BRITANNIA MINES WATER TREATMENT PLANT

OPERATIONS & MAINTENANCE MANUAL

EXECUTIVE SUMMARY

1. Introduction

The Province of British Columbia put forward a request for proposal in the fall of 2004 to construct a water treatment plant at the Britannia Mine to address acid rock drainage (ARD) runoff into Howe Sound from 70 years of mining operation at the mine. A significant amount of preliminary work by Golder and SRK had been completed and construction of a water treatment plant for removal of metals and pH conditioning was recommended. This environmental initiative of constructing a water treatment plant is being undertaken through a Public-Private Partnership (P3) method of project delivery.

The EPCOR Team is constructing a high density lime sludge water treatment plant to treat the metal contaminated mine water and ground water at a combined design flow rate of 25 ML/d (1050 m^3/h) to be located at the 4150 Level. The project also includes a groundwater pump station to pump contaminated ARD from the Britannia creek fan area to the plant, an energy recovery facility, and a new effluent discharge line and an outfall into Howe Sound. The project encompasses the construction of all associated site works including power, communications, site grading, drainage, water and sewer service connections, security and landscaping. The project also has provision for water bypass with pH adjustment for high inflow conditions exceeding the plant throughput capacity.

A schematic of the treatment process is provided as Figure 1.

2. Approvals and Environment

The operation of the water treatment plant will meet the following approvals and licenses:

2.1 License To Occupy Crown Land – Land And Water BC

The Ministry of Agriculture and Lands (MAL) as owner of the site within the Project Agreement has provided the Operator with Operation Licenses for the plant operations. This permit allows the occupier the right to occupy crown land.

These licenses include a license to utilize the water treatment plant site. In addition, the license provides use of the Jane Basin access road, which is used, for sludge hauling for disposal in Jane Basin. The Licenses also include the use of the Mine Workings to regulate inflows to provide a steady flow of the mine workings, the 4100 Adit and Plug, and the use of the outfall.

2.2 Discharge Permit from the British Columbia Ministry of the Environment

The BC Ministry of Environment is the Waste Management Act Regulator for the Britannia Mine Site. The Ministry of the Environment thus serves as the regulator for the permit for the water treatment plant discharge.

2.2.1 Water quality

The Discharge Permit was issued on December 17, 2004 for the discharge from the Britannia Mine Water Treatment Plant.

The permit authorizes the discharge from a High Density Sludge Water Treatment Plant of a maximum of 25,200 m^3/day (an average of 1050 m^3/hr). Subject to peak flow mitigation procedures as detailed in the Reservoir Management Plan (Section 11.1), periodically a maximum flow of 33,600 m^3/day (or an average of 1400 m^3/hr) shall be authorized.

The allowable limits on the parameters for the water quality of the effluent of the water treatment plant will not exceed the following concentration limit. In addition, the preferred water quality level guidelines are provided in Operational Performance Requirements of the Project Agreement (Schedule F) from the Ministry of Agriculture and Lands. If water quality effluent guidelines are maintained at this level on an average annual basis, there is bonus addition to the Periodic Payment.

Permit Requirements:

Parameter	Limit
Dissolved copper	≤ 0.1 mg/L
Dissolved iron	≤ 0.1 mg/L
Dissolved zinc	≤0.2 mg/L
Dissolved aluminum	≤1 mg/L
Dissolved manganese	≤0.4 mg/L
Dissolved cadmium	≤0.01 mg/L
Total Suspended Solids	≤30 mg/L
pH range	6.5 to 9.5
96HR LC50 fish bioassay	≥100% (non-acutely toxic)

The water quality from the groundwater, treated water, and mine water will be monitored on a weekly basis. In addition, discharge monitoring will be performed continuously. All pertinent water parameters will be available continuously in real time through password protected online systems on the World Wide Web to the Province's Operations Representative and the Regulatory Authorities.

The release of untreated mine water is prevented except in accordance with the emergency conditions of the Permit.

2.2.2 Plant Bypasses

The discharge of untreated water is prohibited except where the discharge occurs under:

a) Conditions of an emergency and in accordance with the emergency provisions of the approved emergency response plan within the operations manual and/or
b) Written authorization of the Director of Waste Management.

2.2.3 Emergency Conditions

In the event of emergency conditions, for example, water rising at a rapid rate in the mine reservoir such that it could exceed the 3250 level, the permit may be suspended for brief periods of time during the emergency, or as issued by the Director provided that:

(a) Due Diligence is exercised in the process, operation, or event that resulted in the emergency and the emergency occurred not withstanding the due diligence
(b) The Director of Waste Management is notified of the emergency and of contingency actions invoked or planned to mitigate adverse impacts and restore compliance.
(c) Due diligence is exercised in restoring compliance.

The Director may, notwithstanding (a), (b), or (c), specify contingency actions to protect human health and the environment while standard operating procedures and/or authorized works are being restored.

2.3 Operating Performance Requirements for the Project Agreement

Operating performance requirements are established in Schedule F in the Project Agreement between EPCOR and the Ministry of Agriculture and Lands.

This agreement defines the performance, measurement requirements, and operational performance requirements of the Operator and the operational relationship with the Ministry of Agriculture and Lands, the owner of the infrastructure.

This operational relationship defines the responsibilities of the operator with regard to measurement of volumes, physical, and chemical parameters, pH, and water treatment plant effluent.

2.4 Jane Basin Disposal Permit

The Jane Basin disposal permit authorizes the disposal of metal contaminated soil, water treatment plant sludge, and rock in Jane Basin as part of the Britannia Mine Remediation Project. The amended permit was issued on July 4, 2005 by the BC Ministry of the Environment. The permit authorizes the disposal of 60,000 m^3 of water treatment plant

sludge in the Glory Holes at Jane Basin over a 20-year period from January 2006 to December 31, 2006.

Jane Basin was considered to be suitable disposal site for the water treatment plant sludge disposal as the metal contaminated water will drain into the workings of the mine where the water will be treated at the 4,100 level plug by the water treatment plant. This drainage into the mine workings will have a very negligible effect on the water at the 4,100 level entering the water treatment plant.

As part of the permit, because of the limited storage at Jane Basin, an annual report during the plant operations will be prepared to examine alternative uses and recycling possibilities for the water treatment plant sludge.

2.5 Permits from the Ministry of Energy and Mines

The Ministry of Energy and Mines authorizes the storage of acid drainage and the transportation and disposal of sludge.

An application is currently being made to the Ministry of Energy and Mines to permit the storage of acid rock drainage and is expected in October 2005. The Britannia Mine site as a mine site is under the jurisdiction of the Ministry of Energy and Mines.

3. Safety, Security, and Emergency

Full details of operating procedures and safety measures to be observed are contained within the Operation and Maintenance Manual under the following headings:

3.1 Confined Space
3.2 Lockout/tagout
3.3 Hotwork
3.4 Working Alone
3.5 Safework plans

4. Chemical Feed Systems

4.1 Slaked Slime Feeding System

The Lime Slaking Package for the Britannia Mine AMD Water Treatment Plant is designed to provide bulk storage of quicklime (CaO) and the equipment necessary for slaking the lime to produce lime slurry. Quicklime is supplied to site in self-unloading bulk trucks which is then pneumatically conveyed into the silo with the blower mounted on the bulk truck. A silo vent filter is supplied to prevent lime dust from escaping into the atmosphere.

From the silo, a rotary valve feeds quicklime into one of two volumetric feeder hoppers by way of a diverter valve. A bin activator and aeration pads in the silo operate while the

silo is discharging to promote the flow of the lime from the silo. Quicklime is metered from the volumetric feeder into screw conveyors which transport the quicklime into the lime slakers.

In the lime slakers, quicklime is mixed with water in order to slake the quicklime to produce hydrated lime ($CaOH_2$). The water to lime ratio is controlled based on the thickness or consistency of the lime paste as determined by the power draw on the mixing motor.

Reacted lime paste overflows the mixing chamber with the aid of spray jets into the grit separator. The slurry is further diluted at the grit separator. Heavy, oversized particles fall to the bottom of the separator and are removed with an inclined auger for disposal. Light particles overflow from the separator and flow into the lime storage tank. A venturi-type dust & vapour arrestor is located in the slaking chamber to remove dust and vapour from the vented air stream. An exhaust fan runs at all times to assist with venting of the slaker and to maintain a slight negative pressure in the slaker.

4.2 Polymer

Polymer is dosed into the clarifier to aid and enhance flocculation. There is also provision for additional polymer to be dosed to the Sludge Press to increase the efficiency of the dewatering process if required. The proposed polymer is Ciba Magnafloc 10 Floculant which is an anionic granular grade polymer.

The polymer will be stored on-site in powdered form and made up into a liquid for dosing to the clarifier using the Ultromat AT/96 polymer make up system. The liquid polymer will be stored in a storage compartment within the Ultromat AT/96 and will be pumped forward into the clarifier. The rate at which polymer is pumped forward to the clarifier will be linked to and proportional to the flow of wastewater to be treated.

5. Sludge Dewatering

Sludge Dewatering is done by a filter press which is located on the second floor of the Treatment Building. Waste sludge is withdrawn from the sludge blanket at the base of the clarifier and pumped to the Sludge Holding Tank which is located adjacent to the Treatment Building. From the Sludge Holding Tank sludge is pumped to the Filter Press. Currently there is 1 Filter Press with space for a second to be added at a later date. Filtrate from the Filter Press flows by gravity back to the Reactor Tanks. De-watered cake falls by gravity to a skip/ trailer located on the ground floor of the Treatment Building directly under the Filter Press. There is provision for addition of polymer to the sludge line leading to the Filter Press if required.

6. Blowers & Compressors

6.1. Blowers

Oxygen is required in the reactors as part of the treatment process to enable the oxidation of ferrous iron to ferric iron. This oxygen is provided as air by the Air Blowers and the Air Blower motors. The Air Blowers are controlled by the Main Control Panel and PLC.

6.2. Compressors

Compressed air is required at the following points in the Wastewater Treatment Plant:

1. Filter Press
2. Pinch Valves in Lime Slurry Feed Line
3. Lime Silo Lime fluidizing system

In the Filter Press the compressed air is required for air blowing of the cake and hydraulic operation of the press.

The function of Air blowing of the cake is a post filtration operation that is performed to remove entrained filtrate from the filter cake and residual filtrate from the filter pack porting connections press prior to cake discharge. A pressurized gas, usually compressed air is introduced into the upper filtrate discharge port, forced through the cloth and filter cake in each chamber and out of the diagonally opposed, lower filtrate discharge port. The removal of excess filtrate will improve cake dryness and help loosen the filter cake for improved cake release.

7. Clarifier

Wastewater from the Reactor Tanks flows by gravity to the High Density Sludge (HDS) Clarifier. Polymer is dosed into the clarifier to promote the flocculation of the lime slurry and to enhance settlement and formation of the sludge blanket.

The Polymer can be added at either or both of 2 separate injection points:

- Into overflow line from Reactor No. 2
- Into the Feed Splitter in the Clarifier

Rakes at the base of the clarifier push sludge towards two central sludge collection sumps, with underground connecting pipes to sludge recycle pumps.
Sludge is drawn from the collection sumps at the bottom of the clarifier using sludge pumps and either re-circulated or wasted. The underflow from the clarifier is continuously recycled to the sludge/lime mix tank to maintain a high solids content in Reactor Tanks #1 and #2. Periodically, excess underflow sludge is wasted from the recycle line to the waste sludge holding tank. Sludge is pumped from the waste tank to a plate and frame filter press dewatering device.

The clarified overflow passes over a weir into the launder ring and exits to a treated water tank which overflows a weir to the effluent outfall pipe to Howe Sound.

The HDS clarifier unit is designed with a conservative surface loading rate of 1.2 m/h, based on design flow. For most of the year, the average flow, even with groundwater treatment, is significantly below the design flow.

8. Reactors

The Reactor Tanks are at the centre of the High Density Sludge treatment process. Lime and recycled sludge are added to the Lime-Sludge Mix Tank at the head of the process and this becomes the main neutralization agent. This mixture is discharged to the Rapid Mix Tank (Reactor 1) where it is mixed with the incoming Acid Rock Drainage influent, thereby achieving neutralization.

This mixture is fed to the Main Lime Reactor (Reactor 2) where a combination of aggressive aeration and high shear agitation ensures optimum process chemistry and clarifier performance. The discharge from the Lime Reactor is treated with flocculant. The clarifier separates the treated effluent from the sludge, a portion of which is recycled to the head of the process and a portion wasted.

The HDS process is normally run at a pH between 9.0 and 9.5, as most metals encountered precipitate at or below this concentration of hydroxide ions (the concentration of hydroxide ions increases with increasing pH). Oxidation of ferrous to ferric iron takes place quite rapidly at this pH and oxygen from aeration system is the most common oxidizing agent and is the oxidizing agent used in this process. The oxygen is provided by air blowers which supply air to diffuser cones at the base of each reactor tank.

9. Groundwater Extraction System

The basic function of the groundwater pumps is to prevent contaminated groundwater from entering Howe Sound by controlling groundwater gradients and inducing groundwater to flow into the pumping wells.

Pumping at the required rates however will also cause seawater intrusion into the wells. The pumping control system will attempt to pump as much groundwater as allowable without exceeding the specified 1000 mg/l of chloride content (as determined by conductivity measurement) in the total pumped flow. Seawater is an undesirable component in the groundwater pumping mixture due to its negative effects on the proposed future groundwater treatment process as well as its corrosive effects on pumping and instrumentation equipment.

The anticipated volume of groundwater for treatment is in the order of 500,000 m^3/year. For constant groundwater flow, this would equate to an average flow of 57m^3/h. The actual groundwater flow may be expected to vary between 25 m^3/h to 100 m^3/h. This groundwater will be pumped to the head of the plant inlet works for blending and treatment with main ARD process flow. The volume of groundwater to be pumped will only be what is required for groundwater treatment. The proposed plant configurations are expected to have sufficient capacity to handle the expected range of groundwater flows without additional infrastructure.

10. Micro Hydro

A hydroelectric generation station will be located at the 4,100 level (approximately 75 m elevation) just outside the adit entrance. The turbine will make use of the available energy in the head of water leaving the 4,100 level adit to generate electricity. After the head, is extracted by the turbine, the water will flow by gravity to the treatment plant.

11. Special Procedures

11.1 Reservoir Operations Plan

The use of the mine reservoir at Britannia Mine allows for the balancing of flows arriving to the water treatment plant and a method of controlling high flow events which occur biannually during the summer and fall months. The use of this reservoir is a critical aspect of the operation of the water treatment plant at Britannia Mine.

The proposed operational strategy was developed through using historic information and the model developed through previous studies undertaken by SRK Consulting (SRK). The model was developed through analyzing the annual flow information to determine the time period at which the peak flow periods would occur and other parameters that would be available to the water treatment plant operator. The Province and Project Managers used this model to determine the appropriate size and the design flow and hydraulic capacity of the water treatment plant.

EPCOR's proposed operational strategy consists of operating the mine reservoir at a target level of 40 m during high inflow periods from April 15 to August (operational range of 30 m to 60 m), and operating the mine reservoir near 110 m during low inflow periods (operational range of 90 to 140 m) from August through to April 15, 2005. Such an operational strategy was modeled to result in approximately 4 water treatment plant bypass events over the 25-year study period and would result in no overflow events at the 3250 level if the plant was managed during high flow events at the plant hydraulic capacity. If the plant were managed at design flow, there would be 21 plant bypass events and no overflow events at the 3250 level. The water treatment plant would be operated at the weekly average flow during low to average flow periods to maintain consistent flow for optimum process efficiency.

Every effort will be made to minimize bypass events to ensure that the maximum environmental benefit will be achieved. Actual plan flows above the design capacity will be managed to ensure operational performance requirements will be met.

One consideration that needed to be addressed in the development of this model was the capacity of the 4100 level plug. The maximum flow used in the model that would be passed through the plug would be 910 L/s, corresponding to the maximum flow of 40 ft/s permissible without damaging the valves on the plug, and upgrading the 8" valve on the plug to a 10" valve.

In advance of the summer high flow events resulting from the spring freshet precipitation, the reservoir would be operated from a target range of 30 to 60 m. When the mine inflow rate begins to rise to up to 100 m, the plant would be managed at a flow level up to the plant design flow. Above this level, the maximum flow through the water treatment plant would be raised up to the water treatment plant hydraulic capacity if it is possible to meet permitted effluent requirements. The water level would then be allowed to rise up to a level 150 m and inflow forecasts will be reviewed. At 150 m, the operator would then consult with the operations manager to decide if early bypass should occur based on plant capacities and projected inflows to minimize chances of overflow at the 3250 level.

11.2 Plug Inspection

11.2.1 Background

Under Section 34.3 (q) the terms of the Agreement the Operator is required to perform periodic inspections of the 4,100 Adit and the Plug, no less frequently than once per Month and notify the Provinces Representative of any observed problems or concerns identified in such inspections, provided that such inspections will be conducted in accordance with Applicable lay, including the *Mines Act* (British Columbia) and such reasonable restrictions as may be imposed by the Province including that whenever required by the *Mines Act* (British Columbia), any such access will be under the supervision of the Mine Manager.

11.2.2 Procedure

The Plug at the 4100 Level Adit should be inspected visually once per week and the observations recorded and included in the Monthly Report. The Monthly Report template contains standard forms for recording observations from the visual inspection.

Any sign of dampness or cracking at the face of the plug should be noted.

In addition the face of the plug is fitted with displacement sensors. Any movement in these is indicative of movement of the plug and would require an immediate structural assessment of the plug.

Additionally, there will be conductivity sensor located near the base of the plug to monitor any increase in water should the plug begin to leak to any significant degree between the monthly visual inspections. This sensor will alarm to the plant SCADA system.

11.2.3 Safety

Entry into the adit for the periodic inspection of the plug will require confined space entry procedures to be followed.

11.3 Weather Monitoring Stations

Data from the following weather monitoring stations and river gauges will be collected:

- Jane Basin Weather Station
- Britannia Weather Station
- Upper Britannia flow gauge
- Britannia Creek Flow Gauge at the Mouth

Data from the weather station at Jane Basin is transmitted by use of a wireless modem back to the SCADA system.

The data from the above stations and gauges will be recorded and reported in the Monthly Reports. Templates Sheets for reporting data will be filled out.

Quarterly inspections of the weather stations and flow gauges will be carried out to ensure that equipment is operational. Inspections will be carried out more frequently if there is any failure in data recording or erroneous results recorded.

12. Water Quality Monitoring

12. 1 Discharge Permit Requirements

The Water Quality Monitoring requirements are described in the Discharge Permit from the British Columbia Ministry of the Environment (Provided in Section 2). The key discharge parameters are as follows:

Flow
The maximum authorized rate of discharge is 25,200 m^3/day. Subject to peak flow mitigation procedures approved by the Director under Section 2.1, discharges between 25,200 and 33,600 m^3/day are authorized.

The characteristics of the discharge shall not exceed:

Parameter	Limit
Dissolved copper	≤ 0.1 mg/L,
Dissolved iron	≤ 0.1 mg/L,
Dissolved zinc	≤ 0.2 mg/L,
Dissolved aluminium	≤ 1 mg/L,
Dissolved manganese	≤ 0.4 mg/L,
Dissolved cadmium	≤ 0.01 mg/L,
Total suspended solids	≤ 30 mg/L,
pH range	6.5 to 9.5
96HR LC_{50} fish bioassay	≥ 100% (non-acutely toxic)

Sections 3.1 and 3.2 of the Discharge Permit provide comprehensive guidelines and details on monitoring procedures. This section should be read in conjunction with the Discharge Permit.

Sampling Locations

Samples from the water treatment plant and groundwater pumping station will be taken from three locations:

1. 4100 Level Portal - Sampling location at Micro Hydro after 4100 level adit.
2. Groundwater Pumping Station – Sampling location at inlet to groundwater hold tank
3. Discharge from the Wastewater Treatment Plant - Sampling location at clarifier outlet in sludge recycle pump building.

Sampling Parameters

Mine Water, Groundwater, and Treatment Plant discharge rates will be monitored on a continual basis using a permanent flow metering device. This information will be available continuously in real time through on-line systems available over the World Wide Web (password protected) and there would be a database of historical information available online.

Samples from each of the three sampling locations will be collected weekly and analysed for Dissolved Metals, Total Metals and Total Suspended Solids. A 96HR LC_{50} fish bioassay is required on the effluent discharge from the water treatment plant. The fish bioassay will be carried out monthly.

Table 10.1 - Sampling Locations, Parameters & Frequencies

Parameter	Site 1 - 4100 level portal	Site 2- Groundwater Discharge to WTP	Site 3- Final Effluent
Dissolved Metals*	Weekly	Weekly	Weekly
Total Metals*	Weekly	Weekly	Weekly
Total Suspended Solids	Weekly	Weekly	Weekly
pH range	Continuous	Continuous	Continuous
96HRLC50	N/A	N/A	Monthly

*Metals analysis will include **copper, iron, zinc, aluminum, manganese, and cadmium.**

Groundwater from the groundwater pumping wells will be continually monitored for conductivity and pH. Details are provided in Section 12 Groundwater Collection System.

On-Line Results

In accordance with Schedule F of the Project Agreement, the Operator will make the above measurements available in real time through online systems available over World Wide Web (password protected). A database of historical results will also be available online. It is understood and acknowledged that access to this system may be limited at times for reasons which are beyond the Operator's reasonable control including, developing security concerns.

13. Records Management and Communications Procedures

13.1 Monthly Progress Reports

In accordance with the MWLAP (now the Ministry of the Environment) Permit (PE-17469), Monthly Progress Reports on permit-related activities and particularly on the high density sludge lime treatment plant construction and commissioning shall be submitted to the Director for the Ministry of the Environment and to stakeholder's identified by the Director in accordance with procedures and formats established under the bi-weekly progress reporting process currently in place for the Britannia Mine Remediation Project.

13.2 Discharge and Receiving Environment Monitoring Reports

The results of discharge monitoring performed under the terms of the Discharge Permit, (provided in Section 2 of this Manual) and as described in Section 12 of this Manual, shall be maintained in accordance with procedures approved under the Permit and shall be submitted to the Director in accordance with the following schedule:

13.2.1 Quarterly Reports

Reporting Quarter Submission Date

First Quarter April 30th
Second Quarter July 31st
Third Quarter October 31st
Fourth Quarter February 28th

13.2.2 Annual Reports

An annual monitoring report summarizing the results of discharge and receiving environment monitoring performed over the year ending shall be submitted to the Director and stakeholders identified by the Director by February 28th of the next year in accordance with reporting procedures approved under the Discharge Permit.

13.3 Operations Reporting to the Ministry of Agriculture and Lands

Under the terms of the Agreement, as outlined in Schedule F of the Agreement, the Operator must develop and maintain a system for documenting the operation of the Project, and preparing monthly reports to the Province, and submit same in the Operating Quality Control Plan. The information includes, but is not limited to that required for regulatory purposes and calculation of payments due. The Province may require additional information that the Operator would normally be expected to compile in accordance with good industry practices to complete documentation of the operation of the Project.

13.3.1 Monthly Reports

This report should include summaries of "Performance Indicator" items as Schedule F of the Project Agreement. The Province's Representative may request clarifications and additional information on details of a Monthly Report from time to time. This report will also include results of water quality samples, mine water, water treatment plant, and groundwater discharge rates, and would include, if applicable for conditions where bypass is necessary to prevent overflow at the 3250 level, bypass flow rates and dates of bypass.

The Monthly Report will include individual sections to report on the following:

1. Water Quality Monitoring (as per Operation Manual Section 12 Water Quality Monitoring)
2. Performance in relation to the Key Performance Indicators (Schedule F of Agreement)
3. Details on Inspection of 4100 Plug
4. Weather Data from the weather monitoring stations and flow gauges

13.3.2 Annual Performance Report

This will include a summary of the calendar year activity and Performance Indicators described below. The Province's Representative may request clarifications and additional information on details of an Annual Performance Report from time to time.

The Operator will also prepare the following forward looking reports annually:
(a) **Operating Quality Control Plan.** This report will include plans for any system changes, operations, maintenance, capital enhancements, building and lands upkeep, and strategies to deal with changing water conditions, if any.
(b) **Financial Plan.** This report will outline the forecast annual expenditures as well as the five (5) year capital expenditure plan required to maintain the WTP and/or to address changing water quality regulations.

13.4 Communications

13.4.1 Curtailment of Operations

The Operations Representative from the Ministry of Agriculture and Lands will be notified of any curtailment of operations for more than one day, for example, as a result of planned and unplanned maintenance. The work will be coordinated with work undertaken by the Province to minimize the necessary interruption.

13.4.2 Entrance to Mine Workings

Persons may not enter the mine workings without the prior written consent of the Province's Representative and subject to applicable Law, including the *Mines Act*, including that whenever required by the *Mine Act* (British Columbia), the access will be under the supervision of the Mine Manager.

13.4.3 Annual Operations Planning Reports

(a) **Operating Quality Control Plan**: This report will include plans for any system changes, operations, maintenance, capital enhancements, building and lands maintenance, and strategies to address changing water conditions.

(b) **Financial Plan:** This report will outline forecast annual expenditures as well as the five (5) capital expenditure plan required to maintain the WTP and/or to address changing water quality regulations.

13.5 Emergency Events

Any Emergency will be promptly reported to the Director of Waste Management at Ministry of Environment, representatives from the Ministry of Agriculture and Lands (MAL), the Ministry and Energy and Mines, and the Mine Manager.

Emergency notification procedures have been created for the following events:

13.5.1 High Flow Events/ Bypass

13.5.2 Failure of the 4100 Level Plug and Associate Infrastructure

13.5.3 Collapse Behind the 4100 level Plug

13.5.4 Collapse Between the Workings

13.5.5 Debris Blockage of One or All of the Pipes at the Plug

15. Emergency Response and Contingency Plan

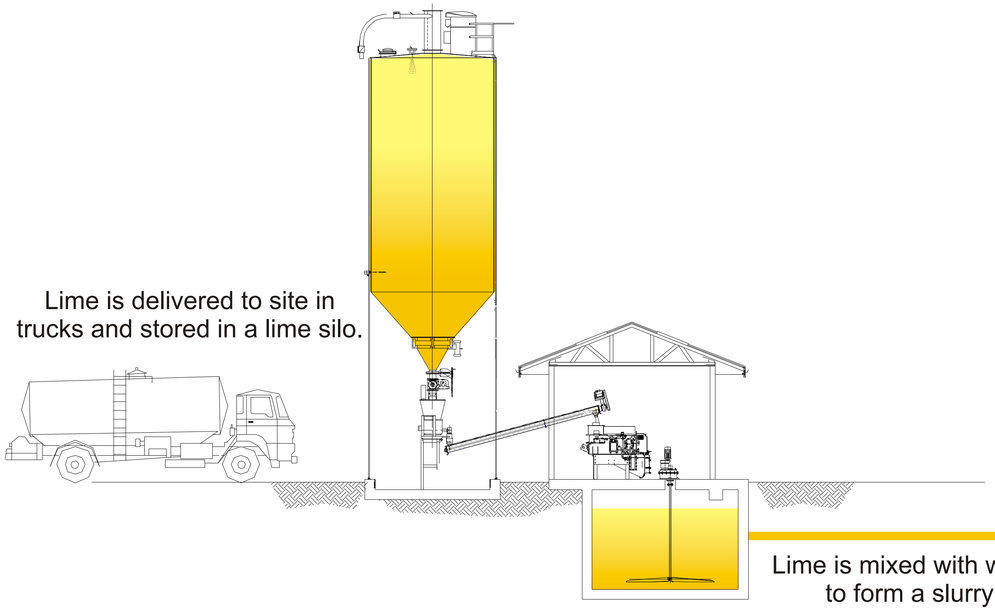
Epcor has developed and maintains a facilities emergency site plan in accordance with Epcor Water Services Emergency Plan. It is incorporated as an integral element of the BC facilities Health and Safety Program. (BC Facilities include Port Hardy and Britannia Mine).

The purpose of this plan is to provide planning and response procedures to enable a prompt and effective co-ordinated response to any emergency or disaster affecting BC facilities. The goal of this plan is to prevent or minimize losses to people, property or the environment during and emergency or disaster.

The plan provides is structured under the following main headings:

1. Policy and Hazard Analysis
2. Functional Responsibilities
3. Initial Response
4. Emergency Support
5. Mutual Aid
6. Business Continuity Plan
7. Emergency Response debriefing
8. Training and Excercises
9. Emergency Plan Distribution and Maintenance

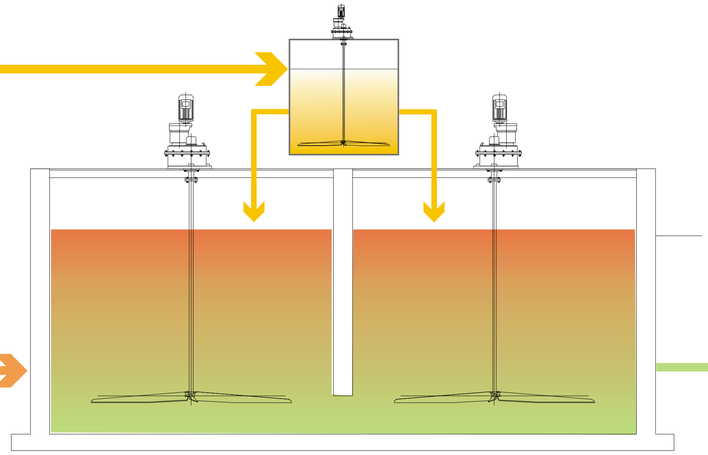
LIME SYSTEM



Lime is delivered to site in trucks and stored in a lime silo.

Lime is mixed with water to form a slurry

REACTOR TANKS

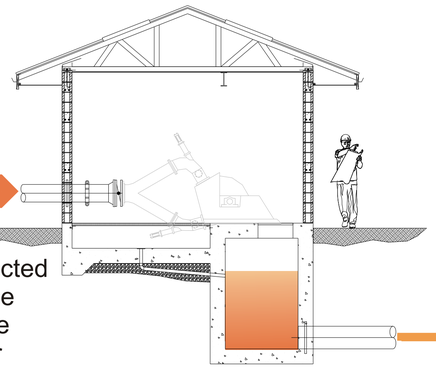


Lime is mixed into the acid mine water. The metals precipitate out of solution

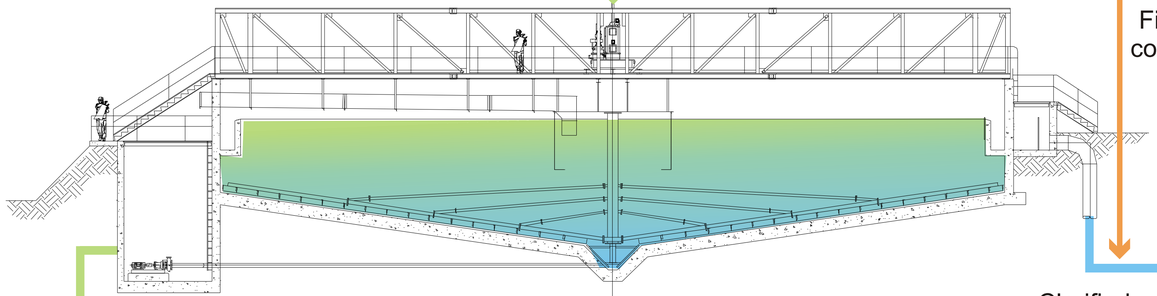
Recycle

Bypass

HYDRO GENERATION TURBINE



Acid mine water is collected and piped to a turbine generator to produce hydroelectric power



Final pH correction

Clarified water to discharge

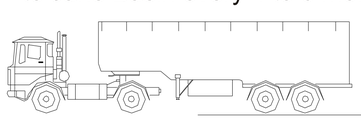
CLARIFIER

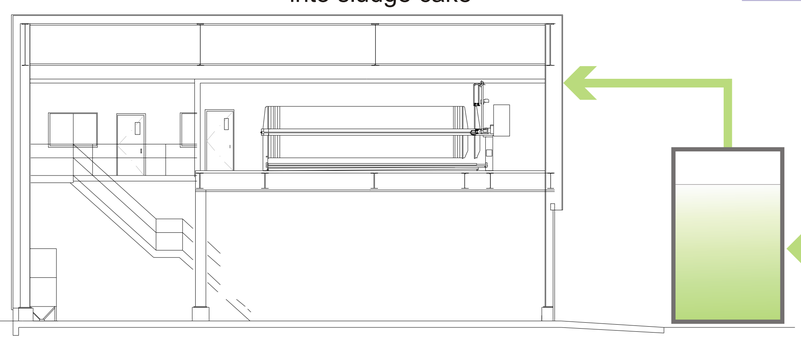
Sludge settles to the bottom of the tank where it is collected and pumped to recycle. A portion is pumped to dewatering & disposal

Sludge is dewatered by filter press and formed into sludge cake

Dewatered sludge is stored in holding pond

Sludge cake is loaded and trucked to Jane Basin every 4 to 6 months





TREATMENT BUILDING

SLUDGE HOLDING TANK

BRITANNIA MINE WATER TREATMENT PLANT

Stantec

Lockerbie Stanley

EPCOR essential elements for living

partnerships British Columbia