Latitude- 48 29.5 N to 48 35.0 N
Longitude- 123 48.0 W to 124 01.5 W
NTS- 92 B/12 W

GEOLOGICAL SUMMARY
of the
RB 1-21 CLAIMS, ANDALUSITE PROJECT

for

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May 21, 1997

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1.0 INTRODUCTION

This report was prepared at the request of Mr. Robert Beau Pre and consists of a compilation of geological fieldwork and petrographic analysis carried out between April 12-25, 1997 within the RB 1-21claim group. The purpose of this report is to summarize geological data in order to evaluate the economic mineral potential (including industrial minerals) of the RB 1-21claims.

2.0 LOCATION, ACCESS & PHYSIOGRAPHY

The property is located 42 km. WNW of Victoria, and 19 km. N of Sooke on SW Vancouver Island (Fig.1 & 2). A network of logging roads (most of which require 4WD) access about 50% of the claims. The main logging road access has weekday travel restrictions during the period 07:00 to 17:00 hours. Other access problems include heavy rain washouts, fire closures and snow at higher elevations. Relatively mild coastal climate allows year round fieldwork to be carried out.

The property is part of the Insular Mountains which formed as a result of crustal thickening and subsequent mature dissection of a Tertiary erosion surface of relatively low relief, now expressed as fault controlled valleys and fault-line scarps forming monadnock-like plateaus (Grove,E.W.,1990). Quaternary ice advances from the north and west has deposited a 1-5 meter depth of till throughout the region.

3.0 PROPERTY STATUS

A list of claims which comprise the RB 1-21claim group is listed as follows:

CLAIM NAME	# OF UNITS	RECORD #	RECORD DATE	EXPIRY DATE *
RB 1	1	336403	June 3, 96	June 3, 98
RB 2	1	336404	June 3, 96	June 3, 98
RB 3	1	336405	June 3, 96	June 3, 98
RB 4	1	336406	June 3, 96	June 3, 98
RB 5	1	336407	June 3, 96	June 3, 98
RB 6	1	336408	June 3, 96	June 3, 98
RB 7	1	336409	June 3, 96	June 3, 98
RB 8	1	336410	June 3, 96	June 3, 98
RB 9	1	336411	June 3, 96	June 3, 98
RB 10	1	336412	June 3, 96	June 3, 98
RB 11	1	336413	June 3, 96	June 3, 98
RB 12	1	336414	June 3, 96	June 3, 98
RB 13	1	336415	June 4, 96	June 4, 98
RB 14	1	336416	June 4, 96	June 4, 98
RB 15	1	336417	June 4, 96	June 4, 98
RB 16	1	336418	June 4, 96	June 4, 98
RB 17	1	336419	June 4, 96	June 4, 98
RB 18	1	336420	June 4, 96	June 4, 98
RB 19	1	33642. 1	June 4, 96	June 4, 98
RB 20	1	33642 2	June 4, 96	June 4, 98
RB 21	1	33642. 3	June 4, 96	June 4, 98

- Expiry dates of June 3,4, 1998 includes one years assessment work as described within this report.

4.0 AREA HISTORY

Placer gold was discovered in the 1860's in sand and gravel alluvium along the San Juan, Leech, Jordan, Sombrio and Loss Creek drainage basins. Leech River was hydraulic mined intermittently until 1941. Nuggets up to 1 ounce and a total production of 10,000-20,000 ounces were sluiced from gravel/bedrock contacts along riverside bars.

Base and precious metal lode deposits in Southern Vancouver Island consist of massive sulphides, skarns, quartz veins and shears. Cu-Pb-Zn-Ag-Au massive sulphides occur near Mt. Sicker. Past producers in tis area include Lenora, Tyee, Richard III, and Lara (which has published reserves of 529,000 tonnes grading 1.11% Cu, 1.22% Pb, 5.87% Zn, 4.73 g/t Au and 100.1 g/t Ag). Magnetite-chalcopyrite skarns in the Cowichan Lake area have produced in excess of 15 million pounds of copper and 75,000 ounces of silver. Shear zone copper deposits occur near the mouth of the Jordan R. where then Sunloch-Gabbro property is located. Past production includes several million pounds of Cu as well as minor silver and gold. The adjacent prospect known as the Sunro shear contains probable reserves of 1.47 million tonnes @ 1.43% Cu.

Gold bearing quartz and/or sulphide zones have been the focus of attention on Valentine Mountain, located immediately east of the RB claims. A summary of previous work is outlined as follows:

1) Gold bearing quartz is hosted in mixed schist/gneiss (i.e. metapelites/metasandstones). Amphibolite units are key stratigraphic horizons and outline major structures, and host gold bearing quartz in the area of the "Discovery Zone"(3 km. west of RB claims). A weakly altered, E-W trending, steeply dipping, laterally continuous, 50-200 m. thick amphibolite unit is in close proximity (about 5-50 m.) to the main series of gold-quartz veins. A total of 3 gold-quartz veins were defined by drill intercepts as follows:

"C" vein zone: Located parallel and 10-15 m. south of the "36" (aka "B" vein), the "C" vein consists of white to grey quartz, trace amounts of pyrrhotite, marcasite and native gold hosted in mixed gneiss and schist. DDH 82-6 intersected the "C" vein at 36.0-36.5 m. depth and returned 7.550 opt Au across 0.5 m. Several other holes drilled nearby (i.e. 82-3,7,7A,5,5A,6A) intersected the "C" vein with assay values up to 0.174 opt Au across 0.3 m.

"D" vein zone: Parallel and 50 m. north of the "C" vein is the "D" vein, which is localized along a fault zone along an amphibolite/gneiss contact. This vein was intersected by DDH 82-6A, 6, 5, & 21 with values up to 0.063 opt Au across 1.3 m., which was recorded in the drill hole furthest west, and appears that the vein improves westward along strike.

"A" vein zone: The depth continuity of the "A" vein was tested by DDH 82-15. At 150.4-151.3 m. (0.9 m. wide) and at 154.6-155.1 m. (0.5 m. wide), two veins were intersected that returned 0.042 and 0.098 opt Au respectively.

2) The "36" gold-quartz vein trench gave the following values:

DISTANCE	LOCATION	WIDTH	OPT Ag	OPT Au
2 m.	footwall	.46 m.	.07	.41
2 m.	vein	.17 m.	3.85	34.950
2 m.	hangingwall	.61 m.	.16	.852
10 m.	footwall	.36 m.	.56	.005
10 m.	vein	.03 m.	2.27	33.200
10 m.	hangingwall	.37 m.	.79	3.845
20 m.	footwall	.46 m.	.10	.142
20 m.	vein	.03 m.	.03	.003
20 m.	hangingwall	.50 m.	.02	.090
30 m.	footwall	.48 m.	.01	.010
30 m.	vein	.13 m.	.12	.328
30 m.	hangingwall	.37 m.	.10	.003

3) Only 1 out of 13 drill holes (DDH #82-6) gave results (7.550 opt Au over 1.6 ft. or 0.5 m.) which compared to the multi-ounce assays returned from the high grade section of the "36" vein trench.

4) The main reason for erratic results appears to be structural, i.e. free gold occurs in scattered pockets in the quartz veins, and in fractures and on shear planes in the adjacent wall rocks (Grove, 1984).

5) A bulk sample was shipped to Trail, B.C. (1983) giving the following results:

ANALYZED FOR:	SAMPLE # 1 (223 lbs.) FINES from 5 tons sluiced	SAMPLE # 2 (296 lbs.) GOLD-QUARTZ grab vein & wall rock
GOLD	4.82 OPT	18.44 OPT
SILVER	0.60 OPT	1.25 OPT
SILICA	66.9%	89.4%

6) Gold bearing quartz mineralogy includes crystalline arsenopyrite, marcasite, rare chalcopyrite, sphalerite, galena and ilmenite.
7) Alteration within the 50-200 m. thick amphibolite unit adjacent to the "Discovery Zone" consists of: extensive quartz, calcite and gypsum veining, spotty to vein-like K-spar zoning, tourmalinization, epidotization, biotitization of hornblende, and magnetite development (Grove, 1984).
8) Spatial relation of gold-quartz and extensive alteration suggest that the amphibolite unit is significant in the localization of gold ore.
9) Drill results reflect structure and give a "hit and miss" account of gold grades due to its scattered distribution as streaks, pockets and fracture infillings.

The 1985 Falconbridge mapping and trenching program identified the following geological features present in the "Discovery Zone":

1) The "36" and "A" vein gold-quartz systems trend at azimuth 068 degrees, dipping 70 degrees south.
2) There are numerous 090 trending, steep S dipping dextral strike-slip faults, offset by later dextral and sinstral strike slip micro-faults (several cm. displacement). Gold-quartz veins appear to have emplaced in between the macro and micro faulting events.
3) Gold grades of the main quartz vein and adjacent wall rock increase where there are zones of increased cross and/or diagonal faulting and fracturing
4) Calculation of weighted averages of vein and wall rock from the "A" trench returned a value of 0.094 opt Au over 1.38 m. along a strike length of 11.0 m.
5) Arithmetic averages of quartz vein from the "A" trench gave 0.959 opt Au and wall rock assays averaged 0.028 opt Au.
6) Biotite gneiss (metasandstone) is the dominant host lithology for gold-quartz veins in the "Discovery Zone". Carbonaceous andalusite-staurolite-garnet-biotite schist (metapelite) forms about 15% of the host lithology for the gold-quartz veins and occurs as narrow, .1-5.0 m. wide, E-W trending bands within the more massive biotite gneiss.
7) Samples identified as carrying visible gold returned assays of 0.001-0.013 opt Au. These samples included severe dilution from non-mineralized wall rock which would partially explain the low values. The other explanation is that the assay lab did not effectively metallic screen the entire sample to recover the observed native gold.

Bondar-Clegg treated a 42.1 kg. (92.8 lbs.) sample from the trench and obtained 8.74 grams Au and 0.46 grams Ag. The grade of this sample is 13.362 opt Au and 0.70 opt Ag.

In 1987-88, Valentine Gold established a bulk sample pilot mill and cored 43 diamond drill holes, with the following significant results:

"C" Vein zone:
Depth extension of the "C" vein (located 10-15 m. south of and parallel to the "36" vein), defined by a total of 10 drill intercepts are projected on longitudinal section by Gord Allen (Appendix C) outlined an ore reserve calculation of 33,795 tons of 0.429 opt Au (based on a 1.2 m. width) from the "C" vein. The "C" vein is located parallel to and 25-35 m. south of a 100 m. thick, steep south dipping altered amphibolite unit.

"D" vein zone:
The "D" vein is located along the south contact of the altered amphibolite unit. This vein has an inferred strike length of over 500 meters, but no ore reserves have been calculated due to grades which average less than 0.100 opt Au across 1.0 m. in the drill intercepts. The main feature of the "D" vein is a) amphibolite contact and b) fault-bound affinity. The "D" vein fault has led to poor recovery and consequent loss of fines as core drills cut this zone.

"E" vein zone:
The "E" vein was discovered by drilling towards a well defined Au soil anomaly 100 m. north of the "C" vein and 70 m. north of the "D" vein. The "E" vein is hosted by altered amphibolite, and is in close proximity to the gneiss/schist contact (10-40 m. to the north) and to a 2 m. wide, cross-cutting, (unit 5) quartz diorite dyke. DDH 87-14 recorded 0.226 opt Au across a 0.3 m. wide fault zone (@ 49.1-49.4 m.) and 0.033 opt Au across 1.0 m. (@ 78.0-79.0 m.), suggesting the presence of two parallel vein zones.

"A" vein zone:
The "A" vein was intercepted by DDH 87-3 returning 0.046 opt Au across 0.6 m. in a fault zone (@28.5-29.1 m.). The "A" vein is located 20 m. south of the altered amphibolite contact, thus there is some speculation that it is the continuation of the "D" vein because if we follow the zone west to 87-4,5 (0.136 opt Au over 1.0 m. and 0.031 opt Au across 0.9 m. respectively), these intercepts align with a fault zone adjacent to the altered amphibolite, characteristic of the "D" vein.

The results from drilling in the "Discovery Zone" resulted in an ore reserve calculation on the "C" vein zone:

CELL #	HOLE #	AREA m2	TONNAGE @1.2 m.	opt Au 1.2 m.wide	Ozs. Au
1	87-11	1054	3630	1.580	5735
2	88-16	996	3430	0.087	298
3	88-18	1550	5338	0.001	5
4	88-17	1454	5008	0.041	205
5	82-3	748	2576	0.019	49
6	82-6A	530	1825	0.149	272
7	82-6	530	1825	3.080	7393
8	87-22	980	3375	0.033	111
9	88-14	1185	4081	0.031	127
10	88-15	619	2132	0.145	309
		Total tonnage=	33,795	Total ounces Au=	14,504
		Calculated grade=	0.429 opt Au	(see Appendix C)	

In 1988, Vancouver Petrographics Ltd. (Dr.John Payne, Dr Jeff Harris, & Wendy Sisson) prepared detailed reports on core and trench samples taken from gold bearing quartz/sulphide zones located 2.5 km. east-southeast of Valentine Mountain. A summary of their work is listed below:

1) The main rock types which host ore in the vicinity of the "Discovery Zone" trenches are a) metasandstone, b) metasiltstone, c) metamudstone. Less abundant host rocks include garnet-bearing schist and a mafic volcanic rock altered to chlorite-carbonate-epidote-actinolite. Several 1-3 m. wide granodiorite/quartz diorite dykes/sills cut the above sequence.
2) Regional deformation resulted in a series of SE trending folds with steeply dipping axial planes and moderately ESE plunging fold axes. Strongly folded, finely banded argillitic schist is crosscut at a high angle by quartz veins up to 10 cm. across. These veins are folded moderately to tightly about axes which may be coaxial to those which had already deformed the schist host rock. This suggests that two pulses of deformation occurred in the same stress field, and were separated by a tensional event during which quartz veins were introduced.
3) Rocks from the "Braiteach Zone" are less deformed, and contain less interbedded argillaceous siltstone/mudstone than the "Discovery Zone".

4) Early quartz veins are distended and smeared out, being locally obliterated in part. Less deformed quartz veins may represent later veins which represent tensional dilation that crosscuts the regional trend of foliation at a small angle.
5) The "Discovery Zone" gold bearing veins contain quartz which has deformed and partly recrystallized to much finer aggregates, with inclusions of quartz with abundant fine grained pyrite and/or pyrrhotite along grain boundaries. Native gold occurs in later, discontinuous veinlets and replacement patches, whose emplacement is moderately controlled by grain borders of deformed quartz. Locally, native gold (and pyrrhotite) occurs in tiny tiny inclusions in coarse grained arsenopyrite.
6) Paragenetic assemblages suggest that during metamorphism, native gold and arsenopyrite were concentrated into shears zones (preferentially in fold closures), and in part into quartz veins formed during early stages of deformation. The presence of K-spar envelopes and euhedral tourmaline suggests a component of hydrothermal contribution to Au-As bearing mineralization. At a later stage, further quartz veins formed, and gold migrated into some of these, possibly near the end of the deformational event.

Noranda Exploration Ltd. (1989), performed a limited amount of work on the area of the RB 1-21 claims as part of a geological, geochemical , geophysical and diamond drilling program that covered an area 3-5 km. east and west of Valentine Mountain. A summary of Noranda's work is given as follows:

1) Unit 2 gneiss (metasandstone) is divided into 2 sub-units: 2a) meta-greywacke has a better developed schistosity and higher % of lithic fragments than 2b and is generally darker coloured, 2b) massive metasandstone light to dark grey colour with minor schistosity with 5% disseminated biotite. Unit 2b is very hard to break because it has been partially recrystallized.
2) Unit 1 schist (metapelite) is divided into 5 sub-units: 1a) phyllite, extremely fine grained and fissile, with abundant sericite and minor biotite on cleavage surfaces as a result of retrograde metamorphism related to movement along proximal faults. 1b) biotite schist, medium grey to black colour, quartz and biotite form light and dark bands 1-3 mm wide, garnet and/or andalusite/staurolite porphyroblasts are often observed within the biotite schist. 1c) Biotite-garnet schist, similar to 2b with the addition of 1-10 cm. reddish brown, euhedral garnet crystals. 1d) Biotite-garnet-staurolite schist, similar to 1c with the addition of euhedral staurolite commonly cruxiform. 1e) Biotite-garnet-staurolite-andalusite schist, similar to 1d with addition of 1-8 cm., pink andalusite porphyroblasts.
3) Cataclastic textures observed in unit 1 schist consist of angular quartz fragments that have been deformed and flattened in the direction paralleling schistosity as a result of mechanical forces caused by proximal faults and/or overthrusts.
4) Unit 5 Eocene intrusives consist of quartz diorite which occurs as a 2.8 km. long X 0.1-0.6 km. wide sill feature that widens out in Walker Creek. This quartz diorite has numerous 1-3 m. wide aplite sills with localized 1-3 mm wide orange-red colour, euhedral garnets.
5) Unit 6 pegmatite is leucocratic with calcic feldspar, sericite, quartz and localized tourmaline crystals up to 10 cm. in length. Pegmatite dykes and sills range from 0.1-1.5 m. width and occur in the Walker Creek area.
6) 1-5 cm. wide parasitic "S" and "Z" folds were observed in schist layers and quartz veinlets, which serve as a guide to direction of fold hinges and indicate a major E-W trending, gentle east plunging anticline along the axis of Valentine Mountain Ridge.
7) Quartz veins occur throughout all rock units mapped and vary from 0.05 to 2.0 m. width. They are generally milky white "bull" quartz with occasional subhedral crystals. Limonite is frequently observed, minor fine grained pyrite and lesser pyrrhotite occurs as fracture coatings in quartz. Arsenopyrite crystals were observed in quartz veins and wall rock. There appears to be an association of arsenopyrite and gold bearing quartz veins.
8) Gold bearing zones within the amphibolite are associated with pyrrhotite aggregates (forming 3% of total volume), however not all pyrrhotite zones contain gold mineralization.
9) Quartz veins hosted in schist (metapelite) generally parallel well developed schistosity. In gneiss (metasandstone), quartz veins 0.05-0.1 m. wide cut sandstone beds at angles of 30-45 degrees, and bedding is at low angles to foliation.
10) Variation in quartz veining between various lithologic units reflects the units themselves, i.e. quartz vein material is of metamorphic origin with relatively minor influence of hydrothermal activity. Phyllites

contain the least quartz and metasiltsones contain the most quartz, with amphibolite and metasandstone containing relatively medium amounts of quartz.

11) Gold bearing quartz veins are predominantly hosted by metasandstone. The "B" quartz veins are translucent to transparent and commonly light orange in colour and the "C" vein is generally grey black in colour. Gold mineralization occurs within the vein material as well as the adjacent wall rock.
12) Magnetometer data shows a strong, narrow, 120 trending dipolar (high and low) feature east of L 18100 E. In the area of the "Discovery Zone" this feature appears as a broad mag high over the amphibolite unit (probably caused by increased magnetite and/or pyrrhotite) and an adjacent mag low to the north which may reflect massive metasandstone. West of L 17600 E, a similar, narrow magnetic response has a more subtle character. The pronounced background and source shift hints at a possible fold axis occurring on L 17600 E at stn. 20750 N (also observed by IP data).
13) IP data from the west "Discovery Zone" indicates a chargeability/resistivity high and coincident Au soil geochem anomaly between L 20600 E/20087 N and L 19600 E/ 20137 N. Core drilling this target between L 19800 E and L 19900 E proved to be successful in identifying two gold bearing zones localized along the contact of mixed metapelite/metasandstone and altered amphibolite. DDH 89-24 intersected 2.301 opt Au across 0.3 m. @ 59.1-59.5 m.
14) IP data from "BN" and "Braiteach" zones identified a similar IP chargeability/resistivity high and coincident Au soil geochem anomaly between L 17150 E to L 18000 E located parallel and 50-125 m. north of the baseline.
15) "Braiteach Zone" DDH 89-20 and 89-21 were collared on the west projection of Au intercept 0.136 opt Au across 3.0 m. in DDH 88-12. DDH 89-20 cut 17.8 m. overburden, the following 99.1 m. cored through amphibolite with 5-7% quartz as stringers and veinlets with no significant Au values. Increased quartz, with 3-4% pyrite, pyrrhotite and chalcopyrite occur at 62.8-63.8 m. Fault breccia and gouge with 2-3% pyrite and pyrrhotite was cut at 76.5-77.8 m. An increase in biotite rich layers occurs at 77.8-84.4 m. with up to 4% disseminated pyrite, pyrrhotite and chalcopyrite. DDH 89-21 had 25 m. of overburden, followed by 86.1 m. of amphibolite. An increase in biotite rich layers with 4% disseminated pyrite, pyrrhotite and chalcopyrite occurs at 75.1-82.6 m. Fault gouge and shearing with 2-3% pyrite occurs at 93.5-94.7 m. and 103.3-109.0 m.
16) "Discovery West" DDH 89-22,23,24 were drilled to intersect an IP target of high chargeability and resistivity which coincides with anomalous Au geochem and is interpreted as being the west extension of the "C" and "D" vein systems. DDH 89-22 cut 3 quartz veins, the largest being 20 cm., with mineralization consisting of 10% pyrite and 1% pyrrhotite. The "D" vein system located 4 m. above the metasandstone/amphibolite contact returned 740 ppb Au over 1.5 m. Within the amphibolite at 148.3-149.3 m. there is a 1.0 m. interval with visible gold that returned 0.027 opt Au. DDH 89-23 cut two quartz veins, the largest being 0.35 m. wide with 1-2% pyrite and 1% pyrrhotite which are interpreted as the "C" vein system was intersected at 56.9-58.4 m. returning 0.040 opt Au across 1.5 m. width and the "D" vein at 106.5-108.0 m. assaying 0.028 opt Au across 1.5 m. DDH 89-24 cut 4 quartz veins, the largest being 0.41 m. wide, with 1-2% pyrite and less than 1% pyrrhotite. DDH 89-24 intersected 2.301 opt Au across 0.4 m. @ 59.1-59.5 m. depth. This intersection is situated 2.2 m. above the metasandstone/amphibolite contact and is interpreted as the "D" vein system. At 69.0-70.0 m. depth, DDH 89-24 cut a biotite rich layer with 0.5% euhedral garnet porphyryblasts, 1-2% pyrite and 1% pyrrhotite which returned assay values of 0.087 opt Au across 1.0 m. At a depth of 129 m., DDH 89-24 intersected a 5 m. wide band of 2-3% pyrrhotite blebs (with assay values up to 0.013 opt Au across 0.4 m.), and the projected IP chargeability high correlates with this mineral zone.
17) Detailed mapping of the "BN Zone" shows the gold-bearing quartz vein systems are predominantly hosted by gneiss (metasandstone, unit 2), typically with 10-20% biotite and exhibiting "woodgrain texture". There is some interbedded biotite-garnet-staurolite schist (unit 1) at L 17600 E/20935 N where there are 5-25 m. wide quartz vein swarms along the contacts of unit 1 & 2. At the southern edge of the Au soil anomaly is a massive, chlorite altered amphibolite (unit 3).

18) A total of 41 rock chip samples were taken with the following highlights:

SAMPLE #	Au ppb	As ppm	WIDTH m.
59655	5950	2219	0.03
58559	5530	3	0.05
59662	3960	1730	0.02
59660	3850	573	0.02

19) "Braiteach Zone" trench sampling is summarized as follows: a) Zone #1outcrops in a road cut on J-6 logging road where specks of visible gold were found in limonitic, vuggy quartz hosted in a hydrothermal alteration zone within metasandstone. Out of 5 channel, 3 panel and 1 grab sample, the highest geochemical value returned was 390 ppb Au and 538 ppm As. b) Zone #2 is located 55 m. north of the baseline on L 16800 E where a 0.08 m. wide E-W trending quartz vein was channel sampled in 11 locations along the outcrop, returning a high value of 740 ppb Au, and 875 ppm As. c) Zone #3 is 80 m. WNW of zone #2 and consists of a main E-W trending, steep north dipping quartz vein with 10-20% quartz stringers 1 m. from the vein, which decrease with distance from the main vein. Results produced a high value of 150 ppb Au and 1063 ppm As. d) 8 chip samples from Zones #4-6 returned values up to 159 ppb Au and 25 ppm As.

1) Rock chip sampling on the Peg and Bo Claim Groups (Walker Creek area), returned 0.67% Cu across 0.2 m. and 0.28% Cu across 0.1 m.
2) Recommendations for further work include exploration and development of low tonnage, high grade ores shoots along the 7 km. strike length which is known to host gold-bearing quartz vein systems.

5.0 GENERAL GEOLOGY

L.H. Fairchild (1979), completed a structural and metamorphic analysis of the Leech River Group in partial fulfillment of the requirements for a Masters degree at the University of Washington. Most of his work focused on the Valentine Mountain area. A point form summary of his study is listed below:

1) Leech River Group consist of greenschist to amphibolite facies gneiss and schist metamorphic rocks Their protolith rock types listed in order of abundance are: a-pelite (shale), b-sandstone, c-volcanic, d-chert, e-conglomerate.
2) Two Eocene deformational events, separated by a static period of unknown duration, consisted of fragmentation, rotation and regional shortening resulted in axial-plane cleavage, linear structures and coaxial mesoscopic parasitic folds about east-plunging fold axes.
3) Amphibolite facies metamorphism resulted in biotite-garnet and staurolite-andalusite successively introduced by continuous reaction, which extended from the end of the first phase of deformation into the second phase.
4) Greenschist facies metamorphism results in muscovite-chlorite-quartz assemblages.
5) San Juan, Clapp Ck. And Leech R. faults are E-W trending, steeply dipping, relatively straight zones of regional sub-parallel fault traces. The Leech R. fault is interpreted to be a left-lateral strike-slip fault zone active during the Eocene-Oligocene-Miocene.
6) In the Jordan R. valley southwest of Valentine Mountain, 10-50 m. wide coarse-grained biotite orthogneiss to grandioritic sills and related pegmatite dykes are concordant with regional schistosity.
7) In both mesoscopic and macroscopic folds throughout the Leech R. Group, metasandstone and metavolcanic units behave competently and pelitic rocks, which typically filled-in between competent bodies, behaved in a more ductile fashion. This competency contrast indicates that buckling, rather than homogenous flattening or slip-folding, was the dominant mechanism of folding.
8) Isoclinal F1 structures are refolded by F2 resulting in cylindrical folds which are generally asymmetric-open in the north study area, and progressively symmetric-closed to the south.
9) Dominant foliation in the study area is steeply dipping, F2 axial planar.

Gay A. Wingert (1984), completed a B.Sc. thesis for U.B.C. entitled Structure and Metamorphism of the Valentine Mountain Area, SW Vancouver Island, B.C. Her study is summarized as follows:

1) The Leech R. Fm. underwent 2 stages of deformation and metamorphism which correlates with 2 stages of intrusion. Evidence for polymetamorphism is defined by distribution of staurolite and andalusite, indicating there was a primary metamorphic event which reached temperatures high enough to produce andalusite and a secondary metamorphic event of lower grade which only produced staurolite.
2) The second stage of metamorphism began prior to the second stage of deformation.
3) The final stages of igneous activity (presumed to have occurred in Late Eocene to Early Oligocene) coincide with dextral strike-slip movement along the Leech R. Fault. Retrograde alteration consists of staurolite & andalusite partially replaced by sericite-chlorite-quartz, garnets are crushed and altered to chlorite, and biotite and hornblende appears kinked and boudinaged. Late stage retrograde alteration is associated with late stage faulting and intrusive activity which produced dykes & sills, and gold-bearing quartz (Appendix D).
4) The axial trace of a regional E-W trending anticline fold axis is centered on Valentine Mountain.
5) Walker Creek is an axis for an E-W trending anticline fold axis

The B.C. Geological Survey Branch and the G.S.C. prepared a paper titled Andalusite in British Columbia-New Exploration Targets (Dr. G. Simandl, et.al., 1994)). There was a chapter of this paper devoted to the Leech River Area with specific reference to potential economic deposits within the subject property (Appendix A). A point form summary of this paper is given below:

1) Typical grades of primary "hard rock" andalusite ores vary from 7 to 20%. Typical production capacities of individual mines vary from 25,000 to 65,000 tonnes per year.
2) The coarser the crystals, the easier it is to upgrade the ore. Garnet and staurolite typically coexist with andalusite and where grades and textures permit, they are recovered as byproducts.
3) Most of the area east of Valentine Mountain contains andalusite strongly retrograded to either mica and staurolite or mica and chlorite. The retrograde alteration appears to be strongest in the "Discovery Zone"
4) The degree of retrograde alteration diminishes westward where an E-W trend formed by occurrences mapped by sample reference # LR 114,13,32,35 & 37 is especially interesting and may host zones of economic andalusite-garnet-staurolite (Appendix A).
5) Station LR-37 is described as a 6 m. wide zone of 7% andalusite bearing schist surrounded by a felsic intrusion.

PROPERTY GEOLOGY

The following legend is used to described rock types of the Leech River Group and younger intrusiuve rocks which underlie the RB 1-21claim group:

EOCENE AND YOUNGER? INTRUSIVE ROCKS

6 Pegmatite, Leucocratic dykes and sills

5 Quartz diorite, minor granodiorite, granite
5a Aplitic dykes and sills (leucocratic, fine grained)

TRIASSIC TO CRETACEOUS? LEECH R. GROUP METAMORPHIC ROCKS

4 Phyllite (finer grained and better cleaved than schist)

3 Amphibolite (metavolcanic)
3a Tuff
3b Flow
3c Pervasive chlorite alteration

2 Gneiss (metasandstone)

2a "Dirty"- greywacke
2b "Clean"- metaquartzite

1 Schist (metapelite)
1a Biotite schist
1b Biotite-garnet schist
1c Biotite-garnet-staurolite schist
1d Biotite-garnet-staurolite-andalusite schist

6.0 1997 FIELDWORK

A 4 km. strike length, E-W trending zone of andalusite bearing schist is described in "Andalusite in British Columbia" (1994), which outcrops within RB 3. Detailed mapping of the andalusite bearing units were carried out to determine their extent and composition.

6.1 METHODS AND PROCEDURES

A 10 ha. area of the RB 3 claim was surveyed and mapped using hip chains and compasses. Flagged lines were surveyed E-W and N-S, at 25 m. intervals marked flagging was placed to assist in determining the outline of each outcrop exposure. Sample sites were chosen by visual presence of andalusite and/or staurolite + garnet. One kilogram hand specimen samples were taken using sledge hammers in order to examine fresh, unoxidized bedrock. A total of 4 samples were taken and 1 inch thick slabs were cut with a diamond saw. Sample #GS-1 and GS-3 were shipped to Vancouver Petrographics, Langley, B.C. for petrographic description (Appendix B).

6.2 PROPERTY GEOLOGY

The RB 1-21 claim group is underlain by the Leech River Group metasediments and metavolcanics, which are cut by younger intermediate to felsic intrusives (Fairchild, 1979, Wingert, 1984, Grove, 1984). Geological mapping at a scale of 1:2,000 was carried out over the south and east portions of RB 3 and the following lithologies were recognized:

TRIASSIC TO CRETACEOUS? LEECH R. GROUP METAMORPHIC ROCKS
2 Biotite Gneiss (metasandstone)
2a "Dirty"- greywacke
2b "Clean"- metaquartzite

1 Schist (metapelite)
1a Biotite schist
1b Biotite-garnet carbonaceous schist
1c Biotite-muscovite-garnet-staurolite carbonaceous schist
1d Biotite-muscovite-garnet-staurolite-andalusite carbonaceous schist

Geological mapping has identified 2 sub-parallel, andalusite bearing schist units within a sequence of Mesozoic metasediments (Fig. 4). These 2 schist units are between 5-25 meters thick and contain 2-10% andalusite.

There were no outcroppings of intrusive rock found in the mapped area, but a small portion of diorite/granodiorite float boulders were located in the overburden. Felsic intrusive rocks outcrop along the J-5 logging road (see Appendix A, description of LR-37) located approximately 700 meters west of the RB 3 claim (Simandl, 94).

Detailed examination of each hand specimen taken is listed as follows:

HAND SPECIMEN DESCRIPTIONS- RB 3 CLAIM
92 B/12 W, Victoria Mining Division, May, 1997 **(see Fig. 4 for Locations)**

GS #1: See Appendix B, Vancouver Petrographics Ltd. thin section description.

GS #2: BIOTITE-GARNET-STAUROLITE CARBONACEOUS SCHIST, rusty weathering, fresh surface shows 0.1-5.0 mm. wide alternating bands of quartz/biotite, foliation is well developed, 3% brownish black coloured staurolite crystals to 5 mm., 1-2% red, euhedral garnet crystals to 2 mm., Trace-1% disseminated pyrrhotite.

GS #3: See Appendix B, Vancouver Petrographics Ltd. thin section description.

GS #4: BIOTITE-GARNET CARBONACEOUS SCHIST, rusty weathering, alternating quartz/biotite banding is poorly developed, foliation is well developed, 1% red subhedral garnet crystals to 2 mm., trace-0.5% disseminated pyrrhotite, trace fine grained, fracture filling pyrite.

GS #5: BIOTITE-MUSCOVITE-CHLORITE-GARNET-STAUROLITE-ANDALUSITE CARBONACEOUS SCHIST, grey weathering, noticeable absence of rusty weathering and sulphides, well developed quartz/biotite banding and foliation, 2-5% andalusite as 5-25 mm. porphyroblasts, 1% euhedral garnet crystals to 2 mm., 10% disseminated muscovite and as secondary replacement rims surrounding edges of andalusite porphyroblasts (giving pronounced "halo" effect), 1% staurolite crystals to 8 mm., 3-5% fibrous chlorite developed as fine grained secondary alteration.

GS #6: BIOTITE-MUSCOVITE-CHLORITE-GARNET-STAUROLITE-ANDALUSITE CARBONACEOUS SCHIST, grey weathering, noticeable absence of rusty weathering and sulphides, well developed quartz/biotite banding and foliation, 2-3% andalusite as 5-15 mm. porphyroblasts, 1% euhedral garnet crystals to 2 mm., 5% disseminated muscovite and as secondary replacement rims surrounding edges of andalusite porphyroblasts (giving pronounced "halo" effect), 1% staurolite crystals to 8 mm., 3% fibrous chlorite developed as fine grained secondary alteration.

Thin section descriptions from Vancouver Petrographics Ltd. indicate sillimanite is present in GS #1 and not GS #3 suggesting that as you proceed westward, relatively higher temperatures are a result of close proximity to intrusive rocks. The description of LR-37, located about 300 m. west of GS #1, indicates andalusite bearing schist is enclosed in a felsic intrusion. Andalusite formed as pendants or screens enclosed within intrusive rock have increased economic potential as they are better protected from incursions of retrograde metamorphic fluids (Simandl, 1994).

7.0 DISCUSSION OF RESULTS

On the deposit scale, the thickness and chemical composition of the protolith and temperature of the low-pressure metamorphism are the main factors influencing the formation of andalusite (Simandl, 1994). Petrographic descriptions of GS #1 and GS #3 indicates that metasediments were originally derived from a carbonaceous shale. Through regional Eocene metamorphism, estimated @ 1.5 to 3.5 kbars pressure and a

temperature of 500-600 degrees C, andalusite-staurolite-garnet formed as second stage coarse euhedral-anhedral crystals. Retrograde alteration has resulted in partial replacement of original andalusite with either mica and staurolite or mica and chlorite. Westward along the LR 32-37 trend (which is also the GS #1-3 trend), the degree of retrograde alteration diminishes resulting in well preserved andalusite crystals with a significant reduction of mica and/or chlorite (Simandl, 1994).

The presence of coarse grain porphyroblasts of andalusite up to 30 cm. in length with accessory garnet-staurolite crystals up to 5 cm. suggests that an evaluation of grade, texture, and impurity content related to the economic marketability of this product will be necessary. Metallurgical studies are being carried out on a staurolite bearing schist in Ontario. Should that deposit prove to be viable, then the Leech River area should be re-examined in that context (G. Simandl, 1994).

8.0 CONCLUSION & RECOMMENDATION

The RB claim group has potential for hosting an economic deposit of andalusite with accessory staurolite-sillimanite-garnet. A 2 phase program of exploration and follow up petrographic analysis of andalusite-garnet-staurolite-sillimanite is recommended along the trend of the two schist units which are referred to as:

1) GS #1,3 (aka LR 32,35,37)- located in the southwest portion of RB 3 (Fig. 4, Appendix A).
2) GS #5,6 (aka LR 13)- located in the east central portion of RB 3 (Fig. 4, Appendix A).

Phase 1:
Recommended fieldwork would involve establishing a survey grid with a 2-3 km. long E-W baseline(s) and 200-500 meter long N-S tie lines spaced at 100 meters and flagged at 25 meter stations. A magnetometer ground survey is recommended to assist in determining intrusive contacts. Detailed geological mapping, petrographic and whole rock geochemical analysis, sampling and hand trenching of exposed outcrop along strike of these two schist units, as well as mapping of intervening ground is recommended in order to select a site that would qualify for a bulk sample. Field crew would consist of 1 geologist, 1 geotechnician for 21 days with an approximate budget of $12,000 including support.

Phase 2:
Bulk sample from one or more sample sites for testing of recoveries and grade. Small scale metallurgical tests could determine if a commercial grade concentrate can be produced using conventional methods. Field crew would consist of 1 geologist, 2 equipment operators for 14 days with an approximate budget of $25,000 including support.

REFERNCES

Allen, G. (1989): Valentine Mountain Property "C" Vein Ore Reserves, Beau Pre Exploration Ltd.

Fairchild, L.H. (1979): The Leech River Unit and Leech River Fault, Southern Vancouver Island, B.C.; M.Sc. Thesis, University of Washington.

Fairchild, L.H. (1982): Structure, Petrology, and Tectonic History of the Leech River Complex, NW of Victoria, Vancouver Island; Can. Journal of Earth Sciences, Vol. 19, pages 1817-1835.

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Grove, E.W. (1984): Geological Report and Work Proposal on the Valentine Mountain Property for Beau Pre Explorations Ltd.

Simandl. G.J., (1994): Andalusite in British Columbia-New Exploration Targets, B.C. Geological Survey Branch and G.S.C.

Valentine Gold Corp. (1988): Valentine Mountain Project Report.

Wingert, G.A. (1984): Structure and Metamorphism of the Valentine Mountain Area, SW Vancouver Island

STATEMENT OF QUALIFICATIONS

I Andris Kikauka, of 6439 Sooke Rd., Sooke, B.C., hereby certify that:

1) I am a graduate of Brock University, St. Catharines, Ontario, with an Honours Bachelor of Science Degree, Dept. of Geological Sciences, 1980.

2) I am a fellow in good standing with the Geological Association of Canada, registration # 5,717.

3) I am registered in the Province of British Columbia as a Professional Geoscientist, registration # 18,275.

4) I have practised my profession for 16 years in precious and base metal exploration in the Cordillera of North, Central and South America, and for 3 years exploring for uranium within the Canadian Shield.

5) The information, opinions and recomendations in this report are based on research of previous work and fieldwork carried out in my presence on the subject properties.

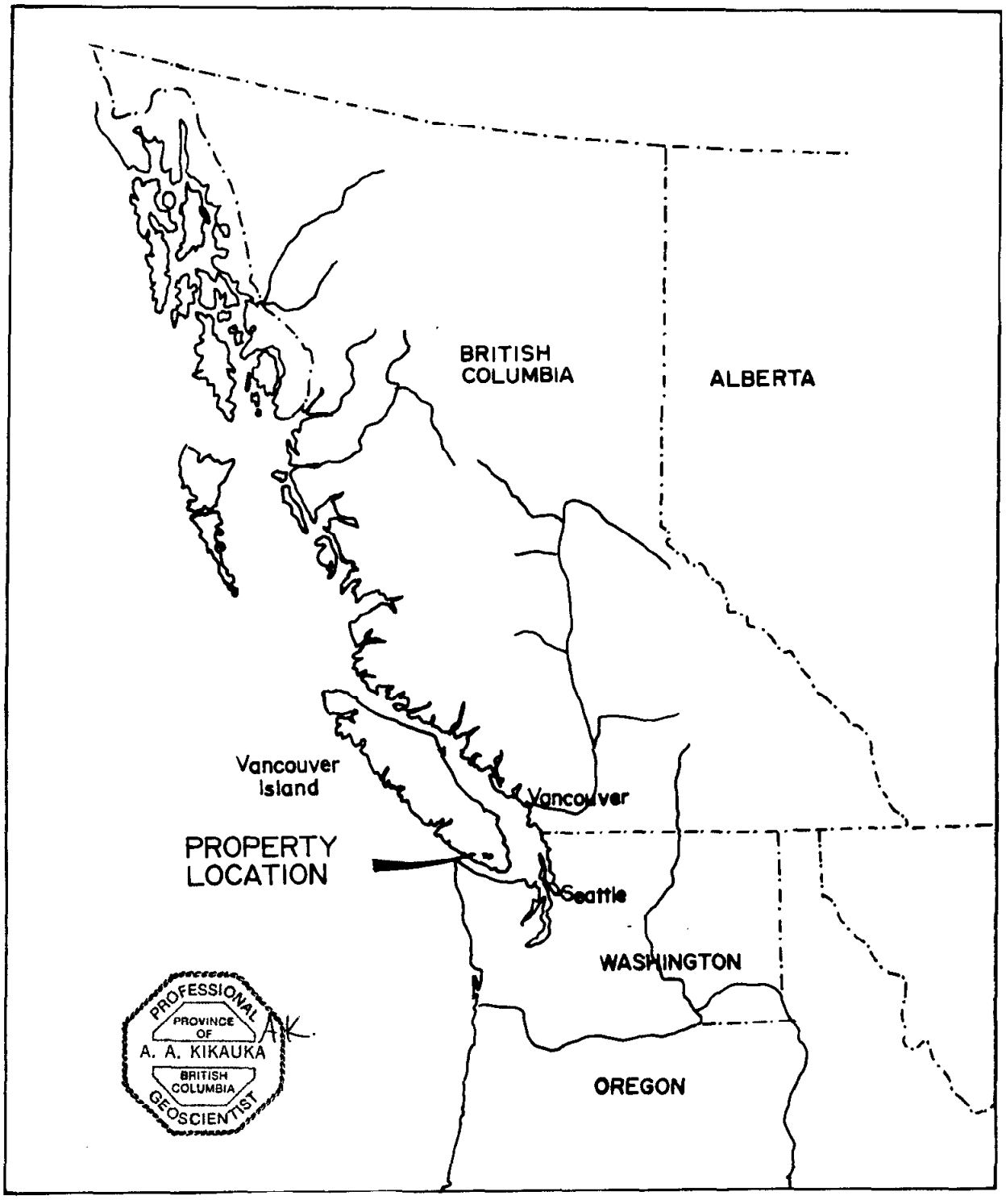
Andris Kikauka, P.Geo.

Andris Kikauka

May 21, 97

ITEMIZED COST STATEMENT- RB 1-21 CLAIM GROUP, APRIL, 1997
Victoria Mining Division, NTS 92 B/12 W, Jordan River, SW Vancouver Island
Work performed on RB 3 claim- detailed costs as follows:

FIELD CREW:	
Geologist, Andris Kikauka, April 12, 13, 14, 18, 1997	$ 800.00
Geotechnician, Simon Salmon, April 12, 13, 14, 18, 1997	600.00
FIELD COSTS:	
Truck rental (4 days)	300.00
Fuel	72.00
Radio rental (1 week)	94.28
Petrographic description (including preparation)	140.00
Report	175.00
Total =	$ 2,181.28



GENERAL LOCATION MAP

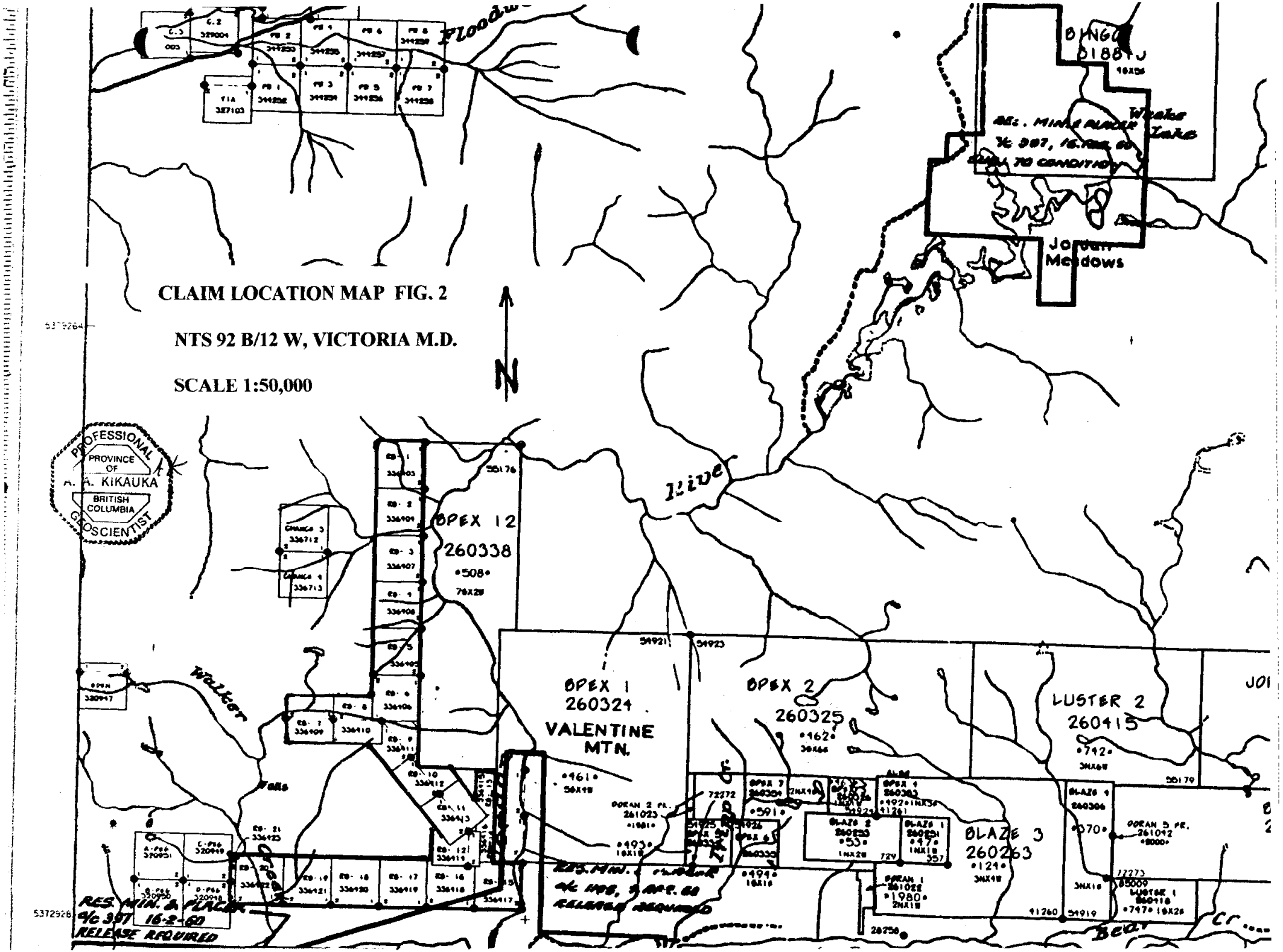
RB 1-21 CLAIMS, JORDAN RIVER, SOUTHERN VANCOUVER ISLAND

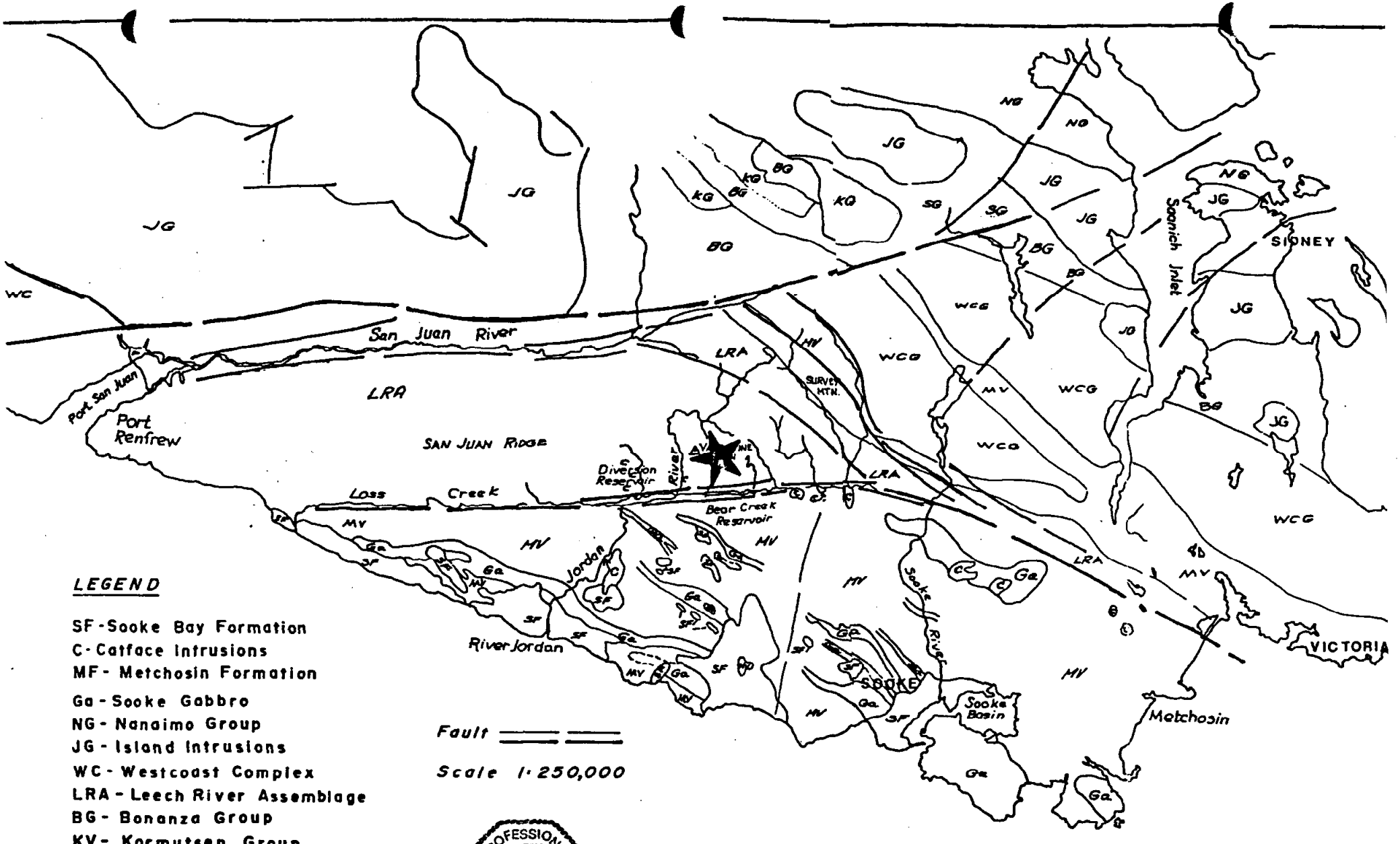
VICTORIA MINING DIVISION

Scale 1:12,000,000 FIG. 1

0 320 640 Km.

N


CLAIM LOCATION MAP FIG. 2
NTS 92 B/12 W, VICTORIA M.D.
SCALE 1:50,000
N
PROFESSIONAL
PROVINCE OF
A. A. KIKAUKA
BRITISH COLUMBIA
GEOSCIENTIST
OPEX 12
260338
OPEX 1
260324
VALENTINE MTN.
OPEX 2
260325
LUSTER 2
260415
BLAZE 3
260263
Jordan Meadows
Live
Walker
Falls
RES. MIN. & PLACER
4/c 307 16-2-60
RELEASE REQUIRED
5372928
5379264



LEGEND

SF - Sooke Bay Formation
C - Catface Intrusions
MF - Metchosin Formation
Ga - Sooke Gabbro
NG - Nanaimo Group
JG - Island Intrusions
WC - Westcoast Complex
LRA - Leech River Assemblage
BG - Bonanza Group
KV - Kormutsen Group
SG - Sicker Group
MV - Malahat Volcanics
WCG - Wark & Colquitz Gneiss

Fault

Scale 1:250,000

PROFESSIONAL GEOSCIENTIST
PROVINCE OF BRITISH COLUMBIA
A. A. KIKAUKA

GENERAL GEOLOGY
SOUTH VANCOUVER ISLAND
(after Grove, 1990) **FIG. 3**

RB 3 CLAIM GEOLOGY, NTS 92 B/12 W, VICTORIA MINING DIVISION, MAY, 1997

GEOLOGICAL LEGEND

Fig. 4

TRIASSIC TO CRETACEOUS? LEECH R. GROUP METAMORPHIC ROCKS

2 Biotite Gneiss (metasandstone)
2a "Dirty"- greywacke
2b "Clean"- metaquartzite

1 Schist (metapelite)
1a Biotite schist
1b Biotite-garnet carbonaceous schist
1c Biotite-muscovite-garnet-staurolite carbonaceous schist
1d Biotite-muscovite-garnet-staurolite-andalusite carbonaceous schist

FOLIATION
BEDDING
FRACTURE
VEIN
LITHOLOGICAL CONTACT
CREEK
Chl.- Chlorite
Outcrop
Py.- Pyrite
road
Pyo.- Pyrrhotite
SCALE 1:2,000
N

• LR- Hand specimen location
LR PREFIX INDICATES STATION FROM ANDALUSITE IN B.C., DR. G. SIMANDL, et.al., (1994)

• GS- Hand specimen location
GS PREFIX INDICATES STATION FROM GRID TRAVERSE, A. KIKAUKA (1997)

0 50 100m.

RB 2
RB 3
1b Mylonite schist
84
78
quartz
pyo. 1a
py.
85
1a
1c
75
72
GS-6
2a
1d chl.py.
2a
GS-5
1d chl.
LR-13
70
GS-4
2a
2a
1b pyo. quartz
62
2a
2a
JORDAN R.
2a
RB 3
RB 4
82
2a
← GS-1 (550 m. west)
← GS-2 (300 m. west)
1a
66
pyo.
2a
py.
GS-3
1d
chl.
LR-32
2a

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
A. A. KIKAUKA
GEOSCIENTIST

APPENDIX A

(after G. Simandl, et.al.,1994)

OCCURRENCE DESCRIPTIONS

LR-4: A zone exposed over a width of 4 metres and a length of 6 metres contains about 10% andalusite porphyroblasts almost entirely replaced by mica and chlorite. The length of the porphyroblasts occasionally exceeds 10 centimetres.

LR-9: Three small outcrops contain strongly retrograded andalusite porphyroblasts up to 2 centimetres in cross-section.

CA-5: A rounded block of hornfels, found in the bed of Loss Creek, contains up to 10% fresh, honey-coloured staurolite porphyroblasts, 0.5 to 2 centimetres long, and 5% pink, strongly retrograded andalusite porphyroblasts.

LR 13: A large zone of andalusite-bearing rocks, about 25 metres thick, outcrops in the bed of the Jordan River. Compositional layering is oriented 289/70. Partially retrograded andalusite porphyroblasts measure up to 4 centimetres across and more than 20 centimetres long (Photo 4). Locally, there are some brown, euhedral staurolite crystals within the andalusite porphyroblasts.

LR-58, 60, 61 and 62: **Outcrops of dark-coloured gneiss, interlayered with leucocratic gneiss, contain up to 8% strongly or entirely retrograded andalusite crystals, up to 2% garnet and dark, soft crystals, possibly retrograded staurolite.**

LR-37: This is an outcrop of andalusite-staurolite-garnet-bearing rock with compositional layering oriented 286/86. It is 6 metres wide, and contains less than 7% andalusite porphyroblasts up to 10 centimetres long and 2 centimetres across, associated with dismembered, centimetre-scale quartzofeldspathic layers. The occurrence is enclosed in a felsic intrusion. Individual andalusite crystals are up to 10 centimetres long and 2 centimetres in cross-section. This andalusite occurrence is the least retrograded in the Leech River area.

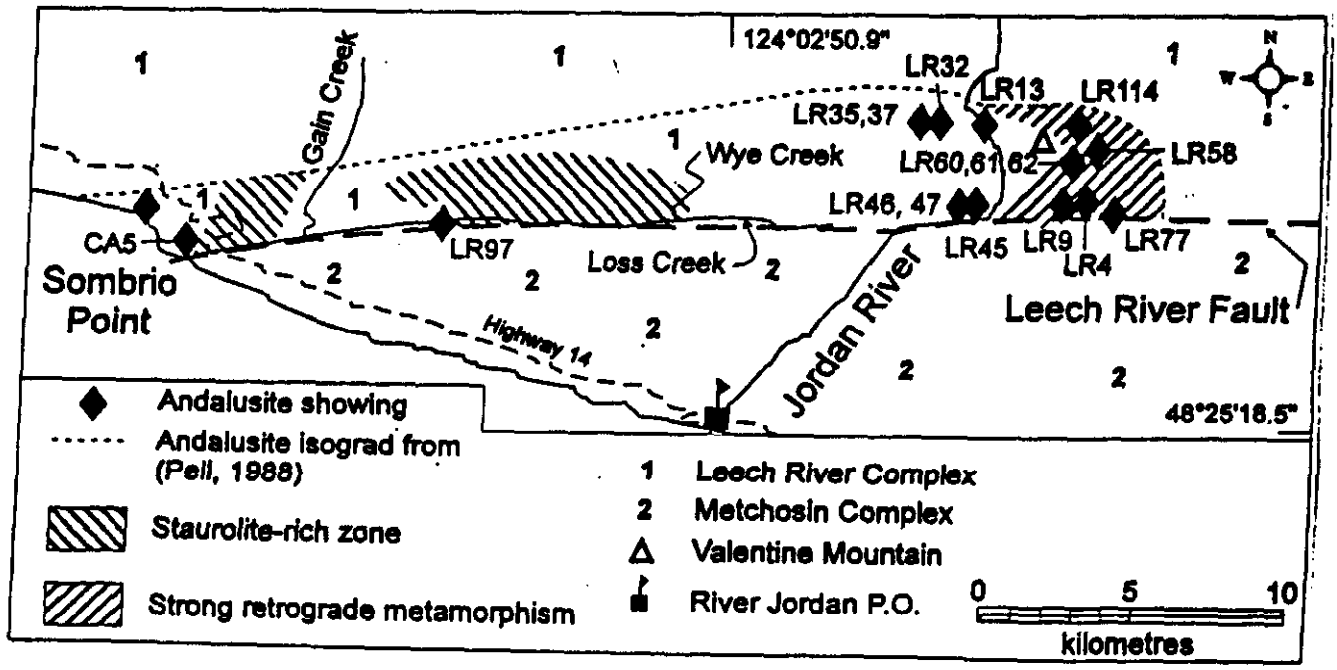
LR-45: A biotite-garnet-andalusite-staurolite schist is exposed over 2 metres. Andalusite forms less than 3% of the rock and is partially retrograded.

LR-46: This is a small exposure of biotite-garnet-andalusite-staurolite schist with less than 3% strongly retrograded andalusite.

LR-47: This zone is similar to LR-46. The andalusite-bearing layer is less than 30 centimetres thick.

LR 32: An andalusite-bearing zone, 5 metres thick, outcrops in a cut on the *J5* road. Andalusite content varies from 2 to 8%. The zone also contains about 2% staurolite and 0.5% garnet. Some of the andalusite appears fresh and some is 50% retrograded to fine-grained muscovite.

LR-35: This is an outcrop of hornfels about 8 metres thick carrying 5% andalusite porphyroblasts that have cross-sections up to 1 centimetre and are several centimetres long.



Andalusite occurrences in the Leech River area.

Vancouver Petrographics Ltd.
8080 GLOVER ROAD, LANGLEY, B.C. V1M 3S3
PHONE (604) 888-1323 • FAX (604) 888-3642
email: vanpetro@vancouver.net

Invoice 970282
April 25, 1997

APPENDIX B

Samples: GS#1 GS#3 (2 Polished Thinsections)

Summary: The host rock for both these thinsections is a carbonaceous biotite-quartz schist. Coarse crystalline andalusite (Al_2SiO_5) has developed throughout the rock which co-exists with a second-stage dark, anhedral andalusite grains. All these andalusite crystals are characterized by abundant small carbonaceous inclusions. Grain boundaries of the andalusite crystals are rimmed by an up to 0.5mm thick layer of retrograde muscovite.

Euhedral red garnet is present in small amounts. Coarse crystalline staurolite $Fe(OH)_2 \bullet 2Al_2O_3$ was noted in both sections. Each specimen is moderately magnetic due to irregularly distributed pyrrhotite ($Fe_{1-x}S$) grains. Unless the pyrrhotite can be removed during ore processing, this pyrrhotite content will result in a high iron content. Iron is a detrimental impurity in most refractory applications. There is also a significant fibrous chlorite $(Mg,Fe)_{12}[Si,Al)_8O_{20}](OH)_{16}$ content of the samples. In some cases, chlorite (replacing muscovite) microveinlets actually cross-cuts individual andalusite crystals along cleavage lines. Small micro-inclusions of pyrite and pyrrhotite also occur along the andalusite cleavage lines.

If you have any questions regarding the attached petrographic descriptions or would like other specific lines of inquiry addressed, please call me at 970-6402.

Yours truly,

J.T. (Jo) Shearer, M.Sc., P.Geo.

-- PETROGRAPHIC DESCRIPTION --

FOR: Applied Mine Technologies Inc. Attn.: Frank Wright,
SPECIMEN NUMBER: GS#1

HANDSPECIMEN DESCRIPTION:
Moderately rusty weathering, fine grained, Moderately to strongly schistose, Abundant biotite (and other micas?) along foliation planes, Prominent large pinkish andalusite twinned metacryst clusters up to 11mm in length - sparsely distributed throughout, Slightly magnetic due to irregular disseminated pyrrhotite clots, Sometimes the pyrrhotite is distributed in pyramidal lenses up to 2mm in length, Numerous cavities throughout caused by soft micaceous mineral causing differential weathering, Small subeuhedral reddish garnet crystals up to 0.5mm in diameter are common throughout, Larger, up to 3mm in length, black andalusite porphyroblasts are also sparsely distributed throughout, Sawn surface suggests rounded primary fragments up to 15mm in length.

FIELDROCK NAME: Andalusite porphyroblasts in fine grained, black micaceous schist

THINSECTION EXAMINATION:

ESTIMATED MODE:
8% Andalusite
25% Biotite
3% Garnet (euhedral red)
2% Pyrrhotite
2% Pyrite
Trace Chalcopyrite
35% Quartz
6% Muscovite
13% Carbonaceous material
4% Chlorite
2% Sillimanite
Trace Staurolite

Biotite is very abundant as 0.1mm flakes defining the schistosity of the host rock. Some layers have coarse biotite up to 0.4mm in length.
Pyrrhotite forms small irregular lenses up to 0.5mm in length. The pyrrhotite lenses contain numerous rounded gangue inclusions. The lenses are often elongated parallel to the foliation.
Less common are similarly shaped pyrite microlenses. There are traces of chalcopyrite inclusions associated with the larger pyrite grains up to 0.02mm,
Andalusite metacrysts are up to 4mm across and commonly have irregular carbonaceous inclusions throughout. Some andalusite grains have a 0.4mm thick carbonaceous rim. The edges of the andalusite crystals have 0.05mm thick development of retrograde muscovite or chlorite.

The large andalusite grains are sometimes rounded in shape but usually have roughly straight edges. Characteristically the large andalusite grains have highly corroded grain boundaries. The corroded edges are up to 0.5mm thick giving a "halo" effect in hand specimen.
The fragments noted in handspecimen are mainly composed of relatively clear fine granules of lineated quartz grains 0.04mm in length with minor irregular coarser biotite grains up to 0.15mm long. Fine muscovite needles 0.05mm long occur throughout the fragment.
Thinsection shows 2 barrel shaped grains of staurolite twinned together also exhibiting carbonaceous inclusions with a cross extinction effect.
The smaller, more euhedral garnet crystals are up to 0.6mm in diameter and are completely extinct under crossed nicols. These crystals are commonly rimmed by a thin layer of opaque carbonaceous organic (?) matter and traces of pyrrhotite.
Minor sillimanite forms thin needle-like crystals up to 0.5mm in length within the quartz-biotite layers.

Rock Name: Andalusite-Staurolite-Garnet Bearing Carbonaceous Biotite-Quartz Schist

-- PETROGRAPHIC DESCRIPTION --

FOR: Applied Mine Technologies Inc. Attn.: Frank Wright,
SPECIMEN NUMBER: GS#3

HANDSPECIMEN DESCRIPTION:
Slide produced to include one coarse andalusite crystals up to 20mm by 35mm long, The host rock is schistose with foliation planes marked by abundant biotite, Andalusite metacrysts appear porphyroblastic, Surrounded by coarse crystalline yellowish muscovite which appears to replace some of the andalusite, Porphyroblastic dark anhedral andalusite distributed throughout up to 5mm in diameter, Small euhedral red garnet up to 0.6mm common throughout, Elongated lenses grading to discontinuous layers of granular quartz, Slightly magnetic due to irregular clots of pyrrhotite.

FIELDROCK NAME: Coarsely porphyroblastic andalusite in garnetiferous biotite schist

THINSECTION EXAMINATION:

ESTIMATED MODE:
35% Andalusite
18% Muscovite
3% Garnet
2% Pyrrhotite
Trace Pyrite
Trace Hematite
12% Quartz
4% Chlorite
14% Biotite
11% Carbonaceous material
1% Staurolite

The slide is 35% composed of a single crystal of andalusite. The andalusite crystal is cross cut along the cleavage lines by a "veinlet" of coarse muscovite which, in places, has been altered to fibrous chlorite.
There are also discontinuous elongate enchelon inclusions of muscovite up to 1.2mm long which cored with pyrite, hematite, pyrrhotite and carbonaceous material. Pyrite appears to replace pyrrhotite.
The edge of the large andalusite crystal is rimmed up to 0.4mm thick with retrograde coarse muscovite and minor biotite. Some muscovite grains are over 1mm in length.
The host rock in the general vicinity of the andalusite metacryst has been recrystallized and is now composed of an equigranular mosaic of 0.5mm diameter quartz grains with very minor biotite.
The remainder of the specimen consists of strongly lineated coarsely crystalline biotite associated with finer grained quartz (0.05mm), Abundant carbonaceous matter is present throughout the biotite-rich layers.

Euhedral garnet crystals are up to 0.5mm in diameter. One grain of andalusite has been partially replaced by irregular patches of garnet near the grain edges.
Staurolite occurs as one relatively large poikioblastic (mesh textured) grain.

Rock Name: Coarse Crystalline Andalusite in Garnetiferous, Carbonaceous Biotite-Quartz Schist