

# **Sunro Copper Mine Restart Project**

Jordan River, British Columbia, Canada

## **PROJECT DESCRIPTION**

### **BC Mining Properties**

Nanaimo, BC.

Kelly Funk

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And

### **Hanam Canada Corp.**

Victoria, BC.

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## **Introduction**

This report is intended to attract a potential partner or buyer for the Sunro copper and gold mine at Jordan River, BC. The author is a chemical consulting engineer with experience in the mining industry. For geological information including resource estimates we rely on an August 2004 report by Andris Kikauka, Professional Geologist.

## **Location & Leases**

The mine is two kilometres north of highway 14 along a logging road that turns off just before Jordan River, BC. The mine is located partly under the former head pond for BC Hydro's original power plant penstock. There is a rock quarry at the top elevation of the mine that is also used to burn refuse. The surface of the mine area is District Lot 922 owned by Western Forest Products Ltd.

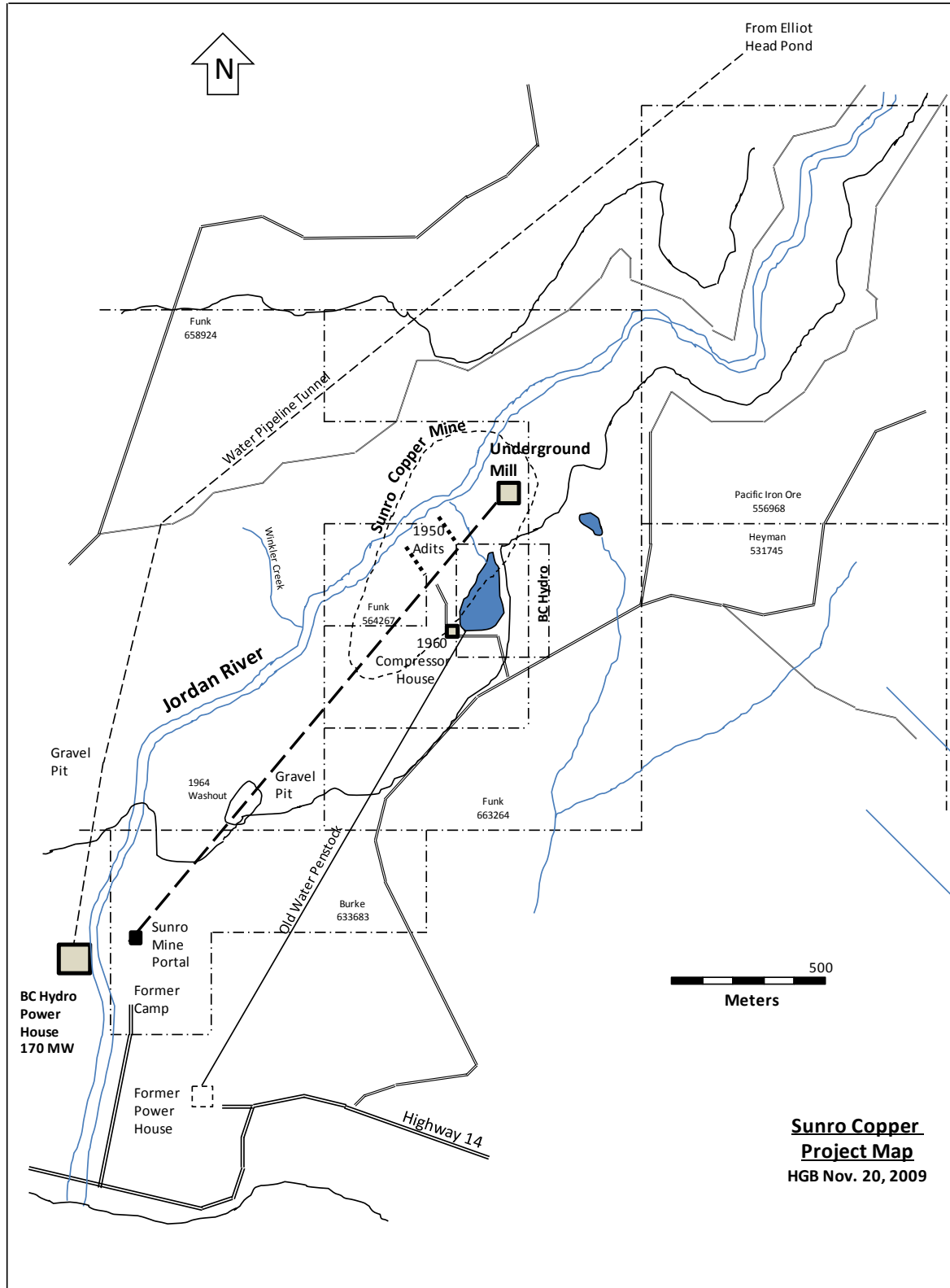
Present access to the mine is by a switchback trail starting on the west side of the head pond down into the river canyon to the mine portals along the Jordan River Canyon. The trail is wide enough for a four wheel drive vehicle but would require some maintenance prior to its use by vehicles. There are eight such portals and five were easily visible from the trail. Three of the portals are conveniently accessible. The adits have been blocked with timber and some concrete as shown in Exhibit 2. These adits are connected to the underground mill room.

Previous mine access was through a 2.4 kilometre tunnel from the south that has been blocked off. The portal can be reached by a road starting immediately at the top of the bend on Highway 14 into Jordan River. A culvert on the access road has been washed out about 300 meters from the portal. The portal is about 200 meters north of the BC Hydro Power plant at a point where there is a straight view down the Jordan River to the ocean.

The property was briefly owned by Commerce Resources followed by Amarillo Gold. From August 2003 to August 2007 the property was held by BC geologist Andris Kikauka who completed a report based on his own surface samples and a review of past reports. The mine property title is currently held 100% by Kelly Funk, BC Mining Properties, Nanaimo. The number of the title from the BC Ministry of Energy & Mines is 663264. Title for the adjacent property to the south including the former mine portal and camp area is held by Helmut Burke, P.Eng., under tenure number 633683.

# Sunro Copper Mine Restart

## Exhibit 1. Sunro Mine Location



**Sunro Copper Mine Restart**

**Exhibit 2. Current Photos**

 <p>Quarry Above River Adit</p>	 <p>Former Head Pond</p>
 <p>BC Hydro Power Line to Site</p>	 <p>River Adit</p>
 <p>River Adit (one of 5 visible)</p>	 <p>View From Portal</p>
 <p>Blocked Access Tunnel</p>	 <p>Tailings Beach</p>

## **Mine History**

The mine was operated at full production for an 8 year period from 1962 to 1968 and from 1972 to 1974. Some pictures of the mine are provided in Exhibit 3. Average ore mined and milled was 173,000 tonnes per year. Copper production was an average of 1,900 tonnes/y, about 1.1% of the ore milled. Silver production averaged 310 kg/y about 1.8 g/t and gold, 28 kg/y, about 0.16 g/t.

The property was discovered in 1915 by George Winkler. First mining was by Cominco in 1919 and 1920. Cominco maintained ownership of the mine until 2003 when Commerce Resources briefly held the property. From 1929 to 1976, Cominco optioned the property to a series of different companies that operated the mine. In 1949, Cominco optioned to property to Hedley-Mascot Mines, who installed electrical transformers and compressors near the former BC Hydro penstock intake. Entry to the mine was from adits along the river bank. The company milled 600,000 tonnes. At this time access to the mine was by a 24 inch wide railway along the side of the river.

In 1961, Cowichan Copper took over and installed an underground mill and concentrate production system. They drove a new access tunnel to the mine, 3 meters wide by 3 meters high and 2,379 meters long. The tunnel extended from an entry portal near the former Jordan River powerhouse at an elevation of 40 meters above sea level to beyond the mill room almost to the river. They also located a concentrate storage system and shops at the portal. Production continued strongly for four years but was stopped in November, 1968, when the copper price dropped to \$1.06/kg.

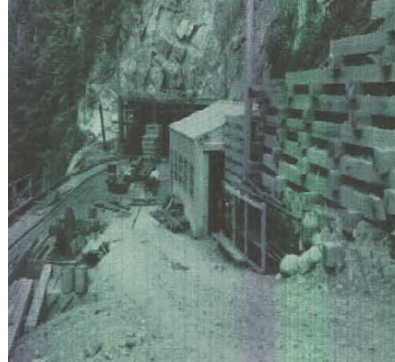
In 1972, Cominco transferred operations to Jordan River Mines who continued full scale production until the end of 1974 when the copper price dropped to \$1.41/kg and at a smaller low rate until January 1977 when there was cave in along the access tunnel.

**Sunro Copper Mine Restart**

**Exhibit 3      Photos of former mine operations**



View west from mine portal



Mine entrance 1958



Flotation cells



Underground mill and flotation cell room



Ore Cart



Concentrate Thickener

## **Most Recent Operations**

The access tunnel, surface adits, the underground crushers, mills and concentrating equipment, power supply line, and electrical substation are all still in place. There are three crushers, a Joy, Traylor, and Telesmith.<sup>1</sup> From the crushers there are conveyers to a large ore bin, then to two concentration circuits consisting of a rod mill and two ball mills with a combined capacity of 1000 t/d. There are conditioning tanks, flotation cells, surge tank and single disc filter. The underground mill room is about 10 meter wide X 6 meter high by 60 meters long, and the crushing chamber, 6X6X60 metres, fine ore bin 1,000 m<sup>3</sup> and workshop 320 m<sup>3</sup>.

Most of the mining was directly above the mill room in the River zone of ore as shown in the mine plans Exhibit 4 and 5 and the Section Exhibit 6. There was also a shaft sunk 150 meters deep below the mill room. Ore was mined at five levels from this shaft each 30 meters apart in elevation. There was a service and ventilation shaft that went from the mill room up 150 meters to the river adit. Another access route was a 25 degree decline from the river adits.

There were two concentrator circuits one for the River zone ore which contained almost no pyrrhotite (iron sulphide) and another for the cave zone which contains pyrrhotite. For the River zone the heads were about 1.6% copper, recovery was 90% and the rougher float was 10% copper. Tailings were ground to 35 mesh minimum and 63% under 200 mesh. Cave zone heads were 1.12% copper, recovery was 85% with regrinding of at least part of the rougher float to get 20% concentrate. Tailings from 35 mesh minimum to 65% under 200 mesh. Flotation agents were Aerofloat 25 at 0.025kg/t, Xanthate Z-5 at 0.025kg/t, and pine oil at 0.04kg.t. Concentrate at 25% copper was loaded into 5 ton containers mounted on narrow gage rail cars through the access tunnel to a storage area at the portal.

The containers were transported by truck 93 kilometres and loaded on ships at Chevron's Hatch Point loading dock in Cowichan Bay, south of Duncan.

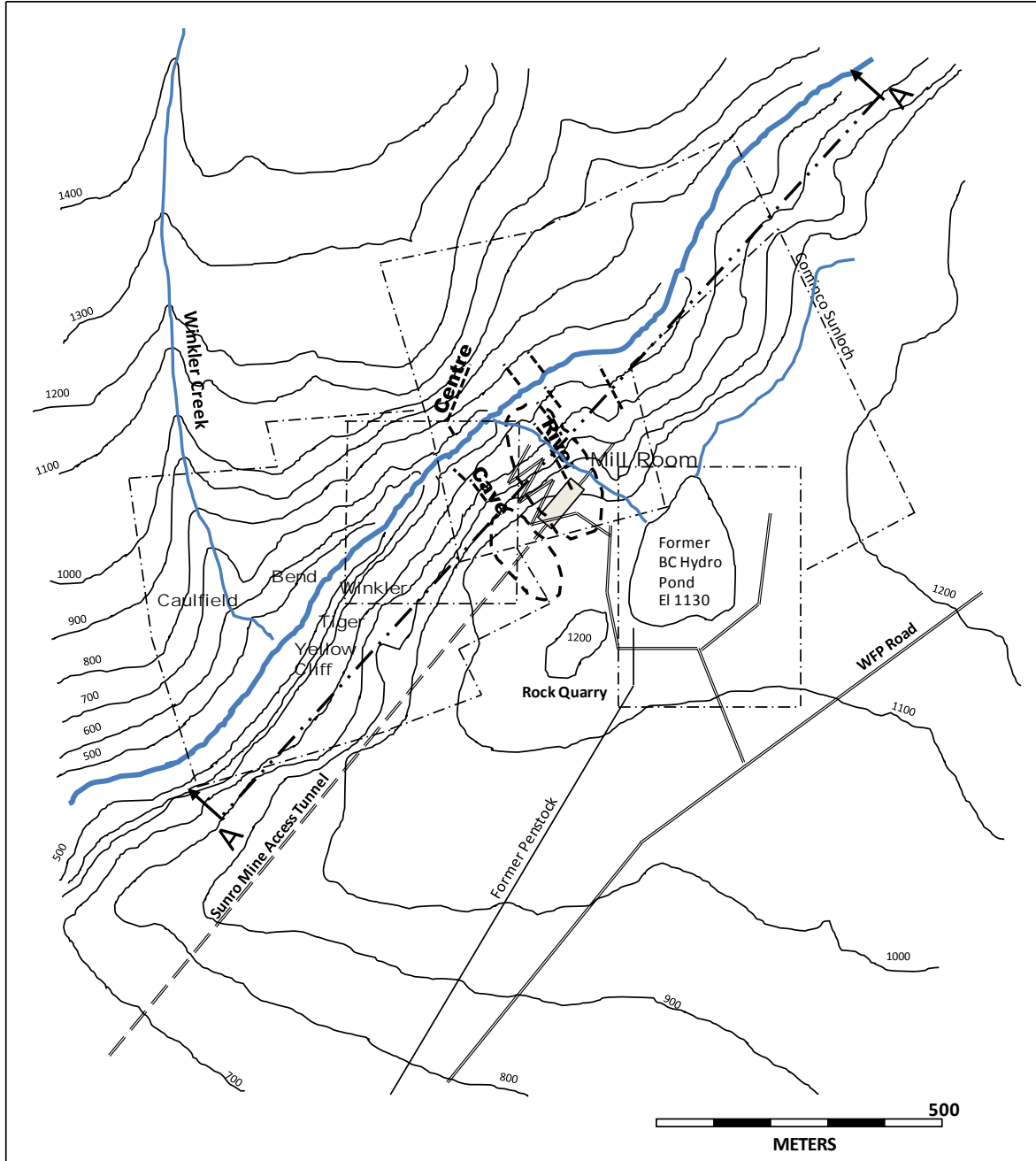
In January 1977 the access tunnel to the mine caved in 520 and 700 meters from the access tunnel entry portal in an area of previous weakness and bypasses. Cominco repaired the first section but not fix the second one by the end of April. The BC Ministry of Mines then directed Cominco to install a 34 metre long rock plug in the tunnel 2010 meters from the portal near the point where it joins the mill room with workers and equipment entering the mine through the river adits. The plug was installed with a 200 mm diameter drain pipe underneath but rock was placed ahead of the drain location and it was anticipated that the mill chamber would flood.

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<sup>1</sup> A.J. Richardson, Central Mine Engineering, Cominco, June, 1977  
[http://propertyfile.gov.bc.ca/PDFTemp/fileid\\_15086.pdf](http://propertyfile.gov.bc.ca/PDFTemp/fileid_15086.pdf)

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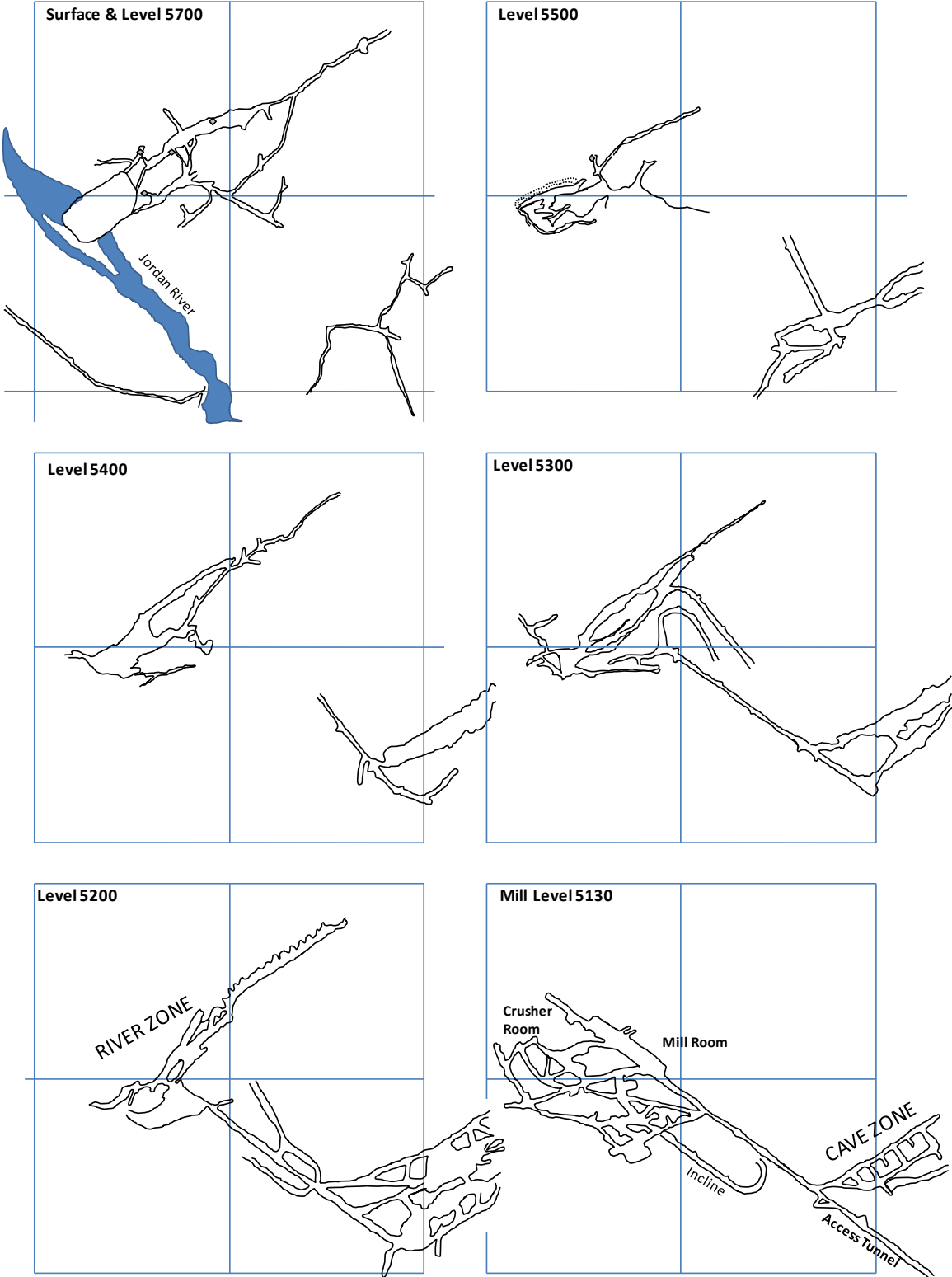
## Exhibit 4. Mine Surface Plan



Source: [http://propertyfile.gov.bc.ca/PDFTemp/fileid\\_15072.pdf](http://propertyfile.gov.bc.ca/PDFTemp/fileid_15072.pdf)

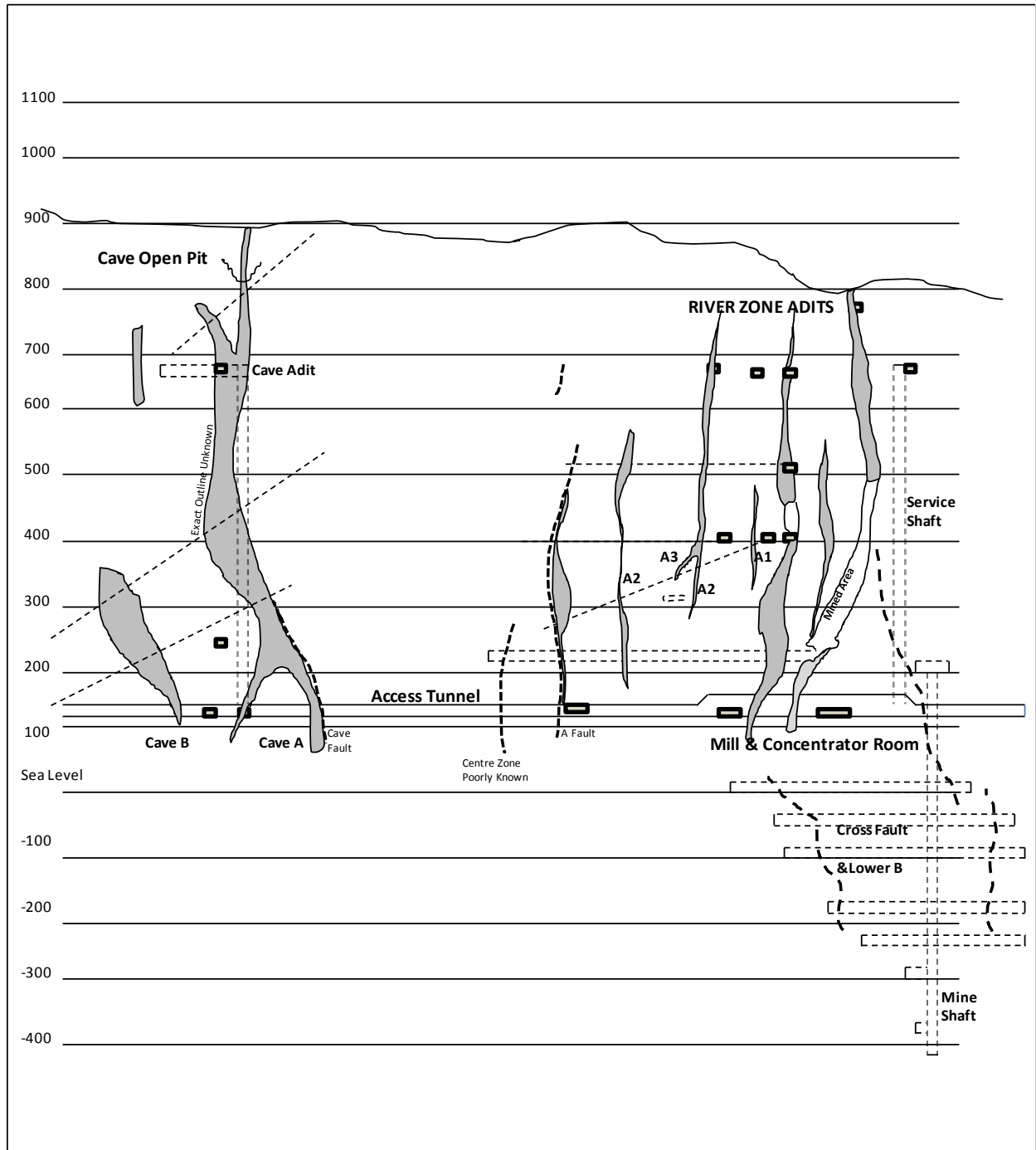
**Sunro Copper Mine Restart**

**Exhibit 5. Plans from Access Tunnel to Surface**



# Sunro Copper Mine Restart

## Exhibit 6. Mine Section



Source: [http://propertyfile.gov.bc.ca/PDFTemp/fileid\\_15085.pdf](http://propertyfile.gov.bc.ca/PDFTemp/fileid_15085.pdf)

## **Resources**

The mineralization of the Sunro mine is related to the placement and crystallization of Eocene Sooke Gabbro (a coarse grained igneous rock) within the Metchosin volcanics with the ore bodies occurring near contacts. The ore in the mine vicinity are elongate striking with the enclosing volcanics and may be sills. Three north westerly trending bands of gabbro occur on the Sunro property ranging in width from 150 to 900 meters, separated by about one kilometre of basalt, and known to extend along strike for about 6.5 kilometres. As many as 16 mineralized zones have been discovered outcropping along the Jordan River.

The centre band, from 600 to 900 metres wide, is the widest of the bands and is potentially the most important, hosting copper mineralization in shears in basalt along both contacts. However, mining to date has been only in the River and Cave zones. Altogether more than 14,000 meters of exploratory holes have been drilled on the River and Cave zones of the property. The zones typically occur in basalt but at least three major zones are located in areas mapped as gabbro,. Three zones along the northeast contact of the gabbro body, the River, Cave and Centre have been most productive.

The River zone ranges in width from 30 centimetres to about 30 metres and is traceable along the strike for about 335 meters and to a depth of 340 metres. The zone dips 70 degrees southwest. The Cave zone, about 200 meters southwest of the River zone, trends at 140 degrees and has a proven length of 180 meters but may be up to 460 metres long. It is 150 metres deep. The Centre zone is 90 meters southeast from the River zone, strikes 110 degrees and dips vertically. It has been traced for a length of 200 meters, a depth of 97 metres, and width where exposed underground of 36 metres.

In June 1973 the River and Cave zone reserves were 1.6 million tonnes at an average of 1.43% copper. About 0.5 million tonnes were milled between June 1973 and the time of mine closure. Based on measured and drill indicated sampling and assays, the River and Cave zone of the mine had a inventory at the time of mine closure of 1.0 million tonnes @ 1.47% proven copper and 0.42 million tonnes at 1.33% copper probable.<sup>2</sup> All of this ore is in the Cave and River zone although it was known that the Centre and other zones also hold significant additional resources. Two other zones were mined briefly from adits west of the Jordan River. The Vulcan property south west of the mine, also held by Cominco, was test mined from several surface trenches and pits. Further drilling would be required to bring the resources estimate up to the modern 43-101 stock exchange security standard. An 11 hole 1,800 meter drill program budgeted to cost \$250,000 has been outlined by a professional geologist familiar with the property.

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<sup>2</sup> Andris Kikauka, P.Geol, Sooke, BC, Geological & Geochemical Report on the Sunloch Claim (Sunro Copper-Silver-Gold Mine), Jordan River, BC <http://aris.empr.gov.bc.ca/ArisReports/27472.pdf>

### ***Sunro Copper Mine Restart***

All of the mining was in the River and Cave zones but other areas were explored along the Jordan River and Winkler Creek. The Tiger zone is in basalt. A series of large rusty outcrops occur for a strike length of 260 feet extending from the main outcrop and elevation from 290 to 520 feet. Mineralization occurs over a length of at least 300 feet but the richly-mineralized main shoot cannot be more than 150 feet long. The ore is too high in pyrrhotite. Core assayed 1.6% copper over a width of 20 feet. It was recommended that this zone should be tested at greater depth.

The Yellow Cliff zone showed some very good mineralization in surface trenches. In 2.1% copper over 3 feet and another 3.3% copper over 5 feet. The Caulfied zone includes six old pits scattered at intervals along 1,300 foot elevation of the southwest contact. A showing at elevation 340 feet was tested with three holes. The first cut ore between 2 and 3% copper over 5-7 foot widths at shallow depth.

## **Environmental & Community Issues**

Some of the issues to be considered include:

**Waste Rock-** Waste rock was previously disposed of underground and this practice will be continued.

**Tailings-** During past mine operation, tailings were pumped through a 150 mm diameter plastic pipe to the portal and then an additional 1,524 meters for disposal in tidewater at what is now a small privately owned beach east of Jordan River shown in Exhibit 7. It is proposed that a tailing treatment system would be installed. There would be no discharges to the Jordan River.

### **Exhibit 7. Jordan River Private Beach**



**Truck traffic-** Only one truckload of concentrate would be produced per day. This would not have a significant impact on the neighbourhood or Highway 14.

**Community Impacts-** There would be no visual impact of mining operations.

**Industrial Impacts-** Cooperation would be needed from BC Hydro as an electricity supplier and from Western Forest Products who maintain the access road.

## **Government regulations**

A preliminary project description will be delivered to key stakeholders including local government officials, provincial and federal agencies. We would meet with regulatory reviewers and support the mine and environmental permitting process. Since the mine will disturb less than the 750 hectares of land that was not previously disturbed, or disturb more than 50% of the land that has been previously disturbed, the project is not subject to review by BC’s Environmental Assessment Office.<sup>3</sup> Applications will be made for a Mine Permit and an Environmental Permit. Public meetings would be held to answer questions, identify areas of concern, and to address any issues.

Applications for a Mine Permit, Water License, Waste Management Permit, and other related permits for the mine, plant site and required infrastructure must be made to the BC government as summarized in Exhibit 8. One of the key requirements is for a life of project design, sizing and reclamation of the waste rock dump.

### **Exhibit 8 Regulatory Approvals Required For Sunro Mine Restart**

<b>Impact Benefit Agreement- T’sou-ke First Nation and Pacheedaht First Nation-</b> Signifies T’souke and Pacheedaht people will benefit and support the project. Required for land tenure approvals.
<b>Mine and Reclamation Permit- Ministry of Energy &amp; Mines (MEM)-</b> Approves the mine plan (layout, geotechnical assessment and engineering design for underground workings, pits, dumps, plant, mine roads, other key facilities), mine operations, acid drainage prediction and management plans, and reclamation plan.
<b>Waste Management Permit- Ministry of Environment (MOE)-</b> Approves permitted solid waste disposal plans, liquid effluent quality, structural designs, and waste management and monitoring plans (pond effluents, tailings seepage, sewage, other). Approves air emission standards, equipment and dust control and other management and monitoring plans.
<b>Water License- Ministry of Environment (MOE)-</b> Grants approvals to withdraw, divert and use water (i.e. domestic and process water supply, drainage management plans, site water balance).
<b>Land Tenure Approvals- Various-</b> Grants rights to occupy land, including Coal Lease for underground workings and pits, plant site ( <b>MEM</b> ); License of Occupation for road and power line ( <b>Land and Water BC</b> ); others as required.
<b>Road Use Permits- Ministry of Forests-</b> Authorizes use of Ministry of Forests’ roads.
<b>Other Permits, Licenses- Various-</b> Approves potable water supply (Ministry of Health)

<sup>3</sup> [http://www.bclaws.ca/Recon/document/freeside/--%20E%20--/Environmental%20Assessment%20Act%20%20SBC%202002%20%20c.%2043/05\\_Regulations/13\\_370\\_2002.xml#section8](http://www.bclaws.ca/Recon/document/freeside/--%20E%20--/Environmental%20Assessment%20Act%20%20SBC%202002%20%20c.%2043/05_Regulations/13_370_2002.xml#section8)

## **Economics**

**Capital cost-** The approximate cost of restarting the mine is estimated to be about \$10 million. Most of the mechanical equipment could still be serviceable although the electrical system would need to be entirely replaced.

**Revenue-** At production rates similar to the average in the past the value of copper and gold produced would be about \$14 million dollars per year. The breakdown of values is based on current prices for copper of \$6.80/kg, silver \$19/oz, equals \$610/kg, and gold \$1,142/oz, \$36,700/kg is as follows:

	Kg/y	\$/kg	\$million/y
Copper	1,900,000	6.80	12.9
Silver	310	610	0.2
Gold	28	36,700	1.0
Total			14.1

**Operating Cost-** At the time of the mine closure mining, milling and concentrating costs were \$0.70/kg and the shipping and smelting cost was \$0.44/kg for a total cost of \$1.14/kg. This was about \$2.0 million per year. When the mine closed the copper price was \$1.41/kg and the income was \$1.5 million per year. The average current cost of production, transport and smelting is conservatively estimated at triple the cost in 1978, about \$5 million per year.

**Payback-** The income before interest, taxes, government and First Nations royalties would be about \$ 9.1 million per year. The payback on investment would be less than one year.