

Location/Identification

MINFILE Number:	082FSW010	National Mineral Inventory Number:	082F3 WO9
Name(s):	EMERALD TUNGSTEN JERSEY, EMERALD		
Status:	Past Producer	Mining Division:	Nelson
Mining Method	Underground	Electoral District:	Nelson-Creston
Regions:	British Columbia	Resource District:	Arrow Boundary Forest District
BCGS Map:	082F014		
NTS Map:	082F03E	UTM Zone:	11 (NAD 83)
Latitude:	49 06 25 N	Northing:	5439369
Longitude:	117 13 41 W	Easting:	483355
Elevation:	1160 metres		
Location Accuracy:	Within 500M		
Comments:	The Emerald Tungsten deposit lies east of Emerald lead-zinc mine (082FSW310). The production is included with Jersey mine (082FSW009).		

Mineral Occurrence

Commodities: Tungsten, Molybdenum, Bismuth, Gold

Minerals

Significant: Scheelite, Wolframite, Molybdenite, Pyrrhotite, Pyrite, Chalcopyrite, Bismuth, Arsenopyrite, Gold, Telluride

Significant Comments: Molybdenum is only a minor constituent of the ore.

Associated: Quartz, Apatite, Cassiterite, Vesuvianite, Fluorite, Wollastonite

Alteration: Garnet, Pyroxene, Tourmaline, Powellite, Calcite, Biotite, K-Feldspar, Sericite

Alteration Comments: Kaolinite, tremolite and silica are also reported as alteration types.

Alteration Type: Skarn, Tourmalin^zn, Oxidation, Potassic

Mineralization Age: Unknown

Deposit

Character: Disseminated, Vein

Classification: Skarn, Replacement

Type: K05: W skarn, I02: Intrusion-related Au pyrrhotite veins

Shape: Regular **Modifier:** Folded

Host Rock

Dominant Host Rock: Sedimentary

Stratigraphic Age	Group	Formation	Igneous/Metamorphic/Other
Lower Cambrian	Undefined Group	Laib	-----
Jurassic	-----	-----	Emerald Stock

Isotopic Age	Dating Method	Material Dated
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Lithology: Limestone, Argillite, Granite, Black Quartz Breccia, Dolomite

Comments: Mineralization occurs at the contact of the Reeves and Argillite members of the Laib Formation.

Geological Setting

Tectonic Belt: Omineca **Physiographic Area:** Selkirk Mountains

Inventory

Ore Zone: EAST **Year:** 2008
Category: Indicated **Report On:** N
Quantity: 256,000 tonnes **NI 43-101:** N

Commodity	Grade
Tungsten	0.19 per cent

Comments: Resource reported in Assessment Report 35243, however the main subject of the report is 2014 drilling.

Reference: Assessment Report 35243

Ore Zone: MINE **Year:** 2008
Category: Inferred **Report On:** N
Quantity: 112,200 tonnes **NI 43-101:** N

Commodity	Grade
Tungsten	0.28 per cent

Comments: Resource reported in Assessment Report 35243, however the main subject of the report is 2014 drilling.

Reference: Assessment Report 35243

Capsule Geology

The property lies on the summit between Sheep and Lost Creeks, about 13 kilometres southeast of Salmo. The early development work on the Emerald was done on a lead-zinc showing by J. Waldbesen and by Iron Mountain Ltd.; reference is made to this development in the Jersey (082FSW009).

After being inactive from about 1925 to 1940, the owners, Iron Mountain Ltd., increased their holdings from 17 to 41 claims and carried out exploration and a small amount of development for 3 years which led to the discovery of scheelite to the west of the principal lead-zinc showing early in 1942. Later in the year, scheelite ore was found on the Dodger (082FSW011) property to the east of the lead-zinc zone. At about the same time the Feeny (082FSW247) ore body, about 183 metres north of the Empire, was discovered.

In August 1942 the property was purchased by the Dominion Government who operated it through the Wartime Metals Corporation. A mill was built beside the Nelson-Nelway Highway and put into production in August 1943 but on September 10th an order was received to close down.

Early in 1947 the property was bought by Canadian Exploration Ltd. and production was resumed in June. Exploration for additional tungsten ore was extended to a study of the Jersey (082FSW009) showing which was dominantly zinc bearing and by the end of 1948 a considerable tonnage of lead-zinc ore had been proven on the Jersey. The tungsten operation was closed down and the mill converted to a lead-zinc operation for production from the Jersey.

Early in 1951 the Canadian Government bought back from the company the known Emerald tungsten orebodies and the partly developed Dodger (082FSW011). An agreement was made for Canadian Exploration Ltd. to build a tungsten mill and to mine tungsten ore on a fee basis. A 227 tonnes mill was built near the portal of the Emerald 3,800 level and put into production in December 1951. Further diamond drilling on company ground demonstrated the existence of a large tonnage of tungsten ore so the company agreed to buy the tungsten operation from the Government. The mill operated until the end of 1958. On the Emerald claim all ore was mined from above the 3,800 level main haulageway by open pitting and underground mining. An inclined shaft was put down to the 2,730 level and 9 levels established off this, the bottom one 344 metres vertically below the 3,800 level. All ore was mined out above this lowest level. A small orebody on the Feeny claim was mined out by 1955. The mining of the Dodger zone was completed in 1957.

Diamond drilling on the Invincible claim revealed a tungsten orebody 245 to 275 metres below the surface that is estimated to contain 350,000 tonnes grading 0.83 per cent tungstic oxide. The sinking of a 275-metre vertical shaft was begun but the project was abandoned in 1958 on completion of a

sales contract with the United States General Services Administration. Work was resumed on the property in 1967. A geophysical survey was made of the Invincible claim (Lot 12084) and 394 metres of diamond drilling was done in 2 holes in the Tungsten King workings (082FSW034, 321, 322).

Drilling during 1968 on the Invincible (082FSW218) showing totalled 2875 metres. Development work was begun in 1969 and production began in mid-October 1970. The Emerald tungsten mill was rehabilitated to handle about 454 tonnes per day. Ore reserves at the end of 1970 from three separate zones totalled 435,500 tonnes averaging 0.65 per cent WO₃. Initial production was from the rehabilitated Dodger workings since the Invincible ore zone had not been reached. The Invincible drift was advanced to 1310 metres during the year; the orebody was developed by a decline trackless haulageway. Mill capacity was increased to around 544 tonnes per day during 1971. The company name was changed in 1972 to Canex Placer Limited. Ore reserves were exhausted and the mine closed in August 1973, and in 1977, Canex's assets were acquired by Placer Development Limited. In 1979, Mentor Exploration and Development Co., Limited optioned the property from Placer. In 1980, they diamond drilled 4504 metres in 11 holes plus one wedged hole. The best intersection was 0.36 per cent WO₃ over 1.07 metres.

The Emerald Tungsten zone is located on the west side of the Emerald Stock granite of the Middle to Late Jurassic Nelson Intrusions. The zone occurs within the Lower Cambrian Laib Formation along the contact of the Reeves Member limestone with the Emerald Member argillite as well as on the limestone-granite contact.

The strata strike about 020 degrees and dip between 45 and 70 degrees east; many of the beds are actually overturned. The granite appears at the surface as a north trending elongate stock. West of the stock are argillite and skarn bands of the Truman Member (Laib Formation), which forms an isoclinal anticline overturned to the west. The Reeves limestone is on the west limb of this anticline, and dips 25 to 70 degrees east, terminating at depth against granite. It is succeeded on the west by the Emerald argillite that also dips east. Both the Emerald and nearby Feeney (082FSW247) ore zones are transected by the Granite fault; drilling, east and north of the fault, located the Invincible (082FSW218) tungsten zone at the same stratigraphic horizon.

Within the deposit four distinct types of mineralization can be recognized: sulphide, "greisen", skarn, and quartz ores. The sulphide-type consists of irregularly shaped "replacement" bodies in limestone and dolomite, consisting of pyrrhotite, calcite, biotite and scheelite. Locally quartz, pyrite, molybdenite and chalcopyrite may be present. The "greisen"-type of ore is in altered granite and extends as much as 12 metres into the granite from the contact with the limestone. The ore consists of potash feldspar, in some places completely kaolinized, abundant quartz, sericite, pyrite, tourmaline and scheelite. Locally, calcite or ankerite, apatite, pyrrhotite or molybdenite may be present. The skarn-type of ore, occurring mainly at or near the contact of limestone and argillite, consists of garnet, diopside, calcite and quartz with small amounts of pyrrhotite, pyrite, scheelite and molybdenite. The quartz-type ore, which in many places grades into greisen, is silicified limestone intersected by numerous veins of quartz containing abundant ankerite, large crystals of scheelite, a few flakes of molybdenite, and orange-fluorescing crystals of apatite. Near the veins are found disseminated scheelite and pyrite with some pyrrhotite and tremolite. Also reported are native bismuth, arsenopyrite, gold, tellurides, cassiterite, vesuvianite, fluorite, and wollastonite (G. Ray, 1995).

Scheelite is the main tungsten mineral but minor powellite and wolframite have also been reported. Most of the scheelite occurs as fine, disseminated grains in lenticular skarn zones which extend an average of about 5 to 6 metres from the granite contact along the limestone-argillite contact. Grades are 0.5 to 1.5 per cent WO₃.

The Emerald Tungsten mine was worked in 1943, 1947 to 1949 (inclusive) and again from 1951 to 1958 (inclusive). Production to the end of 1957 amounted to 597,100 tonnes of ore (Bulletin 41, page 119). Production for the Emerald deposit, combined with that of the Feeney (082FSW247) and Dodger (082FSW011) deposits, is recorded with the production statistics of the Jersey mine (082FSW009).

During 2014, Margaux Resources Ltd. conducted a two-phase drilling program on the East Emerald target area that produced 6318.6 metres of core over 35 drill holes (Assessment Report 35243). Drilling confirmed and expanded on historic reports of contained tungsten. The tungsten-bearing zones consist of several mostly parallel skarn bands in argillite or limestone beds that dip moderately to the east. Assessment Report 35243 reports mostly on work completed in 2014, however also includes indicated and inferred resource grades from 2008 for the East Emerald and Emerald Mine areas. An indicated resource of 256,000 tonnes grading 0.19 per cent WO₃ and an inferred resource of 1,122,000 tonnes grading 0.28 per cent WO₃ are reported (Assessment Report 35243).

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Date Coded:	1985/07/24	Coded By:	BC Geological Survey (BCGS)	Field Check:	N
Date Revised:	2016/01/08	Revised By:	Jessica Norris (JRN)	Field Check:	Y