STOCKWORK MOLYBDENITE IN THE MISSION RIDGE PLUTON: A NEW EXPLORATION TARGET IN THE BRIDGE RIVER MINING CAMP* (92J/16)

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KEYWORDS: Economic geology, Bridge River, Cub claims, Mission Ridge pluton, Rexmount porphyry, mylonite, molybdenum, copper, gold, stockwork, quartz veins.

INTRODUCTION

The Mission Ridge pluton is a northwest-trending body of granodiorite 30 kilometres long that outcrops along Mission Ridge and the southern Shulaps Range approximately 200 kilometres north of Vancouver. The area is within the region mapped during the summer of 1989, the final year of the MDA-funded Taseko–Bridge River project (Schiarizza *et al.*, 1990, this volume). During the course of this work the author and D.A. Archibald of Queen's University discovered considerable exposures of silicic granodiorite containing disseminated molybdenite. The area was mapped in some detail and several dozen rock samples were collected for base and precious metal analysis. This report summarizes the results of the field study and addresses the nature and distribution of metals within the Mission Ridge granodiorite, specifically on the Cub 200 and adjacent mineral claims.

The area of interest (and much of the adjacent property) is covered by mineral claims owned or under option to MacNeill International Industries Inc. (formerly MacNeill Industrial Inc.) of Vancouver. The Spokane prospect (held 50 per cent by MacNeill International Industries Inc., 25 per cent by Enexco International Ltd. and 25 per cent by Julia Resources Corporation), which is approximately 3 kilometres to the west, had been the focus of MacNeill's attention and was being trenched and diamond drilled under the direction of Wright Engineering Ltd. at the time of our discovery. Our findings prompted MacNeill to examine the area of molybdenum mineralization. Surface samples collected by the ministry and by Wright Engineering Ltd. yielded significant gold in addition to molybdenum and copper; at the time of writing this report (late October) a $250000 diamond-drilling program was initiated to test the nature and distribution of the metals on the Cub 200 mineral claim (George Cross News Letter, Issue No. 201, 1989).

GEOLOGY OF THE SOUTHEAST PART OF THE SHULAPS RANGE

GENERAL STATEMENT

The regional geology of the area is described by Schiarizza *et al.* (1990, this volume). The southeast part of the Shulaps Range is dominated by schists and phyllites of the Bridge River complex intruded by syn to post-tectonic granitic to felsic porphyry intrusions. These are structurally overlain by the Shulaps ophiolite complex, and near the Spokane prospect are imbricated with a belt of Shulaps-related serpentinite mélange and penetratively deformed metasedimentary rocks of the Cadwallader Group (Figure 2-7-1).

Granodiorite of the Mission Ridge pluton occupies the central part of the southern Shulaps Range Quartz feldspar porphyry, known as the Rexmount porphyry, is in contact with the northwest part of the Mission Ridge pluton and forms an irregular extension that continues northwest past Rex Peak to the Shulaps ultramafic complex.

MISSION RIDGE PLUTON

The Mission Ridge pluton consists of generally coarse-grained biotite granodiorite to quartz diorite. These rocks are usually massive within the interior of the pluton, although there is rare compositional layering, whereas marginal phases commonly have a slight to pervasive foliation that parallels contacts with country rocks. Pervasively foliated rocks are protomylonites defined by ribboned quartz paralleled by clots of biotite and chlorite and augened plagioclase grains and granodiorite clasts. Late aplite dikes are common and crosscut fabric trends.

Biotite from granodiorite of the Mission Ridge pluton has yielded a K-Ar age of 44 Ma (Woodsworth, 1977). Zircon and monazite have yielded U-Pb ages of 47.5 Ma for the Mission Ridge granodiorite and 46.5 Ma for deformed dikes of similar composition (M. Coleman, personal communication, 1989). The northern end of the pluton crosscuts north-dipping thrust faults that may be related to emplacement of the Shulaps ophiolite complex. Foliation and lineation along the margin of the pluton and within deformed dikes of similar composition are, however, related to the final stages of ductile deformation within the enclosing Bridge River schists, which may be related to Eocene dextral strike-slip faulting (Schiarizza *et al.*, 1990, this volume).

REXMOUNT PORPHYRY

The Rexmount porphyry consists of megascopic phenocrysts in a light grey to greenish aphanitic quartz-feldspar groundmass. Plagioclase, commonly a few millimetres in size, is the most abundant phenocryst and is generally partly altered to sericite and clay minerals. Smaller bipyramidal quartz and chlorite pseudomorphs after biotite and hornblende are present in variable proportions. Flow struc-

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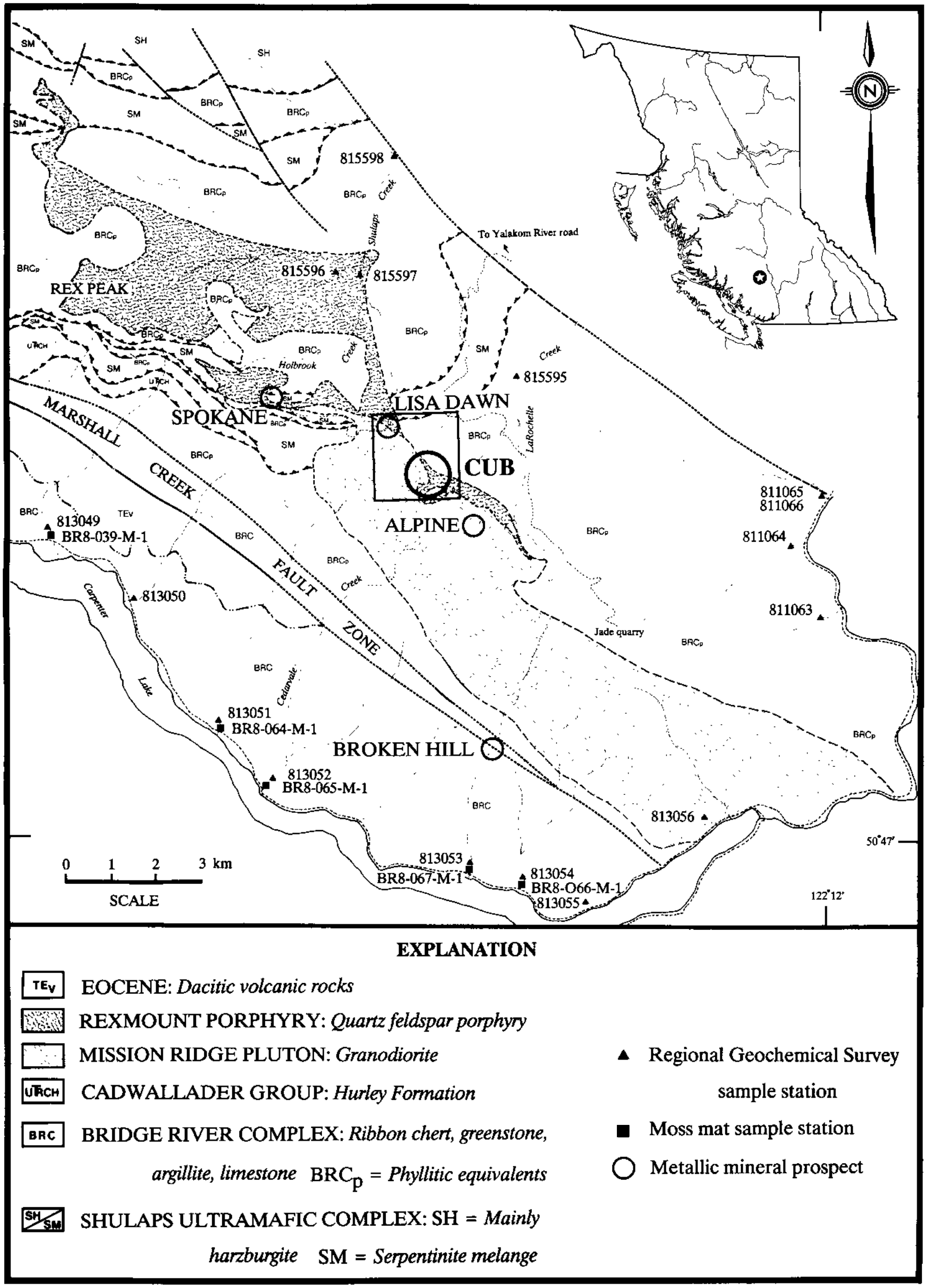

Figure 2-7-1. Geological setting and metallic mineral prospects of the Mission Ridge pluton. Area within square is location of Figure 2-7-2.

ture, defined by the alignment of phenocrysts, and columnar jointing are rare features in marginal phases.

The lower contact of the northwest part of the Rexmount porphyry with underlying phyllites of the Bridge River complex dips gently to the northeast and is exposed along the western slopes of Rex Peak and the prominent unnamed peak to the northwest. The underlying rocks, also cut by porphyry dikes, record no contact metamorphic effects related to the Rexmount porphyry. The northwesternmost lobe of the porphyry partly truncates serpentinite mélange along the southern margin of the Shulaps ultramafic complex.

The Rexmount porphyry is in contact with the Mission Ridge pluton at the headwaters of Holbrook and LaRochelle creeks (Figure 2-7-1). The contact is essentially a complex zone of granodiorite interfingered with and crosscut by abundant Rexmount porphyry dikes; some dikes contain small xenoliths of foliated granodiorite. Breccia, composed almost exclusively of angular fragments of Rexmount porphyry, occurs as irregular to elongate zones at some porphyry-granodiorite contacts.

Attempts to determine the age of the Rexmount porphyry by K-Ar methods have not been successful. Field relationships indicate porphyry emplacement was post-fabric development in granodiorite.

ECONOMIC GEOLOGY

Metallic mineral prospects in the southern Shulaps Range are within or adjacent to the Mission Ridge pluton (Figure 2-7-1) and spatially associated with dikes of Rexmount porphyry. The Cub and Lisa Dawn molybdenite prospects are combinations of veins, stockworks and disseminations within granodiorite adjacent to porphyry dikes. Other previously known prospects include the Spokane, Broken Hill and Alpine (Table 2-7-1).

The Spokane prospect comprises gold, silver and copper-bearing quartz veins within granodiorite and adjacent country rocks. The distribution of gold closely follows that of copper, and is commonly accompanied by anomalous bismuth and tungsten (Table 2-7-1). Host granodiorite is generally foliated and is crosscut by relatively fresh Rex-mount porphyry dikes. Some quartz veins are also crosscut by porphyry; this indicates that vein formation predated the porphyry.

The Broken Hill prospect consists of a zone of polymetallic veinlets and disseminations in silicic sedimentary rocks. The metal concentrations are peripheral to dikes of granodiorite and porphyry, suggesting a possible genetic relationship.

GEOCHEMICAL SURVEYS

The Alpine molybdenite vein-prospect was first noted by Pollock (1983) in a report on a geological and geochemical survey carried out in the Holbrook-LaRochelle creeks area for Utah Mines Ltd. The results of the exploration program were generally discouraging and no areas of anomalous base or precious metals were found.

Stream sediment from the southern Shulaps Range was collected and analyzed as part of the Canada/British Columbia Regional Geochemical Survey of the Pemberton (92J) map area. No notably anomalous metal concentrations were obtained, except for the sample from Cedarvale Creek which yielded 10 ppm molybdenum (sample 813052, Table 2-7-2; Figure 2-7-1). This was verified when moss-mat sediments collected from the same location yielded 11 ppm molybdenum (sample BR8-065-M-1, Table 2-7-3; Church, 1989). Cedarvale Creek drains approximately 20 square kilometres of steep terrain along the southwest side of the Mission Ridge pluton: its northernmost headwaters are less than a kilometre

TABLE 2-7-1
METALLIC MINERAL PROSPECTS WITHIN OR ADJACENT TO THE MISSION RIDGE PLUTON
(SEE FIGURE 2-7-1 FOR LOCATIONS)

Name	Description	Approximate Dimensions Length (m)	Width (m)	Comments/References
Cub	mo as fine disseminations in brecciated and silicic gd and as flakes within and adjacent to qtz veins (± py) in variably silicic gd; vein qtz (as talus blocks up to 1.5 m thick) contains mo as stylolites and irregular concentrations, and cpy as blebs and veinlets	650	120	Dimensions indicate area where mo was observed on surface; anomalous Cu and Au (with Bi and Pb)
Lisa Dawn	mo as stylolites within qtz vein at contact between gd and qfp; mo as disseminated flakes in adjacent gd	30	1.5	Dimensions of exposed vein; extent of disseminated mo not known
Alpine	mo within qtz vein in extremely fractured, limonitic gd; gd contains cpy, mal and az	50	2.5	Pollock, 1983; weakly anomalous Au and Ag
Spokane	cpy, mal, az, po and py in massive to partly ribboned, vuggy qtz (? c/c) vein; wallrocks are gd and qfp: gd adjacent to vein is foliated, whereas qfp appears to be fresh	700	2	Appreciable Au, Ag, Cu, Bi and W content MINFILE 092JNE034
Broken Hill	py, gln, sp, cpy and mal occur as disseminations and narrow lenses and veinlets within silicic Bridge River complex sedimentary rocks adjacent to dikes of gd and qfp	500	18	Appreciable Ag, Au, Cu, Pb and Zn content MINFILE 092JNE087

Abbreviations: az = azurite, clc = calcite, cpy = chalcopyrite, gln = galena, mal = malachite, mo = molybdenite, po = pyrrhotite, py = pyrite, qtz = quartz, sp = sphalerite; gd = granodiorite, qfp = quartz feldspar porphyry.

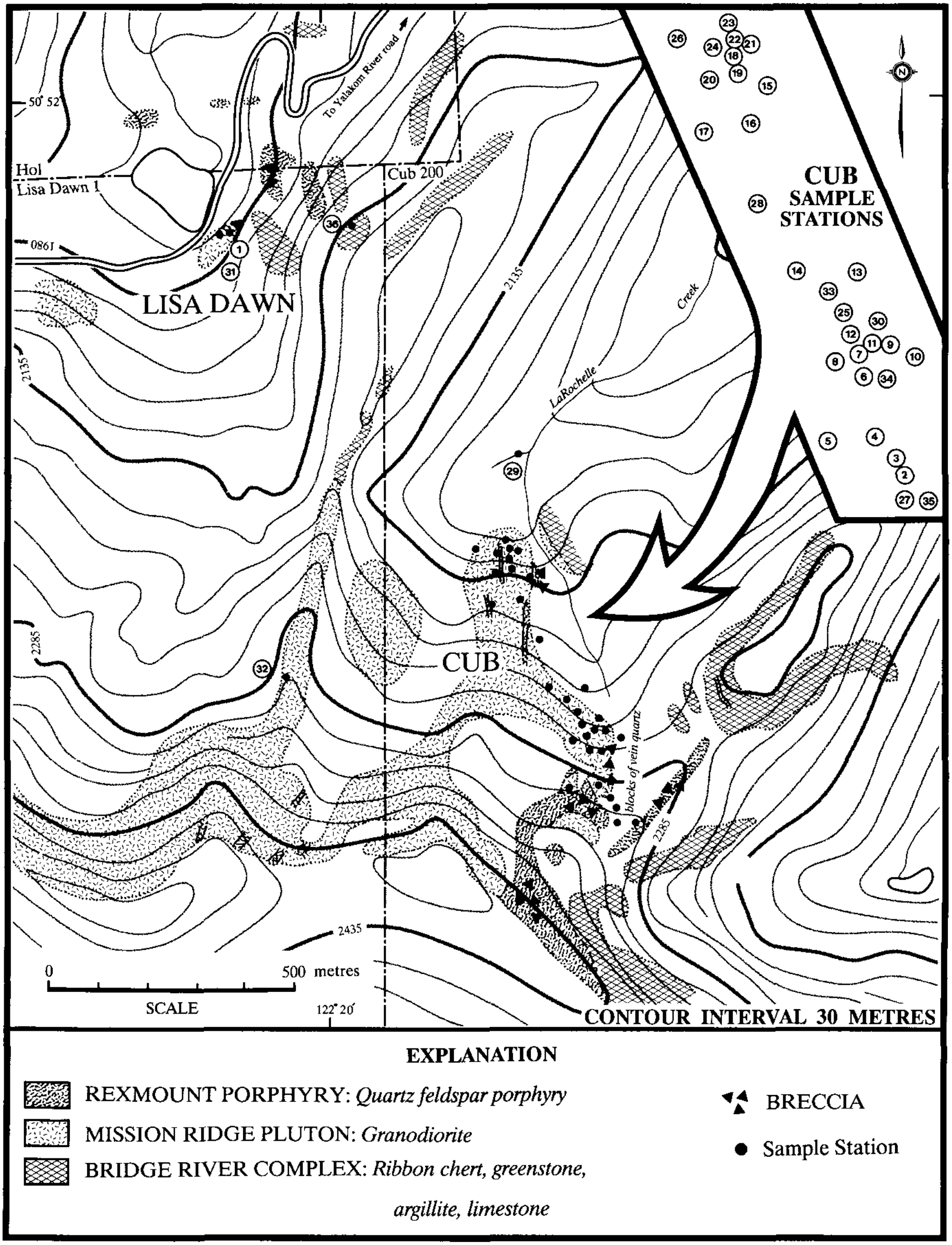

Figure 2-7-2. Geology in the area of the Cub and Lisa Dawn molybdenum prospects. Location is shown on Figure 2-7-2.

TABLE 2-7-2
STREAM SEDIMENT (RGS) GEOCHEMICAL ANALYSES
(SEE FIGURE 2-7-1 FOR SAMPLE LOCATIONS)

Sample Number	Zn	Cu	Pb	Ni	Co	Ag	Mo	W	As	Sb	Hg (ppb)
811063	95	56	–	150	17	0.4	3	1	19.5	0.2	30
811064	115	105	1	160	32	0.4	2	1	18.0	0.6	20
811065	120	90	3	90	27	0.2	3	1	14.5	0.6	20
811066	120	92	2	90	26	0.2	4	1	16.0	0.8	20
813049	86	54	3	73	17	0.2	2	1	15.0	1.8	30
813050	86	36	1	39	15	0.1	2	1	7.5	0.8	140
813051	115	82	5	101	20	0.2	4	1	11.5	1.2	260
813052	165	150	12	75	21	0.1	10	1	16.0	2.2	610
813053	92	82	6	70	32	0.1	2	1	10.0	1.2	120
813054	120	86	1	72	43	0.1	3	1	5.0	0.4	100
813055	50	38	1	17	9	0.1	1	1	7.0	0.4	100
813056	75	39	3	50	13	0.1	1	1	14.5	0.4	40
815595	105	50	7	330	30	0.3	3	1	19.5	1.8	50
815596	92	45	6	650	49	0.4	2	1	9.5	1.0	160
815597	97	56	1	340	30	0.4	3	2	35.5	1.0	50
815598	90	53	1	340	28	0.4	2	1	13.5	1.2	30

Data source: Regional Geochemical Survey, BC RGS-9, 1981 (GSC Open File 867).

All results recorded in ppm, except Hg in ppb.

All analyses performed by Chemex Labs Ltd., North Vancouver.

Analytical techniques: W by colorimetric determination, Hg by flameless cold vapour atomic absorption spectroscopy; all other elements by atomic absorption spectroscopy.

south of the Cub, Lisa Dawn and Alpine prospects and may be sampling similar molybdenite concentrations.

THE CUB MOLYBDENITE PROSPECT

The Cub prospect is wholly within the Cub 200 mineral claim at the headwaters of the southwesternmost tributary of LaRochelle Creek (Figures 2-7-1 and 2-7-2). At the ridge crest, the north-facing exposures of the Mission Ridge pluton, Rexmount porphyry and Bridge River complex are steep and craggy. Outcrop that extends down into the cirque is mostly granodiorite with smooth but steep surfaces over much of its exposure; a steep cliff along its eastern margin and water from runoff and melting icefields at higher elevations make access to much of the exposure hazardous. The lowermost outcrops are at treeline, and are now accessible by a road recently extended into the valley by MacNeill International Industries Inc. (Figure 2-7-1).

GEOLOGICAL SETTING

In the area of the Cub molybdenum prospect, Mission Ridge granodiorite is in contact with metamorphic rocks of the Bridge River complex, and is intruded by Rexmount porphyry (Figures 2-7-1, 2-7-2). All molybdenite seen in surface exposures is within granodiorite that is foliated to mylonitic and variably silicic. The granodiorite contains abundant quartz as stockwork veinlets to veins a few centimetres thick; the quartz veins are unevenly distributed and appear to be of several generations. Most outcrop surfaces are stained with manganese oxide.

Rexmount porphyry occurs as a large mass at higher elevations and as several dikes or apophyses, some of which clearly intrude the granodiorite. The porphyry is mostly feldspar and quartz-phyric, with minor hornblende altered to chlorite. It outcrops on the east side of the main zone of molybdenite mineralization at high elevations, but its contact with the granodiorite is largely obscured by talus of porphyry and Bridge River phyllite. The contact is marked by a ravine and a series of ribboned vein-quartz blocks up to 2 metres in size. The source of these blocks is not exposed but is thought to be close to the porphyry-granodiorite contact beneath talus.

An irregular and discontinuous zone of breccia fringes part of the granodiorite in contact with Rexmount porphyry. The breccia is largely composed of angular fragments of feldspar-phyric Rexmount porphyry, with lesser silicic granodiorite, quartz, and rare fragments of Bridge River complex rocks. It is generally adjacent to extremely silicic, brecciated and vuggy granodiorite (in part mylonitic). Vugs in granodiorite are lined with drusy quartz and chalcedony, and rarely by quartz pseudomorphous after calcite.

METAL DISTRIBUTION

The exposures of granodiorite in which molybdenite was observed occupy an area of at least 650 by 120 metres and span an elevation difference of at least 250 metres. The locations from which samples were obtained for analysis reflect the inaccessibility of the area between the 2150 to 2225-metre elevations (Figure 2-7-2).

At elevations between 2225 and 2315 metres, molybdenite, pyrite and possibly other sulphides are finely disseminated in extremely silicic, brecciated and partly vuggy grano-

TABLE 2-7-3
MOSS-MAT GEOCHEMICAL ANALYSES
(SEE FIGURE 2-7-1 FOR SAMPLE LOCATIONS)

Sample Number	Zn	Cu	Pb	Ni	Co	Ag	Mo	W	As	Sb	Cr	Au (ppb)	Pt (ppb)
BR8-039-M-1	132	83	9	106	21	0.3	2	1	34	2	104	592	1
BR8-064-M-1	161	101	15	97	20	0.2	5	1	16	2	72	5	1
BR8-065-M-1	169	130	15	65	20	0.3	11	1	17	2	29	6	1
BR8-066-M-1	119	82	7	69	29	0.1	1	1	6	2	83	1	1
BR8-067-M-1	105	98	3	72	29	0.2	1	1	11	2	91	1	1

All samples collected and submitted for analysis by B.N. Church, 1988.

All results recorded in ppm, except Au and Pt in ppb.

All analyses performed by Chemex Labs Ltd., North Vancouver. Analytical techniques: Hg by flameless cold vapour atomic absorption spectroscopy, Au and Pt by fire assay and mass spectroscopy; all other elements by inductively coupled plasma – atomic emission spectroscopy.

diorite. In some areas silicification and granulation are so intense that the character of the granodiorite is obliterated and the rocks are banded blue-grey silicic microbreccia or mylonite. The molybdenum content of these rocks is generally less than 400 ppm (Table 2-7-4), with less than 120 ppm copper and negligible gold.

Within less silicic foliated protomylonitic granodiorite, discordant vein and stockwork quartz contains up to a few per cent visible molybdenite and pyrite, but analyses generally indicate only up to 140 ppm molybdenum with negligible copper and gold. One outstanding exception to this is sample 33 (Table 1-7-4) which contains 0.50 per cent copper, 2120 ppb gold and anomalous bismuth and lead.

Large blocks of vein quartz (along the ravine at the Rexmount porphyry-granodiorite contact) are found up to an elevation of 2225 metres. The vein quartz is ribboned with molybdenite stylolites and veinlets and blebs of chalcopyrite. Samples of these blocks returned analyses as high as 0.55 per cent molybdenum, 1.36 per cent copper, 1.66 grams per tonne gold, in excess of 50 grams per tonne silver and, in some cases, anomalous bismuth, lead and zinc. In general, the distribution of gold closely follows that of copper, but not molybdenum (Table 1-7-4).

At elevations between 2070 and 2150 metres, molybdenite occurs as disseminated flakes and clots a few millimetres in size within and adjacent to irregular pyritic quartz stockwork

TABLE 2-7-4
TRACE METAL CONTENTS OF SAMPLES COLLECTED FROM THE CUB MOLYBDENUM PROSPECT AND ADJACENT AREAS
(SEE FIGURE 2-7-2 FOR SAMPLE LOCATIONS)

Sample Number	Field Station	Au	Ag	As	Bi	Cu	Fe	Mo	Pb	Zn	Sample Description
1	89BGA-34-6	120	2.5	14	—	17	0.73	2270	40	12	Quartz vein (Lisa Dawn prospect); mo, fmo
2	89BGA-35-10a	75	1.0	120	—	261	0.73	537	35	58	Quartz vein (talus); mo, fmo, cpy, mal, az
3	89BGA-35-10b	870	10.0	130	—	3610	1.50	1260	90	174	Quartz vein (talus); mo, fmo, cpy, mal, az
4	89BGA-35-10c	15	0.5	11	—	117	0.63	69	10	14	Bleached, silicic gd; py, hem
5	89BGA-36-2	<5	<0.5	5	—	37	0.49	17	15	12	Stylolitic quartz in gd; py
6	89BGA-36-4-1	<5	<0.5	4	—	11	0.41	12	10	4	Quartz stockwork in silicic gd; py, mo
7	89BGA-36-4-2	<5	1.0	3	—	23	0.45	137	165	10	Quartz stockwork in silicic gd; mo, py
8	89BGA-36-4-3	<5	<0.5	3	—	14	0.40	8	15	4	Silicic gd; mo, py
9	89BGA-36-5	<5	<0.5	3	—	14	0.53	394	40	14	Silicic gd; mo, py
10	89BGA-36-6	45	2.5	5	—	1070	0.58	5490	5	34	Quartz vein (talus); mo, fmo, cpy, mal, az
11	89BGA-37-1b	15	<0.5	7	—	13	0.71	54	10	12	Silicic gd – qfp contact; py
12	89BGA-37-2	<5	<0.5	3	—	21	0.66	107	5	8	Silicic gd, vuggy; mo
13	89BGA-37-3	<5	<0.5	4	—	27	0.75	50	5	4	Quartz stockwork in silicic gd; mo, py
14	89BGA-37-4	<5	<0.5	4	—	14	0.57	26	15	22	Quartz veins in gd
15	89BGA-37-7	<5	0.5	53	—	25	0.78	15	5	6	Quartz stockwork in silicic gd; py, mo
16	89BGA-37-8	60	3.0	39	—	514	2.32	866	155	48	Quartz veins in gd; mo, py
17	89BGA-37-9	<5	<0.5	15	—	25	0.71	26	20	8	Quartz stockwork in silicic gd; py, mo
18	89BGA-37-10	65	2.0	65	—	174	2.93	1310	5	12	Quartz stockwork in silicic gd; mo, py
19	89BGA-37-11	10	0.5	10	—	78	0.99	873	5	6	Quartz veins in silicic gd; mo
20	89BGA-37-12	15	1.0	7	—	68	0.74	1250	35	16	Quartz veins in silicic gd; mo, py
21	89BGA-38-1	10	1.0	14	—	64	0.88	558	5	6	Quartz veins in silicic gd; mo, py
22	89BGA-38-2	5	1.5	7	—	46	0.60	1620	5	6	Quartz veins in silicic gd; mo, py
23	89BGA-38-3	<5	1.0	6	—	42	0.72	462	5	2	Quartz veins in silicic gd; mo, py
24	89BGA-38-4	10	1.5	20	—	60	0.95	441	10	6	Quartz veins in silicic gd; mo
25	89BGA-38-5	<5	1.0	5	—	27	0.45	34	<5	8	Brecciated silicic gd, chalcedony; py
26	89BGA-38-6	55	1.5	38	—	42	1.19	1310	10	4	Quartz veins in silicic gd; mo, py (talus)
27	DAR-89-004	50	1.5	31	<3	821	0.60	0.46%	32	16	Quartz vein (talus); mo, cpy, py
28	DAR-89-006	20	1.9	<3	<3	26	0.44	0.14%	30	3	Quartz veins in silicic gd (talus); mo, py
29	DAR-89-008	<5	0.2	23	<3	32	2.07	31	26	57	Silt sample from LaRochelle Creek
30	DAR-89-015	1660	>50.0	8	144	0.96%	2.17	3	1236	51	Quartz vein (talus); cpy, py
31	DAR-89-020	150	0.1	47	3	366	1.12	876	20	5	Slightly silicic gd; mo, py
32	DAR-89-028	150	2.3	69	<3	517	1.93	162	26	27	Quartz vein in gd; py
33	DL-89-6	2120	0.1	<3	72	0.50%	1.14	3	769	22	Quartz stockwork in silicic gd; mo, cpy
34	08651	340	45.5	486	65	1.36%	2.78	158	635	483	Quartz vein (talus); cpy, mal, az
35	83-RKT-756	200	0.6	3	—	870	—	18	1	56	Chert-argillite (Bridge River Complex); py
36	T300	30	—	14	—	>1%	—	—	—	—	Argillite-greenstone (BRC); py, cpy, mal

Samples 1 to 26 collected by Geological Survey Branch staff; approximately 1 kg samples taken in-situ unless otherwise noted.
Samples 27 to 34 collected and submitted for analysis by Min-Ex Resource Consultants.
Samples 35 and 36 collected and submitted for analysis by Utah Mines Ltd. (Pollock, 1983).
All results recorded in ppm unless otherwise noted; Au in ppb.
All analyses, except for 27 to 34, performed by Chemex Labs Ltd., North Vancouver. Analytical techniques: Au by fire assay and atomic absorption spectroscopy finish; as by atomic absorption spectroscopy; all other elements by inductively coupled plasma – atomic emission spectroscopy.
Analyses 27 to 34 performed by Vangeochem Lab Ltd., Vancouver. Analytical techniques: Au by fire assay and atomic absorption spectroscopy finish, and all other elements by inductively coupled plasma spectroscopy.
Abbreviations: apy = arsenopyrite, az = azurite, cpy = chalcopyrite, fmo = ferromolybdite, hem = hematite, mal = malachite, mo = molybdenite, py = pyrite; gd = granodiorite, qfp = quartz feldspar porphyry.

and discontinuous quartz veins. Rare chalcopyrite accompanies pyrite concentrations in quartz veins. The host granodiorite is slightly silicic and has a well-defined protomylonitic fabric paralleled by conspicuous clots of chlorite and secondary(?) biotite. The molybdenum content of these rocks is generally between 0.05 and 0.16 per cent (Table 2-7-4) but ranges up to 0.32 per cent (J. Perry, personal communication, 1989). Anomalous copper is rare and correlates with slightly anomalous gold and silver.

Synthesis

The Cub prospect is hosted by protomylonitic to mylonitic Mission Ridge granodiorite adjacent to Rexmount porphyry. Host granodiorite is extremely silicic at higher elevations and contains only geochemically anomalous metal contents; these rocks display textures characteristic of the upper part of a hydrothermal system. At lower elevations, quartz is present mainly as stockwork veins with associated molybdenum mineralization. Overall, there is a rough zonation from a high-level silicic cap with generally low but sporadic metal content to a deeper level of stockwork quartz-molybdenite-pyrite mineralization.

Vein quartz occurring as blocks in the granodiorite-porphyry contact zone contains the largest molybdenum, gold and copper contents. The zone of breccias at the granodiorite-porphyry contact records a complex history of repeated fracturing. The breccias appear to be essentially tectonic, but irregular pipe-like forms suggest hydrothermal events may have played a role in their development. The position of ribboned quartz veins at the contact between granodiorite and porphyry (as at the Cub and Lisa Dawn prospects) suggests that their origin may be related to episodic tectonism and hydrothermal activity along the contact zone.

Regional Metallogenic Implications

Metal prospects within the Mission Ridge pluton are conspicuously aligned along the contact with the Rexmount porphyry (Figure 2-7-1). However, the participation of porphyry in the mineralizing events is not understood. Porphyry at the Cub prospect is unmineralized, and its fresh appearance suggests postmineralization emplacement. Similarly, the porphyry at the Spokane prospect seems late.

The similar metal assemblages in the Spokane veins, the ribboned quartz vein at the Lisa Dawn prospect, the vein quartz blocks on the Cub prospect and the Alpine vein provide an important link across the area; the Spokane veins, however, are copper-rich with little(?) or no molybdenum. If the veins at the Cub prospect are an intregal part of the Cub stockwork molybdenite system, and the vein at the Lisa Dawn prospect is related to disseminated molybdenite in adjacent granodiorite, then the area between the Spokane and Alpine prospects is prime exploration ground for additional stockwork molybdenite.

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Doug Archibald of Queen's University assisted in the collection of data and shared in the thrill of discovering the Cub prospect (alias "the Stubby"). Rob Macdonald of Memorial University of Newfoundland whole-heartedly helped with the task of geochemical sampling. Field trips and discussions with P. Schiarizza, D.G. MacIntyre, W.J. McMillan, R.E. Meyers and W.R. Smyth of this ministry and D. Lucas and J. Perry of Min-Ex Resource Consultants were informative and helped focus attention on specific geological problems. The generous hospitality of the MacNeill International Industries Inc. field camp and F. Hilton in Vancouver is much appreciated. Constructive discussions and geochemical data from J. Perry greatly added to the content of this paper.

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