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Joe Murdock
Nunavut Water Board
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Re: JERICHO MINE WWTP OPERATIONS AND MAINTENANCE MANUAL REVIEW

Dear Mr. Murdock:

On June 28, 2006, the Nunavut Water Board commissioned Associated Engineering to provide a technical review of the materials filed for the Jericho Diamond Mine Wastewater Treatment Plant (WWTP) Operations and Management Plan. We have reviewed the following document prepared by Dillon Consulting Ltd. posted on the Nunavut file transfer website:

- Jericho Mine Wastewater Treatment Plant – Operations and Maintenance Manual (Tahera Diamond Corporation, April 19, 2006)

Our scope includes the following:

- Review the above information to provide a technical opinion of the Operations and Maintenance Manual;
- Review the above information to identify practices or conditions that may allow for release of untreated or partially treated wastes to "fresh waters". (We interpret this to mean surface waters beyond the Processed Kimberlite Containment Area or PKCA.)
- Make reference to the Jericho Wastewater Treatment Plant Design Plan – Addendum, January 30, 2006, submitted by Dillon Consulting Ltd. to ensure that the two Dillon documents present a consistent approach to operations and maintenance. Also refer to the intervention statement presented by Indian and Northern Affairs Canada on May 25, 2005 entitled "Jericho Waste Water Treatment Plant Design Plan"

This letter report summarizes Associated Engineering's findings.

1 TECHNICAL OPINION OF THE OPERATIONS AND MAINTENANCE MANUAL

The scope of an Operations and Maintenance Manual for a plant of this small capacity and limited longevity (approximately 10 years) would not be expected to be extensive. In general, the submission does cover many of the critical issues such as start up and shut down procedures, monitoring of the process,

responding to upset conditions and response to emergencies. However, we do suggest that certain additions and improvements should be made.

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.

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.
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.
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.
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.

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.
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.

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.

2 RELEASE OF WASTES TO FRESH WATERS

The wastewater treatment plant is located in the catchment area of Cell A of the processed kimberlite containment area. Therefore, in the worst case of a spill at the plant, the wastewater would flow over land to the PKCA or into the soil that would drain eventually to the PKCA. The minimum volume of the PKCA is shown to be 100,000 m3 or about 2200 times the design daily flow of wastewater. The PKCA can be considered a large, slow-rate polishing pond. In our opinion, the surface waters beyond the PKCA are not threatened by the activities of the wastewater treatment process, even with an occasional upset in the process, or spill of raw wastewater.

3 JERICHO MINE WASTEWATER TREATMENT PLANT DESIGN PLAN – ADDENDUM

For the most part the current O&M Manual by Dillon is in harmony with their Wastewater Treatment Plant Design Plan – Addendum, January 30, 2006.

As mentioned in section 1, item 3 above, the "additional discussion regarding instrumentation and control" for the plant that was promised in the Jericho Mine Wastewater Treatment Plant Design Plan – Addendum was not provided in the Operations and Maintenance Manual. Otherwise, the two documents are consistent.

4 INAC INTERVENTION STATEMENT

The following table provides a comment on some of the issues related to the "Operations and Management Plan" that INAC had raised in its intervention letter of May 25, 2005. We indicate in a few cases that information should be added to the Wastewater Treatment Plant Operations and Maintenance Manual in order to fully address INAC's concerns.

General Comments	Associated Engineering's Comments
1. Additional process performance expectations	The WWTP Design Plan - Addendum provides adequate information. Specifically Table 3 on page 5.
2. Residuals disposal practices, characteristics and volumes.	Requested information has been provided in the WWTP Design Plan - Addendum. The O&M Manual should contain specific descriptions of how the waste digested sludge and grease collected from grease traps will be disposed of.
3. WWTP effluent monitoring	Information is provided in Dillon's O&M Manual. This meets and exceeds our earlier recommendation for weekly effluent monitoring.

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Specific Comment	Associated Engineering's Comments
Impact of treatment efficiency operating at 50% of design.	Addressed in the WWTP Design Plan – Addendum.
Influent Temperature	Adequate information has been provided.
Chemical Dosing pump operation	We concur with the information provided in the WWTP Design Plan - Addendum. Phosphorus in the effluent may contribute to a license violation. The proposed Monitoring Plan for the effluent will show whether it is necessary to provide alum addition to reduce effluent phosphorus concentrations.
Sludge digestion and management procedures	More detailed information is required in the O&M Manual to describe how digested sludge will be disposed of.
Kitchen grease trap	Provide specifics of disposal procedures in the O&M Manual.
Contingency plan for process upset conditions.	Information provided (Addendum page 9) is a reasonable assessment. This information should be included in the O&M Manual under Section 3.9.
Wastewater plant effluent monitoring	Monitoring procedures outlined in the O&M Manual are adequate.

We trust that this is the information you need at this time. Please call should you require further assistance.

Yours truly,

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Senior Project Engineer

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Project Manager

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