Location/Identification

MINFILE Number: 082ESW073
National Mineral Inventory Number: 082E6 Ag1
Name(s): **SALLY (L.2092)**
ROB ROY (L.2093), PUEBLO FR. (L.1205S), SALLY GROUP

Status: Past Producer
Mining Method Underground
Regions: British Columbia
BCGS Map: 082E045
NTS Map: 082E06E
Latitude: 49 25 41 N
Longitude: 119 04 21 W
Elevation: 1249 metres
Location Accuracy: Within 500M

Mining Division: Greenwood
Electoral District: West Kootenay-Boundary
Resource District: Arrow Boundary Forest District

UTM Zone: 11 (NAD 83)
Northing: 5477107
Easting: 349720

Comments: The Sally No. 1 tunnel is located 3.0 kilometres west of Mount Wallace and 1.5 kilometres south-southeast of Beaverdell (Geological Survey of Canada Memoir 79, Figure 1).

Mineral Occurrence

Commodities: Silver, Gold, Lead, Zinc, Copper

Minerals
Significant: Argentite, Pyrargyrite, Silver, Tetrahedrite, Galena, Sphalerite, Pyrite
Associated: Quartz, Calcite
Alteration: Chlorite, Calcite, Clay, Turgite
Alteration Type: Propylitic, Argillic, Oxidation
Mineralization Age: Eocene

Isotopic Age: 50 Ma
Dating Method: Lead/Lead
Material Dated: Galena

Deposit
Character: Vein, Shear
Classification: Hydrothermal, Epigenetic
Type: I05: Polymetallic veins Ag-Pb-Zn+/-Au
Shape: Bladed
Modifier: Faulted
Strike/Dip: 090/75S

Comments: The main vein averages about 76 centimetres width. Vein occupy faults or shears striking 090 degrees and dipping steeply south. Age date: Canadian Journal of Earth Sciences, Vol. 19, No. 6, p. 1267.

Host Rock

Dominant Host Rock: Plutonic

Stratigraphic Age	Group	Formation	Igneous/Metamorphic/Other
Jurassic	------	------	Westkettle Batholith

Isotopic Age	Dating Method	Material Dated
------	------	-

Lithology: Granodiorite

Geological Setting

Tectonic Belt: Omineca
Physiographic Area: Okanagan Highland
Terrane: Plutonic Rocks, Harper Ranch

Metamorphic Type: Regional
Relationship: Pre-mineralization

Grade: Greenschist

Inventory

No inventory data

Summary Production

		Metric		Imperial	
	Mined:	10,413	tonnes	11,478	tons
	Milled:	0	tonnes	0	tons
Recovery	Silver	60,998,814	grams	1,961,157	ounces
	Gold	5,007	grams	161	ounces
	Lead	486,187	kilograms	1,071,859	pounds
	Zinc	215,375	kilograms	474,821	pounds

Capsule Geology

The Sally (Lot 2092) past producer is located 3.0 kilometres west of the summit of Mount Wallace and 1.5 kilometres south- southeast of Beaverdell, British Columbia (Geological Survey of Canada Memoir 79, Figure 1).

Initial prospecting began in the Beaverdell area in the late 1880s. The first ore was shipped in 1896. The major producing mines in the Beaverdell silver-lead-zinc vein camp, from west to east, were the Wellington (082ESW072), Sally and Rob Roy (082ESW073), Beaver (082ESW040) and Bell (082ESW030), with numerous other small workings throughout the area. The Sally occurrence was first discovered in 1901 and operated from 1901 to 1910 by the Vancouver and Boundary Creek Development and Mining Co. The property was idle in 1911 and 1912. A lease was given to J. Drumm in 1913 with ore shipments made from 1913 to 1918. An option was given to Wallace Mountain Mines Ltd. in 1916. Then in 1925 an option was granted to Federal Mining and Smelting Co. From 1926 to 1929 another option was given to Sally Mines Ltd. from Wallace Mountain Mines Ltd. Highland- Bell Ltd. acquired the property in 1948 and in 1949 conducted geological work and diamond drilling on the Sally No. 2 level. From 1949 to 1991, the property became part of the ground held as part of the Highland-Bell (Beaverdell) mine. The Highland-Bell mine produced until 1991. Past development on the Sally, Rob Roy and Pueblo claims consisted of over 600 metres of underground workings, opencuts and trenches exploring high-grade silver-lead mineralization on two or three main veins on the Sally (Lot 2092), and two or more veins on the Rob Roy (Lot 2093) and Pueblo (Lot 1205s) Crown-granted claims. At depth, the Sally mine is connected to the Wellington mine (082ESW072).

Granodiorite of the Westkettle batholith underlies most of the area. It has been intruded by small quartz monzonite porphyry stocks including the Beaverdell, Tuzo Creek, Eugene Creek and Carmi stocks. Other granitic porphyry stocks that intrude the Westkettle batholith are the Beaverdell porphyry. These have been dated by potassium- argon methods as Eocene (Watson, P.H. (1981): Genesis and zoning of silver-gold veins in the Beaverdell area, south-central British Columbia; Leary, G.M. (1970): Petrology and structure of the Tuzo Creek molybdenite prospect near Penticton, British Columbia and Exploration in British Columbia 1995, pages 124-126. The Westkettle batholith has been correlated with the Nelson intrusions that has been dated by potassium-argon and uranium-lead methods as Middle Jurassic. The Westkettle batholith contains remnants of pendants and/or screens of metamorphosed Wallace Formation. The Wallace Formation is believed to be correlative with the upper sections of the Carboniferous to Permian Anarchist Group. Lithologies include metamorphosed andesitic tuffs and lavas, hornblende diorite porphyries, olivine gabbro and hornblendite, hornfels and minor limestone. The contact between the Wallace Formation and the Westkettle batholith is sinuous, trending north with gentle east dips. These are unconformably overlain by Oligocene tuffs and conglomerates and Miocene plateau basalts. Westkettle granodiorite or Beaverdell quartz monzonite are the dominant hostrocks. Mineralization rarely extends into the Wallace Formation to the east.

A series of dikes, ranging in composition from quartz latite and quartz monzonite porphyries to hornblende andesite porphyries, are found throughout the area. In the Beaverdell camp, fine grained, brown andesite dikes, referred to as Wellington-type dikes, are believed to be pre-mineralization. One of these was dated by potassium-argon methods at 61.6 +/- 2.2 Ma (Watson, P.H., 1981). Quartz latite dikes are referred to as Idaho-type dikes and thought to be syn or post-mineralization. One of these has given a potassium-argon age of 50.6 +/- 1.5 Ma (Watson, P.H., 1981).

Beaverdell silver-rich veins are found in a 3.0 by 0.8 kilometre belt, referred to as the Beaverdell silver-lead-zinc vein camp. Five distinctly separate quartz vein systems are arranged roughly en echelon in this structural zone. The west-half contains the Wellington (Lot 2621), Sally (082ESW075, Lot 2092) and Rob Roy (Lot 2093, also part of Sally) systems which all strike east and dip from 70 degrees south to vertical. The Wellington and Sally each comprise two separate veins and the Rob Roy three. In the central part of the zone, the Bell (082ESW030, Lot 2343) comprises two veins which strike east to northeast and dip south to southeast. The eastern part of the zone contains the upper and lower sections of the Lass (082ESW133) and Highland Lass (Lot 2341, also part of the Bell) vein which strikes northeast and dips 50 degrees southeast. In general, quartz breccia veins and stockworks are so complex that continuous mineralized sections are a maximum of a few metres before being faulted or disrupted. Nevertheless, some mineralized zones have been found that extend up to 150 metres horizontally. Faults have been classified into five types based on their orientation, with each type having common orientation, kind of movement and age relationship: (1) high angle, north-striking normal faults, (2)

low angle, north trending, strike-slip faults, (3) northeast striking, high angle normal faults (terminal faults), (4) northeast trending, 'slice' faults and (5) crossfaults. The northeast striking, high angle normal faults pose the greatest obstacle to systematic exploration and mining, as these faults are commonly spaced a few metres apart dividing veins into short segments in a northwest-downward direction.

Vein-type mineralization of the Beaverdell camp is characterized by a high silver content. Mineralization is composed of galena, sphalerite and pyrite with lesser amounts of arsenopyrite, tetrahedrite, pyrargyrite, chalcopyrite, polybasite, acanthite, native silver and pyrrhotite. The gangue minerals in veins are mainly quartz with lesser amounts of calcite, fluorite and sericite with rare barite. 'Ore ground' has been described as propylitic altered granodiorite, quartz diorite and quartz monzonite of the Westkettle batholith, up to 15 metres wide. These zones are characterized by sericite, clay minerals, chlorite, calcite, epidote and hematite. The fault-bounded veins commonly have a banded texture defined by outer, crudely parallel sulphide stringers. The wallrocks are brecciated and sheared over 30 to 150 centimetres width adjacent to veins. Weak sericite alteration of feldspars is pervasive in the Westkettle batholith.

The interpretation of galena lead-lead isotope age data coupled with geometrical and age relationships between dikes and veins suggests mineralization was formed around 50 Ma, coeval with Eocene stocks (Canadian Journal of Earth Sciences, Vol. 19, No. 6, pages 1264-1274, 1982).

The Sally mine is comprised of the Sally (Lot 2092), Rob Roy (Lot 2093) and Pueblo (Lot 1205s) Crown-granted claims where mineralized quartz veins occupy shears along east striking, steeply southward dipping faults in Westkettle granodiorite. The main vein averages 76 centimetres in width with propylitic alteration extending up to 8 metres in the wallrock. The quartz veins have been extensively faulted with the most important type of post-ore faulting being high-angle and normal. These faults strike north to northeast and dip west. The veins are subsequently rarely continuous without offset, however, some ore shoots show only minor offset over larger horizontal distances. Thin-section studies show amphiboles almost entirely altered to chlorite and feldspars replaced by clay and calcite.

Mineralization in the veins consists of argentite, tetrahedrite, pyrargyrite with lesser galena, sphalerite and pyrite in a gangue of quartz with altered wallrock fragments and small concentrations of calcite. Some supergene mineralization is present, chiefly as native silver near fault planes and occurs in a gangue of chlorite, clay, calcite-altered wallrock and turgite (a red fibrous mineral equivalent to hematite with absorbed water). The quartz vein also exhibits slight oxidation. A sample taken from the No. 1 tunnel on the Rob Roy in 1913 yielded 0.68 gram per tonne gold and 1975 grams per tonne silver. Another sample from the No. 2 tunnel yielded 1.37 grams per tonne gold and 1079 grams per tonne silver (Minister of Mines Annual Report 1913, page K155). Samples taken during ongoing property exploration by Teck Corp. in 1987 yielded similarly high silver values. Sample 87-5, taken from a 18-centimetre wide shear zone with 0.6 to 2.5 centimetre wide quartz veins, yielded 2.06 grams per tonne gold and 4226 grams per tonne silver (Assessment Report 16771).

Past production has included 10,413 tonnes of ore from which 60,998,814 grams of silver, 5007 grams of gold, 486,167 kilograms of lead and 215,375 kilograms of zinc were recovered. Production commenced in 1901 and ran continuously between 1904 and 1941, except 1911 and 1912.

Bibliography

EMPR AR 1900-878,879; 1901-1058,1144,1145; 1902-H182; 1903-H168; 1904-G216; 1905-J181; 1906-H159,H160,H250; 1907-L109,L215; 1908-J114,J248; 1909-K132,K273; 1910-K118,K244; 1911-K291; *1913-K154, K155,K162,K421; 1914-K336,K511; 1915-K201,K203,K446; 1916-K255, K518; 1917-F204,F212,F449; 1918-K210,K220; 1919-N168,N174; 1920-N155; 1921-G185,G189; 1922-N172; 1923-A183; 1924-B168; *1925-A201-A205; 1926-A209; 1927-C232,C233; 1928-C253,C254; 1929-C261; 1930-A219; 1931-A123; 1932-A126; 1933-A153; *1934-A25,A29,D9,DF10; 1935-A25,A30,D14,G52; 1936-D56,D57; 1937-A36; 1938-A34,D3,D39,D40; 1939-A37,A93; 1940-A24,A79; 1941-A25,A73,A74; 1943-A38; 1946-A133; *1949-A139-A148; 1953-A108

EMPR INDEX 3-211

EMPR ASS RPT 15704, 15790, 16771, 16772

EMPR BC METAL MM00922

EMPR ENG INSP (Mine plans)

EMPR GEM 1974-57,58

EMPR GEOLOGY 1975, pp. G30-G33

EMPR OF 1989-5; 1998-10

EMPR PF (082ESW General, Underground Plans; 082ESW030; Hedley, M.S. (1937): Map of Wallace Mountain Mine Workings)

EMR MP CORPFILE (Highland-Bell Mines Ltd.; Highland Lass Ltd.; Mastadon-Highland Bell Mines Ltd.; Leitch Mines Ltd.; Beaver Silver Mines Ltd.; Sally Mines Ltd.; Teck Corp.)

GSC MAP 538A; 539A; 37-21; 15-1961; 1736A

GSC MEM *79, pp. 89,92,120-122

GSC OF 481; 637; 1505A; 1565; 1969

GSC P 37-21
CIM *Vol. II, 1957: Structural Geology of Canadian Ore Deposits,
pp. 136-141
CJES *Vol. 19, No. 6, pp. 1264-1274, 1984
*Watson, P.H. (1981): Genesis and Zoning of Silver-Gold veins in the
Beaverdell area, South-Central British Columbia, M.Sc. Thesis,
University of British Columbia, 156 pp.

EMPR PFD 1418, 751995, 751996, 751997, 751998, 751999, 752000, 752001, 752002, 752003, 752004, 752005, 752006, 752007, 1417, 600118, 600119, 600120, 600126, 801990, 672587, 672591, 672595, 672596, 672597, 672598

Date Coded:	1985/07/24	**Coded By:**	BC Geological Survey (BCGS)	**Field Check:**	N
Date Revised:	2008/02/22	**Revised By:**	Karl A. Flower (KAF)	**Field Check:**	N