SCHEDULES A – L OF PROJECT AGREEMENT FOR BRITANNIA MINE WATER TREATMENT PROJECT

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WORK

1. Water Management and Treatment

1.1 The Operator is required to perform the following Design, construction and related design and construction services:

1.1.1 Provide paved access roads within the Site. However, the road from the Project to the BC Hydro substation does not need to be paved.

1.1.2 Provide a paved parking area of sufficient size to permit parking of two tour buses as well as visitors and the Operator's personnel.

1.1.3 Provide site grading and drainage to effectively manage uncontaminated runoff from the Site. The installed drainage system must be independent of the drainage systems through the property of the BC Mining Museum, and not add to the surface water runoff or groundwater flux through the Fan Area.

1.1.4 Provide security systems to minimize the potential for the public to access the Project area, including the 4100 Adit and the Province's property behind the BC Mining Museum, and to minimize the potential for injury to the public.

1.1.5 Provide utility connections from the BC Hydro sub-station to the WTP, the groundwater and storm water pumping systems and other installations requiring electric power supply.

1.1.6 Provide site power distribution as required for the operation of the WTP.

1.1.7 Provide telephone, fax and hi-speed internet communication capabilities.

1.1.8 Provide process water and potable water supply.

1.1.9 Provide sanitary sewage disposal.

1.1.10 Provide a fire alarm system.

1.1.11 Provide a site communications system.

1.1.12 Design and construct a WTP which is capable of treating Contaminated Water which is:

(a) within the Expected Water Chemistry Range and which is designed with the capacity to dewater 1.4 tonnes of dry solids per hour and

(b) designed to treat Typical Water at the rate of 1,050 m^3/hour (the "Design Capacity") with a hydraulic capacity of 1,400 m^3/hour (the "Hydraulic Capacity").

1.1.13 Design and install a storm water pumping system from the existing storm sewer to the Outfall with a capacity of 50 m^3/hour of storm water.

1.1.14 Design and construct the WTP based upon high density Sludge technology.

1.1.15 Provide a new valve and pipe installation at the Plug. In the event that the Operator accepts the existing temporary installation, the Operator will be responsible for all future modifications to this installation.

1.1.16 Provide a Contaminated Water conveyance system from the Plug to the WTP.

1.1.17 Provide a system for the monitoring of water levels in the Workings and for remote control of the flow rates. The Operator may elect to accept the existing installation as either a temporary or permanent facility.

1.1.18 Provide a system for the automatic recording of the flow of Contaminated Water in m^3/hour, and the parameters specified in Schedule F –Operational Performance Requirements. The flow rates of Contaminated Water and groundwater are to be measured and recorded separately.

1.1.19 Provide process control instruments to measure and record the volume (in m^3/hour), and pH, of untreated water that by-passes the WTP and is fed into the Outfall.

1.1.20 Provide reagent storage systems with capacity sufficient to store reagents and chemicals required to meet the projected usage of the Project, if the Project were to operate continuously at the Design Capacity.

1.1.21 Provide a centralized, air-conditioned control room to house process automation, control and data recording equipment.

1.1.22 Provide a building to house: (a) the process equipment that by its nature or function must be protected from the weather, (b) the control room, and (c) storage areas for repair supplies and bagged chemicals or reagents.

1.1.23 Provide a system to enable excess water volumes to by-pass the WTP when the volume of water entering the Workings exceeds both the Design Capacity of the plant and the available storage capacity of the Workings.

2. Outfall System

2.1 The Operator is required to perform the following Design, construction and related design and construction services:

2.1.1 Provide a piping system capable of conveying a combined flow of 3,600 m^3/hour of treated Contaminated Water, and water that has by-passed the WTP to the Outfall.

2.1.2 Provide for the addition of treated groundwater into the Outfall.

2.1.3 Provide for storm water that is collected from the existing storm sewer line that discharges into the existing outfall at Britannia Creek to be piped into the Outfall.

2.1.4 Provide sampling points to allow water samples to be obtained after the groundwater and surface water has entered the Outfall. As a minimum a sampling point is to be provided where the Outfall enters Howe Sound.

2.1.5 Provide all chambers with locked, removable covers.

2.1.6 Conduct a survey of bottom current velocities along the marine section of the Outfall, and incorporate this information into the design of the marine section of the Outfall.

2.1.7 Design of the Outfall diffuser to minimize the dynamic loading on the seabed floor.

2.1.8 Design the Outfall with three diffuser ports.

2.1.9 Design the marine section of the Outfall in a manner that a slope failure will not cause a failure of the entire submerged pipe.

2.1.10 Design the marine section of the Outfall so that a failed section of the Outfall pipe can be replaced in an expedient manner to minimize environmental effects of the pipe failure.

2.1.11 Provide a section of spare Outfall pipe.

3. Design Requirements

3.1 The Design is to be prepared in accordance with the current edition of the BC Building Code, the National Building Code, and any other applicable Regulations, Ministry of Water, Land and Air Protection approvals and other authorities having jurisdiction.

3.2 All drawings and calculations will be in Metric (S.I.) Units.

4. Settlement Requirements

4.1 The estimated total and long-term differential settlement of the Site will not affect the structural integrity, functionality, and operation and maintenance of the WTP.

4.2 The maximum permissible total and differential settlements for the various structures are to be specified by the structural engineer responsible for the design of the structures. The Operator will install settlement markers and monitor at 2 month intervals throughout the performance of the Work and the Term, to confirm the maximum permitted settlement is not exceeded.

5. Seismic Requirements

5.1 Liquefaction potential of the subsurface soils will be evaluated by a geotechnical engineer retained by the Operator. The Design will incorporate ground improvements and other methods of addressing potential liquefaction to meet the NBCC and BCBC.

6. Foundation Design/Retaining Wall Design Requirements

6.1 The Operator will retain a professional engineer to consider:

6.1.1 the minimum factor of safety against bearing capacity failure under static conditions;

6.1.2 the minimum factor of safety against sliding under static loading; and

6.1.3 the minimum factor of safety against overturning under static loading.

7. Settlement Analysis

7.1 The Operator will perform a settlement analysis of structures and design foundations such that differential settlement between adjacent footings is limited to the amount specified by the structural engineer and as specified by the appropriate codes.

8. Site Controls

8.1 Horizontal control will be based on the UTM ground coordinate system as shown by the Plans.

8.2 Vertical control will be based on the elevations in metres referenced to the ground UTM grid

8.3 Mean sea level will mean the 0 m datum.

8.4 Topographical data for the Plant site area (4100/4150 Level benches and Access Road) are included in the Reference Documents and will be provided by the Province in electronic format (AutoCAD 2000 or later).

9. Handling and Disposal of Process Sludge or By-products

9.1 If the Operator elects to use the existing settling pond at the 4150 level, the Operator must perform all rehabilitation and maintenance required to meet the requirements of the applicable regulatory authorities. In the event that the Operator elects to construct facilities within the BC Hydro right-of-way for temporary storage of Sludge, the Operator must comply with the stipulated minimum standoff from pylons and minimum static and dynamic (operating) clearance beneath overhead cables as stipulated by BC Hydro.

9.2 If the Operator disposes of the Sludge in the Glory Hole, the Operator will develop a management plan for the storage and transportation of the Sludge to the Glory Hole and construct any facilities necessary to permit dumping of the Sludge into the Glory Hole.

9.3 If the Operator disposes of the Sludge outside of the Province's property at Britannia, the Operator must clearly state the intended destination for the Sludge dispose of the Sludge in accordance with the *Environmental Management Act* and other applicable legislation.

10. Materials

10.1 General Requirements

10.1 All materials incorporated into the Work will conform to the latest edition of the appropriate CSA and ASTM specifications or to other standards expressly specified in the Contract Documents. All provisions in the CSA and ASTM and other applicable standard specifications regarding materials, workmanship, finish, inspection and rejection are hereby made part of the specifications as far as they are applicable and not inconsistent with the specifications.

10.2 The Operator will prevent electrolytic action between dissimilar metals.

10.3 When securing exterior work or work that may be located in a corrosive atmosphere, the Operator will use non-corrosive fasteners.

11. Civil Design Criteria

11.1 Site Preparation and Earthworks

11.1.1 Cuts and Fills

(a) The Design will provide cut and fill earthworks that will remain physically stable for the design life of the Project, with respect to both mass stability and surface erosion.

(b) The Operator will strip the Site of all topsoil vegetation and other organic debris and stockpile topsoil suitable for use in slope remediation in a location provided by the Province.

(c) The Operator will provide the Province with a plan for stockpiling and re-using topsoil materials.

11.1.2 Compaction

(a) The Operator will ensure that fill material is conditioned, placed, spread and compacted to achieve a sufficient density commensurate with achieving approved design parameters of bearing capacity and settlement tolerance. If necessary, the Operator will sub-excavate and replace unsuitable weak or compressible sub-grade soils in order to ensure that the required design parameters are achieved.

11.1.3 Typical Gradients

(a) The Operator will ensure that a cross slope of 2% is maintained for Site grading purposes.

11.1.4 Side Slopes

(a) The Operator will excavate and remove from the Site all required mine waste rock. Excess waste fill may be disposed on lands owned by the Province.

(b) Where the Operator disposes of waste rock and spoil on land owned by the Province, the Operator will require approval of the Ministry of Energy and Mines (MEM).

(c) The Operator will ensure that the maximum side slopes for both plant area and the Access Road are as follows:

cut area	1.5(H):1(V) in soil
	0.33(H):1:(V) in rock, if encountered
fill area	2.0(H):1(V) at the plant site
	1.5(H):1(V) for road way fill

11.2 Sizing of Drainage Works

11.2.1 The Operator will:

(a) design all ditches to provide ample capacity for the design storm flow, below freeboard level;

(b) design all ditches to ensure that flow velocities for the design event are at or below standard levels specified for the types of material exposed in the side slopes;

(c) size all ditches according to the mineral and forest debris prevalent on the slopes above the Site.

11.2.1 Minimum Criteria

(a) The Operator will design all ditches in accordance with the following minimum criteria:

Minimum positive slope	0.2%
Minimum ditch depth	300 mm
Design storm - culverts and ditches	10 yr. 24 hour
Design storm - headwater requirements	50 yr. 24 hours

11.3 Site Roads

11.3.1 The Operator will design all site roads in accordance with the following design parameters

	Design Parameter
Minimum width of asphalt paved surface	5.5 m
Minimum shoulder width	1 m
Maximum gradient	8%
Maximum design speed	40 km/h
Design loading	MS200
Crown slope	2%
Minimum surface course of crushed, durable, well graded, granular material	150 mm

11.3.1 Pavement

(a) The Operator will design all pavement according to the following requirements:

Pavement Thickness	The Operator is required to design surface asphalt, base course, and sub-base to suit subgrade conditions and

	anticipated traffic loading.
Maximum grade	8% (less than 300 m)
Surface:	Central Crown with 2% cross slope
Runoff Control	Side road ditches and slope erosion protection measures commensurate with exposed materials

11.4 Buried Pipe

11.4.1 The Operator will ensure that all culverts and other buried pipes are designed to ensure that sufficient protective cover is provided to avoid adverse impacts of loaded vehicles using site roads and parking and manoeuvring areas at the Site.

11.5 Sanitary Sewer

11.5.1 The Operator will ensure that the septic tank and/or sanitary sewer system is designed in accordance with Applicable Law.

12. Materials

12.1 General

12.1.1 The Operator will design all in-ground structures to resist uplift from hydrostatic head if sub-drainage systems fail and the tanks are empty.

12.1.2 All liquid containing structures will conform to ACI-350 “Environmental Engineering Structures”.

12.2 Cast-in-Place Concrete

12.2.1 Reference Standards (latest edition as of execution of Contract):

(a) Concrete Materials and Methods of Concrete Construction: CSA-A23.1

(b) Methods of Test for Concrete: CSA-A23.2

(c) Portland Cement: CAN/CSA-A5/A8/A362

(d) Supplementary Cementing Materials: CAN/CSA-A23.5-M

12.2.2 Concrete testing will be in accordance with CSA-A23.1 except for the following:

(a) The average of any three consecutive 28 day tests will not be below the specified design strength.

(b) No one test will be below 90% of the specified design strength.

12.2.3 All concrete reinforcement to be to CSA A23.1 Grade 400W.

12.3 Hydrostatic Testing

12.3.1 The Operator will perform hydrostatic testing on all hydraulic structures upon completion.

12.3.2 The Operator will, prior to testing, finish the structures and will repair and waterproof any areas which appear to be inadequate.

12.3.3 The Operator will ensure that testing is done after completion of repairs and finishing work, and after concrete has adequately cured, but before backfilling.

12.3.4 Structures will be filled slowly to maximum water level and left to stand for 3 days.

12.3.5 The Operator will conduct a visual inspection to confirm that there are no persistently damp areas on exterior faces, nor any visible leakage.

12.3.6 Following the visual inspection test, the water level will be brought to the original level following which the hydrostatic test will begin. The hydrostatic test will last for five days during which there will be no leakage at any point.

12.3.7 In case of leakage during the hydrostatic test, the structure will be emptied, any deficiencies repaired and the hydrostatic test repeated.

12.3.8 The Operator will supply, install and remove a liquid level measuring device with a sharp pointed metal probe with a locking or clamping screw and a scale graduated in millimetres.

12.4 Miscellaneous Metals

12.4.1 Materials

(a) All stairs, ladders, walkways and access hatches are to meet WCB requirements.

(b) All miscellaneous metals to be a minimum of hot dipped galvanized.

(c) Steel – conform to CAN/CSA-G40.21-M, Grade 300W.

(d) Steel pipe – conform to ASTM A53 – Grade B.

(e) Galvanizing – conform to CAN/CSA-G164-M.

(f) Stainless steel – ASTM A167-86 and A276-86a or Type 316.

12.4.2 Fastenings and Anchor Bolts

(a) Anchor bolts to ASTM A307-86a, unless specified otherwise.

(b) For fastenings in stainless steel and aluminium use stainless steel Type 316 ELC ASTM A167-86.

(c) For structural steel use high strength bolts to ASTM A325M-86.

(d) All fasteners submerged in water – Stainless Steel Type 316 ELC ASTM A167-86.

12.5 Architectural Finishes

12.5.1 Roofing will meet the requirements of the RCABC.

12.5.2 Sound levels within buildings are to conform to WCB regulations.

12.5.3 Reference standards (latest edition as of date of execution of Contract):

(a)	CSA Standards on Concrete Masonry Units	CAN3-A165-M
(b)	Mortar and Grout for Unit Masonry	CSA-A179-
(c)	Masonry Design for Buildings	CAN3-S304-M
(d)	Connectors for Masonry	CSA-A370-
(e)	Masonry Construction for Buildings	CSA-A371-

12.6 Painting

12.6.1 Surface preparation paint application and paint products will comply with the Canadian Painting Contractor's Architectural (CPCA) Painting Specification Manual, latest edition.

12.7 Structural Steel

12.7.1 Limit States Design for Steel Structures, CAN/CSA-S16

12.7.2 Cold Formed Steel Structural Members, CSA-S136

12.7.3 General Requirements for Rolled or Welded Structural Quality Steels, CAN/CSA-G40.20

12.7.4 Structural Quality Steels, CAN/CSA-G40.21

12.7.5 Welded Steel Construction (Metal Arc Welding), CSA-W59

12.8 Concrete and Reinforcement

12.8.1 Concrete Materials and Methods of Concrete Construction, CSA-A23.1

12.8.2 Design of Concrete Structures, CSA-A23.3

12.8.3 Welded Steel Wire Fabric for Concrete Reinforcement, CSA-G30.5

12.8.4 Welded Deformed Steel Wire Fabric for Concrete Reinforcement, CSA-G30.15

12.8.5 Billet-Steel Bars for Concrete Reinforcement, CAN/CSA-G30.18

12.9 Masonry

12.9.1 Masonry Design for Building, CSA-CAN3-S304.1 (Limit States Design)

12.9.2 Concrete Masonry Units, CSA-A165

12.9.3 Motor and Grout for Unit Masonry, CSA-A179

12.10 Timber

12.10.1 Engineering Design in Wood (Limit States Design), CSA-O86.1

12.10.2 National Lumber Grades Authority (NLGA)

12.11 Tanks

12.11.1 Welded Steel Tanks for Oil Storage, API 650

12.11.2 Standard for Welded Steel Tanks for Water Storage, AWWA D100

12.11.3 Steel bins, small water tanks (shop fabricated and transported as full units), and all non-water tanks will be designed in accordance with the requirements of API 650. Large water tanks (field assembled) will be designed in accordance with the requirements of AWWA D100.

13. Mechanical Codes

13.1 The mechanical systems will conform to the Standards applicable to the intended use including:

(a) AFBMA Anti Friction Bearing Manufacturers Association

(b) AGMA American Gear Manufacturers Association

(c) AISC American Institute of Steel Construction

(d) ANSI American National Standards Institute

(e) API American Petroleum Institute

(f) ASME American Society of Mechanical Engineers

(g) AWS American Welding Society

(h) AWWA America Water Works Association

(i) BC building codes

(j) Canadian Gas Association

(k) Canadian Underwriters Laboratories

(l) CSA Standards including CSA W59 (welding)

(m) MSHA Mine Safety and Health Administration

(n) NFPA including 70-1991 National Fire Protection Code

(o) OSHA Occupational Safety and Health Administration

(p) SSPC Steel Structures Painting Council

(q) SMACNA Sheet Metal & Air Conditioning Contractors National Association including "Guidelines for Seismic Restraint of Mechanical Systems and Plumbing Piping Systems"

(r) UBC Uniform Building Code

(s) WCB Workers Compensation Board (BC)

In the event of a conflict between the requirements of this specification and the Applicable Law, then the most stringent or strict requirements will apply.

14. Workmanship and Materials

14.1 Except where otherwise specified, structural and miscellaneous fabricated steel used in equipment will conform to AISC standards.

14.2 All structural members will be designed for shock, vibratory and seismic loads.

14.3 Unless otherwise specified, all steel which will be totally or partially submerged during normal operation of the equipment will be at least 6 mm thick.

15. Safety Guards

15.1 All belt drives, fan blades, couplings and other moving or rotating parts will be covered on all sides by a safety guard in accordance with WCB regulations.

15.2 Safety guards will be fabricated from durable material (1.6 mm or thicker galvanized or aluminium-clad sheet steel or from 13 mm mesh galvanized expanded metal).

15.3 Supports and accessories for all guards, including bolts, will be galvanized.

16. Electrical Requirements

16.1 The Operator will design the electrical system to comply with the latest edition of all applicable Federal, Provincial and local Municipal codes including but not limited to:

(a) National Building Code

(b) I.E.S. (Illuminating Engineering Society)

(c) CSA

(d) CEC (Canadian Electrical Code Part 1)

(e) IEEE

(f) ULC

(g) BC Hydro, Fire Department, Building Department, Workers Compensation Board and all other local authorities having jurisdiction.

16.2 The Operator will design seismic restraints for the electrical systems to meet NBCC and Electrical Contractors Association of B.C. "Seismic Restraint Manual".

Schedule B1 to WTP Project Agreement

WORK GUIDELINES

The guidelines contained in this Schedule B1 are provided to the Operator as general guidance only. However, it is the desire of the Province that the Project be designed and constructed in general conformity with the following guidelines. Where the following guidelines state that a specific criterion or standard will be achieved, the Operator may vary from such criterion or standard, provided that the Operational Performance Requirements and Standards are complied with (save in Abnormal Circumstances) and the objective of such criterion or standard is given due consideration by the Operator.

1.0 Project Objectives

1. Buildings and landscaping will contribute to an aesthetically pleasing site and be designed and constructed to retain their appearance under local climatic conditions for 20 years minimum, including exposure to sea air.
2. It is desirable that, in recognition of the proximity of the community of Britannia Beach, the likely expansion of residential areas on private land, and the proximity of the BC Mining Museum, all facilities be designed to mitigate visual and noise impacts.
3. Safety during construction and operation are important to both the Operator and the Province. It is therefore desirable that safety to be designed into the facilities by such means as wide roadways, ease of access to process equipment, and “inherently safe” features. Potentially unsafe situations will be mitigated during design.
4. It is desirable that the treatment technology and Project Design have the flexibility to efficiently treat a wide range of water, including water with lower metal concentrations than the projected “average” chemistry, as it is anticipated that the metal concentrations will decrease with time.
5. All facilities are expected to be in use after the Term. The facilities will be designed so that at the end of the Term, they remain fully operable, excluding deterioration due to normal wear and tear.
6. The facilities will be designed, constructed and operated in a manner that is in accordance with all current environmental regulations and standards.
7. It is desirable that the facilities be designed for ease of monitoring, control and operation including efficient use of human and other resources through remote monitoring and efficient use of chemicals and power.
8. It is desirable that spares be installed for critical process equipment.
9. It is desirable that the Project incorporate features that will minimize the frequency of by-pass events which occur when Contaminated Water by-passes the WTP.

2.0 Specific Planning Requirements

Sustainability and Life Cycle Issues

The Operator will develop the Project consistent with the concept of responsible and sustainable development. In particular, it is desirable that the Design:

- attempt to facilitate the most efficient use of materials and the minimization of waste, e.g. standardized dimensioning; and
- include the use of durable materials.

The Project, including the water conveyance system to the plant and the Outfall, will be designed and constructed on an energy efficient, low maintenance basis with a minimum life expectancy of:

- at least 50 years for structural components;
- 50 years for underground utilities;
- 25 years for roofing;
- 20 years for mechanical components;
- at least - 20 years for electrical components; and
- at least 10 years for instrumentation,

with no major overhauls or replacement anticipated during the first 75,000 hours of operation.

Integrated Design Management Program and Partnering

The Operator will utilize an integrated design management program with respect to the design development of the Project. An integrated design management program recognizes that crucial decisions made at the start of the Design have substantial impacts in the final construction and operation of the Project. It is therefore desirable that all the design trades (e.g. mechanical, electrical, etc.) work in conjunction with each other from the start, rather than being brought in sequentially on the Project to design their respective systems in isolation.

Design Requirements

2.1.1 Code Requirements

It is desirable that the Project life span be fifty (50) years without major structural repairs (excluding wear surfaces) and planned accommodation of settlements.

2.1.2 Design Review Requirements and Documentation

The Province will carry out compliance reviews during the Design development. These reviews will include all design disciplines and will confirm the Design complies with the Standards and the Specifications. The Operator may request phased approvals of aspects of the Design that are considered to be critical to meeting the Schedule A -

Implementation Schedule. Equipment specifications will be reviewed prior to placing orders. Design drawings and construction specifications are to be reviewed when they are 30% to 50% complete, and again when the Design is 90% complete. The Design development will be based on the design review and consultation process.

The Operator will provide a detailed architectural design report including the following drawings:

- key plan;
- plans of all aspects of the Project;
- process and instrumentation drawings;
- process mechanical drawings and equipment lists;
- structural drawings;
- process design criteria;
- process flow diagram and mass balances;
- control panel layouts and I/O listing;
- typical sections;
- electrical single line diagram;
- technical data sheets for major equipment;
- hydraulic profiles for the influent and effluent piping systems; and
- plan and cross-section drawings of piping installations.

The Plan will clearly show and describe the materials to be used and the equipment details. It is desirable that the Operator meets with the Province's Representative to fully discuss the basis for the Design.

90% Design stage review will assure that the Plans have been completed in accordance with the approved preliminary design and scope of Work.

2.1.3 Design Folders

It is desirable that design folders be prepared for the 90% design submission and which include pertinent correspondence arranged in chronological order by subject matter, design calculations, material specifications, and will reference and confirm any pre-design study information utilizing the Design for the Work.

Project Record Submission

It is desirable that the following records be supplied by the Operator:

- as constructed plans, survey plans and cross section plans;
- design folders;
- WCB notice of project;
- minutes of all meetings, including pre-construction;
- construction inspectors daily reports;

- surveys during construction;
- settlement surveys;
- supplemental drawings;
- underground utility plans;
- road and pavement structure design;
- landscape plans;
- copies of all approvals and permits required for the completion of the Project;
- all ancillary works including but not limited to storm drainage, sanitary sewer, lighting, parking areas and road works;
- quality control test data and all inspection reports; and
- signed quality control reports from an engineer.

COMMISSIONING, START-UP AND TESTING REQUIREMENTS

2.1.4 Start-up Testing

The objective of the commissioning and start-up testing program is to demonstrate:

i. that the process technology is capable of meeting the Operational Performance Requirements for the treatment of Contaminated Water, and generation of Sludge in accordance with this Agreement.

ii. That all system components, including the water level control and the Outfall, are operable.

iii. That the process control systems are capable of controlling the water treatment process.

3.0 Design Criteria and Performance Specifications

Geotechnical Design Criteria

3.1.1 Geotechnical Assessment

Soil Investigation Reports pertaining to the plant site area at the 4100/4150 Level benches have been prepared by Golder Associates, AMEC (geotechnical) and URS (environmental). These reports are listed in/provided in the Reference Documents.

3.1.2 Seismic Design

Seismic Zoning for the Project area will be as defined in the National Building Code of Canada (NBCC) and British Columbia Building Code (BCBC).

3.1.3 Settlement Analysis

The structural integrity, functionality, and operation and maintenance of the Project will be designed so as to be unaffected by estimated total and long-term differential settlement.

3.1.4 Effluent Disposal and Outfall

The Operator is required to discharge the effluent from the Project, together with Contaminated Water that by-passes the WTP, and surface water runoff from the Fan Area into a marine outfall into Howe Sound. The Operator is proposing to locate this outfall at a location about 1.5 km south of Britannia Beach that is a feasible location, based upon previous studies by the Province. The Operator is expected to retain risks associated with the on shore portion of the outfall.

The Province accepts that this location has a potential for slope failure and the risk associated with the slope failure of the off-shore portion of the outfall will remain with the Province. The Operator is expected to bear all risk associated with the design, construction, placement, operations, and maintenance of the off shore portion of the outfall.

The Province will not accept an outfall located offshore of Britannia Creek in the area identified as the “North” site in the reports prepared by Komex, due to the high probability of a slope failure in this area. The Province does not wish to accept the potential environmental consequences of a relatively frequent interruption in service.

The Province has commissioned scoping studies to identify an overland routing from the Site to the south outfall location. The routing is entirely on land owned by the Province, BC Rail or the BC Museum of Mining. The Province has held preliminary discussions with the landowners, and understands that there are no objections to this routing, subject to the satisfaction of certain conditions related to construction along the BC Rail right-of-way. Notwithstanding the above, the Operator is responsible for the route selection for the overland component, and for the location of the sub- marine portion of the outfall system. In the event that the Operator selects another routing, the Operator will be responsible for acquisition of all rights-of-way.

3.1.5 The Automated Process Control System

It is desirable that the collection system monitoring, alarm systems together with data logging and reporting functions be designed to encompass not only the WTP, but also the instruments at the Plug, the groundwater pumping and collection system and the Outfall. In addition, the system will be designed to be user friendly and flexible so as to permit new technology to be incorporated into the system as it becomes available.

There are numerous control options available and it will be up to the Operator to select and configure a system which provides complete control and monitoring of the system.

3.1.6 Noise Design Considerations

The development of the Britannia Beach area will include residential housing, some of which will be relatively close to the Site. It is desirable that the impact of night time noise levels at the nearest residential units to the Site be minimized.

The layout and location of the residential development is currently in the planning stages, and could change once the developer finalizes his design and approvals. For

this reason any residential locations presently identified can only be considered provisional.

It is desirable that the target night time noise level at the north boundary of the Site be 40 dBA.

The night time noise level of 40 dBA at the north boundary can be adjusted if the Operator demonstrates that their proposed equipment locations, primary acoustic attenuation and any agreed secondary mitigation measures outside the fence will achieve the desired noise levels in the residential area/s.

It is anticipated that some items of equipment to be incorporated into the Project may produce near field sound pressure levels of 95+ dBA. It is desirable that sound attenuation include specific attention to the issues of inlet and exhaust ventilation on the attenuated structures as well as all other building openings (doors, windows etc.).

It is desirable that any items of plant that may produce high levels of noise that would not normally run overnight (silo filter shakers or reverse jet cleaners, etc.) be inhibited from running overnight. This will minimize the possibility of a control failure causing night time noise problems.

Materials

3.1.7 Goods and Materials to be furnished by the Operator

- It is desirable that only new materials and product be supplied by the Operator for use on the Project, unless the Province specifically approves recycled or reused products.
- It is desirable that only products for which replacement parts and service are readily available be used. The use of ‘end-of-line’ or ‘surplus’ discounted items, where an extended support period cannot be identified are not generally suitable for incorporation into the Design.
- It is desirable that the manufacturer’s/suppliers instructions for material or product installation methods be complied with in all cases.
- It is desirable that metal fastenings and accessories in the same texture, colour and finish as the base metal be supplied.

Environmental Criteria

- It is desirable that all facilities be designed and constructed giving consideration to the effects of the Project and operation upon the environment, and the surrounding land owners. The Britannia town site is intended to be developed for residential housing (250 + units).
- Dust – in addition to meeting all Standards and Permit requirements, it is desirable that the facilities be designed to minimize fugitive dust.
- Odour - in addition to meeting all Standards and Permit requirements, it is desirable that the facilities be designed to minimize the frequency and severity of odours.

Civil Design Criteria

3.1.8 Site Preparation and Earthworks

3.1.8.1 Special Surface Treatments

The Operator may use shotcrete, geosynthetic or other surface erosion control measures as required for the slope stability.

3.1.9 Drainage Structures

3.1.9.1 General

It is desirable that the drainage design intercepts and safely conveys all storm runoff, seasonal streams and seepage waters impinging on the Site. The storm drainage structures will take into account the following design considerations:

Climatic design data specified in the BC Building Code, and other design criteria specified by governing agencies.

- 1:100 year 24 hour storm event or any other applicable event.
- Compliance with applicable environmental regulations for drainage structures, water flow and discharge.

3.1.10 Site Roads

The Access Road will be used to provide access for construction and operations.

3.1.11 Cast-in-Place Concrete

The Operator will ensure that concrete testing is conducted by an independent testing agency.

Structural and Architectural Design Criteria

MECHANICAL DESIGN GUIDELINES

3.1.12 Preamble

It is desirable that the Operator select equipment that will result in efficient life cycle costs and that the following issues be considered as part of this process:

* Reliability
* Durability
* Ease of maintenance
* Demonstrated strong product support
* Energy consumption/efficiency

3.1.13 Reliability

It is desirable that mechanical equipment have been supplied and used in similar duties for a minimum of five years.

It is considered important that the selected design capacity of any equipment be significantly within (25% below) the rated maximum capacity of the item (pump, blower, fan, gearbox etc.).

Electric motors will be selected for the actual duty.

In any case where the Operator is not intending to install a spare, the Operator will make such decision with due regard to the impact that the failure of that piece of equipment will have on the process, until the repair is carried out. Such consideration will include the location of spares and estimated total lead-time, from failure to replacement.

3.1.14 Durability

It is desirable that equipment be selected with proper consideration to environmental conditions. Construction materials and external surface finishes will be selected for long life and to minimise corrosion. Internal finishes will be selected to minimize both corrosion and erosion.

3.1.15 Ease of Maintenance

It is desirable that the installation of equipment be designed with due consideration for field maintenance and access.

Lifting beams and hoist anchor points will be installed to allow equipment to be safely removed and replaced during the service life of the equipment, with the ability to safely move the equipment to an adjacent lay down area using a hoist.

Where feasible, it is desirable that couplings and bearings be designed to be easily removable.

3.1.16 Product Support

The Operator will give due consideration to the ability of each manufacturer to support the equipment with timely spares delivery and technical on site assistance, either directly or through an agent as the Province considers this to be critical to the successful, long term operation of the WTP. The Operator will consider manufacturers' support and the location of the nearest service centre, for each item of plant.

The Operator will consider the envisaged operating staff level, normal working hours and anticipated level of maintenance support (if any) from manufacturers.

The Operator will consider the envisaged methods of technical & maintenance support for control, electrical, instrumentation and mechanical equipment, including the anticipated normal response time (day time working), out of hours responses and estimated travel time to the Site.

3.1.17 Energy Efficiency

It is desirable that equipment operate efficiently, where choices exist to optimise efficiency (i.e. bi lobe or tri lobe blowers).

3.1.18 Elevations

All equipment furnished will be designed to meet stipulated conditions and to operate satisfactorily at the appropriate elevations.

3.1.19 Workmanship & Materials

It is desirable that equipment manufacturers guarantee all equipment against faulty or inadequate design, improper assembly, defective workmanship or materials and leakage, breakage or other failure. Materials will be suitable for service conditions.

It is desirable that all equipment be designed, fabricated and assembled in accordance with recognized and acceptable engineering and shop practice. Individual parts will be manufactured to standard sizes and thickness so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units will be interchangeable. Equipment will not have been in service at any time prior to delivery, except as required by specified tests.

3.1.20 Lubrication

Equipment will be adequately lubricated per manufacturer's instructions prior to shipment to the job site. Where equipment has to be drained of lubricant prior to shipment, for safety purposes, a warning will be attached to the equipment adjacent to the lubricant fill point.

Grease fittings will be provided for all grease lubricated bearings and sleeves and tubing will be installed to permit greasing with unit in operation.

3.1.21 Bearings

It is desirable that unless otherwise specified, oil or grease lubricated, ball or roller type equipment bearings, designed to withstand the stresses of the service specified be provided. Each bearing will be rated in accordance with AFBMA Methods of Evaluating Load Ratings of Ball and Roller Bearings.

It is desirable that equipment bearings have a minimum L-10 rating life of 100,000 hours, as determined using the maximum equipment operating speed, unless otherwise specified.

It is desirable that grease lubricated bearings, except those provided factory sealed and lubricated, be fitted with easily accessible grease supply, flush, drain and relief fittings, using extension tubes where necessary. Standard hydraulic alemite type grease supply fittings will be provided.

It is desirable that oil lubricated bearings be equipped with either a pressure lubricating system or a separate oil reservoir type system.

Each oil lubrication system will be of sufficient size to dissipate the heat energy generated in the bearing under a maximum ambient temperature of 40°C. A filler pipe and an external level indicator gauge will be provided.

3.1.22 Drives

The opportunity to standardise drive couplings will be considered during initial selection of equipment. Spacer type couplings are preferred to simplify separation of direct drives. Manufacturer's warranties for equipment will include couplings.

Specific attention will be given to problems associated with field removal of couplings during the service life using standard hand tools (no flame), possibly after several years service.

V-belt drives will have adjustable, overhead motor mounts and separate baseframe assemblies. A minimum service factor of 1.5 is considered desirable for the selection of V-belt drives.

3.1.23 Safety Guards

Safety guards will be designed for easy installation and removal and all necessary supports and accessories will be provided for each guard.

3.1.24 Equipment Bases

All supports, anchorage and mounting of equipment will be in accordance with the manufacturer's recommendation, the BC Building Code and applicable industry standard requirements. Each component of packaged equipment will be provided with suitable bases or supports adequate for the equipment and service intended.

3.1.25 Special Tools & Accessories

Equipment requiring periodic repair and adjustment will be furnished complete with all special tools, instruments and accessories required for proper maintenance. Equipment requiring special devices for lifting or handling will be furnished complete with those devices.

3.1.26 Surface Preparation and Finish

Steel and iron surfaces (equipment) will be protected by suitable coating systems completely applied in the shop. Coating systems will be selected to provide high durability in the envisaged weather conditions. Consideration will be given to coating degradation due to direct sunlight ('chalking').

Surfaces that will be inaccessible after assembly will be protected for the life of the equipment.

All surfaces will be, where appropriate, abrasive blasted to SSPC SP-6 Commercial Blast Cleaning (Including SSPC-SP-1 Solvent Degreasing) to obtain a 1- to 3-mil blast profile. Wheel abrading or shot blasting (which leaves a slightly peened finish) is not acceptable. Soluble chlorides on the surface will not exceed 2 ppm, so far as reasonably possible.

Surfaces to be finish coated after installation such as handrails will be prepared for painting as recommended by the paint manufacturer for the intended service and then shop painted with one or more coats of the specified primer.

It is desirable if structural steel and walkways are finished hot dip galvanized or constructed from material that will not corrode. Galvanizing will be to CAN/CSA G164-M.

3.1.27 Electric motors

Under steady operating conditions for duty described the power draw of electric motors will not exceed 85% of the available motor power (nameplate).

Major Equipment

3.1.28 General

Equipment will be fit for purpose, with specific reference to long and reliable operation.

3.1.29 Agitators

3.1.29.1 Operational Requirements

The agitators will be installed in a dirty, wet and dusty environment.

The agitators covered by this specification will be installed outside and will be exposed to all weather conditions.

All agitators will be required to operate continuously, 24 hours per day, with scheduled shut down periods for routine maintenance and overhauls.

The agitators will be capable of start-up after tank contents have settled due to a power failure or other equipment shutdown reason.

The operating noise level must be a maximum of 45 dbA measured at the edge of tank (standing on the access walkway) containing the agitator.

Agitator type (axial, hydrofoil, etc.) will be designed and selected to efficiently achieve the duty at the maximum flow rates identified. In practice the system will, for the majority of the year, operate at lower flow rates.

3.1.29.2 Drive

The gearbox will be a combination of helical and spiral bevel gearing in a housing of either high-quality close-grained cast iron or stress-relieved and reinforced fabricated steel. The gear reducer will be constructed in accordance with AGMA 6010E. Reducer will be suitable for AGMA Class II 24-hour continuous service under moderate shock conditions.

Gearbox will be rated in accordance with AGMA standards, with a minimum service factor of 1.5 based on motor nameplate power rating and 24 hours operation and shock loading. Thermal rating will be not less than the motor nameplate rating.

Gearbox will have a minimum L-10 bearing life of 100,000 hours, based on the motor horsepower.

Gear reducer housing will have an inspection door to allow inspection and checking of backlash and alignment of gears.

Bearings will be ball or tapered roller type. Gears and bearings will be enclosed in an oil bath housing with oil level gauge and necessary oil and containment seal, to prevent entering of dust and water or leakage of oil from the oil bath.

Gear reducer bearings will be oil lubricated by immersion in an oil bath or by splash lubrication accomplished by means of gears or a slinger rotating on a horizontal shaft in an oil bath to ensure the positive displacement of oil to lubricate all critical bearings. Oil pumps will not be allowed.

A dry well seal will be provided to prevent oil leakage down the output shaft. A dipstick will be furnished to measure the oil level in the reducer housing. Sight glasses, or other visible means to measure oil levels, are allowed with discretion. Reliance on dirty or blocked visual oil level indicators may lead to equipment failure.

Reducer output shaft bearings (both solid and hollow shaft types) will be grease lubricated or permanently lubricated. All oil fill and drain lines and grease fittings will be located so as to be easily accessible.

3.1.29.3 Shaft and Impeller

The impeller assembly will be designed to produce insofar as practical completely balanced loads on the vertical shaft. The agitator drive train will be balanced to minimize vibration transmitted to the tank and agitator support bridge.

The agitator shaft will be overhung and designed for operation without bottom or intermediate bearings. The agitator shaft design will provide sufficient shaft rigidity to prevent undue shaft flexure and to prevent unbalanced forces on the gears and tank superstructures when agitator is operating during pump down of liquid level through the impeller.

Heavy duty tapered roller bearings or equivalent will be furnished to absorb all thrust loads. Low speed gearing will be placed close to the upper bearings so shaft flexure will cause only negligible gear movement.

The maximum operating speed will be less than 65% of the first critical speed of the agitator.

The blade assemblies will be rubber covered for abrasion resistance.

The agitator speed will be chosen to provide the minimum impeller tip speed necessary to satisfy the agitation requirement specified.

All impellers will be statically balanced.

The agitator design will include provisions for ensuring the accuracy of alignment of the drive and agitator components during assembly.

Replacement of bearings, seals, driver, and gear units will be possible without dismantling other major parts, and without emptying the vessel.

If necessary, shaft couplings will be furnished on agitator impeller shaft.

Carbon steel machined and flanged surfaces will be coated with a heavy rust preventative.

The agitator will have eyebolts suitable for lifting the entire drive assembly, motor, shaft and impeller assembly. To assure stability while lifting, attachment points will be

arranged so that the complete unit can be lifted with the agitator shaft centre line vertical and the centre of mass directly below the crane hook.

Structural member connections will be designed to withstand, within normal working stresses and deflections, all loads imposed on them by rotation of the assembly at maximum design speeds in water and in the dry and also loads which may be superimposed during or subsequent to erection while the tanks are empty.

Shaft will be adequately designed for the maximum power output of the drive unit. The impeller assembly will be securely keyed to the shaft.

3.1.30 Clarifiers/Thickeners

3.1.30.1 Operational Requirements

The clarifier/thickener will be capable of operating continuously, 24 hours per day, with scheduled shut down periods for routine maintenance.

The clarifier/thickener will be capable of producing the required capacities as specified in the Operational Performance Requirements. In addition, the clarifier/thickener will be able to pass a maximum hydraulic flow which will be 1.33 times the overflow design flow, requiring that the feed launder and overflow launder are adequately sized for this condition (all other components may be sized based on the design flow). The maximum hydraulic flow is used purely to design the equipment such that this hydraulic load can be passed through the plant without overflowing tanks.

The clarifier/thickener will be equipped with an energy dissipating feedwell, suitable for the maximum and the minimum flow. The feedwell will allow proper blending of Flocculent with feed slurries and to allow flocculated slurries to be introduced to the clarifier/thickener with minimum damaging shear at the low level.

The clarifier/thickener will have a minimum 3 m sidewall depth.

The rake arms will be a streamlined "low drag" type to minimize Sludge bed disturbance.

The operating noise level will be a maximum of 45 dBA at the outer rim of the clarifier/thickener (standing on the walkway above the launder).

The design life of the clarifier/thickener will be at least 25 years.

3.1.30.2 Clarifier/Thickener Mechanism Drive

Where a mechanical drive is selected for the rakes, the drive will have a heavy duty balanced type drive head.

Where a hydraulic drive is selected for the rakes and rake lifting mechanism, the supplier will provide a complete and self contained hydraulic package including electric drive motor(s) hydraulic pump(s), hydraulic motor(s), oil reservoir and all interconnecting piping, valves, filters and fittings. The entire package will be assembled at the drive head and will provide, as a minimum, alarm signals with voltage free contacts for low oil level, high pressure and high temperature conditions for remote monitoring.

The mechanism will be supplied with a torque measuring system with local indication and provision for remote indication (using a sensor mounted on the clarifier/thickener). The mechanism will be controlled to ensure alarm conditions ("high torque" & "extreme torque") are responded to in a timely manner without damaging the clarifier/thickener.

The clarifier/thickener mechanism will be capable of starting under full load. Shaft, couplings and rakes will be capable of transmitting the full stalled torque of the motor.

The clarifier/thickener mechanism will include an automatic rake lift on high torque reading, with automatic/manual setting to lower the rake on resumption of low torque reading. The rake will have a minimum lift of 600 mm (to be reviewed during final design). Limit switches (local and remote use) for high and low travel will be provided.

Anti-friction type bearings; bearing with an average life rating in excess of 5 years continuous operation will be provided.

Drive guards will be provided to enclose all rotating parts. The guards will be fabricated from expanded metal or heavy wire screen with a minimum opening of 12 mm and will be designed for quick and easy access to the drive components.

3.1.30.3 Support Bridge and Rake

The support bridge will be designed to carry the mechanism, walkway, handrails, feedwell, feed launder, monorail, and all operating and seismic loads. The bridge will be supported on the tank rim.

The feedwell will be supported from the bridge structure.

A feed launder will be provided, suspended from the bridge, terminating 300 mm outside the outer tank wall. The battery limit connection will be a standard pattern ANSI flange.

A walkway will be included with the bridge to provide access to the drive head and drive components. The walkway will be fitted with handrails and kickplates and extend across the entire tank. Both ends will be accessed from platforms.

Cone scrapers will be provided on the rake arms.

The concrete tank will include an overflow launder with a V-notched adjustable 316 stainless steel weir. The weir will be attached to the concrete launder by cast-in or chemical set bolts.

The wetted rake components will have a minimum corrosion allowance of 1.5 mm (1/16").

A lifting beam will be provided to permit removal and installation of all the removable drive equipment and to assist in maintenance tasks on the mechanism drive.

3.1.31 Lime Slaking System

The lime slaking system will be installed in a dirty, wet and dusty environment.

The design life of the lime slaking system will be at least 25 years.

3.1.32 Lime Silo

The silo will be either fully welded or a bolted silo.

The silo will be mild steel construction, consisting of a cylindrical section with cover. The discharge hopper will have a cone angle of not less than 60 degrees to the horizontal.

The silo will conform in design, workmanship, and material to AWWA D100 or API 650.

The silo will be supported on structural steel columns or steel skirt.

The cone discharge will include an isolation valve to permit service of the discharge system. The isolation valve will be a manually operated knife gate valve. The valve will be dust-tight and constructed of cast iron with a 304 stainless steel knife gate. A limit switch will be provided, operated by the silo knife gate to prevent operating of the vibrator if the valve is closed. A flexible neoprene sleeve will be provided with clamping plates and bolts suitable for connection to the lime feeder.

The lime silo will include a dust collector. The unit will be dust-tight, and weatherproof and will be capable of discharging dust free air from the lime silo sufficient to meet applicable discharge limitations. All parts of the unit subject to service or maintenance will be accessible by a person without the use of ladders or platforms.

The operating noise level of the dust collector will be less than 45 dbA at one meter from the unit, or from an enclosure around the unit.

The silo roof will have a suitable combination manhole and vacuum pressure relief valve, and the roof will be sloped for drainage. Steel railings and kickplates will be provided around the perimeter of the lime silo roof.

The lime silo will be provided with an external fixed galvanized steel ladder. The ladder will be provided with a complete safety cage throughout its entire length. One platform will be supplied at the midpoint of silo.

The lime silo will include a bin vibrator(s) bolted to the discharge cone.

The interior of the storage compartment will be smooth with no inward projecting elements (except for plates to protect the bin level sensors). All stiffeners and lateral bracing necessary for stability will be provided as required and will be installed on the outside of the storage silo, except that bracing and stiffeners for the roof will be placed on the inside of the silo.

The storage silo will be completely dust-tight and water-tight (weatherproof). All connections to the storage compartments will be by flanged and gasketed connections. Gaskets will be full face neoprene, or equal. All bolted connections will utilize Type 316 stainless steel nuts, bolts, and washers.

The lime silo will be designed to receive lime delivered by bulk tank truck equipped with self-contained pneumatic unloading systems.

The silo will be provided with a lime supply fill line. The fill line will be 4" inside diameter seamless steel pipe, Schedule 80 wall thickness, in accordance with ASTM A53. The elbows will be long radius ductile iron castings with a Brinell hardness of not less than 550 or provided with highly reinforced replaceable integral wearback plate of this same Brinell hardness. The fill line will be supplied with a 4" Kamlock truck hose adaptor complete with dust cap.

3.1.33 Lime Feeder

The lime feeder will be dust tight and constructed of lime resistant and abrasion resistant materials.

3.1.34 Lime Slaker

The slaker will be either a paste or detention type, consisting of one slaking compartment containing rotating paddles for mixing, a dilution chamber with rakes or vibrating screens for agitation, a classifier for grit separation, a dust and vapour arrestor,

and a conveyor for grit removal. The slaker will be furnished with grit remover to assure positive discharge of grit.

A dust and vapour removal system will be provided.

3.1.35 Blowers

Air blowers will be required to operate continuously, 24 hours per day, with scheduled shut down periods for routine maintenance and overhauls.

Blowers that may be damaged due to discharge closure during operation will be fitted with non-adjustable relief valves (internal or external) capable of full flow bypass if required. The relief system will be designed such that the blower will not be damaged due to prolonged operation while discharge is shut.

Blowers will be of a design that adds no oil mist to the air flow. Water mist addition to the air flow is acceptable in small quantities.

All air blower connections will be ANSI Class 150.

The air blowers will be provided with some approved system for crane lifting, both of the assembly and the individual parts. Where eyebolts are used for this purpose these will be securely fastened into a hole designed for the purpose of lifting (i.e. reinforced where necessary). The eyebolts will be removable after installation of the air blowers.

The installation of the air blowers will require control of noise from the blower. This will include attenuation of both inlet and exhaust ventilation, as well as control of noise emitted from the blower.

3.1.36 Tanks and Pump Boxes

Steel storage tanks will be designed in accordance with the API 650 or AWWA D100 Code for Welded Steel Tanks.

Agitated tanks will be provided with minimum 3.0 mm (1/8") wear allowance. Additional wear plates will be installed where erosion is anticipated to be significant (i.e. under the agitator in the area of flow into or out of the agitator).

All unlined tanks and pump boxes will have suitable corrosion/abrasion allowances added on the wetted surfaces, which will be at a minimum 3.0 mm (1/8").

Pressure vessels will be designed in accordance with CSA B51 latest edition and referenced specifications (e.g. ASME Code Section VIII), and registered with the appropriate BC provincial authority.

3.1.37 Piping

Piping materials will be selected with due consideration of the fluid conveyed in terms of corrosion.

Acid feed water to the plant will be piped in HDPE with appropriate wall thickness. For the fluid pressure, all HDPE pipe will be continuously supported when installed above ground. PVC, ABS, or CPVC pipe will not be used.

Power piping (instrument air) will be designed to CSA B51.

Electrical Design Guidelines

3.1.38 Standard of Products

1) All products and materials used will be new and be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, the Operator is to obtain special approval from the British Columbia Electrical Inspection Department. Where required, the products and materials will have CSA/ULC labels.
2) All electrical equipment must be new and not be older than one year from purchase order date, of current manufacture, with assurance that spare parts are locally available for the foreseeable future. Electrical equipment will be chosen on the basis of durability, serviceability and proven technology.
3) Complete installation to be carried out in accordance with CSA C22.1, B.C. Building Code, B.C. Electrical Safety Branch amendments. Provide underground systems in accordance with CSA C22.3 No. 7-M. Abbreviations for electrical terms to CSA Z85.

3.1.39 Identification of Equipment

1) Products that are required to have CSA, ULC, or other approval will be properly identified or labelled indicating that the product has been approved.
2) Nameplates will be provided for all electrical equipment such as power and distribution transformers, power and receptacle panel boards, motor control centres ("MCC"), individual motor starters, fusible or non-fusible disconnect switches etc. Nameplates will be engraved lamicoid identification plates with black letters on white background fastened by screws and will include the following information:
    i) Disconnects: indicate equipment being controlled and voltage.
    ii) Terminal cabinets and pull boxes: indicate system and voltage.
    iii) Transformers: indicate capacity, primary and secondary voltages.
3) Panel boards will be complete with a directory giving load description of each circuit controlled. Directories will be clearly typed and will be mounted in a metal frame with clear plastic cover on the inside of panel door.

3.1.40 Power Supply

1) Power will be provided at 34.5 kV, 3 phase, 60 Hz from the existing BC Hydro 69 - 34.5 kV Britannia substation.
2) To accommodate this project and future needs, BC Hydro will eventually upgrade this substation and replace the 34.5 kV distribution in the area with a 25 kV system. Provision will therefore be made at the WTP transformer for both primary voltages.

3.1.41 Site Voltage Distribution

1) Provide power to the site with a new power line from the existing Britannia Substation at 34.5 kV.
2) To accommodate the future 25kV supply, the WTP substation will have installed an autotransformer suitably sized for the installed capacity of the step down transformer

to step down from the 34.5kV to 25kV. In the future, the autotransformer will be replaced with a direct connection from the 25kV supply to the transformer. (to be confirmed with BC Hydro) Alternatively, provide a step down transformer with both 34.5 and 25 kV primary windings.

3) The Project will use a step down transformer with a 600/347 volt wye secondary.

4) BC Hydro metering will be included at the existing 34.5 kV substation service point, although provision will also be made at the Site substation, on the secondary (600V) side for future conversion.

5) The design of the electrical distribution system will be based upon IEEE Standard No. 141 Recommended Practice for Electrical Power Distribution for Industrial Plants.

6) Power distribution will be accomplished with step-down transformers. The following distribution voltages will be used at site:

- Medium Voltage Distribution 34.5 kV (future 25 kV)
- Low Voltage Distribution 600 volts, 3 phase, 3 wire, 60 Hz
- Small Power Distribution 120/208 volt, solidly grounded for lighting, convenience receptacles and small power applications

7) The Project will be supplied with power through a main 600 V, 3 phase feeder originating at the Project substation.

8) Electrical coordination will be completed to minimize power interruption on operation of power system protective devices.

3.1.42 Emergency Power

1) Emergency battery power packs will supply back-up power to fire alarm system and emergency egress lighting fixtures.

2) Uninterruptible power supplies will be used to provide back-up power to critical control systems. The UPS equipment will be sized to permit operations to shut down and back-up the computer and control systems to facilitate start-up on resumption of normal power.

3) The 600 volt distribution system will include provision for the connection of a portable generator unit to provide power in the event of a prolonged power outage sufficient to provide power for essential equipment only as permitted through the process control system.

3.1.42.1 Project Utilization Voltages

Motors 3/4 HP to 250 HP	575 volts, 3 phase
Motors under 3/4 HP	120 or 208 volt, 1 phase or 208 volt, 3 phase
Heaters over 1.8 kW	575 volts, 3 phase
Heaters 1.8 kW and under	120 volt, 1 phase or 208 volt, 1 phase
Lighting	
- HID	208 volt, 1 phase

- Fluorescent	120 volt, 1 phase
Instrumentation and control	120 volt, 1 phase

Rating limits may vary in isolated cases to meet design limitations.

3.1.43 Electrical and Control Rooms

1) Electrical and Control Rooms will be built to meet a one-hour fire rating. All openings will be sealed and made water and dust tight using approved fire retardant materials.
2) All electrical rooms will have two means of egress at opposite ends of the room. The floors will be elevated from adjacent process concrete floors a minimum of 200 mm. No liquid or fluid piping will be routed through electrical rooms.
3) Doors to the rooms will be supplied with panic exit type hardware. Each electrical room will have an equipment door, sized to permit the largest piece of equipment to be installed/removed without removing doors from hinges.
4) Electrical rooms and control rooms will be pressurized and air conditioned and designed in accordance with occupancy regulations.

Major Electrical Equipment

3.1.44 Substation Equipment

The HV power supply will have circuit-interrupting equipment (gang-operated fused load break switch) rated for the available fault level available from BC Hydro.

The BC Hydro service point will incorporate a new HV gang-operated fused load break switch rated for the service. Metering will comprise PTs, CTs and utility approved meters. Equipment will include two sets of meters, one for utility and one for the Province's use.

3.1.45 Power Transformer

The power transformer will be outdoor, oil filled with off-load manual tap changer. The transformer will be supplied with a 25 kV primary to meet BC Hydro's future standard voltage requirements. Initially the transformer will be fed from an autotransformer rated 34.5kV-25kV. The transformer will be sealed tank design with provision for future addition of one stage of fan cooling. The transformers will include HV and LV junction boxes. Alternatively, a power transformer with 34.5 and 25 kV primary windings may be used.

3.1.46 Motor Control Centres

The 600 volt MCC starters will be combination type consisting of a motor circuit protector, magnetic contactor and ambient compensated solid state adjustable overload relay. Starters will use "visible-break" protection. Motors up to and including 250 HP will be protected by solid state overload relays.

The magnetic trip settings and overload elements will be selected to match the full load current of the motors. Magnetic starters will be supplied with individual 120 volt control

transformers with primary HRC fuses. Larger starters may employ a line voltage operating coil and auxiliary interposing relay.

Short Circuit bus bracing for 600 volt equipment will be 42,000 A RMS symmetrical.

3.1.47 Motors

All motors will be high efficiency type. Motors will employ Class F or better insulation and will have a horsepower rating based upon continuous operation at full load without exceeding 80°C temperature rise above 40°C ambient.

In general, motors will be totally enclosed fan cooled ("TEFC") with cast iron frames and have a 1.15 service factor. Bearings will be of the antifriction and regreasable type. Motor casing will have porous plug breather drains at each end.

Motors will have NEMA design B characteristics with normal starting torque and low starting current for full voltage starting unless other characteristics are required by driven equipment. Starting methods will be full voltage except where reduced voltage starting is necessary.

Ratings of all motors 250 HP or less will be to standard NEMA sizes, with 1200 or 1800 rpm synchronous speed, 'T' Frames unless the equipment load condition requires special motors.

Provide all 250 HP motors with two 100 ohm platinum RTDs per phase winding and one per bearing.

Terminal boxes will be oversized and rotateable in 90° increments.

Stainless steel nameplates will be provided.

Motors required for variable frequency drive applications will be for inverter duty meeting or exceeding the requirements of NEMA MG-1, Part 31.

3.1.48 Enclosures

In general all switchgear, starters, control system equipment and small power distribution equipment will be installed indoors in pressurized and air conditioned electrical and control equipment rooms. Enclosures will be NEMA 1A with gaskets for all equipment located in these rooms.

Electrical, control equipment and instruments located in process areas or outdoors will be in NEMA 4X enclosures and supplied with anti-condensation heaters.

Any equipment located in hazardous areas will use enclosures approved for use with the specified materials.

Cables will preferably enter equipment in process areas and outdoors from the bottom.

3.1.49 Termination Cabinets and Boxes

Connection boxes will be provided with adequate interior space to allow termination of Teck type cables and will contain mounted terminal blocks with identification to match the schematic drawings. Terminal blocks will be tubular screw type with pressure plate, minimum width 5 mm (1/4") and marked with the wire number. Provide a minimum of 20% spare terminals for future use.

3.1.50 Power and Control Distribution

Cable installation will be with Teck type armoured cable on heavy-duty galvanized steel ladder type cable trays with 300 mm (12") rung spacing and 150 mm (6") depth. The cables will meet the CSA Flame retardant 'FT4' and the Low Acid Gas Emitting 'AG14' standards.

Cable connectors will be watertight and approved for the use with the cable used. Minimum cable size will be copper #14 AWG for control and copper #12 AWG for power.

Wire numbering will be tubular plastic or heat shrink type only.

Conduit system where required will consist of RW90 conductors and ground wire run in rigid galvanized steel conduit or liquid-tight flexible conduit complete with suitable watertight connectors. In corrosive area, rigid PVC conduits will be used. Minimum size will be 3/4" (19 mm) trade size.

Electrical Metallic Tubing (“EMT”) is not approved as an alternate for this application.

3.1.51 Small Power Distribution

Small power will be supplied from dry type transformers fed from MCCs and rated 600-120/208 volt, 3 phase 4-wire. The transformers will be sized to meet the load with a minimum of 25% spare capacity for future loads. The transformers will be indoor air cooled with standard taps, suitable for wall or floor mounting.

Panel-boards will be 120/208 volt, three phase four wire, surface mounted copper bus with bolt-on circuit breakers. Units mounted in electrical rooms will be in NEMA 1 enclosures. Units in process areas or outdoors will be in NEMA 4X enclosures.

Loads will be balanced to insure equal loading of primary phases.

3.1.52 Lighting

High pressure sodium lighting fixtures will be used in all high bay, operating area and outdoor applications. Ballasts will be high power factor energy saving type. Fixtures will employ quick disconnect feature for installation/maintenance purposes.

Fluorescent lighting will be used in all offices, electrical rooms and control rooms.

Minimum lighting levels will meet the requirements of codes and regulations. The following is a guide for minimum acceptable levels:

-	Process areas	350 lux
-	Control rooms	550 lux
-	Electrical rooms	350 lux
-	Storage areas	200 lux
-	Outdoor areas as required	15 lux
-	Other areas not specified above	Per IES Standards

Where outdoor areas require lighting, fixtures will be mounted on buildings. Building entrances and perimeters will be illuminated. Outdoor lights will be photocell controlled. Concern will be given to the surrounding area residents when designing the outdoor lighting system.

Emergency lights will be installed in stairways, exits and in process areas to provide sufficient light to allow safe egress of personnel from the building.

3.1.53 Fire detection

Supply a fire alarm system consisting of a microprocessor based advanced protection system. It will use a network based, peer to peer design to communicate between various control and annunciator panels, distributed throughout the WTP connecting the panels together to act as a single system. The control panel, however, will be capable of stand-alone operation.

3.1.54 Communications

Supply a site communication system consisting of a multi-line telephone system as required and wireless mobile equipment for communicating between various areas of the plant and the WTP control room.

3.1.55 Grounding

All structures will have a continuous grounding system installed.

All structures will be connected to adjacent grounded systems with a minimum of two full capacity connections.

Major equipment will be connected directly to the ground grid with a minimum of two ground connections. Transformers, switchgear and motors will be equipped with ground connection to the enclosure or frame in addition to the Teck cable ground wires.

The electrical room will have a ground bus installed with two connections to the structure ground grid.

Where conduit is used, a grounding conductor will be installed.

4.0 Instrumentation and Control System Design Guidelines

Process Control Approach

Process control for the WTP will be by a stand-alone programmable logic controller (“PLC”) system. The PLC system and communication network will be of current technology that has been field proven to be efficient and reliable. The system will be designed to have 20% spare I/O and the capability to be expanded in future to control additional equipment required to meet future expansion of the WTP.

At least one spare of each module type used in the control system, will be kept on-site for maintenance purposes.

The control system will be designed to utilize device-level network technology for all motor control ("Smart-MCC's"). All digital controls, interlocks, switches, indicator lights, analogue process control loops, process indicators and analogue control devices will be hardwired into the PLC control system.

The Human Machine Interfaces (“HMI's”) will provide the monitoring, alarming, data logging and reporting aspects of the process control system. The HMI's will also permit operations personnel to view graphical representations of the plant process and process

data to enable them to change process control set points, start and stop motors etc. The HMI's will have multiple levels of security depending on user security clearance.

The HMI computer network will be setup to allow remote monitoring only of the plant. This link will allow the viewing only of the plant process and process data from off-site remote locations.

Control system processors will be connected on an independent high speed network to allow peer-to-peer communication between processors in the plant and the HMI computers in the control room. If required, a separate remote I/O network will be provided to allow for communications between control system processors and its remote I/O racks.

4.1.1 PLC's

The control system processor will consist of a single high performance controller linked via an Ethernet network to the plant control room computers.

The PLC and hardware will be supplied by recognized industry manufacturers of control equipment.

The process PLC will be equipped with a local operator interface panel for monitoring and set point adjustment. The local operator interface will be mounted on the door of the process PLC panel.

4.1.2 I/O Modules

The control system will be capable of supporting digital and analogue inputs and outputs. All I/O will be individually isolated. All digital outputs will be individually fused and digital inputs will be fused based on logical functional groups.

Digital I/O modules will be capable of supporting a minimum of 8 digital inputs or 8 digital outputs per module. Both inputs and outputs will be 120Vac and the output channels will have a minimum current rating of 3 Amps continuous with an inrush current of 5 Amps.

Analogue I/O modules will be capable of supporting a minimum of 8 analogue inputs or 4 analogue outputs at 4-20mA, 24Vdc.

4.1.3 Control System Remote I/O

The control system will be capable of supporting remote I/O racks for distributing I/O in close proximity to the controls. Remote I/O racks will be capable of supporting the operation of both discrete and analogue I/O efficiently with a high speed communication link back to the main processor.

The remote I/O communications link will be capable of operating at speeds fast enough to support large volumes of I/O data from the remote racks. The remote I/O communication speed will not be below 1 Mbits/sec.

The update times of the remote I/O racks containing any amount of analogue I/O will be less than 3 times the controllers scan rate.

4.1.4 Operator Interface

The process plant control consoles (Human Machine Interface - HMI) will be desktop PC-based units linked directly to the control system communication network (Ethernet). The control consoles will be located in an air-conditioned control room.

A colour printer for printing reports and trends will be supplied as part of the computer hardware in the control room.

The HMI console will be setup to automatically backup historical data files.

At a minimum the HMI computer will consist of:

1) An Intel based PENTIUM(r) (2.8 GHz, 512 MB RAM, 2 x 120 GByte Hard Drive Raid 1 hot swappable, a Read/Write CD Rom Drive, 10/100 BaseT NIC) computer
2) An LCD Flat Screen Monitor (19" Minimum)
3) A graphics card and LCD screen combination capable of displaying 65536 colors at a resolution of 1024x768 pixels.
4) Uninterruptible Power Supply (to provide 30 minutes standby power in cases where a backup generator system is available. One hour standby power is required in cases where a backup generator system is not available.
5) Microsoft Windows 2000 Operating System
6) HMI Software.

4.1.5 Ethernet Communications

The process control system will be capable of linking directly through an Ethernet switch to an Ethernet communication network. The HMI computers will use this link to collect data about the process from the PLC.

4.1.6 Control System Equipment Installation

Controller equipment will be mounted in metal cabinets, rated either NEMA 12 for electrical or control room installation or NEMA 4X designed to exclude oil, dust and sprayed water, for process areas and outdoor installations. Cabinet environment will be maintained within the operational conditions recommended by the equipment manufacturer.

All cabling will meet flame retardant and gas emission standards, and be suitable for installation in cable trays (see Section 2.11).

I/O equipment will be mounted in a cabinet with the following hardware:

- Field wiring terminals for all inputs.
- Fused field wiring terminals for all outputs.
- Power supplies for instruments and control loops.
- Cooling fans or air conditioning units (as required by location).
- Fluorescent light and 120Vac convenience outlets.
- Uninterruptible power supply (UPS) with 1/2 hour backup minimum.

- Multi-conductor cables for wiring from input/output terminals to control panels or junction boxes.
- Controller outputs connected to inductive 120Vac loads will be protected by transient suppressors connected across the load and as close to the load as possible.

4.1.7 Control System Programming

The program will be programmed in an IEC-1131 programming standard.

Each drive or process control loop will be separated into its own control segment within the program for ease of retrieval and manipulation.

Emphasis will be placed on simplicity and ease of maintenance rather than complicated programming strategies.

Instruments

4.1.8 General

Power supply to all two-wire devices will be 120V, 60Hz.

All analogue signals will be 4-20mA DC. All input or output leads to any instrument must be sufficiently protected to be capable of being short-circuited or connected to ground without causing damage to any component in the system.

All discrete output signals will be dry form 'C' contacts.

System internal wiring will be rated 600V employing stranded PVC insulated machine tool wire rated 90ºC.

4.1.9 Field Instruments

4.1.9.1 General

All instruments used for measurement of parameters that affect payment or compliance with the Permit criteria or the Operational Performance Requirements must be reliable, easy to calibrate and capable of verification.

All measurement devices/transmitters will be supplied with internally mounted indicators whose scales will be application specific. Analogue indicators are to be scaled to indicate the process variable as a percentage of full scale.

All instruments, components, housing and enclosures will be suitably protected from adverse conditions such as dust, rainfall, freezing temperatures, process sprays, protective heating, sealing, insulating or purging.

The material of construction for any instrument component that will come into contact with the process fluid will conform to the specification for that equipment or pipeline in which it will be installed.

The degree of instrumentation will be the minimum required for safe operation of the plant and efficient control of the process using a minimum number of operators.

The control and instrumentation will be capable of continuous operation twenty-four hours per day, seven days per week. The system will be designed to go into a fail-safe mode in the event of a failure.

All instrumentation furnished will be standard catalogue items of suppliers. Component interchange ability to minimize spare parts and to simplify service and repairs will be attempted by using identical components, where possible.

All vendor-supplied packages will utilize control systems and instrumentation similar to those selected for plant control, where practical. Control systems for the equipment contained in vendor packages will be capable of interfacing and communicating with the plant control system.

Field instruments will be suitably supported with due consideration given to accessibility and remoteness from heat, vibration etc.

Local indicators will be selected on the basis of readability, rugged construction and process connection.

4.1.9.2 Flow Instruments

Electromagnetic flow meters will be used in slurry services where the fluid electro-conductivity is more than 10 micro-ohms per centimetre

Electromagnetic meters used in flow measurement applications (other than hydrocarbon applications) will be supplied with lining material suitable for slurry applications and in all cases, provision will be made for appropriate grounding hardware (e.g. grounding rings, electrodes etc.) The associated converter/transmitter packages will allow for local indication of the measured process variable.

Ultrasonic flow meters, where used, will be of the clamp-on transducer design with the signal processor / user interface package mounted near but independent of the pipe.

Rotameters may be used where low-flow linear characteristics and wide rangeability are desired.

4.1.9.3 Level Instruments - Liquids and Dry material

Ultrasonic measurement technique will be used where continuous level measurement is required.

Capacitance type switches will be used where distinct fixed level measurement is required.

4.1.10 Pressure Instruments

Pressure sensing elements used in slurry, dust or high corrosive scaling services that will limit the life or reliability of the sensing element, will be isolated from the process medium by either a diaphragm seal or suitable purge seal complete with flushing connections.

Pressure instruments/transmitters will be installed on all pump and compressor discharge lines, except for slurry pumps.

4.1.11 Temperature Instruments

Thermowells will be installed at all process connections to permit the removal of the temperature sensing element.

Temperature (primary) elements will be 100 Ohm platinum bulb RTD and will be coupled to temperature transmitters.

4.1.12 Density Instruments

All density measurements of the process stream will be made in the process pipeline directly.

The density will be measured as mass in a given volume and not be inferred from another process variable.

The density instrument will employ a fully automated sourceholder for remote shutter operation and failsafe shutdown of the radioactive source (if used).

Video Surveillance

The Province will require video surveillance of the WTP during the Operations. The video surveillance system is to provide visual coverage of critical areas of the WTP as determined by the Province. Surveillance cameras will provide the following features:

1) Provide either 10/100 Base T Ethernet connectivity or dial up modem connectivity.
2) Shall provide terminals to connect a motion detector or intrusion alarm contact.

If the camera is outside or located in adverse environments, it will be protected by a suitable enclosure. The enclosure will provide heat during the winter time so that the camera will operate within its design range. During summer time, ventilation will be available so as not to overheat the camera.

The AXIS Communications Model 2100 Camera meets the requirements as specified above.

Schedule C

Specifications of Contaminated Water

Expected Water Chemistry Range

	Total Acidity $mgCaCO_3/L$	Sulphate mg/L	Ca mg/L	Mg mg/L	Al mg/L	Cd mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Zn mg/L
Statistics										
Minimum (10%)	195	1454	351	70	26	0.103	25	2.6	4.6	22
Maximum (90%)	686	2320	458	165	73	0.126	55	63	12	27

Typical Water Chemistry

	Total Acidity $mgCaCO_3/L$	Sulphate mg/L	Ca mg/L	Mg mg/L	Al mg/L	Cd mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Zn mg/L
"Typical" water	346	1659	370	89	39	0.12	32	14	9	24

The WTP will be designed to treat Typical Water continuously, subject only to interruptions permitted by the Agreement, at the rate of 1,050 m^3/hour with a hydraulic capacity of 1,400 m^3/hour.

Groundwater Chemistry

The groundwater is expected to be within the above-noted range. The chloride content will not exceed 1,000 mg/L.

Schedule D

INSURANCE CONDITIONS

1. During the performance of the Work, up to but excluding the Completion Date, the Province will be responsible for arranging for insurance coverage in respect of the following risks:

   (a) Project specific wrap up liability insurance for bodily injury, death and damage to or loss of property, including loss of use thereof. This policy will be for the benefit of the Operator, the Province and all architects, engineers, consultants, Other Contractors and Subcontractors involved in the Project. Limits of liability for this policy will be $5,000,000.00 inclusive, per occurrence, subject to a deductible of $5,000.00 each and every loss. This policy will incorporate all normal extensions and coverages for a project of this nature and will include; sudden and accidental pollution, XCU coverage and 24 months "Completed Operations" coverage.

   (b) Project specific, professional liability insurance, written on a blanket basis and covering all architects, engineers, consultants and other design professionals involved in the Project. Limits of Liability for this policy will be $2,000,000.00 per claim with an aggregate limit of $2,000,000.00 subject to a deductible of $10,000.00. Coverage will be provided for a 24 month extended reporting period following the Completion Date.

   (c) "All risks" builder's risk insurance in an amount sufficient to cover the full replacement cost of all works that make up the WTP or may be required to complete the WTP.

   The premiums for the insurance arranged by the Province pursuant to this Section 1 will be payable by the Province.

2. From and including the Commencement Date and through to and including the Termination Date, the Operator will be responsible for maintaining insurance coverage in respect of automobile liability on all vehicles owned, leased or rented by the Operator subject to limits of not less than $2,000,000 inclusive per occurrence.

3. From and including the Commencement Date and through to and including the Termination Date, the Operator will purchase and maintain such insurance, in a form, and with insurers acceptable to the Province, acting reasonably, as would be obtained by a prudent owner-operator of a waste water treatment plant such as the Project, including at a minimum, the insurance coverage stipulated in this Section 3:

   (a) "Commercial/Comprehensive General Liability Insurance" with limits of not less than $5,000,000 inclusive per occurrence, and a deductible of not more than $5,000 per occurrence, for bodily injury, death and damage to or loss of property, including loss of use thereof. This policy will be written in the name of the Operator and the Province as owner. This policy will contain a provision that it

will not be cancelled or materially changed without 30 days prior written notice to the Province at the address provided herein. Coverage will include the following:

i) premises and operations liability;

ii) Operator's contingent liability with respect to the operations of persons, firms or corporations having a contract for the execution of a part or parts of the work included in the Agreement;

iii) products or completed operations liability;

iv) blanket contractual liability;

v) cross liability;

vi) elevator and hoist liability;

vii) broad form property damage;

viii) contingent employers liability;

ix) personal injury liability;

x) liability with respect to non-owned licensed vehicles; and

xi) sudden and accidental pollution liability.

(b) "All Risks" property insurance on a replacement cost basis with "Stated Amount Co-insurance", in respect of the WTP. The sum insured will be the full replacement value of the "property of every description" comprising the WTP. The policy will be written in the name of the Province, as owner and the Operator, as their respective interests may appear.

(c) Comprehensive Boiler and Machinery insurance covering direct damage to the Work and damage to any machinery and pressure vessels for a limit of not less than $10,000,000. This policy will be in place prior to any installation of testing of such equipment and will cover losses arising from such installation and testing. This policy will be written in the name of the Operator and the Province and any other party who has an insurable interest in the Project and will contain a provision that it will not be cancelled without 30 days prior written notice to the Province at the address provided herein.

4. <u>General Conditions with respect to insurance requirements</u>

(a) The coverages to be provided pursuant to Sections 2 and 3 are the Province's minimum requirements. The Operator may, as it sees fit, purchase such higher limits or additional coverages that it considers prudent or desirable.

(b) The Operator will be responsible for all deductibles that apply to the coverages to be provided pursuant to Sections 2 and 3.

(c) Any word or term contained within quotation marks in this Schedule D – INSURANCE CONDITIONS will be interpreted using the commonly understood meaning of such word or term in general insurance usage.

(d) The Operator will ensure that, during the period of transition during the commissioning of the Project, there will be no gap in the insurance coverage and that the Project is continuously insured.

(e) Both the Province and the Operator acknowledge that it is likely that the insurance terms and conditions that seemed reasonable at the time that this Agreement was drafted may seem less so at some time in the future. Accordingly, the Province, acting reasonably, reserves the right to review and revise these insurance requirements at any time in the future, provided that any such revisions would be Variations. After the Completion Date, the policy limits and deductibles as set out in this Schedule D – INSURANCE CONDITIONS will be reviewed annually and will be adjusted periodically to ensure that the insurance coverage throughout the Term is comparable to that in place on the Completion Date.

(f) All property insurance policies will provide that in the event of a loss, payment for damages to the Project will be made to the Province and the Operator as their respective interests may appear. The Operator will act on behalf of the Province and itself for the purpose of adjusting the amount of such loss with the insurers. On the determination of the extent of the loss, the Operator will immediately proceed to restore the Project and will be entitled to receive from the Province (in addition to any sum due under the Agreement) the amount at which the Province's interest in the restoration work has been appraised, such amount to be paid as the work of the restoration proceeds and in accordance with the Operator's application for payment, but only to the extent that the Province actually receives payment from the insurer or insurers in respect of that loss, and the Province is not liable to pay the Operator anything in respect of such loss in any other case.

(g) The Operator will, from time to time, at the request of the Province, provide to the Province proof satisfactory to the Province, acting reasonably, that all policies of insurance required by these Insurance Conditions are in force, unaltered and not cancelled, and that any premiums due therefore have been paid in full, and in this regard, will provide to the Province an insurance certificate in the form of Schedule D-1 to this Agreement, whenever required by this Agreement and at other times, upon written request.

(h) If the Operator fails to comply with these Insurance Conditions in any respect, the Province may, in its sole discretion, perform the Operator's obligations under these Insurance Conditions, at the expense of the Operator, which expense may be withheld or set off by the Province in accordance with the Agreement. Nothing in this section places any obligation on the Province to act under this section or relieves the Operator from its obligations under these Insurance Conditions.

Schedule D1

Provincial Form of Insurance Certificate

BRITISH COLUMBIA

CERTIFICATE OF INSURANCE

Freedom of Information and Protection of Privacy Act
The personal information requested on this form is collected u
the authority of and used for the purpose of administering the
Financial Administration Act. Questions about the collection a
of this information can be directed to the Manager, Consulting
Advisory Services, at 250 356-8915, PO Box 9405 STN PRO
GOVT, Victoria BC V8W 9V1.
Please refer *all other questions* to the contact named in P

Part 1 To be completed by the Province

THIS CERTIFICATE IS REQUESTED BY and ISSUED TO *(Name of office)*	CONTRACT/PERMIT/LICENCE/IDENTIFICA
PROVINCE'S CONTACT PERSON NAME & TITLE	PHONE NO ( ) FAX NO ( )
ADDRESS	POSTAL CODE
CONTRACTOR NAME	
CONTRACTOR ADDRESS	POSTAL CODE

Part 2 To be completed by the Contractor's Agent or Broker

INSURED	NAME	
	ADDRESS	POSTAL CODE
OPERATIONS INSURED	PROVIDE DETAILS	

TYPE OF INSURANCE *List each separately*	COMPANY NAME, POLICY NO. & BRIEF DESCRIPTION	EXPIRY DATE YYYY/MM/DD	LIMIT OF LIABILITY/AM

This certificate certifies that policies of insurance as herein described have been issued to the insured(s) named above, are in full force and effective as of the effective date of the contract/permit/licence, and comply with the insurance requirements of the contract/permit/licence except as follows:

AGENT OR BROKER COMMENTS:

SIGNED BY THE AGENT OR BROKER ON BEHALF OF THE ABOVE INSURER(S)	DATE SIGNED

Schedule E

PAYMENT MECHANISM

This Schedule E is comprised of the following separate Schedules, all of which are hereby incorporated by reference herein and each of which may be referred to either by a general reference to this Schedule or by a specific reference to the part of this Schedule in which it is located, as listed below:

Schedule	Description
E-1	Interpretation
E-2	Calculation of Periodic Payment
E-3	Chemicals and Reagents Volume Adjustments
E-4	Utilities Volume Adjustments
E-5	Sludge Volume Adjustments
E-6	Major Events, Minor Events and Quality Events
E-7	Annual Performance Report

Schedule E – 1

Interpretation

Capitalized terms used in this Schedule E, unless defined below, have the meanings as set out in Section 1.1 of the Project Agreement.

“Annual Availability Charge” is defined in Schedule E-2.

"Assessed Chemical Usage" means and is the amount of Lime and Flocculent that is expected to be used by the Project to treat water, calculated using the formula in Schedule E-3 (regardless of the actual amount of Lime and Flocculent used) based upon the actual amount of water successfully treated in accordance with the Operational Performance Requirements.

"Assessed Utility Usage" means and is the amount of electricity that is expected to be used by the Project to treat Contaminated Water, ground water, storm-water, calculated using the formula in Schedule E-4 (regardless of the actual amount of energy used and assuming the turbine generators expected to be used by Operator are used every Day) based upon the actual amount of water successfully treated in accordance with the Operational Performance Requirements.

“By-Pass Event Water” means Contaminated Water which is introduced into the Outfall without being treated in the WTP.

“Flocculent” is the Flocculent more commonly known as “Magnafloc 10” or equivalent, which will be used by the Operator to treat water.

“Flocculent Contract” means the agreement between Operator and the supplier of Flocculent.

“Flocculent Consumption Target Efficiency” is the estimated long-term average rate of consumption efficiency of Flocculent per unit volume of water treated by the WTP and is specified in Appendix E-B.

“Interim Operation Daily Payment” means 1/30th of the Periodic Payment (using the Monthly Base Payment for January, 2006) less a deduction of 2% of such amount for each Day past the Interim Operation Date that the Operator first meets the Interim Operation Requirements.

“Interim Operation Date” means such date as is 50 Days prior to the Scheduled Completion Date, provided that if the Scheduled Completion Date occurs later than January 1, 2006, the Interim Operation Date will not fall later than January 1, 2006 unless the Scheduled Completion Date has been delayed due to Abnormal Circumstances or a Variation.

"Interim Operation Requirements" means treatment of at least 5,000 cubic metres of water per Day in compliance with the pH and Total Suspended Solids (TSS) requirements of the Discharge Permit.

“Jane Basin Area” means Jane Basin, Mount Sheer or any other provincially held lands in the surrounding area to be used for Sludge disposal.

“Lime” is the lime of quality level and specification (93-94% CaO) which will be used by Operator to treat Contaminated Water, as measured by Calcium Oxide (CaO) equivalent.

“Lime Contract” means the agreement between Operator and the supplier of Lime.

“Lime Consumption Target Efficiency” is the estimated long-term average rate of consumption efficiency of Lime per unit volume of Contaminated Water treated by the WTP and is specified in Appendix E-B.

“Major Event” is defined in Schedule E-6.

"Major Event Deduction Amount" is defined in Schedule E-6.

“Minor Event” is defined in Schedule E-6.

"Minor Event Deduction Amount" is defined in Schedule E-6.

"Monthly Base Payment" is defined in Schedule E-2.

“Periodic” means an event that occurs or action undertaken in each Month.

“Periodic Payment” is defined in Schedule E-2.

"Proposed Annual Payment" is defined in Schedule E-4.

”Quality Event” is defined in Schedule E-6.

"Quality Event Addition" is defined in Schedule E-6.

“Rectify” means rectifying a Major Event or Minor Event and restoring all functional capability so that the subject matter of such Major Event or Minor Event complies with the levels of service required pursuant to this Agreement.

“Utility” means electricity and any other utility for which payment adjustments are made under the provisions of Schedule E-4.

“Utility Contract” the annual contractual agreement(s) entered into by Operator for the purchase of any Utility.

Schedule E – 2

Calculation of Periodic Payment

Periodic Payment

The Periodic Payment payable in respect of any Month during the Term (where "n" ranges from 1 to 20 corresponding to the Year of the Term of the Agreement) will be calculated in accordance with the following formula:

Periodic Payment	=	Monthly Base Payment (n)
	+	MC + MU + MS
	+/-	Event Adjustments

where:

"Monthly Base Payment(n)" is defined in this Schedule E-2

"MC" is the Monthly Chemical Volume Adjustment calculated in respect of the relevant Month in accordance with the provisions set out in Schedule E-3;

"MU" is the Monthly Utility Volume Adjustment calculated in respect of the relevant Month in accordance with the provisions set out in Schedule E-4;

"MS" is the Monthly Sludge Volume Adjustment calculated in respect of the relevant Month in accordance with the provisions set out in Schedule E-5; and

"Event Adjustments" is the sum of all Major Event Deduction Amounts, Minor Event Deduction Amounts and Quality Event Addition Amounts in respect of the relevant Month and calculated in accordance with the provisions set out in Schedule E-6. Event Adjustments can be either positive or negative and thus lead to either an increase or decrease to the Periodic Payment.

Notwithstanding anything else in this Agreement, at no time during the first 18 Months following the Completion Date, will Event Adjustments which pertain to any such Month reduce the Periodic Payment which would be payable for such Month to below the Annual Availability Charge divided by twelve months.

Initial Completion Additions

The Province will pay the Operator the Interim Operation Daily Payment for each Day prior to Substantial Completion that the Operator meets the Interim Operation Requirements.

Operating After the Completion Date

Notwithstanding any other provision of this Agreement, the Province will not make deductions from the Periodic Payments for the first 3 Months after the Completion Date in respect of water quality provided the Operator meets the requirements of the Discharge Permit or such relaxation of the Discharge Permit as the relevant Government Authority may approve.

Total Completion Deductions

If Operator has not obtained the Total Completion Certificate by 18 months after Substantial Completion, Province will deduct 20% of each Day's pro-rated portion of the Periodic Payment

for the Month in which such Day occurs until either the Operator obtains the Total Completion Certificate or the Operator's Consultant certifies to Province's Representative that all necessary upgrades and improvements to the Project have been successfully installed and, to the best of Operator's Consultant's knowledge, the Project is capable of achieving Total Completion when sufficient water will next be available to perform Operational Acceptance Testing.

Calculation of the Monthly Base Payment

The Monthly Base Payment will be calculated in accordance with the following formula. The Annual Availability Charge is as defined below and as calculated in Schedule E-A. The Annual RR and the Annual Other Costs are to be adjusted using the CPI and the Annual Labour Costs are to be adjusted using the Labour Index, with all such adjustments being made on an annual basis to the amounts utilized in the previous year. Additionally, the Annual Other Costs will be further adjusted if the Operator's insurance costs increase in any year by more than 10% over such costs in the preceding year, with the Operator and the Province sharing equally the amount by which any such annual increase exceeds the 10% margin.

Monthly Base Payment(n) = Annual Availability Charge(n) / 12
+ Annual RR(n) / 12
+ Annual Labour Costs(n) / 12
+ Annual Other Costs(n) / 12

where:

"Monthly Base Payment(n)" is the monthly service payment for the relevant year of the Term "n", where "n" ranges from 1 to 20;

"Annual Availability Charge" is the component of the Proposed Annual Payments in Schedule E-A for Contract Year "n" (from 1 to 20).

"Annual RR", "Annual Labour Costs", and "Annual Other Costs" are the amounts shown in Appendix E-A for the relevant year of the Term "n", where "n" ranges from 1 to 20;

"Labour Index" is the inflation factor to be used when calculating the increase in the labour component of the annual labour payment amounts above based upon the Operator's Proposed Annual Payments submission and the actual increase in inflation versus Operator's projected inflation. Such index will be based upon the Statistics Canada Change in Hourly Wage indicator for British Columbia, *Average hourly wages of employees by selected characteristics, profession and by province, unadjusted data*, The relevant component of this Indicator is *Natural and applied sciences and related occupations.* This change in hourly wage indicator is compiled by Statistics Canada and be calculated for a given period at Statistics Canada's web site address (http://www.statcan.ca/english/Pgdb/labour69k.htm). From time to time the name of the above index may be changed by Statistics Canada. In this event the most similar index will then apply which will most likely be the renamed index. An example of the application of the Labour Index is as follows:

$$\left(\frac{\text{index (n+1)}}{\text{index (n)}} \times 100 \right) - 100$$

Schedule E – 3

Chemicals and Reagents Costs

Monthly Chemical Volume

Operator will receive in respect of each Month the Monthly Chemicals Payment, calculated in accordance with the following formula:

MC = VW.Contaminated x Lime Efficiency AE x P.limeA
+ VW.Contaminated x Flocculent Efficiency BE x P.flocB
+ By-pass event Lime Usage x P.lime
+ Other Chemical Costs

where:

"By-pass event Lime Usage" means the amount of Lime used to neutralize By-Pass Event Water

"MC" is the Monthly Chemical Volume Adjustment calculated in respect of the relevant Month in accordance with the provisions of this Schedule E-3;

"VW.Contaminated" is the volume of Contaminated Water (excluding By-Pass Event Water) treated by the WTP in accordance with the Operational Performance Requirements during the Month;

"Lime Efficiency AE" is the Chemical A [e.g. lime] Lime Consumption Target Efficiency per unit volume of Contaminated Water treated as described in Appendix E-B attached, ;

"Flocculent Efficiency BE" is the Chemical B Flocculent Consumption Target Efficiency per unit volume of Contaminated Water treated as described in Appendix E-B attached;

"P.lime A" is the actual delivered cost to Operator per unit (after consideration of hedging costs, bulk purchase discounts and other similar discounts, if any) of Chemical A Lime (93-94% CaO) payable by Operator pursuant to the relevant Chemical A Lime Contract;

"P.floc B" is the actual delivered cost to Operator per unit (after consideration of hedging costs, bulk purchase discounts and other similar discounts, if any) of Chemical B Flocculent payable by Operator pursuant to the relevant Chemical B Flocculent Contract; and

“Other Chemical Costs” means the actual delivered cost of other chemicals and reagents (excluding items Lime and Flocculent measured above) used by Operator during the Month for the Operations.

Other Chemical Costs must always amount to less than 5% of the cost of all other chemicals and reagents for the Month (that is, must be less than 5% of MC as calculated above). The cost of other chemicals and, reagents above 5% of MC costs will remain the responsibility of Operator and Operator will fund 100% of such cost over-runs. For greater certainty, if Operator determines significant amounts of iron and/or other chemicals are required to treat water and the costs of such iron additives (and other chemicals) exceeds 5% of MC then such costs above the 5% limit will be funded by Operator and not charged to Province.

Schedule E – 4

Utilities Costs

Monthly Utility Volume Adjustment

Operator will receive in respect of each Month the Monthly Utility Cost, calculated in accordance with the following formula:

MU = VW.Contaminated x NUE x PU + Other Energy Costs

where:

"MU" is the Monthly Utility Cost for the relevant Month;

"VW.Contaminated" is the volume of Contaminated Water (excluding By-Pass Event Water) successfully treated by the WTP in accordance with the Operational Performance Requirements during the Month;

"NUE" is the Net Utility Consumption Target Efficiency (assuming turbine credit) per unit volume of Contaminated Water (excluding By-Pass Event Water) treated, as described in Appendix E-C attached hereto;

"PU" is the price per unit of utility payable by Operator pursuant to the relevant third party Utility Contract. For greater certainty, PU will exclude all costs of any power generated on-site through hydro turbines as proposed by Operator and

“Other Energy Costs” is the actual cost of energy consumption required for groundwater extraction and pumping to the treatment plant, and for the pumping of groundwater and storm water used by Operator during the Month for the Operations times “PU”.

Schedule E – 5

Sludge Costs

Monthly Sludge Costs

Operator will receive in respect of each Month the Monthly Sludge Payment, calculated in accordance with the following formula:

MS = VW.Contaminated x SE x P.transport

where:

"MS" is the Monthly Sludge Cost calculated in respect of the relevant Month in accordance with the provisions of this Schedule E-D;

"VW.Contaminated" is the volume of Contaminated Water (excluding By-Pass Event Water) treated by the WTP in accordance with the Operational Performance Requirements during the Month;

“SE” is the Sludge Production Target Efficiency per cubic metre of Contaminated Water (excluding By-Pass Event Water) treated, as described in Appendix E-C attached hereto;

"P.transport" is the cost of transporting a cubic metre of Sludge.

Schedule E – 6

Major Events and Minor Events

Events

If at any time during any Month a Major Event or Minor Event will occur, then Province will be entitled to make additions or deductions from the Periodic Payment for such Month as described below.

"Event Adjustments" for any Month's Periodic Payment will be calculated as follows:

Event Adjustments = Major Event Deduction Amount + Minor Event Deduction Amount

Major Event Deductions

"Major Event" means the occurrence of any of any event labelled "Major Event" in Schedule F - Operational Performance Requirements.

The number of Days on which a Major Event occurs will be calculated each Month by Operator.

"Major Event Deduction Amount" for any Month's Periodic Payment will be calculated as follows:

Major Event Deduction Amount	=	Periodic Payment for such Month (before any Event Adjustments)
	X	number of Days in the Month on which at least one Major Event occurred ÷ 30

Minor Event Deductions

"Minor Event" means the occurrence of any event labelled "Minor Event" in Schedule F - Operational Performance Requirements.

The number of Minor Events will be calculated each Month by Operator.

"Minor Event Deduction Amount" for any Month's Periodic Payment will be calculated as follows:

Minor Event Deduction Amount	=	Periodic Payment for such Month (before any Event Adjustments)
	X	number of Days in the Month on which at least one Minor Event occurred ÷ 3000

Quality Event Additions

"Quality Event" means the occurrence of the event labelled "Quality Event" in Schedule F - Operational Performance Requirements.

The Operator will be awarded a Quality Event at the end of each year if the annual average target is achieved for the purposes of this section.

"Quality Event Addition Amount", if any, will be calculated as follows:

Quality Event Addition Amount	=	Average Periodic Payment for year n
	X	0.004

Schedule E – 7

Annual Performance Report

By no later than 60 days after the expiry of each year of the Term, Operator will submit to Province a written schedule setting out a calculation (and reasonable supporting documentation, including paid invoices where applicable) of:

A) **Volume:**

a) a summary of water volume treated (Contaminated Water and Bypass Water);

B) **Chemicals:**

a) the actual Lime, Flocculent and other chemical/reagent usage;

b) the actual Chemical Usage;

c) a summary of water volume treated (Contaminated Water and Bypass water);

d) actual Lime and Flocculent consumption efficiencies, and

e) Lime, Flocculent and other chemicals/reagent prices per month. Prices are to be supported by copies of paid invoices, and other documents as may be reasonably requested by the Province

C) **Utilities:**

a) the actual energy produced by the on-site turbine generators, if any;

b) the actual energy purchased by third party suppliers;

c) the Assessed Utility Usage;

d) a summary of water volume treated (Contaminated Water and Bypass Water);

e) actual energy consumption efficiencies, and

f) energy prices per month.

D) **Sludge:**

a) the actual weight (theoretical and actual) of Sludge produced by the WTP before drying at the Site;

b) The water content of Sludge produced by the WTP at the time of production and at the time of transportation;

c) the actual weight of Sludge produced by the WTP transported to Jane Basin Area at the time of such transportation, if any;

d) the actual weight of Sludge produced by the WTP transported to offsite at the time of such transportation, if any;

e) actual Sludge production efficiencies, and

f) Sludge tipping, transportation and other third party costs per month.

Operator will include in their annual submission to Province sufficient information on chemical consumption efficiency and water chemistry variations to enable Province to conduct a complete review for reasonableness.

Operator will include in their submission to Province sufficient information on energy consumption efficiency to enable Province to conduct a complete review for reasonableness.

Province will confirm its acceptance of the schedule or, as the case may be, notify Operator of the details of any disagreement, within 30 days of receipt of Operator's calculations.

Any amount payable either by Province to the Operator or by the Operator to Province, in accordance with this Schedule E-7 will be added or deducted to the following Periodic Payment within 60 days following the agreement to the Annual Performance Report reconciliation in this Section.

APPENDIX E-A

20-Year Proposed Annual Payment

This Schedule E-A is to be updated on Substantial Completion as well as each subsequent year using actual inflation for each line item (in accordance with inflation calculations of the Payment Mechanism). Thus this Schedule E-A will be replaced each year with an updated version reflecting current inflation estimates and projections. Projections of future annual amounts for each line item are to be based upon average annual inflation for the past one (1) years. For analysis and bid purposes, the initial inflation rate assumed was 2% per annum for all line item categories (CPI, labour, energy, chemicals).

The Annual Availability Charge as set out in the table below is calculated based on a total capital cost for the Project of $15,557,000. This total capital cost amount is subject to change based on the actual capital cost for Allowance Work and Variations authorized by Variation Confirmations and will be calculated over the Term in accordance with the table below, without adjustment for CPI or Labour Index.

PROPOSED ANNUAL PAYMENTS (IN NOMINAL DOLLARS)	**TOTAL** $'000	2005	Year 1 $'000	Year 2 $'000	Year 3 $'000	Year 4 $'000	Year 5 $'000
Annual Availability Charge	XXX		XXX	XXX	XXX	XXX	XXX
Annual Repair & Replacement Charge	1,614		39	40	40	41	42
Annual Labour Charge	XXX		XXX	XXX	XXX	XXX	XXX
Annual Other Charges (routine repairs, overhead, other)	7,817		322	328	335	341	348
Estimated Annual Chemicals/Reagent Charge	8,440		347	354	361	369	376
Estimated Utility Charge	962		40	40	41	42	43
Estimated Net Sludge Charge (transportation, disposal)	5,691		234	239	244	249	254
Major Events, Minor Events & Quality Events	0		0				
Proposed Annual Payments	61,987	0	2,805	2,829	2,854	2,879	2,905
NPV of Periodic Payments at 8.12% discount rate ($000)			27,177				

Year 6 $'000	Year 7 $'000	Year 8 $'000	Year 9 $'000	Year 10 $'000	Year 11 $'000	Year 12 $'000	Year 13 $'000	Year 14 $'000	Year 15 $'000	Year 16 $'000	Year 17 $'000	Year 18 $'000	Year 19 $'000	Year 20 $'000
XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
82	83	85	87	88	90	92	94	96	98	100	102	104	106	108
XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
355	362	370	377	384	392	400	408	416	424	433	442	450	459	469
384	391	399	407	415	423	432	441	449	458	467	477	486	496	506
44	45	45	46	47	48	49	50	51	52	53	54	55	57	58
259	264	269	274	280	286	291	297	303	309	315	322	328	335	341
														0
2,970	2,998	3,026	3,055	3,084	3,114	3,144	3,175	3,207	3,239	3,272	3,306	3,340	3,375	3,410

Appendix E-B

Chemical Consumption Target Volume & Efficiency

Chemical Consumption Target Efficiencies	Annual Average Chemical Lime and Flocculent Consumption Target (Chemical Consumption per year)	Chemical Consumption Target Efficiency (Chemical Consumption per Unit Volume of treated water)
Lime Consumption Weight & Efficiency	XXX tonnes	XXX Kg per cubic metre of water treated ("Lime Efficiency")
Flocculent Consumption Weight & Efficiency	XXX tonnes	XXX Kg per cubic metre of water treated ("Flocculent Efficiency")

Appendix E-C

Net Utility Consumption Target Volumes & Efficiency

Net Utility Consumption Target Efficiencies	Annual Average Net Utility Consumption Volume Target	Net Utility Consumption Target Efficiency)
Electricity Volume and Efficiency before affect of turbine generators	XXX KW hours per year	XXX KWh per cubic meter of Contaminated Water successfully treated by the WTP (excluding By-Pass Event Water)*
Electricity deemed generated by turbines each year	XXX KWh hours per year (KWh hours per Day)	
Electricity Volume and Efficiency after affect of turbine generators	XXX KW/year	XXX Kw per cubic meter of Contaminated Water successfully treated by the WTP (excluding By-Pass Event Water).

** To be used where there is less than 100 m. head as a result of the Operator's determination, made reasonably, on how best to manage the Contaminated Water in the Workings (subject to verification by the Province).*

Appendix E-D

Sludge Production Target & Efficiency

Sludge Parameter	Assumptions
"VW.Contaminated" for the purposes of the calculations	XXX m3 Contaminated Water (4,977,000 m3 from the Workings and 500,000 m3 ground water). No By-Pass Event Water.
The cost of transporting Sludge per cubic metre ("P.transport ")	XXX per tonne of wet Sludge when shipped to Jane Basin Area.
Sludge Production Target Efficiency	XXX Kg per cubic metre of Contaminated Water (as described above).

Transportation Costs

The Province understands that the cost of all equipment, labour, materials and supplies related to the following activities are included in the payment for Sludge transportation costs.

1. Transport of Sludge from the plant to temporary holding areas.
2. Management of the holding areas, including covering of the Sludge, when required.
3. Loading of the Sludge into trucks and transportation to Jane Basin.
4. Placement of the Sludge in the Glory Hole in accordance with the requirements of the regulatory agencies.
5. Maintenance of the road from the plant site to Jane Basin in a condition suitable for use by the Operator's selected means of transporting the Sludge. This includes routine grading prior to and during transport operations, removal of minor slides and provision of dust control measures.
6. Provision of all of the above in compliance with regulatory requirements.
7. Provision of environmental liability insurance in the amount of $5 million.

The Province understands that the cost of the following are included in the Operator's operating costs:

1. Sampling the Sludge and analysis for chemical stability by the TCLP method, and reporting of the results.
2. Construction and rehabilitation of temporary holding ponds or storage areas for Sludge.

The Province understands that the following are excluded from the excluded from the Operator's operating costs and are the Province's costs:

1. Environmental monitoring that may be required by the regulatory authorities
2. Provision of a suitable bridge structure at Mineral Creek and at Marmot Creek.

3. Repair of washouts and structural failures of the road.
4. Capital expenditures required to comply with regulatory requirements.
5. All costs associated with the construction, operation and closure of impoundment cells at the plant interim storage site, if impoundment cells are required.

Schedule F

OPERATIONAL PERFORMANCE REQUIREMENTS

The Operator will be responsible for the overall operation, repair and maintenance of the Project in a manner that is in compliance with the requirements of this Agreement, this RFP and the RFP Documents, and that maintains the utility of the assets. The services during the operating phase include the following, as well as any services that are not listed but are required to sustain a fully functional facility.

1.0 Quality of Effluent

The following information is to be used as the basis for the operation of the WTP:

Parameter	Discharge Criteria[1] (Discharge Permit)	Provincial Guidelines[1]
dissolved copper	≤ 0.1 mg/L,	≤ 0.02 mg/L,
dissolved iron	≤ 0.1 mg/L,	≤ 0.01 mg/L,
dissolved zinc	≤ 0.2 mg/L,	≤ 0.03 mg/L,
dissolved aluminum	≤ 1 mg/L,	≤ 0.5 mg/L,
dissolved manganese	≤ 0.4 mg/L,	≤ 0.2 mg/L,
dissolved cadmium	≤ 0.01 mg/L,	≤ 0.001 mg/L,
total suspended solids	≤ 30 mg/L,	≤ 10 mg/L,
pH range	6.5 to 9.5	6.5 to 9.5
and, on a grab sample;		
96HRLC50 fish bioassay	≥100% survival (non-acutely toxic)	≥100% survival (non-acutely toxic)

[1] The Province has established the Average Monthly Values that it expects the Project to be able to meet on a monthly basis when the volume of water treated is less than or equal to the design capacity.

2.0 Measurement Requirements

In addition to activities that the Operator must perform to satisfy obligations under other sections of this Agreement, the Operator is required to provide the following sampling and analytical services. All analyses are to be performed in accordance with the protocols and procedures specified in the Discharge Permit.

Measurement of Volumes

The measurement of the volume of water treated will be at the point where the treated water exits the WTP, before the addition of any untreated Contaminated Water and storm water that is by-passing the WTP. In addition, the Operator is required to measure the volume of water at the following locations:

- Volume discharging from the Plug.
- Volume by-passing the WTP.
- Volume pumped to the WTP from the groundwater collection system, which may include surface runoff.
- Volume of storm water pumped directly to the Outfall.

Subject to Sections 2.2 and 2.3 of this Schedule, all of the above measurements are to be continuous and recorded electronically using the SCADA system.

Measurement of Physical and Chemical Parameters

These requirements are the minimum required by the Province. The Operator may perform more frequent sampling and analysis for process control.

Water is to be sampled and analyzed as indicated in the following sections. Notwithstanding anything else in this Schedule F Operational Performance Requirements, it is understood and acknowledged that on-line continuous analyzers and other instruments may fail as a result of plugging, fouling or any other cause. In the event that an analyzer fails, it is permissible to collect daily samples until the analyzer is repaired or replaced. The Operator will ensure that the said analyzers are repaired or replaced in a timely fashion.

2.1.1 Semi-Quantitative Analysis for Copper, Zinc and Aluminium

The Operator will be required to perform daily semi-quantitative analysis for copper, zinc and aluminium for:

i. The first three months of operation

ii. For a one week period whenever the WTP has been shut down for a period of a week

iii. At the start of the spring freshet when it is ramping up from winter operations,

iv. When the WTP is operating at rates in excess of 1050 m3/hour

v. During the Operational Acceptance Testing.

2.1.2 Water exiting the Workings

i. Continuous – pH

ii. Weekly – quantitative analysis for total and dissolved metals in accordance with the analytical protocol required in the discharge permit, and total suspended solids ("TSS")

2.1.3 Groundwater pumped to the WTP

i. Continuous – pH and conductivity

ii. Weekly – quantitative analysis for total and dissolved metals in accordance with the Discharge Permit and TSS

2.1.4 Storm water pumped to the Outfall

i. Monthly – pH, quantitative analysis for total and dissolved metals in accordance with the Discharge Permit and TSS.

2.1.5 WTP effluent

i. Continuous – pH, turbidity.

ii. 24 hour daily composite – semi-quantitative analysis for copper and zinc.

iii. Weekly composite – quantitative analysis for total and dissolved metals in accordance with the Discharge Permit.

The Operator is to establish the relationship between turbidity measurements and TSS for reporting purposes.

Analysis for each measured parameter will include at least the following:

i. Averaged parameter amount each Day (weighted average by volume of water).

ii. Daily minimums and maximums of each parameter are to be identified.

iii. Out-of-range events (identifying number of events each Day, cumulative amount of water for each incident, water chemistry characteristics).

Analysis for additional parameters specific to the process may be added.

The frequency of analysis will be reduced if the Operator can demonstrate that the WTP can operate reliably under varying conditions. If the semi-quantitative analysis indicates that the metal content exceeds the requirements of the Discharge Permit, samples will be required to be sent for quantitative analysis to identify the cause.

Online Results

Subject to Section 2.2 of this Section, the Operator will make 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.

3.0 Operations and Monitoring Performance

Operator is responsible for satisfying Operational Performance Requirements (as described in Table B2-1 below) and self-monitoring performance. Failure to monitor and report performance to Province's Representative as described may have material consequences (depending upon the item not monitored or reported). Operator is also responsible for all other required reporting under the Permits.

Operational Performance Requirements

The services to be performed by the Operator during the Operations are described in this Agreement and certain requirements are specified below in the column labelled "Operational Performance Requirements" of **Table B2-1 Operations Scope, Reporting and Consequences**.

Monthly and Annual Reports to Province

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.

Operator will prepare and certify the accuracy and completeness of the following reports:

(a) **Monthly Report**. This includes summaries of "Performance Indicator" items described in the column below. Province's Representative may request clarifications and additional information on details of a Monthly Report from time to time.

(b) **Annual Performance Report**. Summary of calendar year activity and Performance Indicators described below. 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.

4.0 Major Events, Minor Events and Quality Events

"Major Event", Minor Events" and "Quality Events" are as identified in Table B2-1 to this Schedule F – Operational Performance Requirements, which is entitled "B2-1 Operations Scope, Reporting and Consequences." Each Operational Performance Requirement described below generally has one of these events associated with performance (or non-performance). Major Events and Minor Events always lead to deductions to the Operator's monthly Periodic Payment for services, while Quality Events lead to small bonuses to the monthly Periodic Payment The parties acknowledge that the adjustments provided for in this Schedule F are not exhaustive and that the Periodic Payments may be increased or decreased for any reason permitted by the terms of the Agreement. The parties acknowledge that the adjustments to the Periodic Payments provided for in this Schedule F are not exhaustive of the remedies available to the parties.

5.0 Flow of Contaminated Water from Reservoir

The Operator is permitted to operate the mine reservoir at levels between 20 metres and 255 metres above the Plug datum point. Operation with less than 20 metres of water in the reservoir has the potential to entrain floating debris and is not permitted. The maximum level of 255 metres above the plug datum point is slightly below the overflow point into the 3250 Level adit. Operation above this level has the potential to result in an uncontrolled overflow event into Mineral Creek.

Provided that the Project is operating at or near the Design Capacity (as defined in Schedule B), and the Operator forecasts that the reservoir is likely to fill to the maximum operating level (approximately 255 metres above the Plug) the Operator is permitted to allow Contaminated Water to by-pass the WTP, provided that such Contaminated Water is mixed with the treated effluent prior to discharge to the marine environment, and that the pH of the discharge, before the addition of any storm water, meets the pH criteria of the Discharge Permit. The total water management system, including conveyance system from the Plug to the WTP, the WTP by-

pass system and Outfall must be capable of handling 3,600 m^3/hour. The Province accepts the risk that the flow rate may exceed this figure on rare occasions, and that this could result in the reservoir overflowing through the 3250 Level adit through no fault of the Operator. The Province will construct a means for handling such an extraordinary overflow event, and will not hold the Operator responsible for any environmental consequences of this overflow, providing that the Operator has met his other obligations with respect to the operation of the Project.

6.0 Flow of Groundwater

The groundwater in the Fan Area is contaminated due to the flux of water through the Museum area, and the former concentrate storage area, both of which are underlain by soils containing mine tailings and waste rock. Drilling investigations and computer modeling have provided a basis for the assessment of the means of mitigating the flux of groundwater from entering the environment at the foreshore. The Province has committed to the mitigation of this source of contamination by installing a groundwater collection system. This collection system will be installed by Other Contractors or by the Operator pursuant to a Variation prior to the commencement of operation of the treatment plant Prior to the startup of the WTP, the collected water will be discharged through the existing outfall pipe at Britannia Creek.

The Operator will be required to treat groundwater (GW) collected from the South Fan Area along the foreshore. The Province has developed the Groundwater Management Plan (GMP) for the Britannia Mine Remediation Project based upon the parameters shown in the table below. The Operator is required to be able to treat the volumes and handle the variations shown in this table, provided that the Contaminated Water falls within the Expected Water Chemistry Range.

Maximum volume to be pumped	100 m3/hour
Maximum chloride content	1,000 mg/L – to be controlled by Measurement of conductivity
Projected volume to be pumped during the wet season	80 m3/hour
Projected volume to be pumped during the dry season	50 m3/hour
Projected annual volume to be pumped and treated	500,000 m3/year

The Province also wishes to clarify that provided that the Contaminated Water complies with SCHEDULE C – SPECIFICATIONS OF CONTAMINATED WATER, the WTP must be capable of treating a total of 1,050 m3/hour of combined mine water and GW under all conditions. While the volume of GW to be treated is limited to a maximum of 100 m3/hour, it may well be less than that amount due

to seasonal variations or limitations on the volume pumped to maintain a chloride content of no more than 1,000 mg/L, or a combination of both factors.

The Province intends to install the GW pumping system early in 2005, and to closely monitor the effects of pumping rate and chloride intrusion for at least a 6 month period. The Province will review the GW data in conjunction with an assessment of environmental effects along the foreshore. The end objective will be to achieve acceptable management of the GW source and mitigation of GW impacts on the receiving environment. The Operator will not be allowed to pump GW in excess of that required to achieve this objective.

Table B2-1: Operations Scope, Reporting and Consequences

Ref. No.	Operational Performance Requirements	Performance Indicator	Operator Response & Rectification Requirement	Consequences
OPR1	Perform all Operations throughout the Term as described in the Section 34.3 (Details of Operating Requirements) of this Agreement (the "Operating Requirements"), as amended from time to time.	General obligation of Operator. Operator responsible for performance and monitoring in accordance with this Agreement. No specific reporting of Operating Requirements unless stated otherwise in this Agreement, or this Schedule F – Operational Performance Requirements.	Operator to immediately rectify all breaches of the Operating Requirements. Operator to notify Province's Representative of all material failures, problems or deficiencies in performance and satisfaction of the Operating Requirements in the Monthly Report.	Save as otherwise provided in this Schedule F – Operational Performance Requirements, failure to diligently respond to and rectify any breaches of the Operating Requirements will be deemed a Major Event for each breach (unless Province's Representative deems such failure a Minor Event, in its sole and absolute discretion).
OPR2	Ensure WTP effluent meets the requirements of the Discharge Permit and that any By-Pass Event Water complies with the pH requirements of the Discharge Permit.	General obligation of Operator. At all times during the Operations, Operator to measure, collect, compile and report all WTP effluent required to demonstrate compliance with the Discharge Permit and by-pass parameters required to demonstrate compliance with the pH requirements of the Discharge Permit.	In the event that the WTP effluent and by-pass events do not meet the requirements, the Operator will take immediate steps to identify and rectify the cause of the failure.	Major Event, for each day the WTP effluent and By-Pass Event Water fail to meet the requirements, regardless of the number of individual water parameters that are out of specification. The determination of whether water parameters are out of specification will be based upon results obtained from samples submitted to an accredited water laboratory.

OPR3	Achieve annual average water effluent targets at the "Provincial Guidelines" level as described in Section 1.0 of this Schedule F – Operational Performance Requirements..	Operator to measure this effluent target and report in the Annual Performance Report.		This is a bonus addition to the Periodic Payment and the Operator one Quality Events at end of a calendar year if annual average target is achieved.
OPR4	Manage mine reservoir to minimize the amount of untreated Contaminated Water from the Workings that is discharged into Howe Sound by: 1) minimizing the number and duration of any uncontrolled water discharges from the 3250 Level; and 2) minimizing the number and duration of any controlled, plant by-pass events on a best efforts basis.	General obligation of Operator. Operator is responsible for performance and monitoring of any untreated Contaminated Water that is discharged from the Workings into Howe Sound in accordance with this Agreement.	Operator responsible for performance and monitoring in accordance with this Agreement. Operator will review with the Province any uncontrolled discharge of untreated Contaminated Water from the 3250 level.	If the number of days in a calendar year on which an uncontrolled discharge of untreated Contaminated Water from the 3250 level exceeds for 6 days , it will be a Minor Event for the 6th and each subsequent day.
OPR5	Pump and treat groundwater in accordance with this Agreement.	General obligation of Operator. Operator responsible for performance and monitoring in accordance with this Agreement.	The Operator will rectify any failure to pump and treat groundwater in accordance with this Agreement.	Monthly Payment adjustments for volume of water treated in accordance with the Payment Mechanism.
OPR6	Collect, compile and report all WTP effluent operational data. All periods where WTP	Operator must keep all records of such effluent data on-site with appropriate off-site backups.	The Operator will rectify any failure to collect, compile and/or report WTP effluent operational data.	Each day for which the Operator fails to collect, compile or report the effluent operational data will be a

	effluent does not comply with the requirements of the Permit will be identified (including time periods of such events and volume of water discharged under such conditions).	Provide summary analysis in Monthly Report and Annual Report.		Major Event.
OPR7	Collect, compile and report all operational data on groundwater, water from the Workings which by-passes the WTP and storm water.	Operator must keep all records of such data on-site with appropriate off-site backups. Provide summary analysis in Monthly Report and Annual Report.	The Operator will rectify any failure to collect, compile and/or report non-effluent operational data.	Each day for which the Operator fails to collect, compile or report the non-effluent operational data will be a Minor Event.
OPR8	Perform all sampling and analysis in strict compliance with methodologies as described in this Schedule (subject to the Operator having obtained advanced approval from Province for changes to sampling, analysis and reporting methodology.)	General obligation of Operator. All sampling methodologies will be consistent over time to allow comparison and performance monitoring.	The Operator will rectify any failure to perform sampling in strict compliance with methodologies as described in this Schedule.	Each day for which the Operator fails to perform sampling of WTP effluent in strict compliance with methodologies as described in this Schedule F – Operational Performance Requirements will be Major Event. Each day for which the Operator fails to perform sampling of non-effluent water in strict compliance with methodologies as described in this Schedule F-Operational Performance Requirements will be Minor Event.

OPR9	Collect and compile data related to snow pack, snow-melt rates, reservoir levels, and use this information to manage the flow of water to the Project.	General obligation of Operator. The Operator will summarize collected data for each month in the applicable Monthly Report.	The Operator will rectify any failure to collect, compile and report data related to snow pack, snow-melt rates, reservoir levels.	Failure to collect, compile and report data related to snow pack, snow-melt rates, reservoir levels at least one each Month will be a Minor Event.
OPR10	Submit all reports and communications as required by this Agreement	The Operator will prepare all reports as required pursuant to this Agreement. Province may request reasonable updates to any report from time to time.	The Operator will rectify any failure to submit a report required pursuant to this Agreement.	Failure to submit a report in accordance with this Agreement will constitute a Minor Event for each Day (up to 30 Days) by which the report is late. Failure to submit a report required pursuant to this Agreement within 30 days of the date due will constitute a Major Event.
OPR11	Operate the WTP and associated infrastructure/systems when Contaminated Water from the Workings which cannot be stored in the reservoir is available for treatment.	The Operator will prepare a monthly summary of daily operations (water treated), including a report of any days in which water was not treated and all days when the WTP was not available to treat water. Identify length of time the WTP was not available and the reason for such unavailability. Operator must notify Province's Representative immediately via electronic	The Operator will rectify any problem which caused the WTP to be unable to treat Contaminated Water during a period when water was available which could not be stored in the reservoir and take steps to resume water treatment immediately upon being able to do so.	It will be a Major Event if: (a) the target for treatment of Contaminated Water from the Workings is not met in any Day, (b) the reason for such failure is not due to Abnormal Circumstances, and (c) such failure results in the Release of Contaminated Water other than as By-Pass Event Water in

		mail or telephone with follow-up confirmation in writing within 24 hours for any failure to treat Contaminated Water during a period when water was available which could not be stored in the reservoir. Such notice must explain the reason why that water was not treated and a plan to fix any problem. **Target:** Constant operation of Project when mine water cannot be stored in the reservoir, and 98% plant availability to treat groundwater.		compliance with the pH requirements of the Discharge Permit.
OPR12	Complete Operational Acceptance Testing (as described in Appendix B) within 18 Months of the Completion Date.	Operator to notify Province's Representative upon commencement of Operational Acceptance Testing, to certify successful completion.	The Operator will rectify any failure to complete the Operational Acceptance Testing within 18 months of the Completion Date.	Failure to complete the Operational Acceptance Testing within 18 months of the Completion Date will result in a deduction equal to 20% of the Major Event deduction for each Day in which the Operational Acceptance Testing remains uncompleted.

Schedule G

PERMITS

[♦There are a number of colours used in this Schedule regarding things such as whose names the permits are to be issued in as well as Operator responsibility. Is there any reason why these portions of the schedule remain coloured?]

REGULATORY AUTHORIZATIONS NECESSARY FOR CONSTRUCTION OF THE WATER TREATMENT PLANT

Type of authorization	Decision maker	Issue	Responsible Party	Status	Estimated issuance date	Operator Responsibility
Permit	MEM	Mines Act permit for mine storage of ARD	SRM application.	SRM conducted 3250 overflow test in 2004Q3 and will initiate application in 2005Q1.	2005Q2	Operator to be responsible for compliance with permit conditions.
Effluent Discharge Permit	MWLAP	WMA effluent discharge permit for WTP	SRM application.	Application submitted June 2003. MWLAP provided letter dated March 30, 2004, with an attached draft permit.	2004 Dec	Operator to be responsible for compliance with permit conditions except environmental effects monitoring and preparation of groundwater management plan. Operator to be responsible for treating delivered groundwater.
Outfall Permit	DFO	New outfall requires Navigable Waters Protection Act permit	SRM application.	SRM submitted 2004Q3.	2005Q1	Operator to be responsible for compliance with permit conditions.
Outfall Approval	LWBC	Marine portion of outfall requires License of Occupation.	SRM application.	SRM submitted 2004Q3 May be addressed under reserve authorization initiated September 2004.	2004Q4	Operator to be responsible for compliance with permit conditions.

License	LWBC	WTP site requires License of Occupation on Crown Land.	SRM application.	SRM initiated authorization request 2004Q3. May be addressed under reserve authorization initiated September 2004.	2004Q4	Operator to be responsible for compliance with permit conditions.
Outfall Approval	DFO	Effects of outfall on marine habitat.	SRM application.	SRM submitted 2004Q3. May need for CEAA approval, or may only result in letter of advice.	2005Q1	Operator to be responsible for compliance with permit conditions.
Outfall Approval	DFO/EC	Requirement for CEAA	SRM application.	DFO has provided letter dated October 26, 2004, advising SRM that CEAA is triggered by apparent habitat loss. WLAP to consult DFO/EC. DFO advises that if habitat loss is avoided then CEAA is not required.	Undetermined	Operator to be responsible for compliance with permit conditions.
Construction Permit	MEM	Construction activities associated with WTP plant and upland portion of outfall will require conformance with the Mines Act.	Operator application.	MEM has confirmed jurisdiction on mine site with respect to demolition and construction. Operator must submit designs for review.	60 days from date of application	Operator to be responsible for compliance with permit conditions.
License	LWBC	Upland portion of outfall requires License of Occupation across Crown Land.	Operator application.	Operator to be responsible for implementation. May be addressed under reserve authorization initiated September 2004.	60 days from date of application	Operator to be responsible for compliance with permit conditions.
Agreement or Approval	BCR	Outfall line crosses BCR right of way.	Operator application.	SRM has had initial discussions with BCR. Operator to be responsible for implementation.	60 days from date of application	Operator to be responsible for compliance with permit conditions.
Agreement or Approval	MoT	Outfall line crosses Highway 99.	Operator application.	SRM has had initial discussions with MoT. Operator to be responsible for implementation.	60 days from date of application	Operator to be responsible for compliance with permit conditions.

Agreement or Approval	BCHydro	Authorization to encroach on BC Hydro right of way for interim Sludge storage.	Operator application.	SRM has received approval in principle dated March 30, 2004. Operator to be responsible for implementation.	60 days from date of application	Operator to be responsible for compliance with permit conditions.
Permit	MWLAP	WMA refuse permit for the discharge of WTP Sludge	Operator application	Need depends on Operator's solid waste disposal strategy.	120 days from date of application	Operator to be responsible for compliance with permit conditions.
Permit	MEM	Mines Act permit for for discharge of WTP Sludge	Operator application.	Need depends on Operator's solid waste disposal strategy.	120 days from date of application	Operator to be responsible for compliance with permit conditions.
Permit	MEM	Mines Act permit for 4100, 4150, and 3250 mine reclamation	Operator application.	SRM and Operator to discuss and define issues in 2004Q1 and/or 2005Q2.	90 days	Operator to be responsible for compliance with permit conditions
Permit	LWBC	Water Act Licence to remove water from Britannia Creek for make-up water for the WTP	Operator application	Water Act reserve was issued for Britannia Creek and tributaries on April 15, 2004 and is active until June 30, 2009. The reserve is for water supply for Britannia Beach community and for water supply to the WTP	90 days	Operator to be responsible for compliance with permit conditions insofar as they relate to WTP

Schedule H

DRAWINGS

Schedule I

COMMUNICATIONS PLAN

General Principles

This Schedule I – Communications Plan is drafted on the basis of the following principles:

- there is to be full consultation and co operation between the Province and Operator so far as possible;
- matters are to be prepared on a joint basis so far as possible;
- each party is to be given a reasonable opportunity to consider matters, and where information is supplied such information will include or be accompanied by sufficient explanatory or other material to enable the information to be properly considered.

This Schedule I – Communications Plan is a guideline of the best current assessment of sensible work practice, and may require amendment in light of practical experience and, if so, it is to be amended accordingly.

Where any Party is dissatisfied with the operations of any communications activities or procedures and/or considers that they will be amended in any way, the matter will be referred to Dispute Resolution Procedures.

The communications procedures and processes to be developed will:

1. be agreed by the Operator's Representative and the Province's Representative;
2. set out agreed procedures for the handling of any emergency;
3. set out responsibility for covering costs associated with communications procedures and activities.

The communications procedures and processes to be agreed between the Operator and the Province will take account of the principles below and will comply with the provisions below.

The principles are as follows:

- recognition of the importance of the mine water treatment plant;
- communications activities will be guided by annual communication plans, which will include strategies, communications activities and desired outcomes for dealing with public communications relating to:
    - the Work and/or Operations, and any matters affecting the same;
    - issues which are likely to be controversial;
    - issues which are likely to attract national or regional interest; and
    - issues which are likely to affect local communities within the Squamish Lillooet Regional District, and especially the immediate community of Britannia Beach.;
- cooperation between the Parties, any representatives or members of the Province and the relevant local authorities in relation to the organization or holding of any events, exhibitions or public meetings by either the Province or the Operator in relation to the

Work or Services or any matters affecting the same and the contents of and participants in such events, exhibitions or public meetings; and

- mutual respect for the respective roles of each of the Parties.

The provisions are as follows:

- the Operator and the Province will each from time to time nominate a representative (the "media spokesperson") who will be responsible for any public and media communications relating to the Work and/or Operations, and any matters affecting the same. The media spokespersons for the time being will be as set out below until such time as either Party notifies the other otherwise:
    - The Operator

      Karim Kassam
      General Manager, BC Operations
      EPCOR Water Services
      12260 Vickers Way
      Richmond, B.C.
      V6V 1H9
      Fax: (604)270-3851
      Phone: (604)232-2230

    - The Province

      Communications Director
      Public Affairs Bureau
      Sustainable Resource Management
      PO Box 9386 Stn Prov Govt
      Victoria, BC V8W 9M2
      250 387-4965 telephone
      250 387-4966 facsimile

- neither the Operator nor the Province will make any public statement or public announcement in relation to the Work and/or Operations or any matters affecting the same without prior notification by the media spokesperson of the other Party of the content of such statement or announcement unless, in the case of the Province, such statement or announcement is for parliamentary, governmental, statutory or judicial purposes. Further, any public statement or public announcement will be aligned with an approved joint communications plan. Any matters involved in the Dispute Resolution Process are exempt from this arrangement. The Operator will make no public statements regarding matters involved in Dispute Resolution.

Communications

The Province and the Operator will, throughout the Term, share certain responsibilities for communications to provide communities, businesses, residents and other stakeholders with an efficient and consistent approach to communications.

Principal Categories

There are three principal categories of communications:

Community Relations - Community relations involves ongoing two-way communications with the public and stakeholders. This includes dealing with ongoing public inquiries, problem solving, project updates, and regular public reporting. It is distinct from public and stakeholder consultation.

Public and Stakeholder Consultation — Public and stakeholder consultation involves gathering input from the public and stakeholders on the Project. Public and stakeholder consultation is distinct from community relations, in that community relations includes ongoing two-way communications while public and stakeholder consultation involves gathering and taking into consideration specific input on issues such as design options, operations and planning issues, consistent with any applicable approved corridor-wide community consultation plan.

Media Relations - Media relations involves interacting with, and responding to requests from the media.

Lead and Supporting Roles

Within each category of communications and consultation, the Operator will play either lead or supporting roles, working with the Province to provide communications and consultation services.

An overview of the responsibilities associated with lead and supporting roles is provided below.

Lead responsibilities include:

- Developing communication and consultation plans, including strategies, procedures and outcomes; having them reviewed by the supporting Party, and implementing approved communication and consultation plans.
- Achieving the outcomes set out in the annual communication plans, which will include establishing and maintaining constructive relationships with the public and stakeholders.
- Covering costs related to developing and implementing communication and consultation plans.

Supporting responsibilities include:

- Assisting with the development and implementation of communication and consultation plans, including drafting of initial plans and other communication documents.
- Conducting the Work and/or Operations in a manner consistent with communication and consultation plans.
- Maintaining constructive relationships with the public and stakeholders and supporting the lead party and its team members as the primary contact with the public and stakeholders.
- Providing information, as required by the lead party and its team members, to support all communication activities.
- Organizing, attending and participating in community and stakeholder consultation meetings and provision of other communication tools, as necessary, including open houses, information updates, public displays, advertising, website creation, maintenance & updates, construction notices, milestone celebration events, news releases, and tours.

- Consideration of public and stakeholder input throughout the Term and reporting to the public and stakeholders regarding the manner in which public and stakeholder input will be used.
- Covering costs related to carrying out supporting responsibilities.

An exception to these roles is that, in any matter involved in the Dispute Resolution Process, the Operator will not make any public statements regarding the matter under dispute.

Community Relations

The Operator will share the responsibility with the Province with respect to community relations and communications. The Operator will assist the Province in developing and implementing a comprehensive community relations program to provide the public and stakeholders with project information on a regular basis and to handle public inquiries and concerns.

Public and Stakeholder Consultation

During construction and for a period of one year following Substantial Completion, the Province will lead public and stakeholder consultation, while the Operator will take the supporting role. Where public and stakeholder input regarding the design, construction and operation of the water treatment plant is gathered, it will be considered, along with financial and technical information, by the Operator. The Operator is required to work with the Province to report to the public and stakeholders regarding the manner in which public and stakeholder input will be considered.

The Operator will have full responsibility (both the lead and supporting roles) in public and stakeholder consultation after the expiry of one year from Substantial Completion.

Media Relations

The Province will take the lead role in media relations. The Operator will support the Province in media relations by responding to issues and providing information a

Schedule J

ORDINARY REPAIR AND REPLACEMENT

Subject to the terms and conditions of this Agreement, the Operator will maintain the Project throughout the Term so that it can perform the Operations in compliance with the Operational Performance Requirements and in Discharge Permit and complies with the Standards. The Operator's proposed maintenance expense model contains three primary components:

(a) preventative maintenance on all capital equipment;

(b) corrective maintenance for unscheduled breakdown of capital equipment and operations components; and

(c) a replacement (or refresh) program for capital equipment.

Schedule K

TERMINATION PROCEDURE AND COMPENSATION

1. Termination Prior To Completion Date

1.1 If the Agreement is terminated before the Completion Date, the Operator will deliver the Project in a condition which complies with Section 40.5(a) of the Agreement, in as tidy and organized condition as is reasonably possible in the circumstances (the "Pre-Completion Termination Condition").

2. Condition On Termination At End Of Term

2.1 Upon termination of the Agreement at the end of the Term, whether on the 20th anniversary of the Completion Date or such other date as the parties have agreed will be the last day of the Term (the "Scheduled Termination Date"), the Operator will deliver the Project in good working order and able to perform the Operations in order to achieve the Operational Performance Requirements in accordance with the Standards, in such condition as the Project would be in if the Operator had complied with the Agreement throughout the Term (the "Post Completion Termination Condition").

2.2 In order to establish that the Project will conform with the Post Completion Termination Condition on the Scheduled Termination Date, inspections will be conducted by the parties and their respective consultants at mutually convenient dates and times during the following periods:

2.2.1 not less than 57 Months nor more than 63 Months prior to the Scheduled Termination Date;

2.2.2 not less than 33 Months nor more than 39 Months prior to the Scheduled Termination Date; and

2.2.3 not less than 6 Months nor more than 9 Months prior to the Scheduled Termination Date.

If the parties do not agree to mutually convenient dates and times for an inspection of the Project within the first 2 Months of the aforementioned periods, either the Province's Representative or the Operator's Representative may stipulate a date or dates for such inspections on 10 Business Days' written notice to the other.

2.3 After each inspection, the Province's Representative will cause an inspection report (a "Termination Inspection Report") to be prepared, which Termination Inspection Report will list any deficiencies which would prevent the Operator from meeting the Post Completion Termination Condition and will itemize the work which the Province's Representative believes is necessary to remedy such deficiencies. Within 30 Days of receipt of a Termination Inspection Report, the Operator's Representative will notify the Province's Representative of any disputes regarding such deficiencies or the work identified in the Termination Inspection Report to correct same.

2.4 Any work required to be performed pursuant to a Termination Inspection Report which has not been disputed by the Operator, or if disputed, which has been determined to be necessary pursuant to the Dispute Resolution Procedure (the "Termination Work") will be integrated into the next Operating Quality Control Plan and the Financial Plan and will thereafter be performed by the Operator.

2.5 If any Termination Work is identified during the last Termination Inspection Report, the Province is entitled to hold back from all subsequent Periodic Payments the estimated cost of completing such Termination Work, plus 15%, but such holdback will not exceed an amount equal to the last three Periodic Payments otherwise payable pursuant to the Payment Mechanism. Such holdback may be retained by the Province, without interest until such time as such Termination Work is completed to the satisfaction of the Province, acting reasonably, and all applicable builders lien holdback periods have expired and any builders liens have been discharged.

2.6 In the event that any work required to achieve the Post Completion Termination Condition on the Termination Date is not performed in accordance with the Operating Quality Control Plan and Financial Plan or by the Termination Date, the Province may perform such work and apply any amounts held back pursuant to Section 2.5 to the reasonable costs of the Province incurred in respect thereof, and the Operator will pay the amount by which the reasonable costs of the Province exceed such holdbacks promptly upon receipt of invoice, plus interest from the date of the invoice at the rate applicable to overdue payments as stipulated in the Agreement.

3. Compensation on Termination

3.1 In the event that the Agreement is terminated before the scheduled Termination Date for any reason whatsoever, Province will pay to the Operator the present value of the Periodic Payments estimated to be payable to the Operator for the balance of the Term to the Scheduled Completion Date, net of all costs which would have been incurred by the Operator during such period in performing the Operations, after due adjustment for estimated changes in CPI and any other indexed costs. The Province will also pay to the Operator all other amounts payable by the Province for the period to the date of termination.

3.2 In the event that the Agreement is terminated by the Province pursuant to Sections 39.1 or 39.2(e) of the Agreement, the Province may deduct from the amount owing to the Operator pursuant to this Section the amounts required pursuant to Section 39.5(a)(ii) of the Agreement.

3.3 In the event that the Agreement is terminated before the Scheduled Termination Date otherwise than pursuant to Sections 39.1 or 39.2(e) of the Agreement, the Province will, in addition to other amounts payable pursuant to this Section, pay to the Operator all of the Operator's reasonable transition costs including the proper costs of terminating or assigning all contracts that were put in place for the Operator to fulfil its obligations under the Agreement.

4. End of Term Options

4.1 On or before the Scheduled Termination Date the Province, in the sole and unfettered discretion of the Province, will elect to proceed with one of the following options:

4.1.1 negotiate with the Operator to extend the Term of the Project Agreement on such terms and conditions as the Province may stipulate and the Operator may agree;

4.1.2 take over the Project as of the Termination Date; or

4.1.3 retender the Operations on such terms and conditions as the Province deems appropriate.

The Province may change its election at any time with respect to the course of action the Province will follow on the Termination Date. Unless the Province has negotiated an extension of the Term, the Operator will have no obligations for Operations after the end of the Term.

4.2 Regardless of the reason or timing of termination of this Agreement, the transition provisions of Section 40.8(a)(i) will apply.

4.3 In the event that the Agreement expires on the Scheduled Completion Date, the Operator will not be entitled to any compensation for delivery of the Project in the Post Completion Termination Condition, other than pursuant to the Payment Mechanism, any outstanding Variation Confirmations or any other provision of the Agreement.

5. Disputes

5.1 Any dispute regarding:

5.1.1 any deficiency identified in a Termination Inspection Report;

5.1.2 the appropriate work required to correct a deficiency identified in a Termination Inspection Report;

5.1.3 the cost of work required to correct a deficiency identified in a Termination Inspection Report or amount of holdback to be maintained in respect thereof;

5.1.4 entitlement to release of any holdback maintained by the Province; or

5.1.5 any other matter set out in this Schedule K – Termination Procedure and Compensation,

will be resolved pursuant to the Dispute Resolution Procedure.

Schedule L

LIST OF REFERENCE DOCUMENTS

Technical Documents posted by August 23, 2004, on Project Website Reports Page

This page lists the various reports that are available to the public that are available in electronic format. Unless otherwise stated, all reports are Adobe PDF documents. To download the free PDF reader from Adobe, click here. Please make sure to note the files size before beginning your download if you have a 56K or slower connection. Documents without file sizes are less than 200K.

Project Management Reports

- Britannia Mine Remediation Project Action Plan - (2001/11/01) - 1.1MB
- Britannia Fan Area Remediation Planning Report -(2002/10/24) - 300K
- Overall Mine Closure and Site Remediation Plan (2003/10/08) - 7Mb
    - Overall Mine Closure and Site Plan Cover Letter (2003/10/08)

Mine Hydrology and Hydrogeology Reports

- 4100 Level Audit Stage 1 Rehabilitation Workplan (2001/11/01) - 718K
- Mine Safety Inspection Plan, Rev 1 (2001/11/01) - 2.6MB
- 4100 Level Plug Safety Investigation Plan (2001/12/01) - 2.5MB
- 4150 Level Dam Proposal (2002/01/11) - 221K
- 4100 Level Plug Test Application - Addendum (2002/03/01) - 4.4 MB
- 4100 Level Plug Test Plan (2002/05/01) - 8.7 MB
- 4100 Level Plug Test Emergency Response Plan (2002/05/07) - 1.6 MB
- Memo Re: Britannia - Sulphate Concentrations in the Flooded Mine (2002/05/22) - 34KB
- Structural Geology Final Report (2002/07/30) - **15MB**
- Initial Plug Test (2002/07/30) - 1MB
- Doug Lee - Britannia Iron Speciation (2002/08/01)
- Jane Basin Landslide Report (2002/10/01) - 4MB
- Golder - Development of Operating Criteria for the Mine Reservoir (2002/11/12) - 300KB
- Golder - Model to Allow Simulation of Control of Mine Storage (2002/12/17)

- Engineering Geology Mapping of Distributed West Slopes of Jane Basin (2003/01/15) - **14.7 MB**
- Britannia Mine Remediation Mine Safety Inspection Report (2003/01/15) - **26.4 MB**
- Britannia Mine Remediation Geochemistry and Water Quality of the Mine Workings (2003/02/15) - 4.6 MB
    - Historical Water Chemistry and Flow Data Files
- Assessment of Surface Water Diversions in the Jane Basin and Victoria Glory Hole Catchments (2003/06) 321K
  (*only the text is included in this document, all images have been removed*)
- Britannia Mine Remediation Hydrologic Evaluation of the Britannia Mine Site (2003/03) - **9.67MB**
- Hazard Assessment - Jane Basin Landslide (2003/04/17) - 2.19MB
- Golder - Design Capacity Presentation (2004/01) - 1MB
- Compiled 4100 Level Chemistry to April 29, 2004 (2004/06/15) xls spreadsheet
- Britannia Mine Remediation Site Wide Instrumentation Report (2004/04) - **7.27MB**
- Summary Table of Minewater Temperatures at the 4100 Level Portal/Plug (2004/06)
- Test Plan for the 4100-3250 Level Hydraulic Communication Test (HCT) (2004/08) - 2MB
- Compiled Draindown Water Quality Results to July 16, 2004 (2004/07) xls

Contaminated Site Investigation Reports

- Britannia Marine Sediment Contamination: Interim Status of Knowledge and Next Options (2001/03/02)
- Preliminary Site Investigation Report (2001/04/05) - 8.3 MB
- Britannia Sediment Assessment - Workshop #1 (2001/09/21) - HTML Document
- Britannia Fan Area DSI Revised Workplan (2002/01/16) - 5.6MB
- Britannia Screening Level Risk Assessment (2002/01/17) - **9.3MB**
- Britannia Stage I Preliminary Site Investigation (2002/01/29) - 2.17 MB
    - Figures - 2.98 MB
    - Appendix A: Legal Description and Limited Historical Title Search Documentation - **18 MB**
    - Appendix B: Aerial Photograph Review
    - Appendix C: Historical Maps, Plans and Photos - **12.60MB**
    - Appendix D: WLAP Data - **21.52MB**
    - Appendix E: Photographic Documentation - **13.11MB**
    - Protocol 5

- Britannia Stage II Site Investigation - Additional Areas Revised Workplan (2002/02/22) - 4.1 MB
- Fan Area: Detailed Site Investigation, Britannia Mine Site - Part 1 (2002/06/07) - **24.6MB**
- Fan Area: Detailed Site Investigation, Britannia Mine Site - Part 2, Tables (2002/06/07) - 2.35MB
- Fan Area: Detailed Site Investigation, Britannia Mine Site - Part 3, Figures & Photos (2002/06/07) - **23.4MB**
- Contaminated Site Investigation Fan Area Tier 1 - Ecological Risk Assessment (2002/06) - **29MB**
- Contaminated Site Investigation Report Fan Area - Human Health Risk Assessment (2002/07/27) - 4MB
- Britannia Fan Area: Remediation Planning Document (2002/10/01) - 6.84MB
- Britannia - Subtidal Sampling Program - Final Report (Prepared for Environment Canada (2003/02) - 1MB
- Stage 1 Remedial Action Plan, Britannia Mine, Britannia Beach (2003/03/28) - 907K
- Contaminated Site Investigation Additional Areas Tier 1 Ecological and Human Health Risk Assessment (2003/06) - **9.7MB**
- Britannia Stage II Site Investigation - Additional Areas Report (2003/06/06) - 1.69MB
    - Tables - 391 K
    - Figures **- 18.1MB**
    - Photos - 1.53MB
- Workplan for Sediment Control and Mitigation of Surface Runoff (2003/10/08) - 1.51 MB
- Workplan for South Fan Area Groundwater Investigations: Long-term Pumping Test Program (2003/08/18) - 2.18Mb
- Water Treatment Plant Site Soils Investigation (2004/02) - 2MB
- Aquatic Monitoring Program Baseline Investigation
    - Final Report - **37MB**
    - Appendices - **5MB**
- Westmar - Groundwater and Stormwater Pumping (2004/02/25) - 145KB
- Jane Basin Contaminated Soil Disposal Assessment (2004/05/12) - 17MB
- Britannia Northeast Fan Area Soil Stockpile Investigation Report (2004/05) - 5MB
- Groundwater Management Plan (2004/08) - 1.9MB
- Britannia Ground Water and Stormwater Sampling Report (2004/07/) - 6MB

Water Treatment Plant Reports

- Pilot Scale Testing of the High Density Sludge Process (1997/08) - 3MB
- Treatment of Acid Rock Drainage at the Anaconda-Britannia (1998/03) - 3MB

- Interim Treatment Memorandum (2001/12/01)
- Phase I Pilot Testing Program (2002/01/30) - 377K
- Interpretation of Sidescan Sonographs, Britannia Beach (2002/02/05) - 4.4MB
    - JPEG image of sidescan sonograph - 855K
- Outfall Diver Inspection Memo (2002/02/13) - 589K
- CEMI Final Pilot Plant Report (2002/05/15)
- Britannia Effluent Toxicity Test (2002/05/23)
- Work Plan to Facilitate Repair or Replacement of Existing Outfall (2002/07/02)
- U824A Sludge Disposal Options - Final (2002/07) - 3.4MB
- US Filter - J-Press Test for Mine Water Treatment Sludge (2002/08/05)
- Britannia Mine Water Treatment Plant Feasibility Study (2002/11/15) - 453K
    - Appendix A (link to file with 15 pdf files)
    - Appendix B
    - Appendix C
    - Appendix D - 2.1MB
    - Appendix E (link to file with 7 pdf files)
    - Appendix F (link to file with 6 pdf files)
- Golder - Sludge Characteristics - Water Treatment Plant (2003/01/30)
- Britannia Mine Water Treatment Plant Feasibility Study - Addendum 1 (2003/02/10)
    - Table of Contents and Cover
    - Part 1 - Sludge Disposal Options Study
        - Report - 646K
        - Site A Overall Site Plan - 675K
        - Appendix A (link to file with 19 pdf files)
        - Appendix B (link to file with 7 pdf files)
        - Appendix C (link to file with 3 pdf files)
        - Appendix D (link to file with 3 pdf files)
        - Appendix E - 263K
    - Part 2 - WTP Technical Memo
    - Part 3 - WTP Outfall Hydraulics
        - Report
        - Drawing (link to file with 2 pdf files)
    - Part 4 - Outfall Replacement
        - Comparison of Alternative Sites - Report - 480K

    - Comparison of Alternative Sites - Figures - 2.71MB
    - Appendices (link to file with 2 pdf files)
- Golder - Preliminary Summary of UMR-Toxicity Test Results (2003/04/24)
- Britannia: Stability of Sedimentation Pond, 4150 Level Bench (2003/05/13) - 143KB
- Environmental Impact Study - Final Report (2003/06) - 1.08MB (*attachment to permit application dated June 20, 2003*)
- Environmental Impact Study - Appendix (2003/06) - 1.96 MB (*attachment to permit application dated June 20, 2003*)
- CEM - Treatment of Britannia Water for Acute Toxicity (2003/07)
- Review of the Design Basis for Water Treatment Facilities (2003/10/20) - 376K
- NRCAN-CANMET - Characterization of High Density Sludge Final Report (2003/11) - 7.5 MB
- Britannia Mine Outfall Alignment Selection Investigation (2003/12) - 3.3MB
    - Appendix - Britannia Creek - 3.82MB
    - Appendix - Makin Property - 3.17MB
- Geotechnical Investigation and Factual Report, Proposed New Water Treatment Plant, 4100 Level Britannia Mine, BC (2004/02/11) - 1 MB
- Britannia Mine Outfall Presentation (2004/03/23) - 11.74MB
- Britannia Mine Effluent Outfall (2004/05) - 654KB

Flood Risk Assessment Reports

- Britannia Creek Flood Risk (2002/07/30) - 5MB
- SLRD Flood Protection Works Feasibility Assessment (2004/03) - **23MB**
    - Appendix E - **21.6MB**

Summary Progress Reports (Golder)

- Archived Summary Progress Reports (4 months old)
- Summary Progress Report No. 72 (2004/06/10)
- Summary Progress Report No. 73 (2004/06/24)
- Summary Progress Report No. 74 (2004/07/06)
- Summary Progress Report No. 75 (2004/07/22)
- Summary Progress Report No. 76 (2004/08/05)

Project Schedule

- Project Schedule (2003/09/06)
- Project Schedule - revised (2003/10/06)

- Project Schedule - Master (2004/01/06)
- Project Schedule - Master (2004/04/16)

Newsletters

- Britannia Mine January 2002 Newsletter - 653K
- Britannia Mine February 2002 Newsletter - 381K
- Britannia Mine March 2002 Newsletter
- Britannia Mine April 2002 Newsletter
- Britannia Mine May 2002 Newsletter - Revised
- Britannia Mine June 2002 Newsletter - 1MB
- Britannia Mine July 2002 Newsletter
- Britannia Mine August 2002 Newsletter
- Britannia Mine May 2003 Newsletter - 313K

Letters to Regulator

- Request for Extension - Permit Application (2003/06/03)
- Letter Re: Britannia Discharge Permit Application (2003/06/23)
    - Permit Application PE-17469 (*attachment to letter dated June 20, 2003*) - 650K
    - Environmental Impact Study - Final Report and Appendix (*attachment to permit application above*)
- Response to letter dated June 13, 2003 (2003/07/02)
- Refuse Permit Application (2003/09/02)
    - Cover Letter
    - Application (including EP notice)
    - Application General Site Plan - 554K and Discharge Location Site Plan - 776K
- Letter to Regulator - Ministry Workplans (2003/10/08)
- Letter to Regulator - Draft Discharge Permit (2004/05/07)
- Letter to Regulator - Application to DFO for Environmental Review of Proposed Marine Outfall (2004/06/15) - 2.84MB
- Approval Request for Discharge in Conducting the 2004 Plug Test (2004/07/26)
- MEM Sludge Disposal in Jane Basin Cover Letter (2004/07/05)
    - MEM Sludge Disposal in Jane Basin - Risk Assessment (2004/06/24)
    - MEM Response to SRM Letter (2004/07/29)

Public Events and Notices

- Meeting Notice for May 23rd, 2002 Meeting
- Meeting Notice for June 17th, 2002 Meeting
- Meeting Notice for July 23rd, 2003 Meeting
    - July 23 Public Meeting - WTP Application Presentation (Flash)
    - July 23 Public Meeting - WTP Feasibility Presentation (Flash)
    - July 23 Public Meeting - GOH Final (Flash)
    - July 23 Public Meeting - Environmental Impact Study Presentation (ppt)
- Meeting Notice for March 23, 2004 Meeting

Technical Documents posted by August 23, 2004, to Project Website WTP RFP Technical Background Documents Page

A document index of all Britannia Mine reports and technical documents that the ministry office has on file is available. The Reports Section of this website provides all the available reports in downloadable format. Not all the reports in the Reports Section are required as necessary background information for preparation of the Proposals for the Water Treatment Plant (WTP). Therefore, an abridged list of those reports which are considered the most relevant for the preparation of a Proposal, is provided below:

Project Management Reports

- Overall Mine Closure and Site Remediation Plan (2003/10/08) - 7Mb
    - Overall Mine Closure and Site Plan Cover Letter (2003/10/08)

Mine Hydrology and Hydrogeology Reports

- Doug Lee - Britannia Iron Speciation (2002/08/01)
- Golder - Development of Operating Criteria for the Mine Reservoir (2002/11/12) - 300KB
- Golder - Model to Allow Simulation of Control of Mine Storage (2002/12/17)
- Britannia Mine Remediation Geochemistry and Water Quality of the Mine Workings (2003/02/15) - 4.6 MB
    - Historical Water Chemistry and Flow Data Files
- Assessment of Surface Water Diversions in the Jane Basin and Victoria Glory Hole Catchments (2003/06) - 321K
  (*only the text is included in this document, all images have been removed*)
- Britannia Mine Remediation Hydrologic Evaluation of the Britannia Mine Site (2003/03)
- Golder - Design Capacity Presentation (2004/01) - 1MB
- Compiled 4100 Level Chemistry to April 29, 2004 (2004/06/15) xls spreadsheet
- Summary Table of Minewater Temperatures at the 4100 Level Portal/Plug (2004/06)
- Test Plan for the 4100-3250 Level Hydraulic Communication Test (HCT) (2004/08) - 2MB

- Compiled Draindown Water Quality Results to July 16, 2004 (2004/07) xls

Water Treatment Plant Reports

- Pilot Scale Testing of the High Density Sludge Process (1997/08) - 3MB
- Treatment of Acid Rock Drainage at the Anaconda-Britannia (1998/03) - 3MB
- CEMI Final Pilot Plant Report (2002/05/15)
- Britannia Effluent Toxicity Test (2002/05/23)
- Work Plan to Facilitate Repair or Replacement of Existing Outfall (2002/07/02)
- US Filter - J-Press Test for Mine Water Treatment Sludge (2002/08/05)
- Britannia Mine Water Treatment Plant Feasibility Study (2002/11/15) - 453K
    - Appendix A (link to file with 15 pdf files)
    - Appendix B
    - Appendix C
    - Appendix D - 2.1MB
    - Appendix E (link to file with 7 pdf files)
    - Appendix F (link to file with 6 pdf files)
- Golder - Sludge Characteristics - Water Treatment Plant (2003/01/30)
- Britannia Mine Water Treatment Plant Feasibility Study - Addendum 1 (2003/02/10)
    - Table of Contents and Cover
    - Part 1 - Sludge Disposal Options Study
        - Report - 646K
        - Site A Overall Site Plan - 675K
        - Appendix A (link to file with 19 pdf files)
        - Appendix B (link to file with 7 pdf files)
        - Appendix C (link to file with 3 pdf files)
        - Appendix D (link to file with 3 pdf files)
        - Appendix E - 263K
    - Part 2 - WTP Technical Memo
    - Part 3 - WTP Outfall Hydraulics
        - Report
        - Drawing (link to file with 2 pdf files)
    - Part 4 - Outfall Replacement
        - Comparison of Alternative Sites - Report - 480K
        - Comparison of Alternative Sites - Figures - 2.71MB
        - Appendices (link to folder with 2 pdf files)

- Golder - Preliminary Summary of UMR-Toxicity Test Results (2003/04/24)
- Britannia: Stability of Sedimentation Pond, 4150 Level Bench (2003/05/13) - 143KB
- Environmental Impact Study - Final Report (2003/06) - 1.08MB (*attachment to permit application dated June 20, 2003*)
    - Environmental Impact Study - Appendix (2003/06) - 1.96 MB (*attachment to permit application dated June 20, 2003*)
- CEM - Treatment of Britannia Water for Acute Toxicity (2003/07)
- Review of the Design Basis for Water Treatment Facilities (2003/10/20) - 376K
- NRCAN-CANMET - Characterization of High Density Sludge Final Report (2003/11) - 7.5 MB
- Britannia Mine Outfall Alignment Selection Investigation (2003/12) - 3.3MB
    - Appendix - Britannia Creek - 3.82MB
    - Appendix - Makin Property - 3.17MB
- Geotechnical Investigation and Factual Report, Proposed New Water Treatment Plant, 4100 Level Britannia Mine, BC (2004/02/11) - 1 MB
- Britannia Mine Outfall Presentation (2004/03/12) - 11.74MB
- Britannia Mine Effluent Outfall (2004/05) - 654KB
- Water Treatment Plant Report: Batch High Density Sludge Process Simulations with High Chloride (2004/06) - 63KB
- Water Treatment Plant Report: Batch Testing of Britannia AMD with Groundwater (2004/06) - 64KB

Contaminated Site Investigation Reports

- Water Treatment Plant Site Soils Investigation (2004/02) - 2MB
- Westmar - Groundwater and Stormwater Pumping (2004/02/25)
- Groundwater Management Plan (2004/08) - 1.9MB
- Britannia Ground Water and Stormwater Sampling Report (2004/07/) - 6MB

Letters to Regulator

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    - MEM Sludge Disposal in Jane Basin - Risk Assessment (2004/06/24)
    - MEM Response to SRM Letter (2004/07/29)

Maps

- Topographic PDF Map
- Topographic ACAD Map
- Overall Treatment Plant Site Topography DWG Format
- Treatment Plant Site Topography DWG Format
- Overall Treatment Plant Site Topography PDF Format
- Treatment Plant Site Topography PDF Format

Technical Documents posted by August 23, 2004, on WTP RFP - Protected Information Page

- SRK Model of Daily Water Volumes and Projections of Annual Volumes - Excel workbook (2004/01/21) - 3Mb