



MINFILE Detail Report
BC Geological Survey
Ministry of Energy, Mines and Petroleum Resources

Location/Identification

MINFILE Number:	093M 071	National Mineral Inventory Number:	093M4 Cu1
Name(s):	ROCHER DEBOULE JUNIPER (L2400), RD		
Status:	Past Producer	Mining Division:	Omineca
Mining Method	Underground	Electoral District:	Stikine
Regions:	British Columbia	Resource District:	Skeena Stikine Natural Resource District
BCGS Map:	093M012		
NTS Map:	093M04E	UTM Zone:	09 (NAD 83)
Latitude:	55 09 35 N	Northing:	6113405
Longitude:	127 38 36 W	Easting:	586436
Elevation:	1420 metres		
Location Accuracy:	Within 500M		
Comments:	The No. 2 vein, on the northeastern portion of Rocher Deboule Mountain, 11 kilometres south of Hazelton.		

Mineral Occurrence

Commodities: Copper, Silver, Gold, Tungsten, Zinc, Lead, Uranium, Molybdenum, Cobalt

Minerals	Significant:	Chalcopyrite, Tetrahedrite, Scheelite, Sphalerite, Galena, Cobaltite, Safflorite, Glaucodot, Molybdenite, Uraninite	
	Significant Comments:	Possibly chalcocite.	
	Associated:	Quartz, Hornblende, Feldspar, Apatite, Magnetite, Arsenopyrite, Pyrrhotite, Calcite	
	Associated Comments:	Also pyrite.	
	Alteration:	Limonite, Malachite, Erythrite, Siderite	
	Alteration Type:	Oxidation	
	Mineralization Age:	Unknown	
Deposit	Character:	Vein, Shear	
	Classification:	Hydrothermal, Epigenetic	
	Type:	I05: Polymetallic veins Ag-Pb-Zn+/-Au, I12: W veins, L01: Subvolcanic Cu-Ag-Au (As-Sb)	
	Shape:	Modifier:	Sheared
	Dimension:	Strike/Dip:	075/50N
	Comments:	Veins.	

Host Rock

Dominant Host Rock: Plutonic

Stratigraphic Age	Group	Formation	Igneous/Metamorphic/Other
Jurassic-Cretaceous	Bowser Lake	-----	-----
Upper Cretaceous	-----	-----	Bulkley Intrusions

Isotopic Age	Dating Method	Material Dated
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72 Ma	Potassium/Argon	Biotite

Lithology: Porphyritic Granodiorite, Quartz Monzonite Dike, Diorite Dike, Porphyritic Andesite Dike, Siltstone, Greywacke

Comments: Mineralization is hosted in the Rocher Deboule stock; the age date is from Geological Survey of Canada Open File 720.

Geological Setting

Tectonic Belt:	Intermontane	Physiographic Area:	Hazelton Ranges
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Terrane: Stikine

Metamorphic Type: Contact

Grade: Hornfels

Inventory

Ore Zone: ROCHER DEBOULE **Year:** 1990

Category: Combined **Report On:** Y

Quantity: 54,000 tonnes **NI 43-101:** N

Commodity	Grade
Silver	207.4000 grams per tonne
Gold	3.5000 grams per tonne
Copper	2.7000 per cent

Comments: Probable/possible reserves.

Reference: George Cross Newsletter No.228, November 26, 1990.

Summary Production

	Metric	Imperial
Mined:	36,457 tonnes	40,186 tons
Milled:	36,457 tonnes	40,186 tons
Recovery		
Silver	2,167,780 grams	69,696 ounces
Gold	133,676 grams	4,298 ounces
Copper	2,557,433 kilograms	5,638,175 pounds

Capsule Geology

The Rocher Deboule mine is located on the northeastern portion of Rocher Deboule Mountain, 11 kilometres south of Hazelton. The Rocher Deboule and Victoria mines (093M 072) were discovered before World War I. From 1915 to 1954, 123,395 tonnes produced 2,653,086 grams of silver, 157,226 grams of gold, 2,840,966 kilograms of copper, 341 kilograms of lead, 34,692 kilograms of tungsten, and 3,274 kilograms of zinc.

The area is underlain by hornfelsic greywackes and siltstones of the Jurassic to Lower Cretaceous Bowser Lake Group which are intruded by the Rocher Deboule porphyritic granodiorite stock of the Late Cretaceous Bulkley Plutonic Suite. Dikes are not abundant but consist of fine-grained quartz monzonite, fine-grained diorite and porphyritic andesite.

There are five main vein structures which are numbered from 1 to 5, the No. 2 vein being the most important. The veins occur over a 750-metre width, within parallel structures which generally strike 075 degrees and dip 35 to 65 degrees north. The veins are 0.5 to 2.4 metres wide and up to 700 metres long. The veins outcrop at elevations in the order of 1372, 1454, and 1631 metres. A fifth vein, No. 2a, of similar strike but flatter dip occurs between No. 2 and No. 3 veins. The No. 2 and No. 4 veins are the only veins significantly developed and are the ones from which all production has occurred.

The veins are developed by three main crosscut levels include the 1200 (elev. 1270 metres), 1000 (elev. 1350 metres), and 300 (elev. 1570 metres). The upper part of the No. 4 vein is developed by the 300 Level and a winze leading down to a flooded 500 Level and to the 100 adit Level above. There is no development between the 500 Level and the 950 Level; the 950 Level accesses the No. 2 vein at outcrop by a short adit. The lower part of the No. 4 vein is reached by the long 1201 crosscut. No. 2 vein is developed by long drifts on the 1200 and 1000 Levels and three small sub-levels, 950, 1050, and 1300; the 1300 Level is connected by winze to the 1200 Level. The small No. 2a vein is reached by a crosscut on the 1000 Level, and No. 3 vein is followed by a drift on the 1200 Level. In total there are over 1585 metres of crosscuts, approximately 915 metres of drifts on No. 4 vein, 1067 metres on No. 2 vein and 395 metres on all other veins. The amount of vertical development is small compared to the horizontal.

Three distinct stages of mineralization are apparent. The first stage is pegmatitic and includes hornblende, quartz, feldspar, apatite, magnetite, scheelite, molybdenite and uraninite. The second and main stages include chalcopyrite, glassy quartz, arsenopyrite, cobaltite, safflorite, glaucodot and pyrrhotite. The third stage includes milky quartz, siderite, calcite, tetrahedrite, sphalerite, galena, pyrite and possibly chalcocite. Secondary minerals include malachite, erythrite and limonite.

Work History

The Rocher DeBoule property was located in 1910 by Sargeant and Munroe of Hazelton, British Columbia, which was acquired, in 1911, by Rocher DeBoule Copper Company of Salt Lake City, Utah. Development on the property was done under lease by the Montana Continental Development Company, a company owned by the principals of Rocher DeBoule Company. Ore was mined and shipped from the upper part of the No. 4 vein from April 1915, until February 1916, when the property reverted to its owners. Development work, previously neglected, was done on the No. 2 and 4 veins and by 1917 a 945 metre adit, known as the 1201, was driven from the bottom of the valley of Juniper Creek to intersect all known veins. Production in 1917-18 was largely from the No. 2 vein and was much less than in the previous two years, although the copper-gold grade was good. The mine was closed in October 1918, because of a lack of developed ore and a drop in copper price.

In 1929, Aurimont Mines Limited, who mined and shipped some ore, leased the property. In 1930, Hazelton Copper Mines Limited again leased the property but no production was done. The property remained inactive until 1950 when it was acquired by Western Uranium Cobalt Mines Ltd. whose initial interest was a means of access to the adjacent Victoria mine; the company immediately began to investigate Rocher DeBoule as a source of copper and precious metal ore and as a prospect for uranium-cobalt. In 1950, a slide that blocked the portal of the 1200-level was cleared, the upper levels were rehabilitated and construction of a camp was begun. A 100-ton-per-day mill was put in operation in May 1952, and shut down in November of the same year because the grade was lower than expected. Part of the mill equipment was moved to the nearby Red Rose tungsten mine (093M 067) which was owned by the same company. After the Red Rose mine was closed in 1954, equipment from both mines was sold.

During 1987-89, Southern Gold Resources Limited completed drill testing and sampling of the No. 2 Vein and estimated a potential reserve of 49,800 tonnes averaging 2.69 per cent copper, 208.1 grams per tonne silver and 3.51 grams per tonne gold (Property File Placer Dome - Quin, 1989). The Nos. 4 and 2a veins were examined during this time with encouraging results, but work was limited by accessibility of the old workings and an unstable slide in the vicinity of the outcrops. Sampling of the No. 4 vein, on the 91-metre level, returned an average of 2.17 grams per tonne gold, 88.1 grams per tonne silver and 4.12 per cent copper over an average of 0.78 metre from 24 samples (Property File Placer Dome - Quin, 1989).

In 1991, the indicated ore reserve of the No. 2 vein was estimated at 37,000 tonnes grading 11.66 grams per tonne gold equivalent; the No. 4 vein has indicated reserves of 17,000 tonnes of the same grade respectively (Open File 1992-1). A radioactive sample over 38 centimetres from the No. 2 vein assayed 0.019 per cent equivalent uranium (Geological Survey of Canada Memoir 223 (Rev.)). A sample taken in 1949, assayed 0.21 per cent equivalent uranium (Geological Survey of Canada Economic Geology 16, 1952).

The Number 2 Porphyry zone is a bulk tonnage target estimated to be 757 metres long, 605 metres deep and an average of 12 metres wide. Samples from a trench on the quartz stockwork in this zone assayed up to 30.5 grams per tonne gold and 0.35 per cent cobalt over 2.4 metres (George Cross Newsletter No. 228, November 26, 1990).

Total indicated (probable/possible) reserves at Rocher DeBoule are 54,000 tonnes grading 2.70 per cent copper, 207.4 grams per tonne silver and 3.5 grams per tonne gold or 11.66 grams per tonne gold equivalent (George Cross Newsletter No. 228, November 26, 1990).

In 1998, Hunter Exploration Group conducted prospecting on the Rocher DeBoule (Assessment Report 25674).

The property was dormant until May 2001, when American Manganese Inc. (former known as Rocher DeBoule Minerals Corporation) reported that it had acquired four mineral claims consisting of 53 units (1325 hectares) centred around the main underground working at the headwaters of Juniper Creek (www.americanmanganeseinc.com).

During the period of October 2001 and May 2002, geological surveying and geochemical rock and stream sediment sampling was carried out on the Rocher DeBoule and Victoria mines. Aside from the expected copper-silver-gold values of economic interest, which returned values up to 14.8 grams per tonne gold, greater than 10 per cent copper and 399.6 grams per tonne silver, the Rocher DeBoule Nos. 2, 3 and 4 veins contained variable molybdenite, sphalerite, arsenopyrite and safflorite (Assessment Reports 26984, 29338).

In 2004, three rock-chip samples were collected from the vicinity of the No. 4 vein of the Rocher DeBoule mine. The samples were analyzed geochemically and all results were in excess of 10,000 parts per million copper, from 0.79 to 1.8 grams per tonne gold and 7.1 to 100 grams per tonne silver (Assessment Reports 27558, 29338).

In March 2007, Rocher DeBoule Minerals Corp. contracted Fugro Airborne Survey Corporation to complete a Dighem electromagnetic, magnetic, radiometric geophysical survey over the Rocher DeBoule property in a survey block amounting to 1089-line kilometres. The survey identified a strong positive anomaly (60,000 to 62,000 nanoteslas, approximately 3000 to 5000 nanoteslas above average) over an area of approximately 0.5 by 1 kilometre (Vancouver Stockwatch - November 20, 2012; Assessment Report 29338). American Manganese conducted a limited diamond drill program near one of the Highland Boy adits in 2007.

In 2011, American Manganese Inc. carried out a program that entailed 22 kilometres of ground magnetometer survey, 841 soil samples, 455 rock samples and 68 silt samples. The most significant soil sample returned 8650 parts per billion gold, 72.4 parts per million silver, 0.58 per cent copper, 1.31 per cent arsenic and 20.09 per cent iron (Vancouver Stockwatch - November 20, 2012; Assessment Report 33297). At this time, the Rocher DeBoule property covered three small, past-producing mines and five significant prospects including: Highland Boy (093M 070), Rocher DeBoule (093M 071), Victoria (093M 072), Great Ohio (093M 069), Cap (093M 073), Golden Wonder (093M 074), Three Hills (093M 075) and Daley West

Prospecting programs carried out were designed to step away from the known mines and expand the working knowledge of the property. Prospecting resulted in the discovery of numerous new showings. The principal areas of interest extend in an east-west trending belt from Golden Wonder (considerably west of the contact of the stock) through the Rocher Deboule and Victoria mines and east to the Highland Boy. One of the most intensely studied areas is the upper Silvertip Creek, approximately mid-way between the Rocher and Highland Boy mines.

On the Rocher Deboule occurrence itself, the 2011 program explored for extensions and additional structures of known veins. It focused on the potential for broader zones of lower grade mineralization. New veins were found and pockets of alteration were noted and sampled. Fourteen samples were collected in the general vicinity of the old mine.

In 2012, American Manganese Inc. completed a minor program of rock and soil sampling on the area.

During 2016 through 2019, American Manganese Inc. completed further programs of geochemical (rock and soil) sampling and 10.2 line-kilometres of ground magnetic surveys on the area as the Rocher Deboule property.

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Date Coded:	1985/07/24	Coded By:	BC Geological Survey (BCGS)	Field Check:	N
Date Revised:	2022/04/01	Revised By:	Karl A. Flower (KAF)	Field Check:	N