MINING
QUARTERLY

Island Copper Closes in Spectacular Fashion

BHP

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Pit Flooding Was The Most Spectacular Element of a Comprehensive Mine Closure Plan Implemented by BHP Minerals Canada Ltd.

The Island Copper Mine's international reputation for innovative mining and environmental techniques was highlighted again in July with a unique decommissioning of the open pit by flooding it with seawater from adjacent Rupert Inlet, creating a 300-metre deep lake covering 215 hectares.

The pit flooding was the most spectacular element of a comprehensive mine closure plan implemented by BHP Minerals Canada Ltd. following the cessation of mining operations in August 1995 and milling operations in December with the exhaustion of the copper-molybdenum orebody after 25 years.

Flooding the Pit

The flooding of the open pit with seawater stabilized the pit walls and provides a manageable receiving environment for drainage from the land-based waste rock dumps which produce some acid rock drainage (ARD). This project involved the excavation through the beach dump of a 600-metre channel, 20 metres wide and half a metre below the low tide point, leaving a "plug" at both ends.

On May 22, the plug at the pit end was blasted out, allowing drainage of two water management ponds into the pit. On June 15, a backhoe removed the plug at the Inlet end allowing the ocean to flood through, creating a spectacular 400-metre waterfall over the lip of the pit. More than one billion gallons a day poured into the pit until it reached the desired level of 15 metres below the Inlet water level and the channel was closed off on July 23.

Surface water runoff will form a freshwater cap on the seawater, forming a meromictic lake as occurs in nature. The Federal Department of Fisheries has determined that fish habitat would be marginal and required the prevention of fish access to the lake by placing a fish net across the mouth of the channel during flooding.

Meantime, revegetation continued on the four land dumps covering 193 hectares, which began in the 1970s, and the 260 hectare landfill created by the beach dump.

More than 30,000 alder seedlings and 50,000 lodgepole pine have been planted over the past year and another 400,000 alder are to be planted this fall. The mine site has been a popular habitat for wildlife throughout the operating years and currently is home to about 30 deer and 500 Canada geese as well as black bear, cougar and other wildlife.

Island Copper is a Success Story – From Start to Finish

"The closure operation has been a continuation of the Island Copper success story," says Mine Manager Brian Welchman. "While costly (closure and reclamation costs run into the tens of millions of dollars) we have adhered to the plan in a timely and safe manner. There have been no time loss accidents in 1996 in spite of many workers taking on different jobs over the closure period."

The ore body ultimately contained 399.4 million dry short tons of ore averaging 0.41 per cent copper and 0.017 per cent molybdenum. More than 1.2 billion tons of rock were mined with conventional truck-and-shovel methods at a maximum rate at peak production in 1982 of 170,800 tons per day. Since the first

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ON JUNE 15, A BACKHOE REMOVED THE PLUG AT THE INLET END ALLOWING THE OCEAN TO FLOOD THROUGH, CREATING A SPECTACULAR 400-METRE WATERFALL OVER THE LIP OF THE PIT.

shipment of concentrate in December 1971, Island Copper's concentrator produced 1.3 billion kilograms of copper, 31 million kilograms of molybdenum, 31.7 million grams of gold, 336 million grams of silver and 27,000 kilograms of rhenium.

The mine created more than 16,250 person-years of employment and paid out $900 million in wages and benefits. At its peak, Island Copper employed more than 900 men and women, most of whom lived in the town of Port Hardy 15 kilometres from the mine site. Spending on supplies and services in British Columbia exceeded $1.2 billion while total spending was $2.9 billion, including $3 million annually in municipal and regional taxes.

Special features of the mine operation included the marine tailings disposal system which set an international standard. The thickened tailings were mixed with salt water and discharged from a pipeline more than 45 metres below the surface of Rupert Inlet.

Most of the mine's waste rock was deposited in Rupert Inlet, forming a landfill extending one kilometre from the south wall of the pit. In 1990, a 1,200-metre-long plastic concrete wall, only 81 centimetres wide but up to 33 metres deep, was constructed along the original shoreline as a seepage barrier to allow mining of the south wall. The project won awards in 1992 from the Colorado Consulting Engineers Council and the American Council of Consulting Engineers.

Island Copper Standard Setting Environmental Program

Island Copper's environmental program also set international standards. A comprehensive water management program controlled runoff from waste rock dumps, maintained pit dewatering and recycled all site drainage through the concentrator. The marine tailings disposal and oceanographic monitoring system was a model for similar systems around the world. Island Copper received four environmental reclamation awards from BC's Ministry of Energy, Mines and Petroleum Resources and the Mining Association of British Columbia.

BHP has benefited greatly from the expertise developed at Island Copper, transferring many personnel to company operations in Chile, Australia, Mali, Papua New Guinea, Indonesia, the western United States and the Northwest Territories where BHP is the joint venture partner on the DiaMet diamond project.

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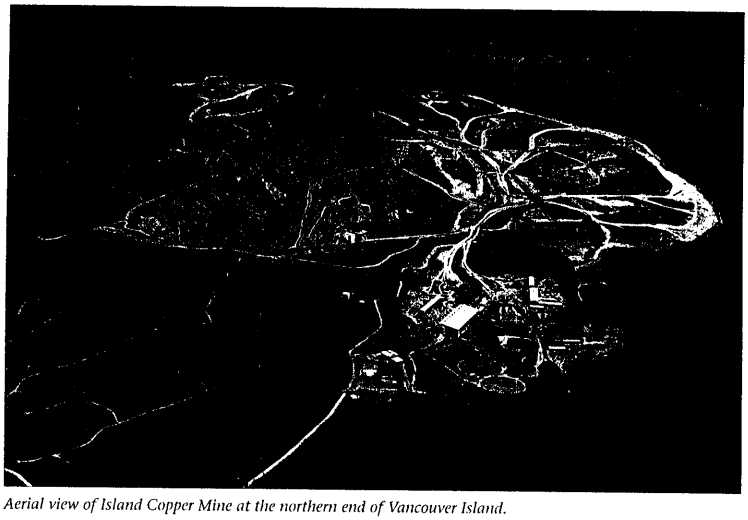
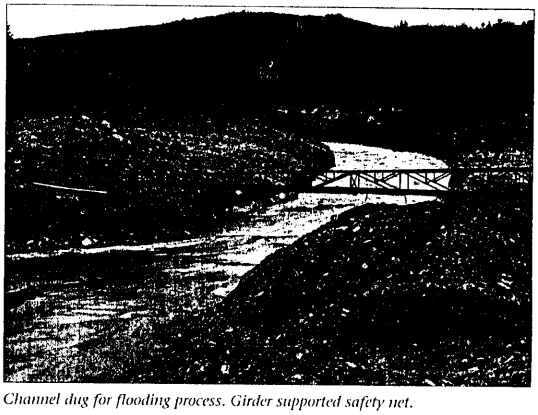
Environmental Recovery Monitored

The rate of recovery of marine organisms in the mine tailings and the chemical composition and suspended sediment content of the water will be monitored by the Review Committee of scientists from the universities of British Columbia, Victoria and Alberta which was established in 1971 as part of the mine's permit and bonding requirements.

"Benthic colonization and diversity are already evident off the beach dump and are expected to approach pre-mining levels within two years," says Environmental Manager Horne. "Populations of juvenile salmon, dogfish shark, six-gill shark, rock cod, sea perch, greenling and Dungeness crab presently are similar to the early 1970s when mining first began."



Aerial view of Island Copper Mine at the northern end of Vancouver Island.



Channel dug for flooding process. Girder supported safety net.

Cleanup and Disposal of Assets

The final element of the closure plan is the disposal of the mine's physical assets and cleanup of the plant site. All fuel, chemicals and any designated special wastes are being removed from the property and disposed of according to federal and provincial standards. All PCB was removed from the property in 1994. Areas contaminated by fuel, product concentrate or other materials are being rehabilitated to provincial environmental standards as buildings are decommissioned.

Mine Manager Brian Welchman during flooding process.

The mine's physical assets include a deep sea shipping dock with access to the Pacific, maintenance shops, warehouses, mill building, laboratories and offices, a dedicated 138 Kv power line and fresh water system and sewage treatment facilities. These structures, along with the huge grinding mills, other operating machinery and mobile equipment such as trucks, cranes and dozers are being offered for purchase through Henry Butcher & Co. of the U.K. and The Tradewest Group Limited of Langley.

The 55-hectare plant site, which is provincial crown land operated under a mineral lease, is being marketed internationally for lease or purchase as an industrial/commercial site – with or without the buildings and other assets. This is a joint effort of BC Lands, BHP Minerals and the Butcher/Tradewest group. Island Copper has actively promoted the site's assets with BC resource companies since 1993 without result. BHP also developed a proposal to utilize the open pit as a municipal solid waste landfill to service the Lower Mainland and Vancouver Island, again without success.

If alternative uses are not identified, all structures will be removed from the 55 hectare plant site and the land reclaimed to wildlife habitat. Options are being discussed for continued operation of a pump house on the Marble River which supplies water to a salmon enhancement facility sponsored by BHP Minerals in partnership with Western Forest Products and the Department of Fisheries.

While efforts are being made to find new tenants for the site and provide a continuing economic benefit to the North Island, the municipality of Port Hardy has implemented its own program to offset the mine's closure. Reserve funds have been established, infrastructure projects completed or funded – including a major renovation of Port Hardy Secondary School – and value-added forestry and fish processing operations have been attracted to the community of 5,300. There has been a mini-boom in both commercial and residential construction over the past two years and the town Council was instrumental in achieving recent changes to the mid-coast ferry system which will benefit tourism. ■