

A Short Chronology of Enforcement and Monitoring at the Britannia Mine Site

- 1905 - Britannia Mine begins production.
- 1974 October - Anaconda Canada Exploration Ltd announces that mine will be permanently closed. BC Environment orders current Anaconda to collect and treat all acid rock drainage (ARD), and discharge through an approved submerged outfall. Mine is permanently closed in November 1974.
- 1979 October - Copper Beach Estates Ltd (CBEL) purchases Britannia block and other properties from Anaconda.
- 1981 January - BC Environment revises 1974 Order to name CBEL as responsible for collecting and treating all ARD.
- 1983 to 1986 - BC Environment regional staff conducts environmental impact study in receiving waters and produces a report showing ARD rendering Britannia Creek and Jane Creek acutely toxic to macroinvertebrates and fish, and, ARD was shown to elevating copper levels in Howe Sound near toxic levels as defined by the laboratory tests of the study. The report recommends that the 2200 portal discharge be removed from Jane and Britannia Creeks and be redirected to the submerged 4100 portal outfall, and that source control be investigated through assessment of the diversion of runoff in the Jane Basin pit area.
- 1985 - February - Environment Canada reviews available environmental information at Britannia and produces a report which states that copper removal plant is not effective in removing copper for the present discharges, and removal of the 2200 level discharge would improve Britannia Creek water quality and reduce copper loadings to surface waters of How Sound.
- 1985 - BC Environment confirms CBEL's failure to comply with the 1994 Order (now under the Waste Management Act). CBEL is advised that that failure to collect and discharge all drainage through a submerged outfall is a contravention of the 1974 Order.
- 1987 - BC Environment recommends an investigation of CBEL's failure to comply with the 1974 Order. Further information is requested from BC Mines and in May 1991 a report prepared for BC Mines concludes that the mine will potentially continue to generate contaminated drainage for many years, and that more information is required to determine appropriate physical and chemical remedial measures. The report further recommends that the 2200 drainage be diverted from the Britannia Creek, water quality monitoring of the drainage and creeks, seepage surveys and acid-base accounting of materials

and rocks at the site, assessment of surface water diversions to reduce ARD flow, and further refinement of a treatment system.

- 1991 August - Flood, or emergency response to flood, results in damage to pipe leading to submerged outfall which discharges acid rock drainage from mine. In December 1993, BC Environment begins re-construction of submerged outfall for ARD and sewage which was completed in March 1994.
- 1993 November/December - Pollution Prevention and Pollution Abatement Order OE-12635 and amendment issued by the province to CBEL. The Order includes requirements to submit a written description of the scope, terms of reference, and schedule for a plan to treat all mine drainage, submit a plan to treat all mine drainage, submit a permit application, and submit audited financial statements. CBEL submits the written description for the plan and the permit application, but fails to provide a plan and to submit audited financial statements.
- 1994 August - Court orders appointment of Coopers & Lybrand as the receiver-manager for the property. Court Order removes all collateral and income from CBEL.
- 1994 August/September - BC Environment and Environment Canada jointly declare the site a "high risk orphan contaminated site" and submit a joint application for funding under the National Contaminated Sites Remediation Agreement. Funding provided in 1995 is used for a water quality and flow monitoring program in 1995-97.
- 1995 February - The water quality and flow monitoring program, jointly funded by BC Environment, Environment Canada, and BC Mines, is initiated at Britannia to supplement information base for establishing remediation alternatives and costs.
- 1995 March - BC Mines produces report which concludes that metal discharges from the 2200 level and 4100 level are making the water in lower Jane Creek, Britannia Creek, and adjacent portions of Howe Sound, toxic for aquatic life, that there are a large number of much smaller metal discharges from portals, waste rock, other mine wastes or exposures, metal release from sediments accumulated in surface waters (eg. drainage channels, creeks, settling ponds) but insufficient data exists to ascertain whether any of these smaller sources pose a threat to the environment, and that the copper recovery treatment plant is not capable of reducing metals to levels safe for discharge to either Howe Sound or Britannia Creek.
- 1995 July - A pilot plant is installed at Britannia to test biosulphide technology for treatment of ARD.

- 1997 April - Environment Canada commissions a report to assess a pipeline to carry the 2200 level ARD to the 4100 level for discharge through the submerged outfall.
- 1997 August - A study co-funded by Cominco, Environment Canada, and BC Environment is undertaken to assess a pilot scale testing of high density sludge (CHDS) process using pulp mill ash and lime to neutralize and remove metals from the 4100 level ARD. The study concludes that the HDS process is capable of reducing metals and neutralising to meet regulatory standards, and produce a non-toxic effluent, using either lime or pulp mill ash.
- 1997 October - BC Environment and Environment Canada co-fund a pre-feasibility design and cost estimate for a treatment system at the Britannia site to treat ARD in the combined 2200 and 4100 flows. In February 1998, the study is extended to include an assessment of hydraulic conductivity between 2700 level and 4100 level to minimize piping costs for redirecting 2200 drainage as well as further monitoring to improve the treatment plant design assessment.
- 1998 May - BC Environment advises three companies (Canzinc Ltd., Arrowhead Metals, and Atlantic Richfield Corporation (ARCO)), in addition to CBEL, that they have been identified as responsible parties under the province Waste Management Act. A meeting is held in November 1998 with representatives and legal counsel for Copper Beach Estates Ltd., Legal submissions are required and received by February 1999.
- 1999 March – CBEL submits applications to the province for a Mines Act reclamation permit, a Waste Management Act effluent discharge permit (for the discharge of treated ARD), and a Waste Management Act refuse discharge permit for operation of a landfill site in the Jane Basin Pit.
- 1999 September 8 – After reviewing written submissions from interested parties and considering CBEL's permit applications, BC Environment issued Effluent Permit PE-12840, Refuse Permit PR-15938, and Remediation Order OE-16097. Refuse Permit PR-15938 requires the construction of the ARD treatment plant prior to the operation of the landfill, and financial security for the operation. Redemption Order OE-16097 requires studies to be conducted and reports to be produced for collection, treatment, and prevention of ARD. The Order stipulates that the treatment plant is to be operational by August 31, 2000.
- 2000 March 8 - BC Environment issues a non-compliance letter for CBEL's failure to comply with Remediation Order OE-16097 by failing to provide required submissions and not initiating required engineering design work.

- 2000 April 6 - BC Environment advises CBEL, Canzinc, Arrowhead, and Arco that it no longer considers CBEL capable of carrying through with its proposal to address the pollution at Britannia and that it is amending the Order to include additional responsible parties.
- 2000 September/October - On the basis of legal submissions made by Canzinc, Arrowhead Metals, and Arco, BC Environment advises Canzinc, Arrowhead Metals, ARCO, Alcoa, Intalco Aluminum Corporation, Alumax Inc., Howmet Holdings Corporation, the Province of British Columbia and the federal government that they have responsibilities in connection with Britannia Mine.
- 2000 November 28 - The province begins negotiations with companies it had previously identified as potentially responsible parties; Aluminum Company of America (ALCOA), the Atlantic Richfield Company (ARCO), Canzinc Ltd., Ivaco/Arrowhead Metals Ltd., and three ALCOA subsidiaries, Intalco Aluminum Corporation, Alumax Inc. and Howmet Holding Corporation. These negotiations focus on terms under which the province would provide indemnities against future pollution cleanup costs. Environment Canada provides advice to the province throughout these negotiations.
- 2001 April 12 - The province announces agreement with Canzinc, Arrowhead Metals, ARCO, Alcoa, Intalco Aluminum Corporation, Alumax Inc., and Howmet Holdings Corporation on terms of an indemnity under which the province will receive \$30 million from the companies in exchange for a release from future liabilities. A separate memorandum of agreement with CBEL would provide an additional \$5 million plus annual treatment plant operating costs estimated at \$1.7 million. All parties endorsed an application to the Federal-Provincial Infrastructure Fund, on behalf of the Squamish Lillooet Regional District, for \$9 million towards the capital costs of the required treatment plant. Environment Canada agreed to provide ongoing technical assistance and to assess sediment contamination in Howe Sound.
- 2001 April and May - Environment Canada initiates sampling and analyses of Britannia Beach subtidal and intertidal sediment.
- 2001 June - The province invites bids for the position of Project Manager and related advisory services and completes an initial project schedule for site assessment and treatment plant construction.
- 2001 July 30 - The province retains a Project Manager, and completes requests for proposals for site assessment and engineering designs.
- 2001 August 15 - Environment Canada performs subtidal seabed reconnaissance at Britannia Beach to determine further sediment sampling locations.

- 2001 September 21 - A multi-agency workshop reviews existing Britannia sediment data and recommends next steps.
- 2001 October - The province concludes contracts with engineering firms providing mining engineering services, treatment plant designs and contaminated site assessments. Work begins immediately as directed by the project manager and a multi-agency technical advisory committee.
- 2001 November - The Geological Survey of Canada conducts geophysical marine surveys of Britannia Beach.
- 2002 January/February - Work continues on many remediation tasks like pilot scale testing of effluent treatment; rehabilitating the 4100 level for safe access; designing tests for the 4100 level plug; researching the history of site contamination, and drilling further holes to assess contamination in the alluvial fan.
- 2002 March - Environment Canada begins further marine sediment sampling for chemistry, toxicity and bioaccumulation, and for assessing benthic invertebrate community health.

**MINISTRY OF ENVIRONMENT, LANDS AND PARKS
INFORMATION NOTE**

Date: March 12, 2001
Date of last note: Jan. 12, 2001
File: 280-20/280-40/OE-16079

III. PREPARED FOR

Deputy Minister at his request.

III. ISSUE: Britannia Mine – Regulatory Process

III. BACKGROUND:

- On September 8, 1999 a remediation order was issued to Copper Beach Estates Ltd. requiring construction of a water treatment plant by August 2000 to treat serious and longstanding acid rock drainage (ARD) at the Britannia Mine. Copper Beach Estates failed to comply with the Order to treat the worst source of heavy metal pollution on the west coast of North America.
- As a result of Copper Beach's non-compliance and the urgency of the required remediation, the potential responsible party review process was initiated to determine if other parties, including a total of four past owners and operators of the mine, could be added to the Order and required to contribute to remediation costs.
- In a submission under this process, the Provincial Crown itself was alleged to be a responsible party in connection with various licenses and leases issued by the Crown and flood control work carried out in the early 1990s.
- To avoid a perceived conflict, decision-making responsibility for the order was transferred from Ray Robb, Assistant Regional Waste Manager, to Ron Driedger, Deputy Director of Waste Management, Headquarters Division.
- The obligation of the provincial Crown on matters of responsibility was assumed by Jon O'Riordan, Assistant Deputy Minister, Regions Division.
- Commencing September 7, 2000, the Deputy Director set out a process for potential responsible parties, including the provincial and federal governments, to make submissions on responsibility and technical requirements of the Order. In this process, the Deputy Director has taken measures to ensure his objectivity and independence from the Crown in its capacity as potentially responsible person, to ensure integrity in regulatory decision-making.
- The submissions process, originally commenced in September, 2000, was extended at the request of the parties on the basis of positive progress made in settlement negotiations between the provincial Crown, the private potentially responsible parties, Copper Beach and the federal Crown.
- On January 10, 2001, a firm deadline of February 28, 2001 was set out by the Deputy Director for the conclusion of a settlement agreement, pending Treasury Board approval. Failing a settlement by this date the submissions process would recommence. The letter notes the urgency of the problem and states:
...taking into account the uncertainties...and the serious practical consequences on the environment of further delays to this longstanding and serious problem, I am not prepared to defer my process indefinitely, or to make the regulatory process depend on the private discussions of the parties.
- The settlement deadline was not met. The first set of submissions was due March 8, 2001 and all of the required three submissions were received.

IV. DISCUSSION:

- The regulatory submissions process is scheduled to conclude March 30, 2001.
- It is neither possible nor appropriate to forecast the outcome of the deliberations process. What can be stated is that pending the outcome of the submissions process and any ongoing settlement negotiations, a revised remediation order may be issued in late April or May 2001.
- Due to the complex and contentious nature of responsibility for the mine, any revised remediation order would likely elicit an appeal or appeals of the order on grounds of responsibility. Similar appeals were sought at 9250 Oak Street, Meadow Avenue (Koppers) and Nexen (COPL).
- The technical requirements of a revised order would focus on the completion of a facility and associated works to treat upwards of 2,500 USgpm of acid rock drainage that is currently entering Britannia Creek and Howe Sound. The order would also likely require further field investigations to assess the full extent of environmental problems associated with the mine site.
- Provided a stay of any such order is not granted, an appeal would not be expected to affect compliance with ordered requirements.
- Order administration costs leading up to and following any order would be predominantly for outside legal support and internal staff time for reviewing technical reports and issuing approvals and permits under the WMA. A small portion of costs would be recoverable through the contaminated sites review process. The extent of legal costs arising from an order is difficult to anticipate as costs are primarily dependent on litigation initiated by ordered parties, but will likely be in the range of \$100,000 or more.
- If the conditions of the private settlement agreement are realized prior to or after issuance of an Order, the need for an Order may be re-assessed if proposed private remediation addresses regulatory objectives. In a non-ordered environment, regulatory approvals, such as permit and plan approvals, would still be necessary.

Contact

*Margaret Eckenfelder
Assistant Deputy Minister
Environment and Lands
Headquarters Division
Phone: (250) 387-1280*

Alternate Contact

*Ron Driedger, Director
Pollution Prevention Branch,
Headquarters Division
Phone: (250) 387-9974*

Prepared by:

*Peggy Evans
Pollution Prevention Branch,
Headquarters Division
Phone: (250) 356-8386*

I:\CSIPM\Csrunit\CSRUnit\Britannia\BNs&MOs\info\noteforDM.doc

October 13, 2000

Copper Beach Estates Ltd.
c/o Alan Walker
Walker and Company
1500-1030 West Georgia St
Vancouver BC V6E 2Y3

Dear Alan Walker:

Re: Britannia Mine Remediation - Remediation Order OE-16097

This letter responds to the October 4, 2000 letter from your client, Copper Beach Estates Ltd., regarding the captioned.

Having considered the letter, I confirm that I am not prepared to expand the present process to include the additional persons identified in your client's letter.

With respect to the Tacoma Smelting Company/ American Smelting and Mining Company, your client advised that it "does not appear to have had any direct control over operations at Britannia, or any known ownership relationship..." The summary of additional information does not satisfy me that it is appropriate to add them to this process.

With respect to Construction Aggregates Ltd., I am not prepared to add that person to the process at this late date, given the very general information provided without documentation in support, and given the urgency of remediation. Its present corporate status, if any, is not provided. It is not suggested that it was a previous owner. Nor is a basis given under the *Act* for how it would be a previous operator in connection with the site. Further, as with the issue of whether to name directors, I take into account that I am proceeding not as a court in cost recovery action, but as part of a urgent regulatory process to protect the environment.

Finally, I confirm that the Britannia Beach Historical Society, operating as the BC Museum of Mining, is not part of the present process. The focus of the present Order is on the remediation of serious and ongoing Acid Rock Drainage from the old mine workings of the Britannia mine. This most urgent contamination is being addressed as part of this process. At a future time, I would be prepared to consider whether the Order should be expanded to address remediation of other contaminated properties. At

such time, I will of course provide notice and an opportunity to be heard to potentially affected persons.

Yours truly,

Ron J. Driedger
Deputy Director of Waste Management

cc: ARCO c/o Gary Letcher at 604-689-5177
Canzinc Ltd. c/o Neo Tuytel at 604-687-6314
Ivanco/ Arrowhead c/o Murray Rankin at 388-4456
Government of Canada c/o Robert McCandless at 604-666-9107
and Michelle Ball at 604-666-1599
Alcoa c/o Ralph Waechter at 412-553-1402
Government of British Columbia c/o Angela Westmacott at 480-7488
Intalco Aluminum, Alumax Inc. and Howmet Holdings Corporation
via fax to 302-655-5049
Britannia Beach Historical Society c/o Yale Simpson at 604-896-2260
Frank A.V. Falzon at 387-4924

REF: Eripm/cuniit/cs_fin/Britannia/letters/1000CopperBeachEstates.doc
I:\eripm\csrunit\csru_fin\britannia\order\1000copperbeachestates.doc

**MINISTRY OF ENVIRONMENT, LANDS AND PARKS
PRIORITY ISSUES NOTE**

Date: Sept. 7, 2000
File: 280-20/ 280-40 /
OE-16079

- I. PREPARED FOR:** Ministry Executive
- II. ISSUE:** Britannia Mine Remediation - Update
- III. BACKGROUND:**

Copper Beach Estates Ltd.(CBEL) has made no progress in meeting the requirements of the Remediation Order issued last September to address the pollution from Britannia mine. There is little indication that the company will be able to come into compliance with the Order. The ministry has recently suspended the landfill permit issued to CBEL as part of the remediation proposal.

MELP has proceeded with a process to amend the Order to include additional responsible parties. It was during this process that one of the potentially responsible parties, Canzinco, has made allegations that the province is also a responsible party for contribution to contamination in the form of water licences, land, mineral and foreshore leases and removal of a pipeline following a flood. Canzinco also alleges that a company called the Aluminum Company of America (ALCOA) is a potentially responsible party.

Canzinco has also raised objections that the Attorney General was in conflict of interest for providing advice to the statutory decision-maker and filing appearance in the lawsuit that has been filed against the province regarding Britannia. The Attorney General has taken these allegations seriously and independent legal counsel has been appointed to defend the Crown in the lawsuit.

In addition, Ron Driedger, Director of the Pollution Prevention and Remediation Branch, has been appointed as the new decision-maker. Ron Driedger is receiving independent legal advice from Frank Falzon and staff support from Douglas Pope, Lower Mainland Regional Pollution Prevention Manager.

On Sept 7, 2000, Ron Driedger issued letters to the potentially responsible parties indicating that he was prepared to review submissions from the two parties newly brought to the attention of the ministry, namely ALCOA and the Provincial Crown. In addition, he issued a memo to ministry staff to advise that he and his staff in this matter should be isolated from all discussions with respect to the Crown's potential liability with respect to this issue. (See attached letters).

IV. DISCUSSION:

It is expected that the submission process will take until November 30, 2000. It is anticipated that Ron Driedger will be in a position to make a decision on whether to amend the remediation order to include other parties by the end of the year.

Ministry staff other than those directly involved in the regulatory process will meet with Environment Canada officials at the end of September and then with the Fraser Basin Council to explore the possibility of a negotiated solution that does not involve the litigated process contemplated under the contaminated sites legislation.

V. MINISTRY POSITION:

MELP is taking steps to ensure those responsible for the pollution at Britannia address this serious environmental problem.

MELP will report on the possibility of a negotiated solution in early October.

Contact:

Dr. J. O'Riordan
Assistant Deputy Minister
Environment and Lands
Regions Division
Phone: (250) 387-9877

Initial: JOR 00-09-18

Alternate Contact:

J. W. McCracken
Regional Director
Lower Mainland Region
Phone: (604) 582-5265

Initial: _____

Prepared By:

Douglas Pope
Regional Manager, P2
Lower Mainland Region
Phone: (604) 582-5284

Reg. Mgr. Initial: DTP 00/09/07

Attachments:

**MINISTRY OF ENVIRONMENT, LANDS AND PARKS
DECISION NOTE**

Date: August 21, 2000

File: 280-20/ 280-40

I. PREPARED FOR DECISION BY: ADM, Environment and Lands, Regions Division

II. ISSUE: Britannia Mine Remediation – Statutory Decision-Maker

III. RECOMMENDATION:

Move the Decision-Making Responsibility to Headquarters

IV. BACKGROUND:

Copper Beach Estates has made no progress in meeting the requirements of the Remediation Order issued last September to address the pollution from Britannia mine. There is little indication that the company will be able to come into compliance with the Order.

The ministry has proceeded with a process to amend the Order to include additional responsible parties. It was during this process that one of the potentially responsible parties, Canzinc, has made allegations that the Province is also a responsible party for contribution to contamination in the form of water licences, land, mineral and foreshore leases and removal of a pipeline following a flood.

Canzinc has also raised objections that the Attorney General was in conflict of interest for providing advice to the statutory decision-maker and filing appearance in the lawsuit that has been filed against the province regarding Britannia. The Attorney General has taken these allegations seriously and independent legal counsel has been appointed to defend the Crown in the lawsuit

S14

s.14

V. DISCUSSION:

These allegations are of a particular concern in that any amendment to the present Order made by the present decision maker might be challenged on the basis of alleged apprehension of bias and the remediation of the serious environmental problems at Britannia could be delayed further.

VI. OPTIONS:

Option 1 – Keep Decision Making Responsibility in Region

Pro:

- Region continues to deal with the problem
- Existing history and experience on the site remains
- Minimal delays in amending the order

Con:

- Decision will likely be challenged on the basis of alleged apprehension of bias
- Remediation of the site could be delayed

Option 2 - Move the Decision-Making Responsibility to another Region

Pro:

- Would deal with apprehension of bias concerns

Con:

- Existing history and experience on the site would be lost
- Some of the potentially responsible parties are large companies with very sophisticated legal counsel. Other regions may lack the level of experience with the contaminated sites legislation required for this file.
- Would be a drain on resources for another region. However, it is anticipated that once the decision is made the administration of the order can be given back to Region 2.

Option 3 - Move the Decision-Making Responsibility to Headquarters

Pro:

- Would deal with apprehension of bias concerns
- Some of the potentially responsible parties are large companies with very sophisticated legal counsel. HQ has the level of experience with the contaminated sites legislation required for this file.

Con:

- Existing history and experience on the site would be lost
- Would be a drain on resources for HQ. However, it is anticipated that once the decision is made the administration of the order can be given back to Region 2.

VII. RECOMMENDED OPTION:

Option 3 - Move decision-making responsibility to Headquarters

Approved / Not Approved
Assistant Deputy Minister
Environment and Lands
Regions Division

Date

Contact:

Dr. J. O'Riordan
Assistant Deputy Minister
Environment and Lands
Regions Division
Phone: (250) 387-9877

Initial: _____

Alternate Contact:

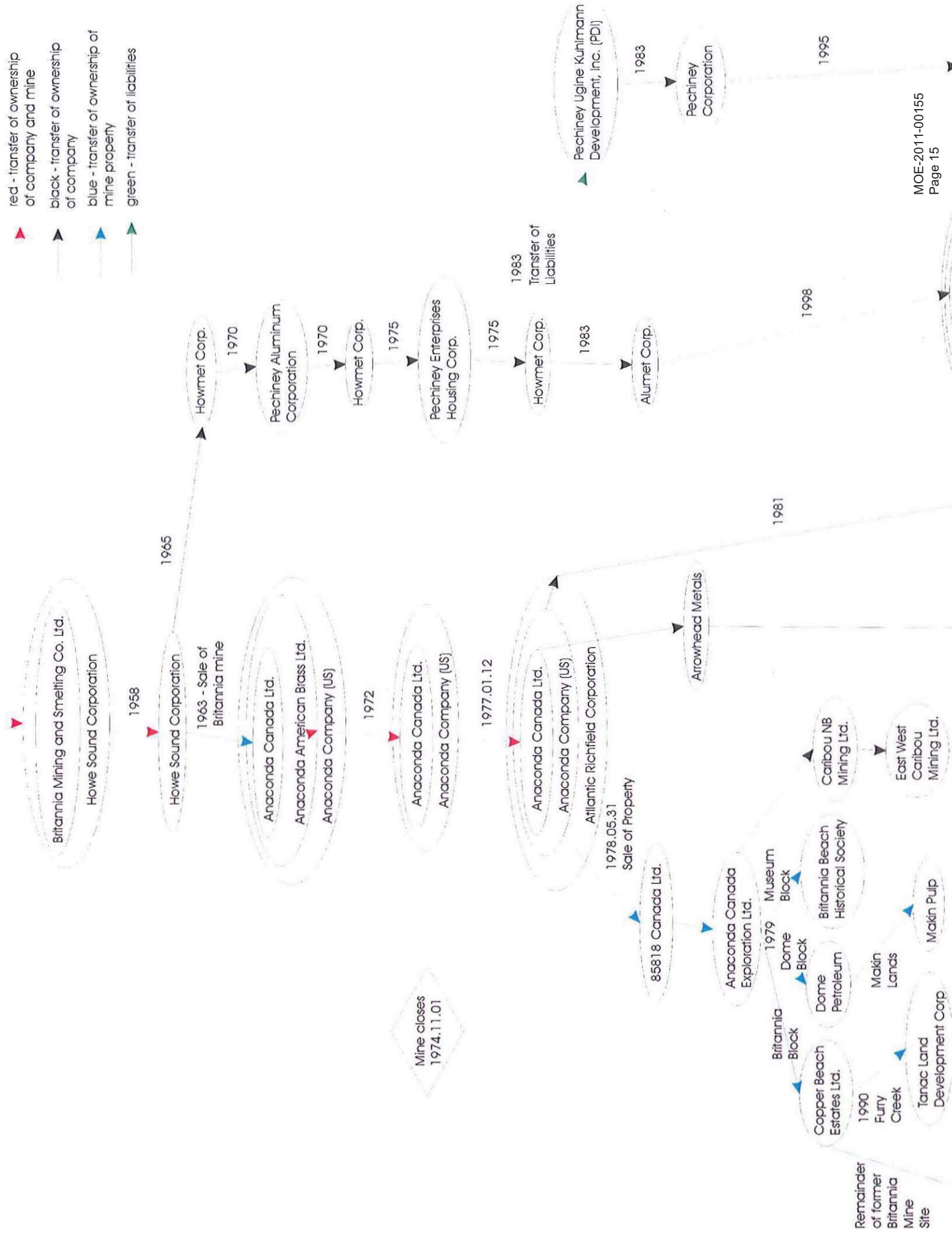
J. W. McCracken
Regional Director
Lower Mainland Region
Phone: (604) 582-5265

Initial: _____

Prepared By:

Douglas Pope
Regional Manager
Pollution Prevention
Lower Mainland Region
Phone: (604) 582-5284

Reg. Mgr. Initial: DTP 00/08/21

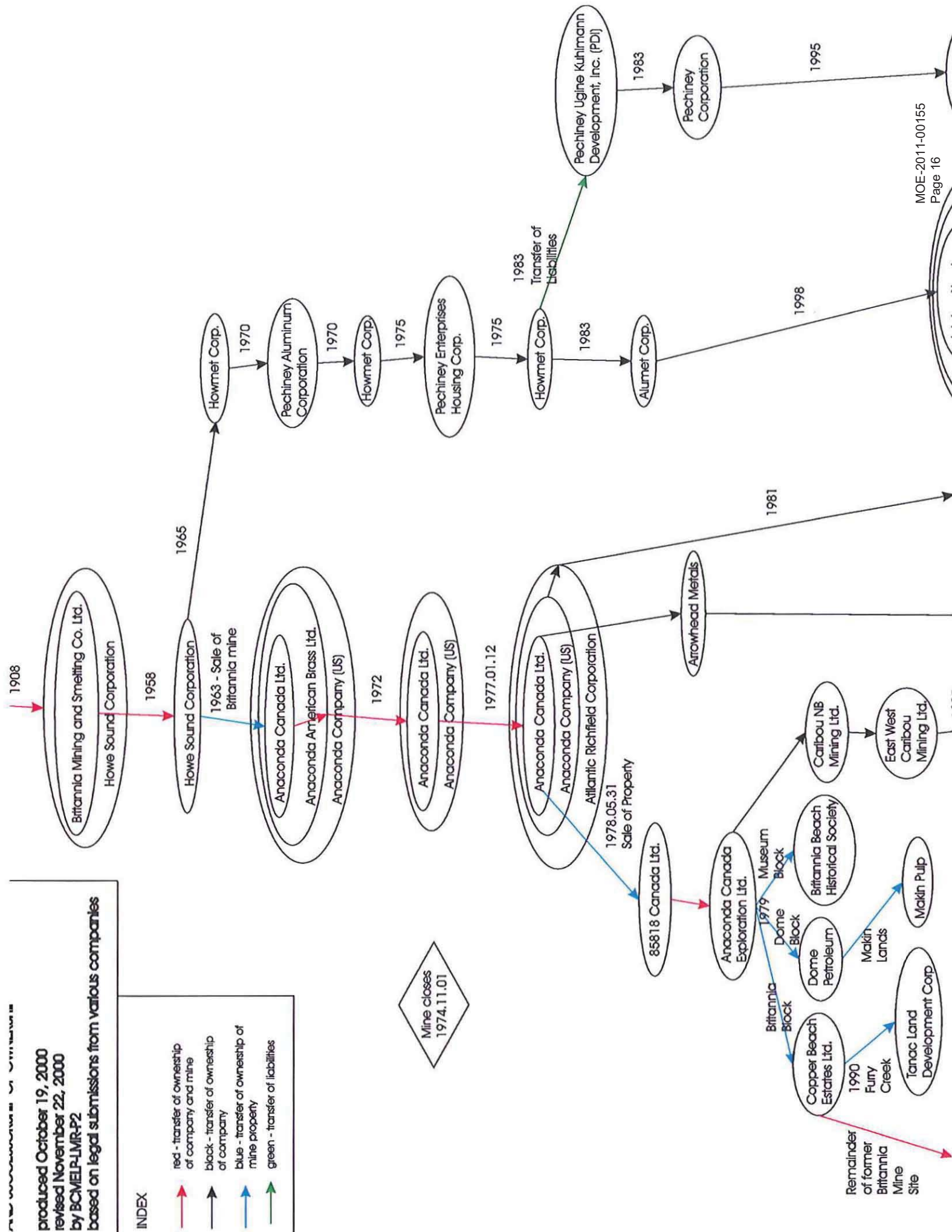


produced October 19, 2000
 revised November 22, 2000
 by BCMELP-LMR-P2
 based on legal submissions from various companies

INDEX

- red - transfer of ownership of company and mine
- black - transfer of ownership of company
- blue - transfer of ownership of mine property
- green - transfer of liabilities

Mine closes
 1974.11.01



A Long Chronology of the Britannia Mine Site

Barry Azevedo
P2 - LMR - BCMELP
June 12, 1998

- 1905 - Britannia Mine begins production.
- 1958 - Britannia Mining and Smelting Co. Ltd. placed in voluntary liquidation and purchased by Howe Sound Corporation
- 1963 - Anaconda Canada Ltd. purchases Britannia Mine from Howe Sound Corporation.
- 1965 - Anaconda boosts ore production by commencing open pit mines in Jane Basin.
- 1972 - All mine drainage water is diverted to 4100 level copper treatment plant and then discharged to Britannia Creek.
- 1973 March - BC Pollution Control Branch orders Anaconda Britannia Mines Ltd., c/o Anaconda American Brass Limited, to make application for a permit. Anaconda Canada Limited provided an application for a permit dated May 8, 1973.
- 1974 October - Anaconda announces that mine will be permanently closed. BC Pollution Control Branch orders Anaconda to collect all mine drainage, treat in approved treatment works, and discharge through an approved submerged outfall. The purpose of the submerged outfall is to reduce the impact of the discharge on the biologically-active surface waters of Howe Sound. An October 1977 Order further requires discharge monitoring and reporting, commencement of outfall construction by January 1978, and outfall operation by June 1978. Submerged outfall noted to be in operation by July 1978. An April 1979 Order requires treatment by copper recovery treatment plant when mine water exceeds 15 mg/L of dissolved copper.
- 1974 November - Mine is permanently closed. Over the mine life, a total of 47.9 million tonnes of ore were mined and produced a total of 500,000 tonnes of copper, 125,000 tonnes of silver, and 16,000 tonnes of lead.
- 1978 May - Concrete plug installed at 4100 bulkhead to increase flow equalization and thereby allow better collection and treatment in copper recovery plant.
- 1978 - After Anaconda Canada Ltd. amalgamates with another company and becomes Arrowhead Metals Ltd., Arrowhead Metals sells Britannia lands to 85818 Canada Ltd. and soon thereafter 85818 amalgamated with and changed its name to Anaconda Canada Exploration Ltd.
- 1979 October - Copper Beach Estates Ltd (CBEL) purchases Britannia Block, Furry Creek Block, and Mt. Sheer Block from Anaconda Canada Exploration Ltd. Anaconda Canada

Exploration sells Museum Block to BC Mining Museum, Dome/Makin Block to Dome Petroleum.

- 1980 - CBEL sells Furry Creek lands to a developer. Developer proceeds to develop Furry Creek lands as a separate project from Britannia.

- 1981 January - BC Waste Management Branch revises Order to name CBEL.

- 1983 to 1986 - BCMELP regional staff conducts environmental impact study in receiving waters and produces a report titled "Copper Beach Estates Ltd. AE-2194 Receiving Environment Survey". In addition to rendering Britannia Creek and Jane Creek acutely toxic to macroinvertebrates and fish, ARD was shown to elevate copper levels in Howe Sound near toxic levels as defined by the laboratory tests of the study. The report recommended that the 2200 portal discharge be removed from Jane and Britannia Creeks and be redirected to the submerged 4100 portal outfall, and that source control be investigated through assessment of the diversion of runoff in the Jane Basin pit area. The 2200 drainage into Britannia Creek was of particular concern, due to the lower density of the creek freshwater which results in greater impact to the more biologically significant surface waters of Howe Sound. The report noted that it had been shown that dissolved copper is being released back into the Howe Sound waters from the contaminated sediment and tailings in Howe Sound. The report recommends further study to determine the necessary levels in the discharges which are required to ensure the receiving waters are adequately protected.

- 1985 February - Environment Canada reviewed available environmental information at Britannia and produced report titled "Environmental Assessment of the Britannia Mine - Howe Sound". The report concludes that minewater (ARD) quality has improved considerably since the mine shutdown in 1974 and metal concentrations are approximately 10% of their 1974 levels but are likely to remain at their present levels for the foreseeable future. The report also states that copper removal plant is not effective in removing copper for the present discharges, removal of the 2200 level discharge would improve Britannia Creek water quality and reduce copper loadings to surface waters of Howe Sound, and severely depressed benthic invertebrates and fish populations are noted inside the sill in Howe Sound below a depth of 140 metres. The report recommends further investigations be undertaken to determine the impact of AMD on aquatic life.

- 1985 - Failure to comply with Order (now under the Waste Management Act), confirmed by Waste Management Branch regional staff and CBEL is reminded failure to collect and discharge all drainage through submerged outfall is a contravention of the Order. Failure is believed to be due to a collapse of internal workings, resulting in a drainage discharging from 2200 portal, and contaminating Jane Creek, which flows into and contaminates Britannia Creek.

- 1987 - Waste Management Branch regional staff recommends a legal investigation of CBEL for failure to comply with Order. Further information is determined to be required and assistance from BCMEMPR is requested.

- 1989 May - Water Management Branch determines Park Lane Bridge on upper Britannia Creek is a safety hazard. CBEL hires contractor to remove dam with Water Management providing technical assistance. Contractor bases explosive charge on steel-reinforced concrete as shown in original engineering drawings. Explosion causes oversized hole in dam and results in large debris torrent travelling down Britannia Creek. No loss of life results and minimal damage to property. It was later determined that dam was not constructed in accordance with engineering drawings and was not built using steel reinforced concrete. In 1998, BCMELP is in process of developing a Dam Safety Regulation for exactly this type of problem. At present, none of the other four other dams on Britannia Creek are considered to present a hazard (two lower dams are concrete gravity and are therefore very unlikely to undergo massive failure).

- 1991 May - SRK produces report for BCMEMPR titled "Evaluation of ARD from Britannia Mine and the Options for Long Term Remediation of the Impact on Howe Sound". The report states that the mine will potentially continue to generate contaminated drainage for many years, and concludes that more information is required to determine appropriate physical and chemical remedial measures. The report recommends that the 2200 drainage be diverted from Britannia Creek, water quality monitoring of the drainage and creeks, seepage surveys and acid-base accounting of materials and rocks at site, assessment of surface water diversions to reduce ARD flow, and further refinement of a treatment system.

- 1991 March - 400091 BC Ltd. enters into a purchase agreement with CBEL for the purchase of the site for \$16,975,000. A term of the agreement is that 400091 advance a sum to CBEL before completion to prevent a first mortgage from foreclosing.

s.21

- 1991 July - 400091 elects not to purchase site, demands payment of loan, and commences foreclosure proceedings

- 1991 August - Flood, or emergency response to flood, results in damage to pipe leading to submerged outfall which discharges acid rock drainage from mine. Flood also damages sewage collection, treatment, and discharge system (to submerged ARD outfall pipe), allowing raw sewage to be discharged to Britannia Creek. Damaged pipe is subsequently removed to allow creek to be widened to prevent future flooding. CBEL advises they are not responsible for replacement of pipe and do not have funds to rebuild pipe. In December 91, BCMELP issues order to CBEL to install satisfactory sewage collection, treatment and discharge works. In December 1993, BCMELP begins re-construction of submerged outfall for ARD and sewage. Work completed in March 1994 at a cost of \$144,842 paid by BCMELP.

- 1991 November - Court grants Order for Conduct of Sale to 400091 with an effective date of September 16, 1992. CBEL has been attempting to sell property ever since.

- 1993 November/December - Pollution Prevention and Pollution Abatement Order OE-12635 and amendment issued to CBEL. Order includes requirements to submit a written description of

the scope, terms of reference, and schedule for a plan to treat all mine drainage, submit a plan to treat all mine drainage, submit a permit application, and submit audited financial statements. CBEL submitted the written description for the plan and the permit application, but has failed to provide a plan and submit audited financial statements.

- 1994 April - Court orders that rental payments from the residents of Britannia Beach be restricted to paying for essential services such as electricity, telephone, water, fire, and health. Court Order put enforcement of 1993 Order OE-12635 to address environmental concerns in question.

- 1994 July - 400091 advises that although foreclosure has proven ineffective, they do not want to petition CBEL into bankruptcy since no trustee would want to incur the significant environmental liabilities specifically since no limit to liability can be provided. 400091 petitions court to appoint a receiver-manager with immunity from environmental liabilities. It was noted that no receiver-manager would want to incur the environmental liabilities and therefore environmental immunity was essential to obtain a receiver-manager. It was further noted that the essential services and infrastructure to the community were seriously deteriorating and without appointment of a receiver manager the residents of Britannia Beach would bear the consequences.

- 1994 August - Court orders appointment of Coopers & Lybrand as the receiver-manager for the property (including all lands, collateral, income, and rents). The court also exempted Receiver-Manager from environmental liabilities. Court Order removes all collateral and income from CBEL and therefore effectively prevents CBEL from complying with BCMELP Order OE-12635. Therefore no legal action has been taken to enforce BCMELP Order OE-12635. Further, the Court Order prohibits such legal action against CBEL without leave of the Court first being obtained.

- 1994 August/September - BCMELP and Environment Canada jointly declare the site an "high risk orphan contaminated site" and submit a joint application for \$4.3 million funding under the National Contaminated Sites Remediation Agreement which requires the federal and provincial government makes equal contributions. Actual funding provided in 1995 is \$60,000 and is used for water monitoring in 1995-97.

- 1994 November - Court adjourns hearing of purchase proposals due to uncertainty of liability for mortgagee and potential purchaser. At the time, there were four proposals ranging from \$8.2 million to \$10 million. The last offer was turned down by BCMELP in February 1996 due to the proposal for the provincial government to limit the environmental liability of the purchaser in exchange for certain pollution abatement measures and financial commitments. Since 1991 until the present, BCMELP has also received various proposals which propose to separate the liability of the townsite from the remainder of the mine site. BCMELP has consistently expressed concern regarding the separation of assets from liabilities and therefore has not supported such proposals. Several such proposals have come from the community of Britannia Beach.

- 1995 February - Water quality and flow monitoring, jointly funded by BCMELP, Environment Canada, and BCMEMPR, initiated at Britannia to supplement information base for establishing remediation alternatives and costs for the purpose of providing BCMELP prospective purchasers with an understanding of environmental liabilities at Britannia and increase the likelihood of sale. Monitoring program continued for approximately two years. BCMELP regional staff also collect independent flow measurements of ARD at 2200 and 4100 portals.

- 1995 March - BCMEMPR produces report titled "A Reconnaissance Study of AMD at the Britannia Mine". The report reviewed and summarised existing information and carried out a site reconnaissance. The conclusions include that more data is required to characterise mine wastes (ARD and waste associated with mill and mining museum), that specific water quality objectives should be developed for the receiving environment, that metal discharges from the 2200 level and 4100 level are making the water in lower Jane Creek, Britannia Creek, and adjacent portions of Howe Sound, toxic for aquatic life, that there are a large number of much smaller metal discharges from portals, waste rock, other mine wastes or exposures, metal release from sediments accumulated in surface waters (eg. drainage channels, creeks, settling ponds) but insufficient data exists to ascertain whether any of these smaller sources pose a threat to the environment, and that the copper recovery treatment plant is not capable of reducing metals to levels safe for discharge to either Howe Sound or Britannia Creek.

- 1995 July - NTBC Research Corporation installed a pilot plant at Britannia to test their promising biosulphide technology for treatment of ARD. Research is partly funded by BC21 with further limited financial support from BCMELP. Pilot plant stops operation August 1996 due to lack of funding.

- 1995 November - EcoSpirit Land Reclamations Ltd apply for a permit PR-14336 to dispose industrial waste soils at Britannia. As of June 1997, Ecospirit has not provided required supporting reports and regional office intends to refuse application in absence of supporting reports.

- 1996 February - Richmond Plywood constructs logging road across 2700 level mine dump with approval from MOF

- 1997 DFO initiated two year study to determine impact on juvenile salmon habitat

- 1997 April - HA Simons produces a report, under contract to Environment Canada, which assesses the design and costs of a pipeline for carrying the 2200 level ARD from the 2200 level to the 4100 level for discharge through the submerged outfall to Howe Sound. The report provided three options ranging from \$478,000 to \$733,000. The lowest price option uses the existing pipe in sections and would have to be examined in detail to determine if it can be used as proposed.

- 1997 August - Cominco Engineering Services Limited completes study funded by Cominco, BCMELP, and Environment Canada. Study consists of pilot scale testing of high density sludge process using pulp mill ash and lime to neutralise and remove metals from the 4100 level ARD.

Report concluded that pilot testing successfully demonstrated the capability of the HDS process to produce a satisfactory, free-draining sludge, reduce metal concentrations and pH to regulatory standards, and produce a non-toxic effluent, using either lime or pulp mill ash. Recommendations include further testing for toxins (eg. dioxins) in the effluent, and sludge being introduced by the use of pulp mill ash, leachability of metals from the sludge, treatment of the combined 2200 and 4100 drainages, feasibility study to assess costs and benefits of an HDS treatment plant using lime, pulp mill ash, or a combination of the two, and evaluation of sludge disposal options.

- 1997 October - Triton produces report under contract to Environment to re-establish three hydrometric stations for 2200 level ARD, 4100 level ARD, and Jane Creek, after concerns identified with flow information provided by Water Surveys Canada in 1996-1997 data. Triton also installed a rain gauge and temperature probe at 2200 level.

- 1997 October - BCMELP and Environment Canada provide \$30,000 for HASimons to prepare pre-feasibility designs and cost estimates for a treatment system at the Britannia site to treat the combined 2200 and 4100 flows. In February 1998, based on additional funding of \$15,000 from BCMELP, contract was amended to conduct additional work including assessment of hydraulic conductivity between 2700 level and 4100 level (to minimise piping costs for redirecting 2200 drainage), and further monitoring, to improve the treatment plant design assessment. A report dated March 1998 concluded that a high density sludge lime treatment plant was the best process to treat ARD from Britannia on the basis of capital cost, operating cost and operating complexity. The capital cost for ARD collection and treatment was estimated to be approximately \$5,000,000 with annual operating costs of approximately \$1,000,000. Influent flows and quality were based on a review of historical and recent reported information to provide a design average criteria including influent flow of 495 m³/hr, pH=4.5, [Cu]=28mg/L, [Fe]=15mg/L, and [Zn]=25mg/L. The collection system includes \$165,000 for the collection of 2200 drainage and re-introduction into the internal mine workings at the 2700 level. The capital and operating costs assume that sludge disposal is available at the 2200 level. The use of pulp mill ash residue may be used in place of or in conjunction with lime to neutralise the ARD, with operating cost competitiveness dependent on the amount pulp mills would be willing to pay to dispose of ash at Britannia. Further contract requirements pertaining to monitoring and possibly equalisation potential (depending on available funds remaining), are to be completed later in 1998.

- 1997 December - CBEL submits application to BCMEI (now BCMEM) for Mines Act Reclamation Permit to conduct pilot reclamation project at Mt Sheer Townsite whereby industrial-plus contaminated soil (waste soils) would be disposed of in an engineered landfill thereby reducing infiltration and ARD generation, and generate funds to construct pipeline to divert 2200 portal drainage from Jane Creek to 4100 deep outfall into Howe Sound. Further negotiations also reveal that project is a pilot for larger project of using contaminated soil disposal in Jane Basin open pits to decrease infiltration and generate funds to construct and operate a treatment plant. CBEL proposes that a reclamation permit from BCMEM be provided first, based only on geotechnical issues, and then CBEL apply for a WMA permit from BCMELP, as required by BCMELP. As of June 1998, CBEL has submitted a geotechnical report to BCMEM for consideration.

- 1998 April - SLDF produces report on mining in BC and uses Britannia as a case study.
- 1998 May - Britannia Beach Community Association complains that C&L are demolishing a house with intention to demolish more and that assets are being reduced at Britannia in violation of contaminated sites legislation and further no site profiles are being submitted in violation of legislation. Discussion with Ministry of Attorney General confirms that C&L are exempt from obtaining asset reduction approval under legislation, and that demolition of residences do require submission of site profiles. The BBKA advised that they have applied to incorporate as a village and have support from the Squamish Lillooet Regional District and the District of Squamish. BBKA supports setup of a Britannia Community PAC for the purpose of providing community input to government decisions affecting Britannia particularly since incorporation is being anticipated.
- 1998 May - Based on a recently completed legal review by the BC Ministry of Attorney General to determine responsible parties for the Britannia site under the newly effective contaminated sites legislation of the Waste Management Act, BCMELP advises two companies, in addition to CBEL, that they have been identified as responsible parties under the Act. BCMELP requests a meeting by July 1998 to resolve the issues at the site. The two companies are Arrowhead Metals Ltd. which was the successor company to Anaconda Canada Ltd., and Canzinc Ltd. which was a successor company to Anaconda Canada Exploration Ltd.