

INFORMATION ON THE GIBRALTAR MINE OPERATIONS

Amy Crook¹
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Background on Mine ownership and operations:

Gibraltar Mine is owned by Gibraltar Mines, a wholly-owned subsidiary of Taseko Mines Limited. Located in south-central British Columbia, near the city of Williams Lake, the 36,000 ton per day mine was originally developed in 1972 by Placer Development, the predecessor to Placer Dome. Due to high metal prices, the Gibraltar mine repaid its capital cost in less than two years. Mine production continued until 1998, producing 1.86 billion lbs of copper and 19.7 million lbs of molybdenum. In 1996, Placer re-focused on gold and sold its interest in Gibraltar to Westmin Resources, which was subsequently taken over by Boliden. The Gibraltar mine shut down in 1998 when copper prices dropped to \$0.61 per pound. The mine had four open pits, and tailings were disposed to a pond three kilometers north of the mill. It used heap leach and solvent extraction electrowinning from October 1986 to shutdown. In 1999, Taseko acquired the mine, mill and mining equipment and placed the mine on standby while awaiting an increase in copper prices. Mine operations resumed in 2004, amid strong market conditions for both copper and molybdenum (<http://www.tasekomines.com> Gibraltar mine summary).

At re-opening, the mine was operated as a joint venture with Ledcor CMI Ltd., with Ledcor having primary responsibility for mine operations. In November, 2006 Taseko mines announced notice of voluntary withdrawal from the joint venture established with Ledcor CMI Ltd (Public Notice October 17, 2006 www.tasekomines.com). Taseko took over sole operation of the Gibraltar Mine.

Currently, the Gibraltar mine site covers approximately 109 square kilometers and contains seven separate mineralized zones. There is well-developed infrastructure and the property is accessible by a combination of highways and paved roads. It is also close to a rail network that provides service for shipment of copper concentrates through the Pacific Ocean port of North Vancouver.

Gibraltar Mine ore reserves and processing info:

Taseko Mines Limited announced an expansion and upgrade of the concentrator facility which will increase the production capacity of the Gibraltar mine from 70 million pounds to 100 million pounds of copper per year by 2008. An upgrade to the SAG mill will increase efficiency and mill capacity to 50,000 tons per day, more than Gibraltar can currently generate (<http://www.tasekomines.com/tko/NewsReleases.asp?ReportID=133507>, March 30, 2006 Taseko press release) . There is speculation that ore from other mines in the area may be processed at the Gibraltar mine, perhaps from Taseko's Prosperity mine. The first 99.9% pure copper cathode was produced on January 26 from the refurbished and recommissioned solvent extraction and electrowinning plant (www.tasekomines.com). Cathode production is estimated to be approximately 3.5 million pounds for the year ending in September 2007. The company is now looking at a copper refinery operation on site.

¹ I was asked to do some research on the Gibraltar Mine operation, specifically impacts to the Fraser River, whether the current mine operations were having an effect on fish and water quality, and if there was any opposition by First Nations to the mine activities. I've talked with many folks from the BC conservation community, Provincial and Federal agencies that have been involved with reviewing the Gibraltar mine in the past, and reviewed some of the relevant documents in the Victoria offices of the Ministry of Mines and Petroleum Resources and the Environmental Appeals Board. I spent about four days doing this research, and 1.5 days to write up this report. Overall, there appear to be significant issues of interest. I will provide a brief summary of my findings, the sources of my information, the limitations of my research, and suggestions for follow up.

Environmental Impacts and First Nation opposition:

The mine operates under an Environmental Management permit #PE-416, originally issued in July of 1971. Historically the Gibraltar Mine has operated without a discharge to surface waters, storing the runoff in the tailings impoundment and the mined out Gibraltar East pit. In 2005 Taseko applied for an amendment to their existing environmental management permit to discharge wastewater from the tailings impoundment into the Fraser River supposedly to develop a micro-hydroelectric power plant (several small turbines in the discharge pipeline). They have ready access to other power sources, and my review of their final discharge permit shows no reference to hydropower generation. The Province of BC, Ministry of Water, Land and Air protection (WLAP), issued the amended discharge permit to allow wastewater disposal from the tailings impoundment and Gibraltar East Pit into the Fraser River on April 12, 2006.

Taseko Mines says that continued pumping to the Gibraltar East Pit is unsustainable due to the finite available storage volume in this pit. The Gibraltar East pit can be safely filled to an elevation of 3190, but above that there would be added risk of increasing seepage rates due to greater fracture zones existing above this elevation. As well pumping the relatively clean tailings pond water to the Gibraltar East Pit mixes it with contaminated pit and dump water that is also directed to the pit rendering future treatment of pit water less efficient. The Gibraltar East Pit is expected to be full sometime in 2008 (Ministry report by D. Hill, pg. 4).

Tailings pond supernatant chemistry shows elevated levels of TDS, sulphate, conductivity, hardness, aluminum, and molybdenum. Other metals are low or only slightly elevated. The pond water is alkaline due to low sulphide in the tailings and the lime added in the milling process. Due to the long retention time the suspended solids content is low, averaging 2 mg/L. As a result, residual metals in the supernatant are in the dissolved form. Sulphate is elevated and expected to rise somewhat with continued mining; however, it will likely stabilize or decline once mining is completed as levels of sulphate declined to around 1000 mg/L in the tailings pond just prior to mine restart (2004 Environmental and Reclamation Report).

Mill reagents used include lime, as well as floatation chemicals. The floatation chemicals are organic alcohol based compounds. Most of the floatation reagents are consumed in the floatation process and report to the concentrate. The company says the minor amounts remaining in the tailings would volatilize or degrade. Sampling of the tailings impoundment has failed to detect these compounds in the tailings pond supernatant.

The wastewater discharge is located in an area of the Fraser River that supports many species of fish; threatened white sturgeon, bull trout, interior Coho Salmon, chubs, suckers, and more. The local First Nation, the Xats'ull, have traditionally harvested the fish in the Fraser River for subsistence. The Xats'ull First Nation opposes the issuance of the permit to discharge mine effluent into the Fraser River and filed an appeal of the permit decision with the BC Environmental Appeals Board (EAB) on May 23, 2006. The basis of the Xats'ull appeal is that the Director of WLAP did not have sufficient technical information on the background water quality of the Fraser River, did not conduct enough or the right kind of toxicity tests, failed to determine the effects of the mixing zone on resident species, failed to consider the effects of dissolved gas super saturation, established discharge criteria that was not sufficiently protective of species at risk, failed to consider cumulative impacts of other discharges in the Fraser River, required inadequate effluent sampling requirements, required inadequate environmental effects monitoring, did not take into consideration established land use plans, and inadequately consulted with the Xats'ull First Nation. The Xats'ull filing is one of the most substantial appeals in recent years in BC

(Colleen Smith, Attorney with EAB, personal communication). The EAB heard the appeal over an eight week period in December 2006 and January 2007. Final written submissions were due to the EAB by February 22, 2007. A decision is pending, and could come down anywhere from now to two years from now. The EAB has no regulatory timeframe in which to make decisions. EAB decisions can be appealed to the Supreme Court of Canada through a judicial review. The EAB will make all the documents associated with the appeal available. The file is substantial, and I have not reviewed them.

The Valhalla Wilderness Society (VWS) tried to also appeal the WLAP permit, but the Province would not grant them standing (Colleen McCrory, March 27, 2007 personal communication). The VWS commissioned a study by a fisheries biologist, J. Allen Isaccson, to examine the issues (J. Allen Isaccson, Review of the Gibraltar Mine Application for Discharge into Fraser River, no date, 5 pgs.). I have the report, but it is not very in-depth or well documented.

Dispersion modeling for the proposed discharge was completed in 2005, comparing expected river water quality with water quality guidelines at the edge of the mixing zone. Water uses considered included livestock, irrigation, wildlife, aquatic life and drinking water. Drinking water is not a current use, but was included for completeness. The BC Water Quality Guidelines and Canadian Council of Ministers of the Environment environmental quality guidelines for surface water were met for all uses at the edge of the mixing zone, except for copper, as background copper slightly exceeds the 30 day chronic standard. However, no measurable increase in copper resulting from the discharge is predicted. The only parameter that will exceed the generic water quality guidelines outside the mixing zone is copper; however, this is due to elevated background copper (Ministry report by D. Hill, page 4).

Copper concentrations from the tailings impoundment water have a lot of dissolved copper, where the background copper levels in the Fraser River tend to be in a particulate form (Ministry report by D. Hill, page 6). The mean total tailings pond copper is 7.3 ug/L with a range of 1 to 28 ug/L, within the range observed in the Fraser River. Since the tailings pond total copper is the same as that of the Fraser River, the discharge will have no impact on the total copper levels in the river. Although the tailings pond effluent total copper tends to have a greater portion as the more immediately bioavailable dissolved form, there is ample dilution to maintain current water quality, as well this dissolved copper may likely complex with organic and inorganic solids in the river, reducing bioavailability. EEM monitoring can confirm that the water quality in the river remains unchanged with respect to copper (Ministry report by D. Hill, page 8).

The Xats'ull harvest fish from sites upstream, downstream and across the river from the proposed outfall. Their concerns about bioaccumulation of contaminants into their food were dispelled using the rationale that most of the metals don't bioaccumulate, salmon don't stay around long enough to bioaccumulate contaminants from the Fraser River and there isn't enough known about other species like sturgeon to know if there is, or will be a problem. The Ministry report states:

“Monitoring of resident fish species is proposed, so that trace metal bioaccumulation can be monitored. Other species, such as lamprey, whitefish, sculpins and suckers are consumed by sturgeon, so they may be a suitable indicator for metal exposure by sturgeon. Rainbow trout reared in the tailings seepage pond in undiluted effluent have been tested for metal content and no difference was found when compared to fish collected from "pristine" lakes in BC.” (Ministry report by D. Hill, page 6)

The Xats'ull raised concerns that fish migration may alter due to the presence of the mixing zone. The Ministry report states:

“The initial dilution zone is predicted to be small and contained near the river bottom, being approximately a few meters wide and long. Levels in the mixing zone will not be acutely toxic, and likely won't affect fish behavior in any way as a result.” (Ministry report by D. Hill, page 7).

The Xats'ull raised concerns that additional treatment to remove metals should be required in the discharge permit. The WLAP decided that treatment for molybdenum is not needed because there is ample dilution in the Fraser River, and the molybdenum levels are already relatively low at Gibraltar. The Ministry report states:

“The mean molybdenum in the Gibraltar discharge is predicted to be 0.4 mg/L. This is within the range prescribed at other interior mines with molybdenum in the site runoff. The discharge limit is 0.25 mg/L at Brenda Mine, the only site where molybdenum removal is required. In the case of Brenda the pre-treatment molybdenum levels are an order of magnitude higher than found at Gibraltar, and the receiving environment is significantly lower in flow than the Fraser River. Based on environmental monitoring, higher molybdenum concentrations have been set as targets for the discharge at Endako Mine. At this Endako, the site runoff must not exceed 5 mg/L. Requiring further molybdenum removal at Gibraltar would provide no reduction in the impacts of the discharge, and would likely be inefficient and costly since the molybdenum levels are already relatively low. It is also noted that treatment, as is practiced at Brenda, adds sulphate to the discharge”. (Ministry report by D. Hill, page 8).

The Xats'ull raised concerns that the cumulative effects of many discharges into the Fraser were not addressed. Of concern was how the Gibraltar Mine effluent might add to existing anthropogenic metal sources, particularly with respect to molybdenum. The Ministry report states:

“Potential metal sources might include municipal effluent and hardrock metal mine effluent.

Since the basin upstream of the Chilcotin River is not densely populated, metal loading from municipal sources are unlikely to be significant. The only other operating metal mines in this area are Endako and Mount Polley. Mount Polley does not currently have a direct discharge and does not have significant molybdenum concentrations. Endako, located within the Nechako drainage, is a molybdenum mine, and likely a greater source of molybdenum to the basin than is Gibraltar. Closed hardrock mines in the area are QR Gold, Cariboo Gold Quartz, Mosquito, Boss Mountain, and Pinchi Lake. There are only minor discharges from the first three closed operations. Only the pit portion of the Boss Mountain Mine, a former molybdenum mine, drains into the area of concern. The portion of Boss Mtn Mine drainage flowing into the Fraser upstream of the Chilcotin River is a smaller portion of the overall mine drainage, including only the open pit. Sampling of the pit water receiving creek indicates molybdenum levels only slightly above background. The Pinchi Mine is a potential source of mercury loading to the basin, but not molybdenum. In summary, the effluent from Gibraltar Mine would likely only add to cumulative effects from the Endako mine, as it is the only significant source of molybdenum in the same drainage.” (Ministry report by D. Hill, page 8).

Taseko has posted a reclamation bond of \$18.5 million in a Reclamation Trust. As part of the reclamation plan they will establish a landfill site on the old waste rock dumps.

Several other issues at the Gibraltar Mine could be pursued:

- 1) The permit ignored copper loading in the river and cumulative effects.
- 2) Treatment of the effluent vs. dilution to meet WQ guidelines.
- 3) Fishery impact on Fraser at this location. I think there are good grounds for concern here, but the previous report from the independent fishery biologist leaves a lot to be desired.
- 4) Review of Ministry of Water, Air Land and Parks, Dept. of Fishery and Oceans, Ministry of Mines, Ministry of Environment and other agency files for relevant documents.
- 5) Full review of EAB filing.
- 6) Pursuing what happened to the original permit application purpose to generate hydroelectric power. Was the original application just a ruse to cover the real need-discharge of excess water from mine site? When was the hydropower generation portion of the permit removed?
- 7) I have not contacted any of the First Nation or local community groups that are interested in this issue. They may be open to answering questions and/or collaborating to put pressure on Taseko.

References:

Douglas Hill, P.Eng. BC Ministry review of Gibraltar Mines Discharge permit application PE-00416 April 10, 2006. 38 pgs.

J. Allen Isaccson, Review of the Gibraltar Mine Application for Discharge into Fraser River, no date, 5 pgs.

Rob McCandless, Environment Canada, mine permit reviewer and inspector. Personal communication, March 29, 2007.

Colleen McCrory, Executive Director of the Vahalla Wilderness Society. Personal communication, March 27, 2007.

Maggie Paquet, Fisheries Biologist, Personal communication, March 27-28, 2007

Colleen Smith, Attorney with the Environmental Appeals Board, personal communication, March 29, 2007.

Taseko mines. 2004 Environmental and Reclamation report. March 2005.

Taseko mines. 2006 Environmental and Reclamation report. March 2007.

Taseko Mines web site www.tasekomines.com