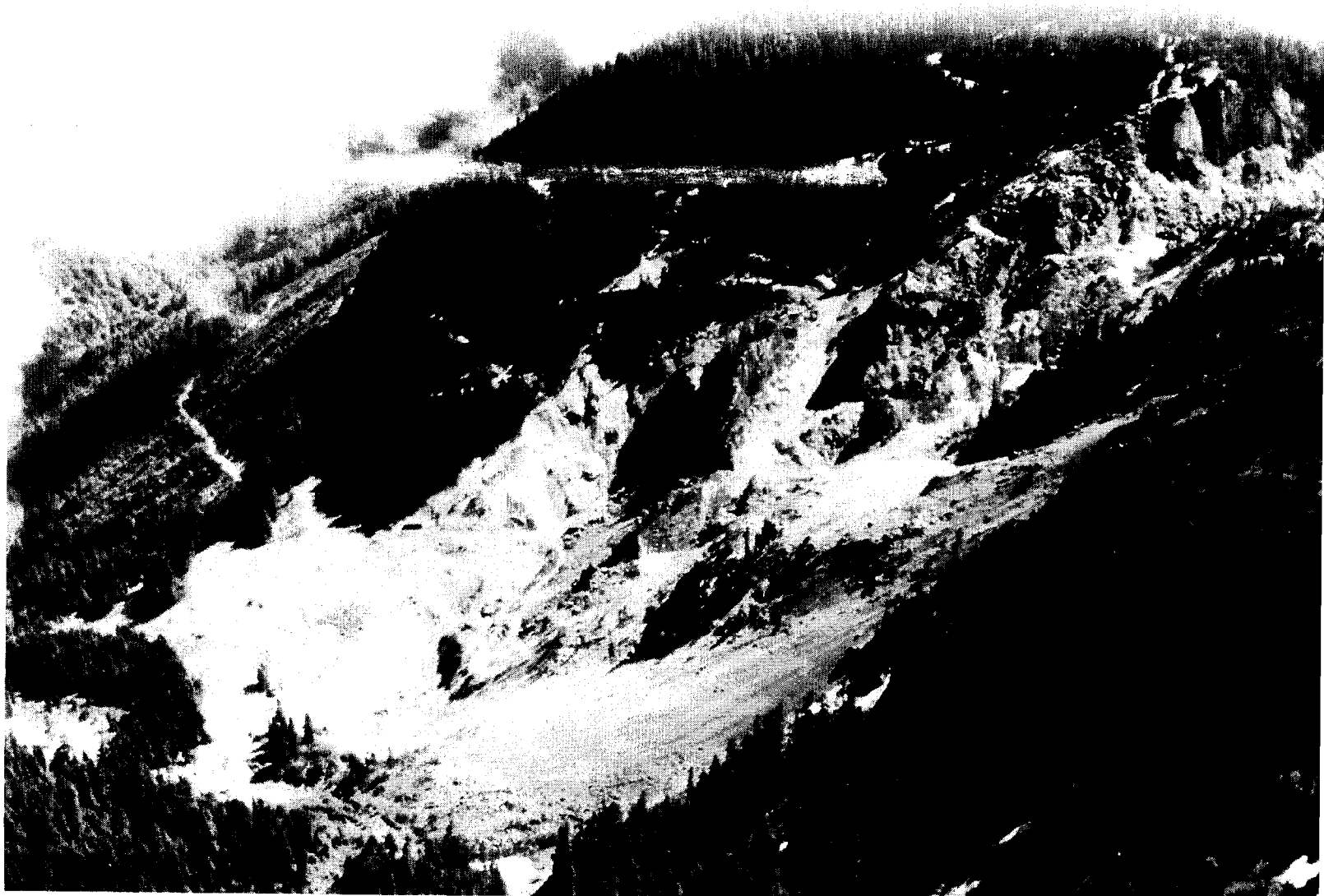


Proposed Britannia Mine Reclamation and Remediation

Project Summary

March 1999



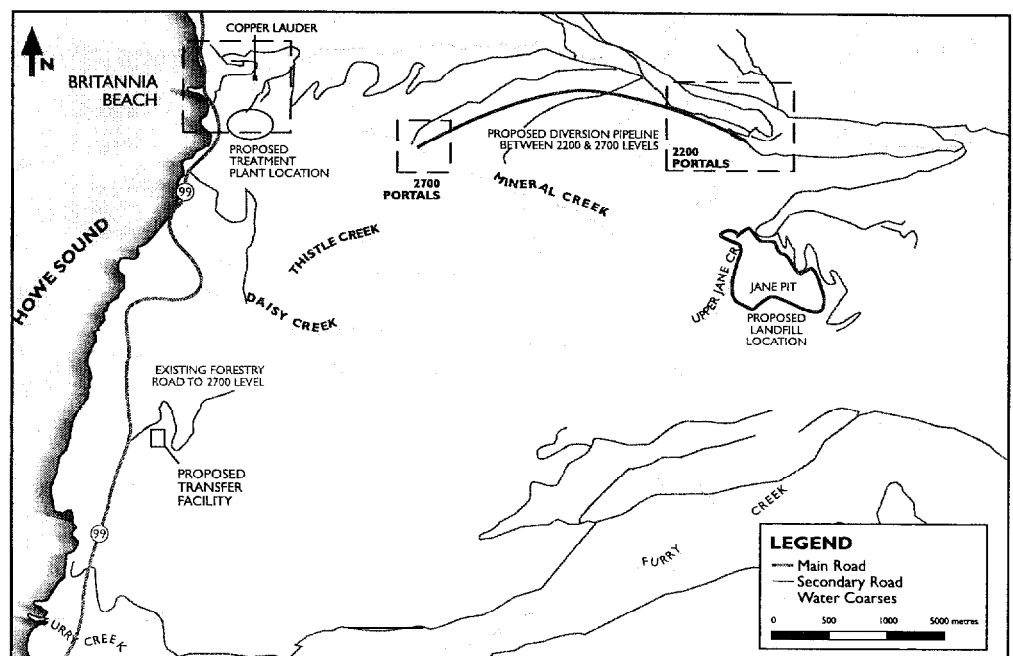
Introduction

The Britannia Mine is located at the town of Britannia Beach, approximately 50 km north of Vancouver on the shore of Howe Sound. It was operated from 1902 to 1963 by the Britannia Mining and Smelting Company Ltd., and from 1963 until permanent shutdown in 1974 by Anaconda Mining Company. In its prime the mine was one of the biggest copper producers in the British Empire.



The Crown grants and freehold rights to the Britannia Mine lands were obtained by Copper Beach Estates Ltd. (CBEL) in 1978. Although CBEL had no part in the earlier mining activities and did not share in the profits from those operations, it now has responsibility for site remediation as the present owners.

This document describes the environmental problems that exist at Britannia Mine, and CBEL's proposed solution which has been submitted for approval to the B.C. Ministry of Energy and Mines and the B.C. Ministry of Environment, Lands and Parks. Technical review by these and other regulatory agencies is a required part of the assessment process. Public consultation is an equally important part of this process. This document is intended to support public consultation by providing a summary level overview of the proposed reclamation and remediation plan.

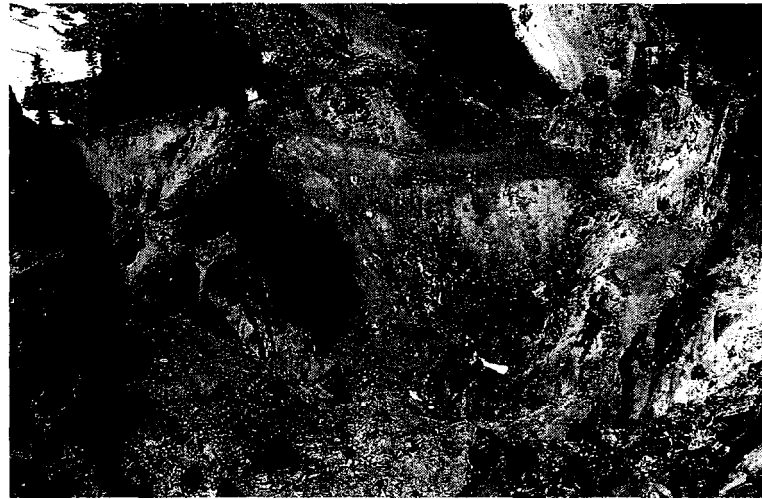
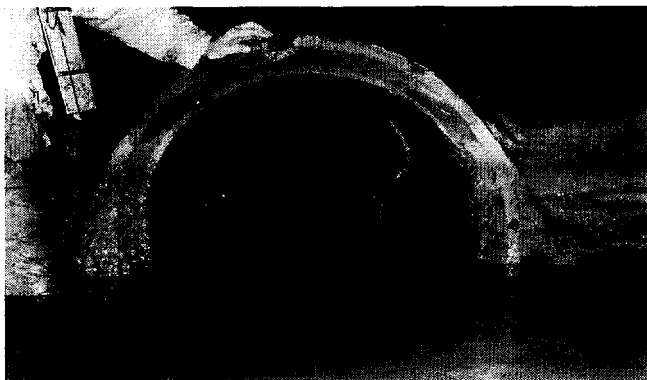


The Problem:

During more than 70 years of mining activity, approximately 80 km of underground workings and five open pits were excavated to mine the ore, which was then processed in facilities at Britannia Beach.

Rocks in the Britannia area, once exposed to air and water by mining or other activities, are susceptible to natural oxidation of sulphide minerals in the rocks. This oxidation process releases acid into the water which in turn dissolves metals that are contained in the rocks and soils. The resultant Acid Rock Drainage (ARD) from the Britannia Mine drains from the underground workings into Howe Sound. It is typically very acidic, contains elevated levels of sulphate and metals, and is highly toxic to fish. The shoreline in the vicinity of the outfall is impacted and the area is considered hazardous to juvenile salmon stocks from the Squamish Estuary.

Acid Rock Drainage is the largest single environmental problem facing the mining industry today. ARD can be effectively controlled if measures are taken at the outset. However, the problem is very difficult to control once ARD generation has started because of the large physical area involved.



Jane Basin.

At Britannia, the widespread extent of exposed rock from mining operations makes it impractical to eliminate or reduce ARD generation to an acceptable level. The preferred solution is to build and operate a water treatment plant, which will collect and treat the ARD to an acceptable discharge quality.

Implementation of treatment, however, has been prevented by the high costs involved. Over the last several years, many studies have been funded by both industry and government to find treatment technologies (such as metals recovery) that alone could generate revenue to offset treatment costs. None has proven feasible for application at Britannia.

ARD discharge from 4150 level to Howe Sound.

The Proposed Solution

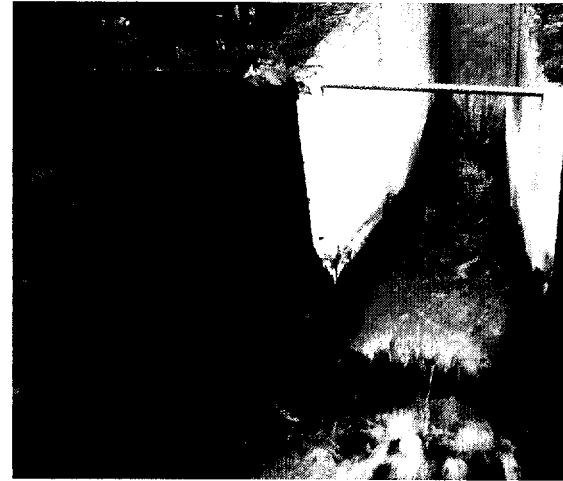
A proposal has been submitted by CBEL to clean up discharge water quality and reclaim mining-affected lands by building and operating an ARD treatment plant, and operating a commercial landfill for the storage of metal-bearing soils, sited within the historical mine workings. Through the course of landfill operations the open pits and much of the disturbed mine lands will be filled, recontoured, and restored to vegetation.

Key to this proposal is the commercial landfill operation, which will generate enough revenue to pay for the construction and operation of the ARD treatment facility. It will also generate enough additional revenue to set aside an accumulated fund sufficient to finance the ongoing operation and maintenance of the ARD treatment plant in perpetuity.

The ARD treatment plant will be located adjacent to the B.C. Museum of Mining property, at the lower mine portal (known as the 4100 level) from which water currently discharges into a culvert and then into Howe Sound. The treatment plant will operate 24 hours per day, 365 days per year, to continuously clean the contaminated water flowing from the closed mine workings.

The landfill will be located in the abandoned open pits and glory holes several kilometers up the mountain at the site of the prior mining operations. A transfer station will be constructed 2 km south of Britannia east of Highway 99 to receive, test, and temporarily store soils prior to placement in the landfill. The landfill and transfer station will operate during usual daytime working hours on an eight month schedule. Operation will be suspended each year during the four winter months when snow conditions make operations impractical.

The underground workings provide an effective “plumbing” system, which directs drainage from the upper mine regions down to the lower (4100 level) portal at which the treatment plant will be located. Additional drainage controls will be constructed at Upper Jane Creek and East Bluff Creek to divert clean water from entering the workings. ARD which now exits the workings at higher levels will be captured and redirected by means of a diversion pipeline back into the underground workings and to the treatment plant.



ARD discharge from 4150 level

What are the benefits of the proposed approach?

- Operation of the water treatment plant, using proven technology to treat all mine drainage on a continual basis, will eliminate a major source of pollution in Howe Sound.
- Drainage controls and the diversion pipeline will divert ARD away from surface watercourses and towards the ARD treatment facility. This will remove a primary source of contamination and allow the creeks to recover water quality and restore aquatic habitat.
- Landfilling in the open pits, together with surface landscaping, will divert clean precipitation and snow melt away from the mine workings, over time reducing the volume of water requiring treatment and also the operating costs of the treatment plant.
- Surface reclamation of a large portion of the mine property will be achieved through contouring and revegetation following closure of the landfills.



- The landfill will provide a local/regional disposal option for many waste materials which originate in British Columbia, but until now have had to be shipped to other provinces or to the USA.
- Revenues generated from landfill tipping fees will pay for the annual operating costs of the treatment plant as well as providing sufficient reserves to fund operation and maintenance of the treatment plant in perpetuity.

Questions

We want to ensure that this proposal for remediation addresses all of the important issues, and is an acceptable solution to this long-standing environmental problem. Your comments and opinions are invited, either through the enclosed feedback form or through direct participation in public meetings. The back page of this information brochure provides further contact information.

In developing the project plans to the present level of detail, constructive input has been obtained from federal and provincial government agencies, regional districts, and technical specialists. In the course of these discussions and technical reviews a number of questions have been raised, and addressed, in the proposal. Some are summarized here for your information.

What material will the commercial landfill receive? Will it be safe?

The bulk of the landfill material will consist of excavated industrial or residential soils which contain metal levels above B.C. standards for industrial soils (for which there is currently no acceptable disposal site within the province). This material could come from excavations for buildings, highways, bridges, and other industrial sites throughout B.C.

Some other materials will be accepted in limited quantities (stipulated in the operating permit). These materials could include ash residues generated in boilers or other thermal treatment systems, industrial demolition waste, and general industrial wastes, providing they meet the material specifications.

The material acceptable for landfill will be strictly specified and regulated by provincial permit, and will exclude all municipal and putrescible wastes. The material will meet B.C. standards for industrial soil quality with the exception of metals, which will exceed the industrial standards, but which will be below the B.C. Special Waste standards.

Will trucks delivering landfill material cause traffic or safety problems?

Highway traffic delivering material to the landfill is expected to average 26 trucks per day, five days per week, for the eight months each year that the landfill is in operation. Based upon vehicle counts provided by the BC Ministry of Transportation and Highways for selected days in 1998, this additional vehicle traffic is expected to increase total highway traffic by less than 1/3% during the operating months of the landfill. During the four winter months when ski season traffic and highway conditions are the greatest concern, the landfill will suspend operations.

The landfill material is not classified as a dangerous good by Transport Canada, and requires no special handling or transportation precautions. The material will be delivered by construction or haulage contractors in standard highway-rated trucks meeting all applicable highway regulations.



Won't the landfill itself cause water contamination problems?

The exposed mine surface workings are within a natural saddle that directs all precipitation and surface flows into the underground workings, and from there to the 4100 level portal (the proposed treatment plant location). The landfill will be located within this saddle, so any drainage from the landfill will also be contained and directed to treatment.

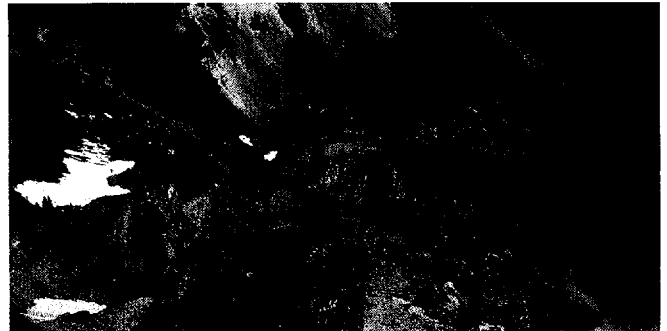
The only contaminants above industrial levels allowed in the landfill materials will be metals, like those naturally occurring in the region, which the treatment plant is designed to remove.

An important component of the landfill design is surface drainage measures to divert clean water around the landfill and exposed mine workings. These diversion works will reduce the amount of water exposed to contamination, and will reduce the total flow through the treatment plant.

Bulkheads installed in portals to the underground workings will allow the workings themselves to serve as a storage reservoir in the event that temporary storm flows exceed treatment plant capacity, or treatment plant operation is otherwise interrupted.

Will the proposed operation be unsightly, and detract from the aesthetic values of Britannia Beach or from the BC Museum of Mining?

The only facilities near the highway and the townsite of Britannia Beach will be the landfill material transfer station and the ARD treatment plant.



Jane Basin glory hole.

The transfer station will consist of low-height enclosed buildings incorporating material storage, vehicle maintenance, and offices. The facilities will not be located within sight of the road or the townsite.

The ARD treatment plant will be designed for use as a public educational site operating in coordination with the BC Museum of Mining. Although clearly functional in design, it is intended to serve a secondary purpose as a showpiece for visitors to the Museum.

The environmental legacy of ARD at the Britannia Mine has been studied by international delegations, environmental organizations, and specialists in the field of mine environmental remediation. This proposal offers British Columbia the opportunity to showcase a sustainable, integrated waste management solution to the long-standing challenges of this well-known site.

How effective will these measures be at restoring fish habitat in Howe Sound and Britannia Creek?

Source control is the necessary first step to habitat restoration. This proposal will eliminate the continued discharge of contaminated water to Britannia Creek and Howe Sound.

Once the source of pollutants to Britannia Creek and Howe Sound has been controlled, the water courses, sediments, and aquatic habitat will naturally improve over time.

Will the existing Britannia Beach townsite residents be forced out or otherwise relocated if this development is approved?

No, the proposed development has no impact on the existing townsite. CBEL, FBC, and other government bodies will work with the residents to ensure minimum impact.



Copper Beach Estates Ltd.(CBEL) is a B.C. company which obtained the Crown Grants and freehold rights to the Britannia Mine lands from Anaconda Mining Company in 1978, after mining suspension. Although CBEL had no part in the earlier mining activities and did not share in the profits from those operations, as the present owner it now has responsibility for site remediation.

On March 15, 1999 CBEL submitted applications to the government of British Columbia for permits under the Mines Act and the Waste Management Act to develop and operate a treatment facility and commercial landfill to remediate acid mine drainage and reclaim disturbed mining lands at Britannia Beach in Howe Sound.

Simons International Corporation has been retained by CBEL to lead the design of the proposed acid mine drainage treatment facilities and landfill, and to prepare permit application documents and technical support materials. Simons also performed earlier studies of Britannia Mine water management and ARD treatment options on behalf of Environment Canada, some of which form the technical basis for this proposal.

Opportunities for Public Involvement

The Fraser Basin Council is facilitating a public consultation process to review the proposal and consider the environmental, social and economic aspects of this long-standing problem and the proposed solution. The public consultation process includes community and stakeholder meetings and involves the B.C. Ministry of Environment, Lands and Parks, the B.C. Ministry of Energy and Mines, Environment Canada, and Fisheries and Oceans Canada. These agencies play a key role in the technical and regulatory review of treatment options, and final decision making.

Copies of the permit application are available for review at the B.C. Museum of Mining at Britannia Beach, the Squamish Public Library, the Squamish-Lillooet Regional District in Pemberton, the Ministry of Environment, Lands and Parks in Surrey, the Ministry of Energy and Mines in Nanaimo, and at the Fraser Basin Council in Vancouver.

Comments about the permit applications should be mailed or faxed to:

Fraser Basin Council
Suite #1257 – 409 Granville Street
Vancouver, BC V6C1T2
Fax: (604) 605-3459
Phone: (604) 605-3450
Attention: David Marshall