maintenance Instructions (PJ Hannah), such as those in table 4, table 5, table 6, table 8 and

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table 11, but the PJ Hannah's instructions are not put in place as appendices. Does TDC believe, even if the PJ Hannah's instructions are annexed, relevant information such as start-up procedures, RBC shut-down procedures, plant operation, maintenance procedures, instrumentation and controls, and plant upset conditions, should be summarized in the body of the manual?

2. A monitoring program for influent, process and effluent is offered in the manual, but the sampling method, such as the sample amount, storage and handling, is absent in the manual. The NWB requests TDC to briefly describe sampling protocols within the Manual.
3. The manual mentions that total ammonia-N, total nitrate, total nitrite (page 12) and total phosphorous (page 9 and 12) could be determined using portable test kits. No recommendation is made for either on-site or off-site testing for these parameters, but "at Tahera's discretion". The NWB requests further clarity on "at Tahera's discretion", and the NWB would like to briefly understand what the portable test kits are, who supply them, and how they are used.
4. In Section 3.8.2, the manual mentions that the pH, DO and temperature can be measured by handheld meters, and the settleable solids concentration can be determined by Imhoff Cone, but no instructions are given or attached. The NWB requests that TDC make these instructions annexed in the Manual.
5. Because the monitoring results lag behind the operation if samples are sent to off-site lab for analysis, trouble shooting information for process control and upset conditions, based on eyeball observations of the appearance of influent and effluent, will be valuable to the operator. However, the manual does not present them. The NWB requests further discussion from TDC on this subject.
6. Does TDC have any plan for periodically reviewing the manual, in response to the regulatory change and equipment update?
7. There are two typing mistakes in the manual. "Appendix B" in Section 3.7 (page 8) should be "Appendix C", and "Appendix C" in Section 3.8.2 (page 11) should be "Appendix D",

The NWB requests that TDC provide further clarity on item 1, 3 and 6, and include necessary information and modifications required by the above items in the Manual.

The NWB is pleased to know that TDC is committed to resolving the technical concerns addressed in this letter. The NWB is looking forward to meeting TDC face-to-face in the near future to discuss.

In summary the NWB requests a formal response to each of the above stated points. Sufficient detail and an avoidance of ambiguity should be followed in submitting response materials to the listed provisions. If you require assistance whatsoever please feel free to contact the undersigned at (867) 360-6338 or tech4@nwb.nunavut.ca .

Sincerely,

Original signed by:

Zhong Liu
Technical Advisor

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cc. Michael J. Whalley (AE)
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