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Nunavut Water Board File: NWB1JER0410/D8

Tahera Diamond Corporation
Jericho Project
P.O. Box 2341
Yellowknife, NT X1A 2P4

Attention: Mike Tanguay, Health Safety and Environment Manager

RE: NWB review of the submitted TDC WWTP Design Amendment

Dear Mr. Murdoch:

We have reviewed your July 25, 2006 letter providing your response to the WWTP Design Addendum and provide the following response to your requests for additional information:

"The NWB requests a brief response from TDC on organic loading on the first stage of the RBC in light of Mr. Watson's Review."

Operational data is now available for the plant. As comprehensive design data was unavailable from the plant manufacture, Dillon utilized a conservatively high estimate for design values for plant influent loadings during the design review of January 30, 2006. It is possible the plant manufacturers utilized similar figures in their design. Flowrates are approximately ½ of the design estimate. The actual maximum first stage and total loadings seen by the plant are on the order of 0.22 kg/m^2-d and 0.007 kg/m^2-d respectively. These values are in-line with Mr. Watson's recommended levels of 0.20 kg/m^2-day and 0.009 kg/m^2-day. Mr. Watson further notes that the TDC RBC's operating temperature of 13°C should permit the plant to work as predicted.

"The NWB requests detailed discussion from TDC on the UV disinfection system, fouling factor, and all other details contained in the above paragraph developed by Mr. Watson."

Mr. Watson recommended that the effective UV dosage should be on the order of 30 mJ/cm^2.

The UV disinfection system was supplied by Violetta Industries (VI). The specifications for the system indicate that, with 90% transmission, a dosage of 32 mJ/cm^2 would be achieved at a flow rate of 52 USPGM.

Mr. Watson identified that WWTP effluent from the Tahera RBC would have a transmissivity in the range of 60% to 70%, and that a fouling factor of 0.7 should also be applied.

Assuming a transmissivity of 60% to 70% and a fouling factor of 0.7, VI reported that a dosage of 32 mJ/cm^2 can be achieved at a flowrate of 31.2 USGPM.

The design average daily flowrate for the Tahera plant was 45.4 m3/day or 8.3 USGPM. Actual flowrates to the plant are approximately half of the design flow, and the maximum average daily flow for September was 4.6 USGPM.

Based upon the information provided by the manufacturer, a UV dosage in excess of 32 mJ/cm^2 is achievable at both the design and actual flowrates through the Tahera WWTP.

"The NWB requests detailed discussion on the adequacy of the specified DCL sludge stabilization in light the above review."

The sludge stabilization process was specified by the WWTP designer, PJ Hannah Equipment Sales Corp.

Digested sludge is disposed on the till dump. Drainage from the till dump is collected in the open pit sump, pumped to the east sump and then into the PKCA. Analytical results from a sludge sample are summarized in the following table:

Parameter	**Concentration**
Total Solids	14.2%
Total Fixed Solids	46.1%
Total Volatile Solids	53.9%

The analysis indicates that much of the volatile solids are not being digested. TDC will confirm that aeration levels and operational parameters such as retention time and decant frequency for the digestor are appropriate and will continue to monitor digestor performance, notwithstanding that sludge quality is not regulated in the licence.

Note that Dillon has had no involvement in the environmental assessment during the design phase of this mine, however we presume that sludge quality is not regulated because sludge quality is not of great concern to the overall mine operation given the small volume and intermittent generation frequency of the sludge stream, and the likely high dilution/assimilation capacity of the till dump and PKCA.

TDC is committed to monitor the discharge from the PKCA, and will make adjustments to their activities if licenced discharge levels are at risk of not being met.

"The NWB requests that TDC monitor WWTP effluent as per Mr. Watson's above advisement. TDC is to confirm and provide detail in how and when this will be accomplished."

Mr. Watson recommends that TDC monitor WWTP effluent quality by collecting weekly grab samples from the backwash holding tank and analyzing for the following parameters:

- Routine parameters (alkalinity, acidity, chloride, carbonate, bicarbonate, total hardness, hydroxide, sulphate, TSS, TDS, total organic carbon, total inorganic carbon, pH (field and laboratory) ORP (field), conductivity (field and lab), temperature (field) and turbidity;
- Total and dissolved ICP metals (24 or 32 metal scan);
- Nutrients (ammonia-N, nitrate-N, nitrite-N, total phosphorous and orthophosphate); and
- Biological (BOD and Faecal coliform).

Mr. Watson further recommends that Tahera compare the analytical results to the parameters in Table 3 of the Dillon Design Plan Addendum, and make adjustments as required.

Section 3.8.3 of the Jericho Mine Wastewater Treatment Plan Operations and Maintenance Manual (Dillon, April 2006) (Dillon O&M Manual) recommends an effluent sampling program that serves the dual purpose of providing information on plant operation as well as providing information on the loadings of regulated parameters to the PKCA.

The monitoring parameters were selected per the requirement of Part G(6)a.i. of the water licence, with additions from the parameter list in Part G(6)a. of the water licence. The additional parameters were selected after assessing potential impacts to the parameter concentration in the PKCA as a result of discharges from the WWTP. The monitoring program recommended by Dillon includes the following parameters:

- Total Ammonia-N;
- Total Nitrate-N;
- Total Nitrite-N;
- Total Phosphorous;
- TSS;
- pH;
- $cBOD_5$;
- Oil & Grease; and

- Faecal Coliforms.

Dillon proposes that the effluent monitoring program proposed in Table 9 of the Dillon O&M Manual is adequate for the purposes of monitoring compliance with the water licence. TDC feels that potential impacts to the receiving environment are adequately addressed by the Surveillance Network Program (SNP) as required under the water licence. The SNP has monitoring stations at all input locations to the PKCA as well as the output from the PKCA and down stream lakes.

Dillon agrees with Mr. Watson's recommendation regarding adjusting plant operation if effluent targets are not being met, and this recommendation is included in Section 3.8.3 of the Dillon O&M Manual.

"The NWB requests confirmation that no treatment is provided to effluent from the emulsion building floor drainage sump and requests detailed discussion into why TDC believes that treatment is not needed."

The floor drainage sump in the emulsion building has a volume of 16 m^3 and is pumped out monthly. The pump out is currently discharged to the till dump, but TDC's long-term plan is to discharge the pump out water to the Process water tank in the plant.

Drainage from the till dump is collected in the open pit sump, pumped to the east sump and then into the PKCA. The discharge from the emulsion sump is estimated to be 192 m^3/year. The discharge to the PKCA from the east sump is approximately 74,000 m^3/year and the plant process water discharge to the PKCA is 290,000 m^3/year. Water balance calculations indicate that the contribution from the Emulsion Sump discharge to nitrogen compound concentrations in the PKCA will not cause PKCA water quality to exceed the licence limits.

Analytical information for the PKCA pond water and PKCA discharge was reviewed for information on nitrogen compound concentrations. The following table summarizes the available analytical information:

Location	Date Range	Parameter	Maximum	Minimum	Mean
PKCA Pond Water	Feb 21/06 to Aug 9/06	Ammonia – N	5.8	0.03	1.94
		Nitrate – N	4.95	0.32	2.93
		Nitrite – N	0.18	<0.05	0.10
PKCA Discharge	June 19/06 to Sept 28/06	Ammonia – N	1.45	0.02	0.25
		Nitrate – N	7.40	<0.05	3.41
		Nitrite – N	0.19	<0.05	0.05
PKCA Discharge Licence Limits		Ammonia – N	12		6
		Nitrate – N	56		28
		Nitrite – N	5		2.5

Note: All parameter concentrations are reported in mg/L

The available data confirms that the concentrations of nitrogen compounds in the PKCA and in the PKCA discharge to Stream C3 are within the limits set in TDC's water licence.

TDC will continue to monitor nitrogen compound concentrations in the PKCA and in discharges from the PKCA and will take appropriate actions in the event that licence limits are at risk of being exceeded.

"TDC is to monitor WWTP influent and effluent Oil and Grease. How will the results of this program be reported to regulatory bodies and the NWB?"

Oil and grease is regulated at the discharge from the PKCA. Oil and grease is not regulated at the discharge from the WWTP. However, oil and grease is included in the suite of parameters analyzed bi-weekly in WWTP influent and weekly in WWTP effluent as the oil and grease concentration is an operational issue for the plant.

Regulatory monitoring and reporting of oil and grease concentration in the discharge from the PKCA is expected to provide sufficient protection for the receiving environment.

"The NWB understands ... to include additional components for phosphorous removal. TDC has stipulated that the additional components are for "future use if required". The NWB requests further discussion on why these additional components should not be required if TDC decides not to install phosphorous removal components. The NWB also requests detailed discussion, analysis and accompanying calculations identifying the mass loading phosphorous per unit time, phosphorous treatment removal efficiency and waste byproduct generated from alum addition. Furthermore the NWB requests further information on how waste generated from the phosphorous treatment process will be managed and disposed of at the Jericho Diamond Mine."

The phosphorous removal system is not installed at the TDC WWTP. Effluent analytical data from the plant shows phosphorous concentrations ranging from

0.42 mg/L to 20.8 mg/L. Most of the data is in the 10 mg/L to 15 mg/L range and concentrations from May to August of 2005 are on the order of 10 mg/L. As noted previously, the actual flowrate through the plant is approximately ½ of the design flowrate.

Analytical information for the PKCA pond water and PKCA discharge was reviewed for information on total phosphorous concentrations. The following table summarizes the available analytical information:

Location	Date Range	Parameter	Maximum	Minimum	Mean
PKCA Pond Water	Feb 21/06 to Aug 9/06	Total Phosphorous	0.19	<0.02	0.06
PKCA Discharge	June 19/06 to Sept 28/06	Total Phosphorous	0.071	<0.02	0.024
PKCA Discharge Licence Limits		Total Phosphorous	0.4		0.2

Note: All parameter concentrations are reported in mg/L

The available data indicates that the total phosphorous concentrations in the PKCA and in the PKCA discharge to Stream C3 are within the limits set in TDC's water licence.

TDC will continue to monitor total phosphorous concentrations in the PKCA and in discharges from the PKCA and will take appropriate actions in the event that licence limits are at risk of being exceeded.

"...Tahera will consider installing a WWTP bypass in spring 2006. The NWB requests further clarity into if this decision has been made and detailed discussion and reasoning involved in determining if the bypass is to be installed or not."

TDC is not planning to install a permanent bypass line in the plant. A temporary by-pass would be installed in the event that maintenance requirements require bypassing the WWTP on a temporary basis. The temporary line would discharge directly from the main lift station to the PKCA.

Yours sincerely,

Dillon Consulting Limited

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