Jericho Mine Wastewater Treatment Plant – Operations and Maintenance Manual
Tahera Diamond Corporation

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Submitted to:

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1.0 INTRODUCTION

This Operation and Maintenance (O&M) Manual was prepared for the Tahera Diamond Corporation to fulfil the requirements of Nunavut Water Board (NWB) Licence Number NWB1JER0410. Part H, Item 5 of the NWB licence states that:

> *The licensee shall (…), submit to the Board for approval an Operation and Management Plan for the Waste Water Treatment Plant, (…). The plan(s) shall be developed in accordance with Schedule H, Item 3.*

Schedule H, Item 3 refers, where applicable, to the Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories, (Diep Duong and Ron Kent, 1996).

PJ Hannah has prepared the Operating and Maintenance Instructions (PJ Hannah) for the plant. This present report, Jericho Mine Wastewater Treatment Plant – O&M Manual serves to expand upon the contents of the Operating and Maintenance Instructions (PJ Hannah) to meet the requirements of Schedule H, Item 3 of the NWB Licence.

Detailed information on the sizing and design of the plant is included in the Jericho Diamond Mine Waste Water Treatment Plant Design Plan (Tahera, April 2005) and the Jericho Mine Wastewater Treatment Design Plan – Addendum (Dillon, January 2006).

1.1. Site Setting

Benachee Resources Inc., a wholly owned subsidiary of Tahera, has constructed and operates the Jericho Diamond Project near the north end of Contwoyto Lake in Nunavut Territory (NT), 65°59’50” N Latitude, 111°28’30” W Longitude.

The Jericho Diamond Project lies within the region of continuous permafrost, and permafrost is estimated to extend to depths of approximately 540 m at the Jericho pipe. A mixture of dwarf shrubs, grasses, mosses, and lichens dominates the plant communities at the Jericho site and is typical of the Low Arctic biome. Monthly temperature data from the nearby Lupin mine shows mean highs on the order of 9°C in August and mean lows on the order of –29°C in January. Average hourly temperature data from the site shows a maximum temperature of approximately 30°C and minimum temperature of approximately –43°C.

The surface topography at the Jericho kimberlite pipe site is characterized by numerous lakes and many ephemeral streams interspersed among boulder fields, eskers, and bedrock outcrops. Surface geology is influenced by glacier activity and consists of a discontinuous, but locally thick blanket of gravelly silty sand till with many cobbles and boulders.

Baseline water quality monitoring at the property indicates that Lakes within the Jericho watershed are oligotrophic. The pH is neutral to slightly acidic with very low concentrations of total dissolved solids (7 to 18 mg/L) and little to no suspended solids (<1 to 4 mg/L). Water is very soft (hardness 3.4 to 12 mg/L--one outlier at 24 mg/L) and very low alkalinity (2.5 to 12 mg/L – one outlier at 23 mg/L). Other physical parameters and metals (dissolved and total) are also very low in concentration.

A rotating biological contactor (RBC) waste water treatment plant (WWTP) package system was installed at the mine site in the early construction phase, at the same time as the camp. It is housed in a stand alone, metal clad, insulated building located next to the accommodations complex at the mine site (refer to Figure 1). The WWTP is sized to service 200 people, and will be operated by site maintenance personnel.

Effluent from the WWTP is discharged to the Processed Kimberlite Containment Area (PKCA).

2.0 BACKGROUND

Potable water for the camp is supplied from Carat Lake. Water is pumped to raw water supply tanks located within the accommodations building, and chlorinated prior to distribution.

Wastewater is generated at the camp from the following sources:

- Laundry facilities.
- Washroom/shower facilities.
- Kitchen (equipped with grease trap).
- Two 1000 L sewage holding tanks: one located at the Emulsion building; and one in the process plant office trailers.

Raw wastewater from the camp accommodations complex is collected in a sump and fed to the WWTP using a level activated submersible solids grinding pump. Sewage flow rates and composition estimates are summarized in Tables 1 and 2 below. Derivation of the values reported in the tables is described in the Jericho Mine Wastewater Treatment Design Plan – Addendum (Dillon, January 2006).

Table 1: Theoretical Flowrates

Parameter	Value
Design Average Daily Flowrate (184 persons)	45.4 m^3/day
Theoretical Peak Hourly Flowrate	7.85 m^3/hr

Table 2: Estimated Wastewater Influent Composition

Parameter	Concentration
BOD_5	375 mg/L
Total Suspended Solids (TSS)	400 mg/L
Total Nitrogen	40 mg/L
Total Phosphorous	8 mg/L
Fats, oils, grease	150 mg/L
Faecal Coliform	1,000,000 to 10,000,000 units/100 mL
Wastewater Temperature	13^{o}C minimum

Wastewater treatment is provided by a RBC package plant, sized to treat wastewater generated by a 200 person camp. Actual camp maximum occupancy is on the order of 190 people however, camp occupancy will be on the order of 100 people during typical operation. Additional information on the sizing and design of the plant is included in the Jericho Diamond Mine Waste Water Treatment Plant Design Plan (Tahera, April 2005) and the Jericho Mine Wastewater Treatment Design Plan – Addendum (Dillon, January 2006).

3.0 OPERATION AND MAINTENANCE

This present document is a companion document to the Operating and Maintenance Instructions (PJ Hannah), which is available under separate cover. Procedures that are described in the PJ Hannah document are not repeated in the following sections, rather the appropriate sections in the PJ Hannah document are referenced.

3.1. Operations Personnel

The WWTP is operated by site maintenance personnel. Contact information for key individuals is summarized in Table 3.

Table 3: Operations Staff Contact Information

Position	Contact Number
Camp Utility Operator	780-644-9129
Facilities Technician	780-644-9129
Environment Department	780-644-9129
Mine Manager	780-644-9120

3.2. Process Components

The process consists of the following components:

- Collection Sump;
- Preaeration/equalization Tank;
- RBC;
- Final Clarifier;
- Tertiary Filter;
- UV Disinfection; and
- Aerobic Sludge Digestor.

These components are described in Jericho Diamond Mine Waste Water Treatment Plant Design Plan (Tahera, April 2005) and the Jericho Mine Wastewater Treatment Design Plan – Addendum (Dillon, January 2006). Section 1.2 of the

Operating and Maintenance Instructions (PJ Hannah) also provides a brief summary of each of the components. Note that the phosphorous removal system described in Section 1.2.11 of the Operating and Maintenance Instructions (PJ Hannah) is not included with the Tahera WWTP.

Drawings showing the plant layout and electrical schematics are included in Section 5 of the Operating and Maintenance Instructions (PJ Hannah).

3.3. Plant Start-up Procedures

Procedures for starting plant operation are described in the Operating and Maintenance Instructions (PJ Hannah), as summarized in Table 4.

Table 4: Start-up Procedures Cross Reference to Operating and Maintenance Instructions (PJ Hannah)

Operational Unit	Section
Preaeration/equalization Tank	1.3.1
RBC	1.3.2
Final Clarifier	1.3.3
Tertiary Filter	1.3.4
UV Disinfection	1.3.5

Recommended operational procedures for the Aerobic Digestor are provided in Section 1.4 of the Operating and Maintenance Instructions (PJ Hannah).

3.4. RBC Shut-down Procedures

Procedures for shutting down plant operation are described in the Operating and Maintenance Instructions (PJ Hannah), as summarized in Table 5.

Table 5: RBC Shut-down Procedures Cross Reference to Operating and Maintenance Instructions (PJ Hannah)

Procedure	Section
RBC Shut-down Procedure	1.3.7

3.5. Plant Operation

Operations tasks for the plant are divided into daily, weekly and monthly tasks and are described in Section 1.4 of the Operating and Maintenance Instructions (PJ Hannah).

Section 1.4 also includes detailed operating procedures for the Aerobic Digestors and the Final Clarifiers.

Effluent is gravity discharged to the PCKA when effluent levels in the Filter Backwash Feed tank reach a pre-determined level.

3.5.1. Sludge Recycle

A quantity of Digestor sludge is recycled to the Pre-aeration Tank from the Digestor on the recommendation of a third party consultant retained to assist with plant startup. The procedure is described in the Sewage Treatment Plant Maintenance Standard Operating Procedure (SOP) in Tahera's SOP manual.

The procedure consists of turning off the air to the digestor blowers, and pumping stirred sludge through the decant line to the Pre-aeration Tank. The stirred sludge is pumped for 2 to 5 minutes, until the solution runs clear, and the procedure results in a transfer of approximately 40 L of digestor sludge from the Digestor to the Pre-aeration tank at a frequency of approximately once per day.

No more than 100 L of sludge should be recycled to the Pre-aeration Tank on any one day; if possible, the volume should be added over the course of an entire operating day.

3.6. Plant Maintenance

A maintenance schedule for the plant is provided in Section 2 of the Operating and Maintenance Instructions (PJ Hannah) as summarized in Table 6.

Table 6: Maintenance Procedures Cross Reference to Operating and Maintenance Instructions (PJ Hannah)

Procedure	Section
Lubrication Schedule	2.1
RBC Bearing Change	2.2

In addition, Tahera has developed a maintenance check sheet covering daily, weekly, bi-weekly and monthly inspection and maintenance procedures. These procedures are also summarized in the Sewage Treatment Plant Maintenance SOP. Copies of the check sheet and SOP are included as Appendices A and B with this document.

3.7. Instrumentation and Controls

PJ Hannah provided information on the Tertiary Filter Control Panel Philosophy. A copy of this document is provided as Appendix B.

Refer to Figures 11494, 11494-1, 11494-2 and 11494-3 in Section 5 of the Operating and Maintenance Instructions (PJ Hannah). Note that PJ Hannah could not supply additional information on the PLC programming logic, so Dillon is unable to provide further commentary on the controls for the plant.

3.8. Monitoring

A monitoring program is required to assess compliance with permit discharge criteria and to keep track of operating conditions within the plant. A record of plant operating conditions should be maintained, and will be invaluable when troubleshooting or optimizing plant operation.

A recommended monitoring program is summarized in the following sections.

3.8.1. Influent Monitoring

Influent monitoring is required to track the quality of wastewater entering the process and records may be used to assist any troubleshooting that may be required. WWTP influent sample collection requirements are summarized in Table 7.

Table 7: WWTP Influent Sampling

Sample Frequency	Sample Location	Sample Parameters
Bi-weekly	Preaeration/equalization Tank	$cBOD_5$
		TSS
		Total Phosphorous
		Total Kjeldahl Nitrogen (TKN)
		Oil & Grease

The monitoring frequency may need to be increased if there are changes to plant loadings (i.e. increased camp occupancy) or if effluent quality targets are not being met.

The $cBOD_5$, TSS, TKN and Oil & Grease samples will need to be submitted to an off-site analytical lab for analysis. The Total Phosphorous analysis may be performed using a portable test kit or the samples may be sent to an off-site analytical laboratory for analysis at Tahera's discretion. Consult the manufacturer's instructions for proper analytical procedures if a test kit is used.

Samples should be collected as a composite over the operating day. Monitoring results are to be logged in the water quality database.

3.8.2. Process Monitoring

Selected process parameters should be monitored to provide information on plant operation. The process monitoring requirements are summarized in Table 8.

Table 8: Process Monitoring

Sample Frequency	Sample Location	Sample Parameters	Acceptable Range of Values	Reference
Daily	Main Collection Sump	Influent flowrate	max 45.5 m^3/day	PJ Hannah Dwg A1-K17550-10455
	Plant Discharge	Effluent flowrate	max 45.5 m^3/day	
	Preaeration/equalization Tank	pH	6.5 to 8.5	PJ Hannah O & M Instructions
		Dissolved Oxygen (DO)	>1.0 mg/L	Industry Standard
		Temperature	>13^oC	PJ Hannah O & M Instructions
		Settleable Solids	<400 mg/L	Dillon Design Plan Addendum
	RBC First Stage	pH	6.5 to 8.5	PJ Hannah O & M Instructions
		DO	<0.5 mg/L	PJ Hannah O & M Instructions
		Temperature	>13^oC	PJ Hannah O & M Instructions
	RBC Second Stage	pH	6.5 to 8.5	PJ Hannah O & M Instructions
		DO	>1.0 mg/L	PJ Hannah O & M Instructions
		Temperature	>13^oC	PJ Hannah O & M Instructions
	Secondary Clarifier	pH	6.5 to 8.5	PJ Hannah O & M Instructions
		DO	>1.0 mg/L	Industry Standard
		Temperature	>13^oC	PJ Hannah O & M Instructions
		Settleable Solids - Influent	<470 mg/L	Dillon Design Plan Addendum
		Settleable Solids - Effluent	<40 mg/L	Dillon Design Plan Addendum
	Aerobic Digestor	pH	6.5 to 8.5	PJ Hannah O & M Instructions
		DO	>1.0 mg/L	Industry Standard
		Temperature	>13^oC	PJ Hannah O & M Instructions
Weekly	Aerobic Digestor Sludge	Settleable Solids	20,000 to 30,000 mg/L	Industry Standard

In addition ensure decant water, transferred per the directions in Section 1.4 of the Operating and Maintenance Instructions (PJ Hannah), from the Digestor is "clear".

The pH, DO and Temperature measurements can be collected using handheld meters. Ensure the meters are calibrated according to manufacturer's specifications prior to use.

The Settleable Solids concentrations should be determined using an Imhoff Cone. Consult manufacturers instructions for information on using an Imhoff Cone.

The Settleable Solids analyses for the Digestor sludge has been specified for ease of completion in light of the site's remote location. These analyses should be supplemented with periodic analyses of VSS and TSS completed at an off-site analytical laboratory.

Sludge from a well operating Aerobic Digestor should contain on the order of 2 to 3% solids (~20,000 to 30,000 mg/L) to maximize the operating efficiency and effective holding capacity of the Digestor; and reduce the required frequency of sludge removal.

Daily monitoring results from Table 8 are to be recorded in the Daily Water Quality Measurements Form, and transferred to the water quality database on a monthly basis. A copy of the Daily Water Quality Measurements Form is included as Appendix C.

3.8.3. Effluent Monitoring

Effluent from the WWTP discharges to the PKCA, and effluent from the PKCA is discharged to Stream C3. WWTP effluent sampling requirements are the same as required by the Water Licence NWB1JER0410 and are summarized in Table 9.

Table 9: WWTP Effluent Sampling

Sample Frequency	Sample Location	Sample Parameters
Weekly	Plant Discharge	Total Ammonia-N
		Total Nitrate
		Total Nitrite
		Total Phosphorous
		TSS
		pH
		$cBOD_5$
		Oil & Grease
		Faecal coliforms

Effluent samples should be collected as a composite over one operating day. The TSS, $cBOD_5$, Oil & Grease and Faecal coliforms analysis will need to be completed by an off-site analytical laboratory. Total Ammonia-N, Total-Nitrate, Total Nitrite and Total Phosphorous could be determined using portable test kits or the samples may be sent to an off-site analytical laboratory for analysis at Tahera's discretion. Consult manufacturer's instructions for proper analytical procedures if test kits are used.

Monitoring results are to be recorded in the Operator's Log Book. Monitoring requirements for discharge from the PKCA (including diluted effluent from the WWTP) are identified in the Licence NWB1JER0410.

Refer to Section 4.6 of the Operating and Maintenance Instructions (PJ Hannah) in the event that effluent quality targets are not being met.

3.8.4. Additional Record Keeping

Table 10 summarizes additional operating information, in addition to the analytical monitoring, that should be maintained for the plant.

Table 10: Plant Operations Monitoring

Operation	Parameter
Filter Backwash	Backwash Frequency
	Backwash Duration
Secondary Clarifier	Sludge Removal Frequency
	Sludge Removal Duration
Sludge	Sludge Volume Disposed
	Sludge Solids Concentration
	Sludge Volume Recycled

3.9. Plant Upset Conditions

Potential plant upset conditions are described in Section 4 of the Operating and Maintenance Instructions (PJ Hannah) as summarized in Table 11.

Table 11: Plant Upset Conditions Cross Reference to Operating and Maintenance Instructions (PJ Hannah)

Condition	Section
Excess Sloughing of Biomass from RBC Media	4.1
High Influent BOD_5 Values	4.2
Poor Sludge Settleability	4.3
Change in Appearance of Biomass Colour	4.4

Section 4.5 of Operating and Maintenance Instructions (PJ Hannah) contains an abbreviated troubleshooting guide, which summarizes causes and potential solutions for the following process issues:

- Excess biomass sloughing;
- High influent BOD5 values;
- Sludge rising in clarifier;
- Offensive odours; and
- Change in colour of biomass.

Section 4.6 of Operating and Maintenance Instructions (PJ Hannah) contains a short pullout Plant Operation and Troubleshooting Guide. The guide contains additional information on the potential causes and potential solutions for the following process issues:

- Odours;
- Decrease in treatment efficiency - high effluent BOD_5, nutrient or suspended solids concentrations;
- Excessively thick and/or unhealthy looking biomass on the rotor;
- Excessive sloughing or loss of biological growth from the media; and
- Development of white biomass.

4.0 EMERGENCY RESPONSE

Conditions at the plant that could trigger an emergency response include the following:

- Accident;
- Tank Rupture/Spill; and
- Fire.

The appropriate response to each of these conditions is described in the following sections.

4.1. Accident

In the event of an accident, complete the following actions:

1. Be alert, consider your safety first;
2. Alert camp emergency personnel – BROADCAST THE EMERGENCY ON EMERGENCY CHANNEL 1;
3. Identify the cause of the accident;
4. Assess fire and safety hazards; and
5. Attend to the injured person according to standard first aid principles.

4.2. Tank Rupture/Spill

In the event of a tank rupture/spill, complete the following actions:

1. Be alert, consider your safety first;
2. Alert camp emergency personnel – BROADCAST THE EMERGENCY ON EMERGENCY CHANNEL 1;
3. Identify the cause of the spill;
4. Assess fire and safety hazards;
5. Attend to any injured personnel;
6. Secure the area of the spill; and
7. Take appropriate measures to stop and contain the spill.

4.3. Fire

In the event of a fire, complete the following actions:

1. Be alert, consider you safety first;
2. Alert camp emergency personnel – BROADCAST THE EMERGENCY ON EMERGENCY CHANNEL 1;
3. After camp emergency personnel have been notified, do what you can to either put out or contain any fires. Do this only if it is safe to proceed; otherwise, clear the area and wait for the emergency personnel; and
4. Only attempt to extinguish fires if you have the proper training, PPE and fire suppression equipment.

Electrical Fires

Before attempting to extinguish any electrical fires the following conditions should be met:

1. Electrical Personnel, if available, are alerted to the problem.
2. All power is isolated to the plant.
3. You have received proper training in the fighting of Electrical Fires and the use of fire extinguishers.
4. Do not enter site alone.
5. A self-contained breathing apparatus must be worn.

5.0 REFERENCES

Dillon Consulting Limited, 2006. *Jericho Mine Wastewater Treatment Plant Design Plan- Addendum*, January 2006.

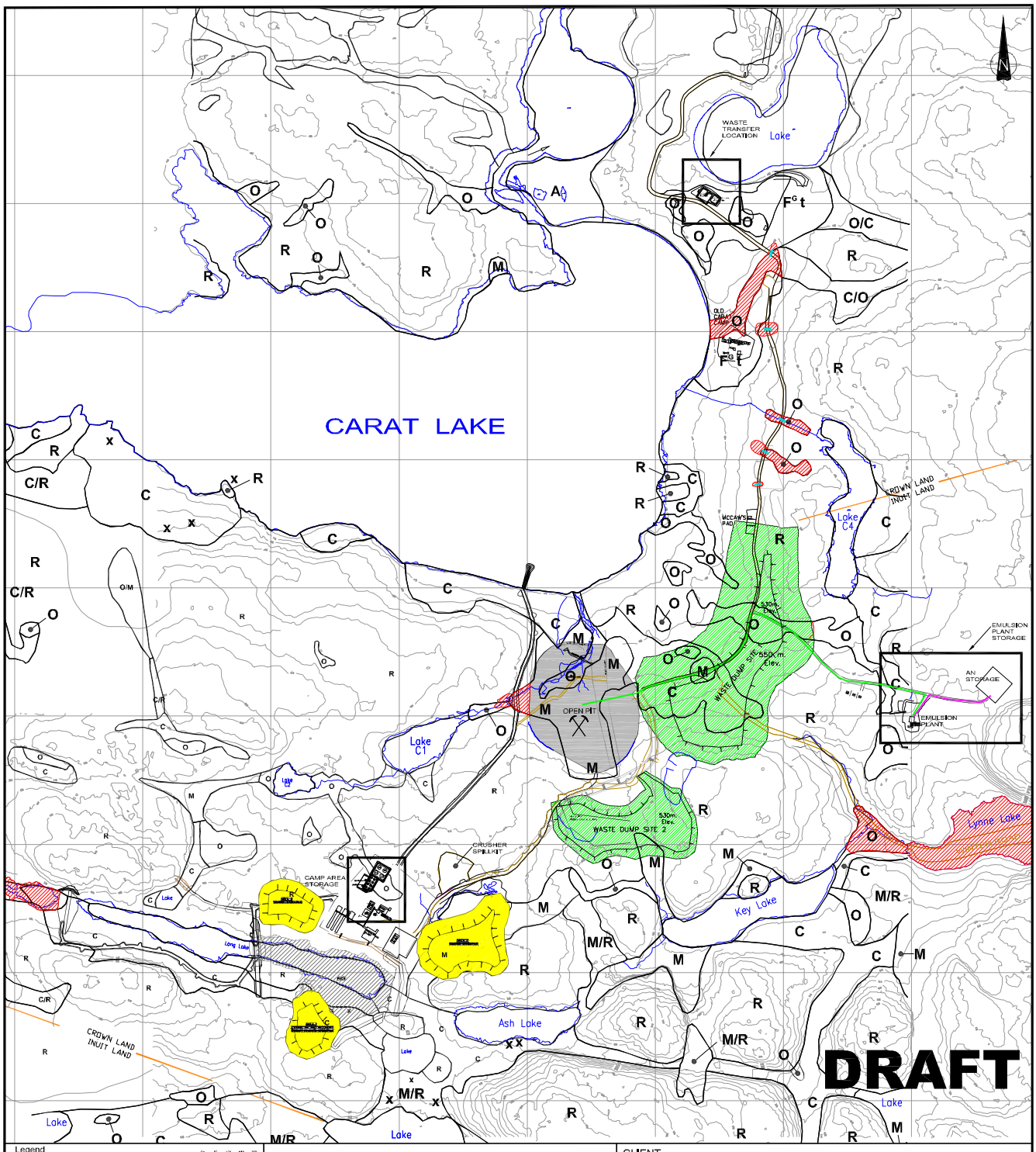
P.J. Hannah Equipment Sales Corp. *P.J. Hannah Rotating Biological Contractor (RBC) Operating and Maintenance Instructions for P.J. Hannah RBC Model DS10H BFP for 200 Man Camp Wastewater Treatment,* Serial Number K17550.

Tahera Diamond Corporation, 2005. *Jericho Diamond Mine Waste Water Treatment Plant Design Plan, Revision No. 2,* April 2005.

Tahera Corporation, 2003. *Jericho Project, Baseline Summary Report,* January 12, 2003.

Water Pollution Control Federation, 1976. *Operation of Wastewater Treatment Plants, A Manual of Practice, MOP/11,* Lancaster Press, Inc., Lancaster, Pa.

Figure 1:
Site Map (AMEC "Environmental Site Map" Figure No.1)



Legend

Quaternary Holocene Deposits
A. River and creek deposits.
C. Colluvium.
D. Organic deposits.
F. Quaternary Pleistocene Deposits

Fluvioglacial sediment.
M. Till, silt, sand, gravel, cobbles and boulders.

Pre-Cambrian Bedrock.
R. Undifferentiated metamorphic and volcanic bedrock.

- Spill Sensitive Area
- Stockpile
- AN truck route
- Explosives truck route
- Culvert
- Waste Dump
- PKCA
- Open Pit

NOTE:
Base map provided by Tahera. Stockpiles and PKCA boundary provided by SRK Consulting.

AMEC Earth & Environmental

2227 Douglas Road, Burnaby, B.C. V5C 5A9
Tel. (604) 294-3811 Fax. (604) 294-4664

CLIENT

PROJECT: JERICHO DIAMOND PROJECT

TITLE: ENVIRONMENTAL SITE MAP

DWN BY:	DATUM:	DATE:
BWS	NAD27	JANUARY 2006
CHK'D BY:	REV. NO.:	PROJECT NO:
BO	A	VE51295
PROJECTION:	SCALE:	FIGURE No.
UTM Zone 12	AS SHOWN	FIGURE 1

C:\DOCUME~1\ADMINI~1\LOCALS~1\Temp\Jericho_EnvSiteMap.dwg - Environmental Site Map - Jan. 16, 2006 11:33am - Administrator

Appendix A:
Tahera Inspection and Maintenance Checksheet

TAHERA
DIAMOND CORPORATION

Sewage Treatment and Lift Station Maintenance Sheet

Date:_____

Daily Maintenance	Completed	Comments
Read and record flow meter		
Perform settling test		
Turn off Air Pumps		
High Pressure Wash		
Squeegee tanks		
Collect grease		
Return sludge to equalization tank		
Add Bio-soil additive (58g to aeration tank)		
Measure DO and pH and Temp		
Measure Settleable Solids on Plant Influent and Clarifier Influent and Effluent		
Backwash pump operation		
Filter feed pump operation		
Aeration Pump 1		
Aeration Pump 2		
D wing Lift Station		
E wing Lift Station		
F wing Lift Station		
Laundry Lift Station		
Kitchen Lift Station		
Main Lift Station		
Weekly Maintenance		
Grease wheels on RBC		
Collect water Sample STP effluent		
Settleable Solids Test on Aerobic Digestor Sludge		
Remove grease kitchen lift station		
Remove 2 feet of volume from sludge tank		
Bi-weekly Maintenance		
Collect Water Sample STP influent		
Monthly Maintenance		
Remove grease D wing Lift Station		
Remove grease E wing Lift Station		
Remove grease F wing Lift Station		
Remove grease Laundry Lift Station		
Remove grease Kitchen Lift Station		
Remove grease Main Lift Station		

General Comments:

_____

_____

Notes:

- Any problems with the Sewage Treatment Plant or lift stations should be reported to the Mine Operations Manager immediately
- Record any alarms in the General Cmments section

Appendix B:
Sewage Treatment Plant Maintenance Standard Operating Procedure

TAHERA DIAMOND CORPORATION	Sewage Treatment Plant Maintenance		
Owner: Camp Utility Operators	**Approver:** Environment Department	**Issue Number:** 1.0	**Creation Date: August 1, 2005** **Revision Date:**

1. Objectives

This procedure is in place to provide the Camp Utility Operators with a comprehensive procedure for ensuring efficient operation of the Sewage Treatment Plant and associated infrastructure.

2. Scope

This procedure applies to the Sewage Treatment Plant as well as the six lift stations associated with the camp.

3. Definitions

RBC-Rotating Biological Contactor
STP-Sewage Treatment Plant

4. General Procedures

Daily Maintenance:
Sewage Treatment Plant

- Read and record effluent flow meter
- Perform settling test
- Turn off aeration pumps
- High pressure wash sides of tanks to remove buildup. (DO NOT WASH THE RBC)
- Squeegee all tanks except the equalization tank
- Skim grease from the surface of the tanks to remove any grease balls. Collect this waste in a garbage bag for disposal at the incinerators.
- Open the flow valve on the sludge tank return line, close the aeration valve feed line to the aeration tank, turn on the air pumps to transfer sludge back to the equalization tank.
- Monitor the sludge return line in the back right hand corner of the equalization tank. When the discharge changes from opaque to a lighter color close the sludge line return valve.
- Check operation of all pumps in the STP by switching them to manual.
- Add 58 g of Bio-Soil Additive wetted in 2L of warm water to the aeration tank
- Measure pH, Dissolved Oxygen and temperature from-equalization tank, RBC 1st stage, RBC 2nd stage, Clarifier, Aerobic digestor and record on the water quality measurements form.
- Measure Settleable Solids of Plant Influent and Clarifier Influent and Effluent

Lift Stations

- Check all lift stations (6 lift stations) for pump operation and grease build up.

Weekly Maintenance:
Sewage Treatment Plant

- Grease wheels on RBC (2 locations at either end of the RBC. Turn off the RBC drive motor prior to greasing.
- Collect Water samples for BOD, FC, TSS, Oil & Grease, Nitrate and Nitrite, Total Phosphorus, Total Ammonia and Total Alkalinity from the sample spigot after the UV disinfection.
- Measure Settleable Solids of the Aerobic Digestor Sludge.
- Remove 2 feet of sludge from the sludge tank and dispose of at the till dump.

Lift Stations

- Vacuum out grease from kitchen lift station and wash down sides of the tank with a high pressure washer.

Bi-weekly Maintenance:
Sewage Treatment Plant

- Collect Water samples for BOD, TSS, Total Phosphorous, Total Kjeldahl Nitrogen and Oil & Grease from the plant influent.

Monthly Maintenance:
Lift Stations

- Vacuum out grease from lift stations and wash down sides of the tanks with a high pressure washer.

5. Records

Maintenance Check Sheet
STP Daily Water Quality Measurement Form

Appendix C:
PJ Hannah Tertiary Filter
Control Panel Philosophy

P.J.HANNAH EQUIPMENT SALES CORP.

UNIT #10, 8528-123RD STREET
SURREY, B.C. V3W 3V6
TEL: 604-591-5999
Toll Free: 800-663-6793
FAX: 604-591-9925
EMAIL: mail@pjhannah.com
www.pjhannah.com

UNIT #9, 151 BRUNEL ROAD
MISSISSAUGA, ONTARIO L4Z 2H6
TEL: 905-712-0620
Toll Free: 800-353-3087
FAX: 905-712-1240
EMAIL: mail@pjhannah.com
www.pjhannah.com

Please reply to above address

ENVIRONMENTAL AND INDUSTRIAL EQUIPMENT MANUFACTURERS AND SUPPLIERS SINCE 1973

TERTIARY FILTER

CONTROL PANEL DESIGN PHILOSOPHY

The filter feed pump (dosing pump) draws water which has to be filtered from the feed tank. It passes this water through the automatic backwash filter and out of the discharge in to the backwash pump feed tank.

This filter feed pump is turned on and off by a differential float switch. There is a delay timer in the control panel which delays the starting of the filter feed pump by 30 seconds. This is to let the filter media re-settle after backwashing.

In the filter feed tank is a float switch which operates a high water alarm in the control panel if the filter feed pump fails. This high water alarm is auto reset and only indicates an alarm condition.

If the filter feed pump fails, the water will bypass the filter and flow by gravity in to the discharge tank (backwash pump feed tank) if it is piped and plumbed per our drawings.

On the filter tank is a pressure differential switch. The “main” pressure on the switch should be set at 22 psi. The “differential” pressure should be set at 12 psi. When the filter tank reaches a predetermined level (approximately 22 psi) the switch makes an electrical contact which does the following:

- Turns on the compressor.
- Energizes the solenoid valve.
- Turns on the backwash pump (note the pump is interlocked so the filter feed pump cannot run when the backwash pump is running).

In the control panel is a timer for the backwash pump. It is normally set to operate the backwash pump for approximately two minutes.

If the backwash pump empties the backwash pump feed tank before the two minutes on the timer expires then a safety float switch will turn off the backwash pump to prevent it running dry. This float switch is auto reset and does not indicate an alarm condition.

When the air compressor starts to operate it pressurizes the two hydraulic flow control valves which switch the filter feed pump valve from normally closed to normally open. It also switches the backwash pump valve from normally open to normally closed.

The air compressor runs for the same time period as the backwash pump as it is connected to the same timer.

When the air compressor and backwash pump stop running the hydraulic automatic valves return to their original position and the filter is now ready to continue its normal filtering cycle.

END

Appendix D:
Daily Water Quality Measurements Form

STP Daily Water Quality Measurements

		Equalization Tank				RBC 1^{st} Stage			RBC 2^{nd} Stage			Clarifier					Digestor		
Date	Time	Settleable Solids (mg/L)	pH	DO (mg/L)	Temp. °C	pH	DO (mg/L)	Temp. °C	pH	DO (mg/L)	Temp. °C	Influent Settleable Solids (mg/L)	Effluent Settleable Solids (mg/L)	pH	DO (mg/L)	Temp. °C	pH	DO (mg/L)	Temp. °C