Location/Identification

MINFILE Number: 092HSW001
National Mineral Inventory Number: 092H3 Cu1
Name(s): **GIANT COPPER**
AM BRECCIA, CANAM, A.M. (L.1586), PASS, CAMP, NEW BRECCIA, NO. 1, INVERMAY, HATCHETHEAD

Status: Developed Prospect
Mining Division: New Westminster
Mining Method Underground
Electoral District: Chilliwack-Hope
Regions: British Columbia
Resource District: Chilliwack Natural Resource District
BCGS Map: 092H015
NTS Map: 092H03E
UTM Zone: 10 (NAD 83)
Latitude: 49 09 49 N
Northing: 5447522
Longitude: 121 01 29 W
Easting: 643999
Elevation: 1800 metres
Location Accuracy: Within 500M
Comments: AM Breccia zone located 37 kilometres east of Hope. See the Invermay (092HSW002).

Mineral Occurrence

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

Minerals
Significant: Chalcopyrite, Arsenopyrite, Pyrite, Pyrrhotite, Sphalerite, Galena, Molybdenite, Uraninite, Monazite, Scheelite
Associated: Quartz, Calcite, Tourmaline, Feldspar, Mica, Magnetite
Alteration: Silica, Kaolin, Sericite, Chlorite, Carbonate, Magnetite, Tourmaline, Actinolite
Alteration Type: Silicific'n, Argillic, Chloritic
Mineralization Age: Unknown

Deposit
Character: Breccia, Vein, Disseminated
Classification: Replacement, Igneous-contact, Porphyry, Hydrothermal
Type: L04: Porphyry Cu +/- Mo +/- Au, I05: Polymetallic veins Ag-Pb-Zn+/-Au, L01: Subvolcanic Cu-Ag-Au (As-Sb)
Shape: Regular **Modifier:** Faulted
Dimension: 550x360x120 metres
Comments: Dimensions are for the AM Breccia zone.

Host Rock

Dominant Host Rock: Sedimentary

Stratigraphic Age	Group	Formation	Igneous/Metamorphic/Other
Jurassic	Ladner	Undefined Formation	------
Oligocene	------	------	Invermay Stock

Isotopic Age	Dating Method	Material Dated
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Lithology: Siliceous Sediment/Sedimentary, Breccia, Argillite, Siltstone, Quartz Diorite

Geological Setting

Tectonic Belt: Coast Crystalline
Physiographic Area: Cascade Mountains
Terrane: Methow

Inventory

Ore Zone: GIANT COPPER
Year: 1998
Category: Indicated
Report On: Y
Quantity: 45,373,026 tonnes
NI 43-101: N

Commodity	Grade
Silver	11.1900 grams per tonne
Gold	0.3800 grams per tonne
Copper	0.4700 per cent

Comments: AM and Invermay (092HSW002) zones calculated by Imperial Metals Corporation.
Reference: Information Circular 1999-1, page 9.

Ore Zone: AM
Year: 1995
Category: Measured
Report On: Y
Quantity: 26,762,000 tonnes
NI 43-101: N

Commodity	Grade
Silver	12.3400 grams per tonne
Gold	0.3770 grams per tonne
Copper	0.6530 per cent

Comments: Previous drilling and underground development have outlined an open pittable resource for the AM Breccia zone.
Reference: Inf. Circ. 1997-1, page 19 and 1995 Annual Report, Imperial Metals.

Ore Zone: AREA
Year: 1995
Category: Indicated
Report On: Y
Quantity: 19,956,200 tonnes
NI 43-101: N

Commodity	Grade
Silver	11.9900 grams per tonne
Gold	0.4100 grams per tonne
Copper	0.7500 per cent

Comments: Drill indicated resource using a strip ratio of 4.5 to 1 and including a small, near-surface pit estimated to contain 5,986,860 tonnes grading 0.64 per cent copper, 0.30 gram per tonne gold and 10.96 grams per tonne silver at a stripping ratio of 1.5 to 1.
Reference: Northern Miner - February 13, 1995.

Capsule Geology

The Giant Copper prospect is located 1.5 kilometres east of the Skagit Valley Recreation area boundary and 2 kilometres due south of Silverdaisy Mountain.

The Giant Copper property originally consisted of two properties: the AM (MINFILE 092HSW001), discovered in 1930 by Consolidated Mining and Smelting Company and the Invermay (MINFILE 092HSW002), discovered in 1933 by Invermay Annex Mining Company. The two properties were consolidated in 1956 by Canam Mining Corp. Between 1955 and 1963, several companies optioned the property and carried out exploration and development programs. After a two year option, Giant Mascot Mines Ltd. purchased all of Canam's assets in 1966. Giant Mascot Mines Ltd. continued work between 1966 and 1972. This included programs of ground magnetic and induced polarization surveys, geological mapping, rock and soil sampling and a lone diamond drill hole, totalling 38.4 metres, on the 10 Level, 26 Mile and Main Breccia grids. Further work ceased until 1979, when limited diamond drilling and rehabilitation work was carried out on the No. 10 level by G.M. Resources. By the end of 1980, 6017 metres of underground drifts and raises, and 14,078 metres of diamond drilling had been completed on the property. The property lay dormant again until 1988, when Bethlehem Resources Corp. acquired it from Campbell Resources Inc. (formerly Giant Mascot Mines Ltd.). Between 1988 and 1990, a comprehensive exploration and evaluation program was carried out; including extensive geochemical sampling, 9.5 line-kilometres of combined ground magnetic, electromagnetic and induced polarization surveys, rehabilitation of the 10 Level workings, trenching, re-logging of previous drill cores, 16

surface and underground diamond drill holes, totalling 1304.9 metres, and 35 rotary drill holes, totalling 2901.1 metres. In 1995, an additional 1389 metres of diamond drilling was completed in eight holes to test for additional, near-surface mineralization that might add to the open pit mineral inventory of the southwest portion of the AM Breccia. In September 1995, the provincial government announced the creation of the Skagit Valley Class A Provincial Park. The Giant Copper property straddles the northern boundary of the Skagit Valley area; future access to the site is guaranteed under the Park Act (Information Circular 1996-1, page 16). . In 1996, Imperial Metals completed a program of diamond drilling (13 holes, totalling 3457 metres) and 658.8 line-kilometres of airborne geophysical surveys on the area. No further exploration work is reported until 2015, when a program of soil and rock sampling was completed. This work identified a northeast- trending zone (200 by 350 metres) of weak copper-gold soil anomaly immediately south of the Giant fault and the 15 Level adit, near the No.1 breccia zone.

In the vicinity of the Giant Copper prospect, the northwest- trending Hozameen thrust fault separates older, late Paleozoic to Middle Jurassic Hozameen Group rocks to the west from Early to Middle Jurassic Ladner Group metasedimentary rocks. The Pasayten strike-slip fault separates Ladner Group rocks from Cretaceous Pasayten Group pelites and conglomerates to the east. Mafic to ultramafic sills intrude sedimentary packages. Early to middle Tertiary plutonic rocks intrude the older sedimentary and intrusive packages. Regional deformation occurred during the late Cretaceous and resulted in a regional greenschist facies metamorphism and a synclinal fold pattern which strikes and plunges 35 degrees to the north.

Argillite, siltstone, quartzite, greywacke and tuffs of the Ladner Group are intruded by diorite to granodiorite of the Invermay stock, thought to be Oligocene. Hornfelsing of Ladner Group rocks can extend for several hundred metres from the contact with the Invermay stock, which is approximately 3300 metres long along a northwest trend and varies from 400 to 1900 metres in width.

Three major fault sets are recognized in the Giant Copper prospect area. Pre-ore, pre-intrusive strike-slip and thrust (Hozameen and Pasayten) faults trend 020 to 030 degrees. Northeast-trending faults, such as the Giant fault, trend through the AM breccia and No. 1 Anomaly on the property. These faults may be long-lived conjugates to the northwest-trending faults. It has been suggested the Giant fault may have been the structural control for the localization of the AM breccia and hypothesized that the Giant fault has dismembered the AM breccia and displaced the eastern portion 1000 metres to the northeast in the vicinity of the No. 1 anomaly (MINFILE 092HSW161). The third fault set strikes 270 to 280 degrees and may be extensional, a factor in localizing brecciation zones.

Three different types of mineralization are found at the Giant Copper prospect. The first is tourmaline, sulphide, magnetite replacement bodies scattered throughout the Invermay stock and along its borders in adjacent Ladner Group metasediments. Alteration consists of the addition of fine-grained tourmaline and magnetite with lesser amounts of pyrite, pyrrhotite and chalcopyrite. Replacement zones frequently have an alteration halo of chlorite, sericite and actinolite.

The second type is lead-zinc-silver veins that form erratic lenses along northeast-trending structures. Mineralization consists of coarse sulphides in a gangue of quartz and calcite, enclosed in a strong fault gouge.

The third and most economically important type of mineralization is breccias with chalcopyrite, gold and silver mineralization. There are six known breccia bodies: the AM, Invermay, No. 1, Pass, Camp and New breccias. The Invermay breccia; however, is weakly mineralized and exploration in the area has concentrated on the Invermay vein. The Pass, Camp and New breccias have received only cursory exploration and have been previously considered lower priority exploration targets. The New breccia, located a couple hundred west-north west of the AM breccia, is described as an area of fractured and brecciated rocks with weak pyrite and trace chalcopyrite mineralization.

Breccia bodies consist of angular to sub-rounded fragments of sedimentary and mafic intrusive rocks in a matrix of calcite, quartz, tourmaline and feldspar. Sulphide minerals occur in patches and consist predominantly of pyrite, pyrrhotite, chalcopyrite and arsenopyrite with lesser sphalerite and galena and minor amounts of molybdenite, scheelite and magnetite.

The AM ore-body is an elongate, northwest- trending, series of sub-vertical plunging, breccia bodies bounded by steeply dipping faults. It has been the focus of the greatest proportion of exploration and has been subdivided into three sectors: the Northern Nose, Southern Nose and Central zones. The bulk of previously stated mineral resources are concentrated in and adjacent to a vertically plunging, crescent or horseshoe-shaped body of higher grade mineralization in the North Nose zone, which wraps around the northwest nose of the breccia. The east limb of the North Nose zone is open to depth below 15 level and the west limb is open to depth below 10 level. Several post mineralization northeast-trending faults cut the breccia. Diamond drilling in 1995 was successful in tracing a near- surface, northeast- trending breccia zone with copper mineralization in the southeast portion of the AM breccia. The Giant fault offsets the southeast part of the breccia 300 metres to the northeast. Mineralization occurs in a pipe-like zone of brecciated siliceous sediments. The zone measures 550 by 360 by 120 metres and comprises siliceous fragments in a grey matrix.

In the North and South Nose zones, mineralization consists of pyrrhotite, chalcopyrite and lesser pyrite as pockets in the matrix adjacent to fragments, and subordinately as veinlets cutting both matrix and fragments. Other minerals include arsenopyrite, molybdenite, magnetite, galena, sphalerite, uraninite, monazite and scheelite. The amount of sulphide minerals is not associated with the degree of brecciation. Where copper mineralization is weak to moderate, pyrite or pyrrhotite are the dominant sulphides. Strong copper mineralization areas are dominated by chalcopyrite as large blebs and clots rimming breccia fragments and partially filling the breccia matrix. These areas of strong chalcopyrite are accompanied by strong sericite clay alteration of the feldspathic breccia matrix or chloritization of an andesitic matrix. Zones of intense tourmaline alteration are commonly found immediately adjacent to, but postdate, zones of strong chalcopyrite mineralization. Copper-silver values within the AM breccia show a marked

correlation while high gold values correlate with high copper values or elevated arsenic values; however, recent drilling has outlined several high- grade gold zones that are associated low copper values. The final 24.4 metres in drill hole GCR89-27 averaged 1.45 grams per tonne gold and 0.19 per cent copper (Assessment Report 24157). The uraninite is spatially associated with the molybdenite. The breccia matrix is composed of calcite, quartz, chlorite, carbonate, alkali feldspar, white mica and kaolin. Tourmaline occurs in fractures, fragments and the matrix. Mineralization in the central zone appears to be substantially lower in grade and lacking continuity.

Another area of mineralization, referred to as the Hatchethead adit, consists of a zone of cross-cutting tourmaline-quartz-sulphide veins. In 1996, a sampling of the veins is reported to have yielded up to 12.48 grams per tonne gold (Assessment Report 24986; pg.16). The location of the adit was not reported.

In 1954, a 1.5-metre sample from an adit, assayed 0.92 per cent copper, 17.14 grams per tonne silver, trace gold, 0.144 per cent molybdenum and 0.044 per cent uranium (0.052 per cent equivalent U3O8) (Minister of Mines Annual Report 1954).

The drill-indicated resource was last estimated at 19,956,200 tonnes grading 0.75 per cent copper, 0.41 gram per tonne gold and 11.99 grams per tonne silver at a stripping ratio of 4.5:1. The resource includes a small, near-surface pit estimated to contain 5,986,860 tonnes grading 0.64 per cent copper, 0.30 gram per tonne gold and 10.96 grams per tonne silver at a stripping ratio of 1.5:1 (Northern Miner - February 13, 1995).

Drilling in 1995 indicates the southeast portion of the Central zone has potential for significant amounts of moderate- grade copper-gold-silver mineralization.

Underground unclassified reserves recalculated on pre-1989 data and limited mainly to the northern end of the AM breccia pipe are 3.36 million tonnes grading 1.17 per cent copper, 0.51 gram per tonne gold and 21 grams per tonne silver (Mineral Exploration Review 1990, page 39).

In 1988, Bethlehem Resources Corporation conducted exploration and re-assayed old drill core. From a total of 2715 samples, the mean value of uranium was 1.02 parts per million, with a maximum value of 176 parts per million (P. McAndless, personal communication, 1990).

Previous drilling and underground development outlined an open pit resource estimated at 20.7 million tonnes grading 0.75 per cent copper, 0.4 gram per tonne gold and 12 grams per tonne silver. A small underground resource of 3.4 million tonnes grading 1.17 per cent copper, 0.5 gram per tonne gold and 20 grams per tonne silver is also estimated.

The geological reserve estimated by Wright Engineers in a 1996 feasibility study was 57.8 million tonnes grading 0.55 per cent copper, 0.28 gram per tonne gold and 6.9 grams per tonne silver. New surface tonnage is estimated to contain an open-pit resource of 29.5 million tonnes grading 0.65 per cent copper, 0.38 gram per tonne gold and 12.34 grams per tonne silver (Information Circular 1997-1, page 19). Drilling (in 1996) on the Invermay (MINFILE 092HSW002), located 1.5 kilometres northwest of the AM zone, was aimed at establishing a second open pit resource on the property. Results were considered encouraging. The company has filed an application for a 10,000-tonne bulk sample from the AM zone.

During 1995 through 1997, Imperial Metals Corporation focused on development planning. It combined assays from drill programs carried out on the AM and Invermay (MINFILE 092HSW002) zones with those from previous studies and reported an aggregated open-pit and underground mineral resource of 45,373,000 tonnes grading 0.47 per cent copper, 0.38 gram per tonne gold and 11.19 grams per tonne silver. The company estimated that the AM zone has an open-pit reserve of 1,084,250 tonnes grading 0.84 per cent copper, 0.55 gram per tonne gold and 11.55 grams per tonne silver at a stripping ratio of 1.13:1 and an underground mineable reserve of 1,183,000 tonnes grading 1.15 per cent copper, 0.51 gram per tonne gold and 20.26 grams per tonne silver (Exploration in BC 1997, page 62).

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Date Coded:	1985/07/24	**Coded By:**	BC Geological Survey (BCGS)	**Field Check:**	N
Date Revised:	2017/09/20	**Revised By:**	Karl A. Flower (KAF)	**Field Check:**	N