



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

Location/Identification

MINFILE Number: 093L 124 **National Mineral Inventory Number:** 093L15 Cu1

Name(s): **BIG ONION**
CIMBRIA, ASTLAIS, JACK

Status: Developed Prospect **Mining Division:** Omineca

Regions: British Columbia **Electoral District:** Bulkley Valley-Stikine

BCGS Map: 093L086 **Resource District:** Skeena Stikine Forest District

NTS Map: 093L15W **UTM Zone:** 09 (NAD 83)

Latitude: 54 48 35 N **Northing:** 6075647

Longitude: 126 53 46 W **Easting:** 635209

Elevation: 1219 metres

Location Accuracy: Within 500M

Comments: Located on the south side of Astlais Mountain, 17.7 kilometres east- northeast of Smithers.

Mineral Occurrence

Commodities: Copper, Molybdenum, Gold, Silver

Minerals

Significant: Chalcopyrite, Chalcocite, Covellite, Molybdenite, Bornite, Pyrite, Magnetite

Associated: Quartz

Alteration: Sericite, Kaolinite, Chlorite, Epidote

Alteration Type: Sericitic, Argillic, Propylitic

Mineralization Age: Unknown

Deposit

Character: Stockwork, Disseminated

Classification: Porphyry, Hydrothermal

Type: L04: Porphyry Cu +/- Mo +/- Au

Host Rock

Dominant Host Rock: Plutonic

Stratigraphic Age	Group	Formation	Igneous/Metamorphic/Other
Jurassic	Hazelton	Telkwa	-----
Jurassic	Hazelton	Nilkitkwa	-----
Middle Jurassic	Hazelton	Smithers	-----
Upper Cretaceous	-----	-----	Bulkley Intrusions
Eocene	-----	-----	Babine Intrusions

Isotopic Age	Dating Method	Material Dated
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Lithology: Quartz Feldspar Porphyry, Quartz Diorite Porphyry, Quartz Diorite, Quartz Monzonite Dike, Quartz Feldspar Porphyry Dike, Hornblende Andesite Dike, Andesite, Andesitic Flow, Andesitic Tuff, Andesitic Breccia

Comments: The quartz diorite intrusion is locally called the Big Onion pluton.

Geological Setting

Tectonic Belt: Intermontane
Terrane: Stikine, Plutonic Rocks
Physiographic Area: Skeena Ranges

Inventory

Ore Zone: BIG ONION
Category: Indicated
Quantity: 7,000,000 tonnes
Year: 2008
Report On: N
NI 43-101: Y

Commodity	Grade
Copper	0.424 per cent
Molybdenum	0.0107 per cent

Comments: Resources reported using a possible cut-off of 0.30 per cent Cu.
Reference: Technical Report on the Big Onion Copper Molybdenum Project, May 31, 2008
(<http://eaglepeakresources.com>)

Ore Zone: BIG ONION
Category: Inferred
Quantity: 18,900,000 tonnes
Year: 2008
Report On: N
NI 43-101: Y

Commodity	Grade
Copper	0.393 per cent
Molybdenum	0.0096 per cent

Comments: Resources reported using a possible cut-off of 0.30 per cent Cu.
Reference: Technical Report on the Big Onion Copper Molybdenum Project, May 31, 2008
(<http://eaglepeakresources.com>)

Ore Zone: BIG ONION
Category: Indicated
Quantity: 32,000,000 tonnes
Year: 1991
Report On: Y
NI 43-101: N

Commodity	Grade
Silver	1.0000 grams per tonne
Gold	0.0640 grams per tonne
Copper	0.3400 per cent

Comments: Supergene portion estimated by Varitech Resources Ltd. in 1991.
Reference: CIM Special Volume 46, page 14.

Ore Zone: BIG ONION
Category: Combined
Quantity: 94,380,000 tonnes
Year: 1977
Report On: Y
NI 43-101: N

Commodity	Grade
Copper	0.4200 per cent
Molybdenum	0.0120 per cent

Comments: Calculated by Canadian Superior Exploration Ltd. in 1977. Resource calculations by other companies are considerably less.
Reference: CIM Special Volume 46, page 414.

Capsule Geology

The Big Onion deposit is located on the south side of Astlais Mountain, 16 kilometres east of Smithers.

The Big Onion deposit is underlain by Lower-Middle Jurassic Hazelton Group volcanics (Telkwa and Nilkitkwa formations) comprised of variegated red, green to maroon andesitic flows, tuffs and breccia. The volcanic division is overlain by the Smithers Formation, also of the Hazelton Group, which is comprised of greywacke, siltstone, sandstone, shale, breccia and minor conglomerate.

A Late Cretaceous stock of the Bulkley Plutonic Suite and small Eocene stock of the Babine Plutonic Suite intrude the Hazelton stratigraphy in the deposit area.

The intrusion in the deposit area is described as the Big Onion pluton which comprised of two phases, an early quartz feldspar porphyry and a later quartz diorite porphyry. The earlier intrusion forms a sheath around the quartz diorite and dikes of the quartz feldspar porphyry are common in the andesites near the margin of the pluton. The quartz feldspar porphyry is intensely altered with sericite, kaolinite and chlorite. A sample of intense sericite alteration has given an isotopic age of 117 Ma and a postmineral quartz monzonite porphyry dike was dated at 48.7 Ma.

In addition to the main plutonic rocks, there is a wide post-mineralization quartz monzonite dike and several varieties of small, late hornblende andesite dikes. The quartz monzonite is sericitized and hosts disseminated pyrite and magnetite with chlorite and epidote.

Copper and molybdenum mineralization is widely distributed in minor amounts throughout the pluton, particularly near the contacts of the two phases and near the peripheral volcanics. Ore minerals include chalcopyrite, molybdenite and minor bornite. Pyrite is ubiquitous but most abundant in the volcanic rocks near the contact. Mineralization is contained largely in a stockwork of quartz-filled fractures or as disseminations throughout the pluton.

Copper and molybdenum mineralization is widely distributed as northwesterly dipping shears that parallel Astlais Creek, and fracture fillings and disseminations in quartz-feldspar porphyry, quartz-diorite porphyry and in the propylitized volcanic rocks, particularly near the contact zones of the two phases and of the peripheral volcanic rocks. The mineralization is largely confined to quartz-feldspar porphyry with relatively minor amounts cross-cutting the thinner quartz-diorite porphyry and margins of the andesite flows, and still lesser amounts observed in the margins of the main quartz-diorite porphyry mass. Mineralization appears to be restricted to rehealed, shattered and sheared zones that strike approximately 065° and dip from between 50 to 70 degrees to the northwest. Mineralization is believed to have occurred over multiple phases of hydrothermal activity. The mineralization appears to be fault controlled and Stock (1977) describes three hydrothermal mineralizing events for the deposit:

- a) quartz, sericite, pyrite ± chalcopyrite
- b) quartz, sericite, chalcopyrite ± molybdenite
- c) quartz, sericite, molybdenite

Two main elongate mineralized zones with northeasterly trends parallel Astlais Creek. The South zone is approximately 1200 by 300 metres and the North zone is approximately 840 by 120 metres.

Unclassified reserves at Big Onion are 18 million tonnes grading 0.36 per cent copper (CIM Special Volume 15 (1976), Table 1, Showing No.73). Canadian Superior Explorations Ltd., in 1977, calculated a geologic resource (probable and possible) of 94.38 million tonnes grading 0.42 per cent copper and 0.012 per cent molybdenum (0.02 per cent MoS₂; CIM Special Volume 46, page 414). At a cutoff grade of 0.25 per cent copper equivalent, the Big Onion was estimated to contain 69 million tonnes grading 0.397 per cent copper equivalent at a stripping ratio of 2.18.

The 2008 drill program (2259 metres in 11 diamond-drill holes) was reported to have resulted in the joining of the North and South zones into a single mineralized body - thereafter called the Main Zone.

WORK HISTORY

Copper showings at the Big Onion deposit were discovered in 1917 by prospectors Axel Almsted, Tommy Haig and Ben Benson. Two short adits were driven in the 1920s but intense exploration of the property did not occur until the porphyry copper boom in the early 1960s. During 1966 and 1967, Texas Gulf Sulfur Co. Inc. completed an I.P. survey, bulldozer stripping and seven diamond drill holes (1217 metres). In 1970–71, Blue Rock Mining Corporation/Cyprus Anvil Mining Corporation completed 22 more diamond drillholes (7358 metres). The most extensive exploration of Big Onion was carried out by Canadian Superior Exploration Ltd. from 1974 to 1977. Geological and geophysical mapping was extended and 67 percussion holes (5003 metres) and 21 core holes (3058 metres) were drilled. Following an estimation of geological reserves, Canadian Superior Exploration Ltd. judged the Big Onion prospect to be sub-economic and declined to do further work.

In 1963, Norpex Limited staked the Astlais group of claims. The main showing was located at 1500 metres elevation on the Ast 7 claim by silt and soil sampling along Astlais creek, road cuts and trenches. In 1964, Noranda Exploration Co. Ltd. optioned the claims and conducted further soil sampling, low-frequency J.E.M. traverses and two diamond-drill holes, 15 and 60 metres long. Reserves at this time were calculated at an indicated resource of 20.0 million tonnes at 0.36 per cent copper plus molybdenum credits (Property File Cyprus Anvil Rutherford, R.A., 1964).

Texas Gulf Sulphur Company acquired 81 recorded claims under option in 1965. Seasonal exploration work continued into 1967 and included detailed geological mapping, geochemical, and induced potential (IP) surveys, stripping, and 762 metres of diamond drilling in 5 holes. The option was

subsequently dropped.

In 1967, induced polarization surveys conducted by Barringer Research Limited identified two areas of high chargeabilities that partially coincided with previous geochemical anomalies. Both the anomalies were tested by a total of seven diamond drill holes (1198 metres), results were discouraging.

-----Drill Hole				
Interval (m)	Length (m)		Cu (%)	Mo (%)
C-1	231-339	108	0.326	0.027
C-5	27-168	141	0.586	0.025
C-6	33-51	18	0.487	0.025
C-7	183-216	33	0.390	0.020
C-12	26-282	256	0.250	0.010
C-14	153-232	79	0.383	0.005
C-15	186-243	57	0.479	0.008
(Property File Cyprus Anvil Sawyer, J.B.P., 1971)				

Other notable drill intersections returned 0.51 per cent Cu over 7.5 metres, 0.16 per cent Cu over 54 metres and 0.20 per cent Cu over 105 metres (Property File Cyprus Anvil Mertens, R.B., 1970).

During 1970, McPhar Geophysics Ltd. conducted a combined induced polarization and resistivity survey of the property on behalf of Blue Rock Mining Corp. This work outlined four anomalous zones. The "Zone A", being of the greatest importance due to its strength, extent and correlation with the siliceous igneous rocks. The other three zones occurred to the south and east of "Zone A" and are all partially or fully underlain by clastic sediments. A second survey, to the south of the first, located several anomalies that were stronger than any found in the original survey (Property File Cyprus Anvil Hallof, P.G., 1970).

In 1991, Varitech Resources Ltd. acquired an interest in the property from Mindoro Corp., who had optioned the claims from Jack Hemelspeck, Jr. Varitech Resources drilled eight HQ core holes (1696 metres) and estimated a supergene reserve of 32 million tonnes grading 0.34 per cent copper, 0.064 grams per tonne gold and 1.0 grams per tonne silver (CIM Special Volume 46, page 414). Supergene intersections during the 1991 diamond drilling program included 108 metres grading 0.55 per cent Cu and 0.02 per cent Mo, 93 metres of 0.63 per cent Cu and 36 metres of 0.69 per cent Cu. Hypogene intersections of up 144 metres grading 0.27 per cent Cu were also encountered in the drill program (Property File Rimfire McCrossan, E., 1992).

Teck Exploration planned drilling the property in 1997. Reported reserves range from 2.4 million tonnes of 0.84 per cent copper (Craigmont) to 6.0 million tonnes grading 0.8 percent copper (Canadian Superior). (pers. comm. Mike Cathro, February 1997).

Consolidated Magna Ventures Ltd. and Gladiator Minerals Ltd. drilled six holes, totalling 1016 metres in 1998.

Eagle Peak Resources acquired 100 per cent interest of the property in 2006 and began a drill program. Since acquiring the property and to May 20, 2009, Eagle Peak reported that they had drilled a total of 84 holes (21,523 metres) to explore the depth and extent of the mineralized zones, conducted preliminary metallurgical test work, completed magnetic and induced polarization geophysical surveys, and calculated two resource estimates.

In 2008 a preliminary feasibility report and a technical report were completed on the property. Updated resource estimates were calculated and included in the technical report. Indicated resources of 7 million tonnes grading 0.424 per cent copper and 0.0107 per cent molybdenum; inferred resources of 18.9 million tonnes grading 0.393 per cent copper and 0.0096 per cent molybdenum using a 0.30 per cent copper as a possible economic cut-off although no economic evaluation has been completed (Technical Report on the Big Onion Copper Molybdenum Project, May 31, 2008; <http://eaglepeakresources.com>).

On October 16, 2009, Metal Mountain Resources Inc ("MMR") purchased the interest of the property from Eagle Peak Resources Inc. On September 12, 2012, MMR entered into a purchase agreement, whereby Lloyd Minerals Inc ("LMI"), a wholly owned subsidiary of MMR, purchased MMR's interest in the Big Onion Property.

Work in 2012 by Lloyd Minerals consisted of one site visit at the Little Onion with who conducted some geological investigation and collected 14 rock chips and 9 soil samples

Bibliography

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Date Coded: 1985/07/24 **Coded By:** BC Geological Survey (BCGS) **Field Check:** N
Date Revised: 2015/10/14 **Revised By:** Garry J. Payie (GJP) **Field Check:** N