GEOLOGICAL REPORT
BOW 1 - 14 MINERAL CLAIMS

Revelstoke Mining Division
82M/08 82N/05 51°19'N 117°59'W

G. GIBSON & ASSOCIATES
November 28, 1990

GEOLOGICAL BRANCH
ASSESSMENT REPORT

20,787
GEOLOGICAL REPORT

on the

BOW 1 - 14 MINERAL CLAIMS

Revelstoke Mining Division

N.T.S. 82M/08 & 82N/05

Latitude 51°19'N  Longitude 117°59'W

by

G. GIBSON & ASSOCIATES

Suite 201 - 2020 West 2nd Avenue

Vancouver, B.C. V6J 1J4

for

BETHLEHEM RESOURCES CORPORATION

Suite 860 - 808 West Hastings Street

Vancouver, B.C. V6C 2X4

owner/operator

Gordon Gibson B.Sc. - Consulting Geologist

November 28, 1990
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SUMMARY

Detailed geological mapping and prospecting on the BOW 1 - 14 claims (218 units) located 38 km northeast of Revelstoke was undertaken in September 1990. The main exploration objective was to explore for Cu-Zn (Pb) massive sulfide mineralization of the STANDARD type in equivalent Lardeau Group host stratigraphy.

The BOW property is underlain by polydeformed metasedimentary and metavolcanic strata of the Lower Cambrian Badshot and Paleozoic Index formations that have been intruded by Mid Jurassic quartz monzonite of the Fang Creek Stock. Three fault-bounded structural domains, each with distinctive internal stratigraphy and deformational style are recognized. The westernmost, CARNES DOMAIN embraces an isoclinally deformed pyritic metavolcanic/ carbonate sequence at Bridgeland Pass that closely resembles host strata at the STANDARD occurrence. Careful prospecting of these rocks in 1990 failed to disclose any new base metal mineralization.

More work is recommended along the northern strike continuation of the Bridgeland Pass section.
INTRODUCTION

Location, Access and Physiography

The BOW 1 - 14 mineral claims are located in the northern Selkirk Mountains of southeastern British Columbia, 38 km. northeast of Revelstoke (Drawing 1). The claims are contiguous, forming a 218 - unit block straddling the southeastern headwaters of Downie Creek, property centre at 51°19'N / 117°59'W.

Permanent helicopter bases at Revelstoke (Canadian, Highland and Tundra) provide the only reasonable means of access to interior portions of the BOW claims. The nearest road accessible helicopter staging points for air-lifting field equipment and personnel are located on the Downie Creek logging road of Westar Timber Ltd. at Pass Creek and on the Carnes Creek mine access road to the J & L deposit, respectively 10 km and 7 km distant. Both roads can be accessed from Revelstoke via. Route 23 - the paved Nakusp-Mica Creek Highway.

Nearly all of the BOW property is above tree - line in extremely rugged alpine terrain with elevations ranging between 3,000 and 9,200 feet A.S.L. Serrate mountain ridges, cliffs, and deeply crevassed icefields represent unusual hazards to geological mapping and prospecting.

Climate is that of the Interior Rain Belt with temperatures ranging between -15° and +30°C. Annual precipitation averages 1.15 metres, more than half of which falls as up to 6 metres of snow. Snowpack rarely exceeds 1.5 metres.
Claims and Ownership

All claims are within the Revelstoke Mining Division.

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Total: 218 units

Operator is Bethlehem Resources Corporation. Claim locations are shown on Drawing 2 of this report - scale 1:50,000.

Previous Work

No previous assessment work has been done within the BOW property area. Regional G.S.C. mapping at 1 in. = 4 mi. is the only available geology (Wheeler 1963, 1965).

Assessment Work - 1990

The BOW 1 - 14 claims were staked by Bethlehem Resources Corporation in October 1989 to protect an area of known Lardeau Group stratigraphy assumed to be a possible host for Cu-Zn(Pb) massive sulfide mineralization of the GOLDSTREAM and STANDARD types.

Geological assessment work in 1990 was conducted from two 2-man fly camps, of 6 days and 4 days duration respectively, see Drawing 4.

Camp 1 made use of an alpine ski-touring cabin, the "Moloch Hut" of Selkirk Mountain Experience as a base of operations. "Moloch Hut" at 7,240 feet A.S.L., is located near the center of Fang Creek Stock (see Geology). Traverses outward along Dismal Glacier and its feeders proved to be a reasonable means of accessing the Lardeau Group target section along the north, south,
and west flanks of the stock. For reasons of safety, all outings were run either as 2-man traverses or individually with continuous voice contact via portable transponders. Prospected elevations ranged from less than 6,000 feet A.S.L. at the snout of Dismal Glacier to 9,200 feet A.S.L. near the summits of Mt. Moloch and Mt. Graham.

Camp 2, located at 7,050 feet A.S.L. on the BOW 11 claim, provided access to Lardeau Group rocks in the area of Tumbledown Mountain, Bridgeland Pass and Carnes Massif.

Geological mapping and prospecting results were compiled daily on 1:20,000 topographic maps enlarged from standard 1:50,000 NTS sheets. Control was easily maintained by compass and altimeter, except where recent ablation of icefields has created significant elevational discrepancies with published NTS topography. Geological data are presented on Drawing 4 of this report - scale 1:25,000.
GEOLOGY

Regional Setting

East of Lake Revelstoke, complexly deformed metasedimentary and metavolcanic units, and granitic intrusions, are part of the Selkirk Allochthon - a composite terrane embracing at least four major fault - bounded tectonic slices, see Drawing 3. Selkirk Allochthon was emplaced from west to east over core gneiss and mantling gneiss of the metamorphic infrastructure (Monashee Complex) along the Monashee Decollement and east - dipping Columbia River Fault during middle Mesozoic to Eocene time (Read and Brown, 1981). In the Goldstream River and Downie Creek areas, structures in Goldstream Slice of the allochthon result from superposition of non-coaxial second and third phase folds on previously overturned stratigraphy.

Stratiform Cu - Zn massive sulfide deposits in chlorite schist and dark banded graphitic phyllite (GOLDSTREAM, MONTGOMERY and STANDARD) are spatially associated with basic volcanics of the upper Index Formation, Paleozoic Lardreau Group (Gibson 1986, 1989; Hoy, Gibson and Berg, 1984). By contrast, stratiform Pb - Zn deposits such as the RIFT occurrence reside in sections dominated by calcareous schist, calc-silicate gneiss, pelitic schist, marble and ultramafic rocks (Gibson and Hoy, 1985).

Local Geology

Within the BOW 1 - 14 claims poly-deformed metasedimentary and metavolcanic strata of the Lower Cambrian Badshot and Paleozoic Index formations are intruded by the syn-tectonic Fang Creek Stock, see Drawing 4. Three structural domains, each with distinctive internal stratigraphy and deformational style are separated by major faults. These are CARNES DOMAIN of Goldstream slice in the west, and FANG and MOLOCH DOMAINS of Illecillewaet slice in the east and northeast.

CARNES DOMAIN

In CARNES DOMAIN, north trending belts of strata dip moderately eastward. These are the limbs of stacked west-verging second phase isoclinal folds the axes of which plunge gently north-northwest or south-southeast. Associated east-dipping faults are related to limb attenuation during folding. In general, second phase folding has obliterated most evidence of earlier deformation, but based on facing directions of the Badshot and Index formations, may have developed in an inverted stratigraphic panel.
PRECAMBRIAN / PALEOZOIC Metamorphic Rocks
PRECAMBRIAN / PALEOZOIC Mantling Gneiss
APHEBAN (? Core Gneiss

Zn - Pb Occurrence
Cu-Zn Occurrence
Selkirk Fan Axis

10 0 10 20 30 40 50 Km.
At the outcrop scale, abundant second phase minor folds are associated with fracture cleavage which in schistose units, transposes an earlier mineral foliation. Third phase fabrics are limited to minor superimposed east-southeast plunging box folds and open warps.

A synform, coring in calcitic Badshot marble, structurally overlies dark graphitic phyllite at Bridgeland Pass. Between Bridgeland Pass and Camp 2, granular chlorite-albite schist, color-banded dark green and violet siliceous phyllite and impure spotted (siderite) marble are associated with talc schist and mariposite. These units occupy both limbs of a minor synform which exposes recessive rusty quartz-graphite phyllite and limy quartz-muscovite phyllite in it's core. Pyrite is ubiquitous, ranging up to 10% in some graphitic horizons as disseminated euhedral crystals up to 5mm in size. The units above closely resemble host rocks at the stratabound STANDARD Cu-Zn occurrence 16 kilometres to the northwest (Gibson et. al. 1977, Hoy 1979) and for this reason were carefully prospected in 1990. No massive sulfide mineralization was discovered.

East of Camp 2, the metasedimentary section gives way to broad areas of grey and tan weathering impure micaeous quartzite and feldspatic grit with subordinate laminated siliceous phyllite and pale green chlorite phyllite. Near the summit of Tumbledown Mountain limy quartz-muscovite phyllite, dark chlorite schist, greenstone and dolomite are exposed in the core of an antiform. East of the summit, to the eastern edge of CARNES domain, impure quartzite and pale green chlorite phyllite again predominate.

FANG DOMAIN

Metasedimentary strata in FANG DOMAIN can be reliably separated on the basis of color and overall weathering characteristics into two convenient map units: a dark recessive slate/argillaceous limestone sequence and a buff weathering mica schist, limy schist and quartzite sequence. Both map units include discrete pale grey marble marker horizons, 50 to 100 metres thick.

The epizonal Fang Creek Stock of Middle Jurassic age (K-Ar 168 ma; Wheeler, 1965) is elliptical in shape, measuring approximately 7 km. east-west by 4 km. north-south, with convex margins that dip steeply outward, away from the center of the intrusion. Quartz monzonite porphyry, with large (to 3 cm) twinned microcline phenocrysts suspended in a coarse granular matrix of quartz, plagioclase and hornblende is typical of the intrusion. No obvious mineral zoning was noted but a crude foliation, outlined by hornblende is roughly concentric. Three joint sets were observed - the strongest has average attitude 185/30E. Plutonic contacts of the Fang Creek Stock are locally highly discordant with intruded metasedimentary strata. Here, offshoot aplite dikes and sills are
relatively common. Contact metamorphism, especially along the northwestern flanks of the stock produced biotite-andalusite hornfels and garnet-tremolite skarn from pelitic and calcareous country rocks, respectively.

At least four upright isoclinal second phase folds, outlined by marble units, trend eastward along the northern periphery of Fang Creek Stock. These folds can be traced for over 9 kilometers eastward, through Mt. Graham, where they begin to deflect south around the east flanks of the intrusion. A major recumbant synform exposed in the north face of Grey Fang is almost certainly equivalent to one of these folds, with axial surface lifted and flattened by intrusive doming. East of Tumbledown Creek, west trending isoclines of FANG DOMAIN are abruptly truncated by the fault separating FANG and CARNES DOMAINS. Likewise, north of the snout of Dismal Glacier the same folds are overridden and removed at much lower angles by the north dipping basal bounding fault of MOLOCH domain.

**MOLOCH DOMAIN**

Badshot marble, striking northwest with northeast dips creates sheer cliffs more than four thousand feet high in the southwest faces of Mt. Moloch, Mt. Baal and ridges above upper Downie Creek. Here, massive to thick bedded grey, white and dark grey calcitic marble is probably thickened many times by repeated folding (Wheeler, 1963).

**CONCLUSIONS**

Elements of the Paleozoic Lardeau Group, known to host Cu-Zn(Pb) massive sulfide mineralization at the STANDARD occurrence underlie much of the BOW 1 - 14 claim area.

Pyritic metavolcanic units trending north through BOW 11 - 14 near Bridgeland Pass offer the greatest economic potential. Prospecting of alpine exposures along this trend in 1990 failed to disclose any new base metal mineralization.
RECOMMENDATIONS

The Bridgeland Pass metavolcanic section should be prospected and mapped along its north trend through Carnes Massif. Possible lateral fold repetitions of the same rocks existing west of BOW 11 and 12 in upper McKinnon Creek should also be investigated.

Ultimately, the Bridgeland Pass section can be expected to merge northward along strike with equivalent units east of Standard Peak near Belcher Creek and Pass Creek. Recent discovery of chert, anomalous in Zn, Mn, and Fe on the RAIN claims near this area (resembling the exhalative "Garnet Zone" pathfinder horizon at GOLDSTREAM) makes the intervening ground worthy of exploration attention.

Respectfully submitted,

Gordon Gibson, B.Sc
G. GIBSON & ASSOCIATES
References


Statement of Costs

1. Wages (Sep 06 - Sep 29, 1990; see Timesheet)

   Consulting geologist: 13.5 days @ $350 4,725
   2 days @ $250 (travel) 500
   Geologist: 11.5 days @ $190 2,185
   Geologist: 4 days @ $190 760

   Total: $8,190

2. Food and Lodging (Sep 06 - Sep 29, 1990)

   31 man-days @ $40/man-day 1,240

   Total: 1,240

3. Transportation

   Helicopter charters:
   BELL G-47: 2.7 hrs. @ $550/hr. 1,485
   BELL 206B: 4.1 hrs. @ $700/hr. 2,870

   Truck rental:
   FORD 1/2T 4x4: 10 days @ $55/day 550
   CHEV 1/2T 4x4: 1 mo. @ $1,525/mo. 1,525
   Fuel 500

   Total: $6,930

4. Drafting and Report Preparation

   3,500

   Total: $19,840
### Timesheet

**Sep 06 - Oct 04, 1990**

**Consulting Geologist - G. Gibson**

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**Geologist - C. Wild**

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**Total:** 11 1/2 days

**Geologist - W. Zerb**

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**Total:** 4 days
Statement of Qualifications

I, Gordon Gibson, do hereby certify that:

1. I am a geologist with residence at Suite 201-2020 West 2nd Avenue, Vancouver, British Columbia V6J 1J4.

2. I am a graduate of the University of British Columbia with a Bachelor of Science degree in geology (1975).

3. I have practised in the field of mineral exploration since 1975.

4. I am a member of the Canadian Institute of Mining and Metallurgy.

5. I have not received, directly or indirectly, nor do I expect to receive any interest, direct or indirect, in the properties of Bethlehem Resources Corporation or any affiliate thereof, nor do I beneficially own, directly or indirectly, any securities of Bethlehem Resources Corporation or any affiliate thereof.

Respectfully submitted,

Gordon Gibson, B.Sc
G. GIBSON & ASSOCIATES