# RADEM VLF-EM GROUND SURVEY ASSESSMENT REPORT

on the

# BURR 1&2 MINERAL CLAIMS ASHCROFT AREA KAMLOOPS MINING DIVISION

by

MURRAY MORRISON, B.Sc.

Claims:

Burr 1&2 (29 units)

Location:

The Burr mineral claims lie 9km

northeast of Ashcroft, B.C.

Lat. 50°45'; Long. 121°10';

N.T.S. 92-I-11&14

Owner:

Murray Morrison

Operator:

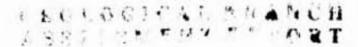
Murray Morrison

Date Started:

April 5, 1984

Date Completed:

April 15, 1984



Kelowna, B.C.

12, 12, 9984

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FILTERED) BURR 1&2 MINERAL	
	in pocket .
GRID, ACCESS, PRELIMINARY	
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Map B-84-4

in pocket /

CLAIMS

#### SUMMARY

The Burr #1 mineral claim of 9 units located on the south side of the Thompson River 11 km upstream from Ashcroft, B. C. was staked by the writer April 15, 1982 to cover a spectacular gossan coincident with the fault contact of Nicola volcanics and a quartz diorite phase of the Guichon Creek Batholith. In March 1984 the Burr #2 mineral claim of 20 units was added to the property to cover the suspected southeastward extension of the fault (called the Barnes Creek Fault by Northcote).

A Radem VLF-EM survey was conducted over the property in April 1984 in an effort to confirm the suspected Barnes Creek Fault extension. A cover of Tertiary volcanic rocks on much of the Burr #2 mineral claim greatly hampered the geophysical projection of the Barnes Creek Fault to the southeast, but during the course of the survey a strong conductor was identified on the southern edge of the quartz diorite intrusive on the Burr #2 mineral claim. It is thought that a concealed area of fracturing and pyritization on the south side of the intrusive might be equivalent to that on the well exposed west side of the intrusive. Access to the south side of the intrusive is much easier than to the west side and drilling into the contact zone at this location is recommended following a detailed, localized VLF-EM survey on the conductor.

The fact that no economic mineralized areas were identified in nine samples collected during 1983 prospecting should be overlooked. The intensity of the pyritization and clay alteration associated with the gossan on the Burr#1 mineral claim is indicative of strong hydrothermal activity. At some point along the quartz diorite intrusive contact economic concentrations of minerals such as copper, gold or silver may have been deposited. Two conductors within Nicola rocks are also worthy of further examination.

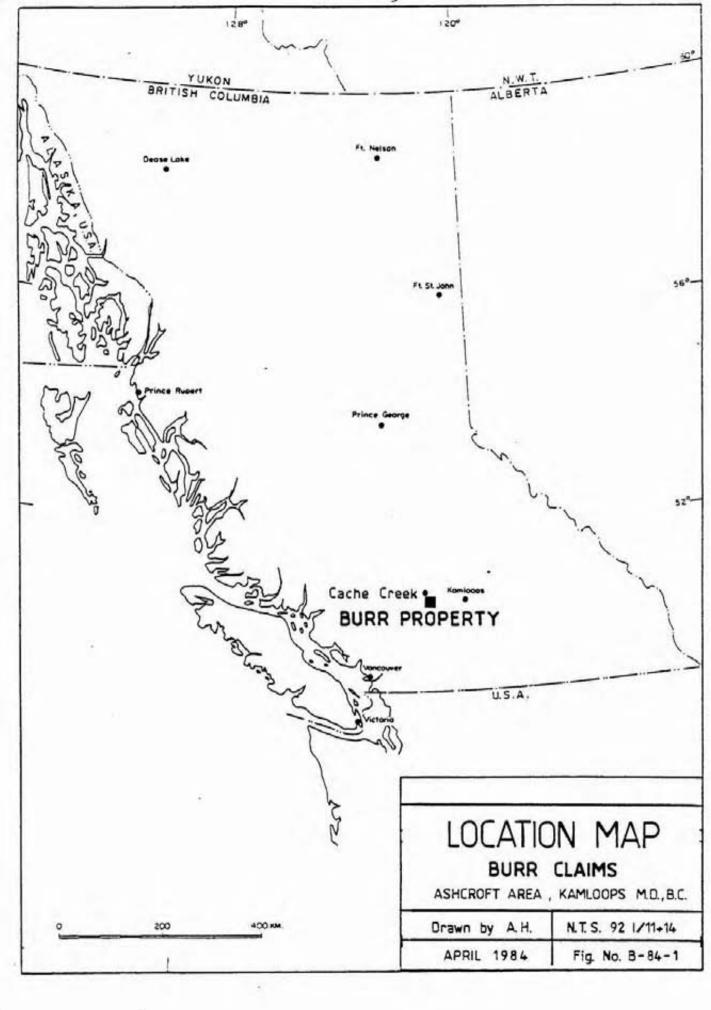
#### INTRODUCTION

The Burr property, made up of the Burr 1&2 mineral claims, totalling 29 units, is situated 9 km northeast of Ashcroft, B. C. (Lat. 50°45'; Long. 121°10'; N.T.S. 92-I-11&14). The original Burr #1 mineral claim was staked during April 1982 by the writer to cover a spectacular gossan zone lying over an intensely fractured, altered, and pyritized contact between Nicola volcanic rocks and a quartz diorite phase of the Guichon Creek Batholith.

The gossan zone was discovered as early as the 1890's, at which time small amounts of copper, gold, and silver were reported to have been found associated with it. After a long dormancy exploration of the gossan zone was renewed in the 1960's and '70's when the zone was evaluated as a potential porphyry copper deposit. The writer staked the property in 1982 believing that the time had arrived to reappraise its gold-silver potential.

During a 1983 prospecting program economic concentrations of mineral were not found associated with the main gossan of the Burr #1 mineral claim. However, the intensity of the gossan, and its apparent association with the Barnes Creek Fault, prompted the writer to stake an additional 20 unit, Burr #2 mineral claim on the projected southeastward extension of the Barnes Creek Fault. It was considered that the more moderate relief to the southeast of the Burr #1 mineral claim would allow for better logistics to test the pyritized fault zone if it were found in fact to cross the countryside.

A Radem VLF-EM survey was selected as the easiest and best means to determine if the pyritized fault zone does extend southeastward from the spectacular creek zone. This report



#### INTRODUCTION Continued

outlines the results of a Radem VLF-EM survey conducted over 8.5 km of grid line on the Burr property during April 1984. The VLF-EM data is presented in grid line form in Appendix "A", and also in contoured form (Fraser Filtered) on Map B-84-3. The basic geology of the property is illust rated on Map B-84-4, also accompanying this report.

# LOCATION, ACCESS, TOPOGRAPHY, AND VEGETATION

The Burr property is located immediately south of the Thompson River at a point 11 km upstream from Ashcroft, B. C. (Lat. 50°45'; Long. 121°10'; N.T.S. 92-I-11&14). The Canadian Pacific Railway mainline crosses the northern edge of the property. The property may be reached via the Highland Valley Highway, and the Barnes Lake road along a 22 km route as shown on figure B-84-2. Dirt roads extend to most areas on the Burr #2 mineral claim (see Map B-84-4).

The average elevation of the property is 850 m with the gentle relief of the Burr #2 mineral claim breaking into a steep (30 degree) slope running down to the Thompson River at the 300 m elevation on the Burr #1 mineral claim.

Vegetation on the Burr property is typical of that of the Dry Belt of B. C.. Sagebrush covers much of the property, while Douglas fir grow in ravines and on shaded slopes.

Snow accumulation rarely exceeds 30 cm, and lasts only from November until March.

#### CLAIM STATUS

The Burr #1 mineral claim of 9 units was staked by the writer April 15, 1982, and was recorded in the Kamloops Mining Division April 19,1982 with record number 4013, while the Burr #2 mineral claim of 20 units was staked by the writer March 29-31, 1984, and was recorded in the Kamloops Mining Division April 3, 1984 with record number 5581. Both Claims are 100% owned by M. Morrison of Kelowna, B. C.

#### HISTORY OF PREVIOUS WORK

The first mention of work done on the Burr property is quoted from the B. C. Minister of Mines Annual Report for 1898, p. 1107:

"The Burr group of eight claims is situated about 5½ miles east of Ashcroft, on the C. P. Railway, which runs through the property. It has a large body of ore, carrying gold and silver, but principally copper, and lies between diorite and granite. The country rock is diorite.

About 80 feet of tunnelling has been run in on the claims, which are most favourably situated for working, as the ore can be dumped into the cars without extra handling."

(The present Burr property covers ground formerly covered by the Burr group of claims mentioned above).

Further references are made to work done on the Pyrite property (now the Burr property) in the B. C. Minister of Mines Annual Reports for 1969 p. 263; 1970 p. 348; and 1971 p. 362. The work, consisting of soil geochem surveying, I.P. surveying, and diamond drilling was designed to find copper in economic concentrations. A total of 3 diamond drill holes were drilled in 1970.

It appears that at least 2 of the 3 diamond drill holes of 1970 were drilled near the southwest corner of the Burr#1 mineral claim as shown on map B-84-4. Two dozen boxes of drill core still lie near the southern edge of the claim. The drill core has not been split for assaying. Near the railway tracks at the northern end of the main creek gossan there is evidence that 2 to 3 percussion drill holes may have been drilled in recent years.

Prospecting of the main creek gossan zone by the writer in 1983 failed to locate the 1898 workings, or any concentrations of economic mineral.

#### REGIONAL GEOLOGY

#### Reference:

McMillan, W. J. <u>Geology and Genesis of the Highland Valley</u>
<u>Ore Deposits and the Guichon Creek Batholith.</u> Porphyry
Deposits of the Canadian Cordillera, C.I.M. Special Volume 15,
pp. 85-103, 1976.

The Burr property lies at the northwest extremity of the Guichon Creek Batholith. The geology of the Guichon Creek Batholith with its massive porphyry copper deposits is well documented in several studies on file in geological libraries, and I feel that the reference cited above properly summarizes the main features of the batholith and its ore bodies. The material in the reference is based on the geological work of Northcote and McMillan. Northcote has indicated that an oblique fault crosses the northern portion of the Guichon Creek Batholith from a point near Tunkwa Lake to the Thompson River northeast of Ashcroft. The fault, called the Barnes Creek fault, is shown to cut across the Burr property, and does, in fact, coincide with the highly fractured gossan zone crossing the centre of the Burr #1 mineral claim. On the claim the rock to the northeast of the fault is a quartz diorite hybrid phase of the Guichon Creek Batholith which is believed to have been emplaced 198 million years ago. The Guichon Creek Batholith is in fault contact with, and also intrudes. Triassic Nicola Group volcanic rocks which lie on the southwest side of the fault on the Burr #1 claim. Movement on the Barnes Creek fault is believed to be leftlateral (Mc Millan).

It would seem that the high degree of alteration and pyritization observed on the Burr #1 mineral claim is genetically related to the emplacement of the quartz diorite intrusive and/or to late solutions ascending the Barnes Creek fault structure.

Cont ......

#### REGIONAL GEOLOGY - Continued

The southern two-thirds of the Burr #2 mineral claim is covered by flat lying andesite and basalt flows of the Tertiary Kamloops Group that are estimated to range from 50 to 250 metres thick.

#### LOCAL GEOLOGY

The creek running through the centre of the Burr #1 mineral claim marks the trace of the Barnes Creek lateral fault. A quartz diorite hybrid phase of the Guichon Creek Batholith lies to the northeast of the fault while Nicola Group andesitic volcanic rocks lie to the southwest. The quartz diorite intrudes the volcanic rocks, and the contact zone is marked by severe fracturing, and intense argillic alteration. (The gossan formed is as strong and colorful as that at the well-known Maggie property near Highway #97, 15 km northwest of Cache Creek, B. C.). The main gossan, or zone of intense alteration. is 900 metres in length by 200 metres in width. Much of the rock is altered beyond recognition, but less altered rock found along the creek was noted to be a hybrid of diorite and andesite commonly containing 2 to 5% pyrite. In places the rock has been moderately silicified, or has quartz veins cutting it equalling up to 2% or the rock. Rock exposures along the southern portion of the main creek on the Burr #1 mineral claim are made up of well fractured, rusty, andesitic rock containing 1 to 3% pyrite. If it were not for overburden the main gossan on the property would have greater dimensions.

Northeast of the main fault the quartz diorite is blocky to massive in structure and rises to form steep cliffs on the Burr #1 mineral claim, and rocky bluffs on the Burr #2 mineral claim. Southwest of the main fault the Nicola volcanic rocks, which are predominantly andesite tuffs, also Cont....

#### LOCAL GEOLOGY - Continued

form steep cliffs on the north half of the Burr #1 mineral claim, but more subdued ridges on the south half of the Burr #1 and north portion of the Burr #2 mineral claims.

The contact of the quartz diorite with the Nicola volcanics is concealed by overburden on the Burr #2 mineral claim. However, hummocky topography near grid lines 22N and 24N in the suspected region of the contact zone is believed to be indicative of faulting.

A second creek with a smaller gossan, 600 metres southwest of the main gossan, originates near the southwest corner of the Burr #1 mineral claim. The creek appears to separate the andesitic vlocanic rocks on the northeast from interbedded rhyolitic and limy rhyolitic tuffs on the southwest.

Flat lying andesites and basalts of the Kamloops Group cover two-thirds of the Burr #2 mineral claim to probable depths of 50 to 250 metres. Much of the Tertiary volcanic cover is believed to equal only 50 to 100 metres, particularly along the projected southeast extension of the Barnes Creek fault, however, it is believed to reach a depth of 250 metres on a ridge on the western side of the property.

Nine rock samples collected from the Burr #1 mineral claim in 1983 failed to assay for any economic minerals.

#### 1984 RADEM VLF - EM SURVEY

A baseline of 2.5 km was measured across the central portion of the Burr property, and a total of 8.5 km of flagged grid line were established at right angles to the base line. The grid lines were spaced 100 to 200 metres apart and stations were marked along the grid lines at 25 metre intervals as

#### 1984 RADEM VLF-EM SURVEY Continued

shown on Map B-84-4 accompanying this report. The grid was established using a Silva Ranger compass and a Topolite belt chain, and required 3 man days to complete.

A Crone Geophysics Limited Radem VLF - EM instrument was used in conducting the survey over the entire grid area. Annapolis, Maryland was selected as the signal station best fitting the geology on the Burr property. The signal was received from a southeast direction and in-phase readings were taken at right angles to the station direction, or facing northeast. At each grid station the Field Strength and In-Phase dip angle were recorded.

At each grid station the instrument was positioned to obtain the maximum signal from the transmitting station to record the Field Strength. The operator then turned 90 degrees (facing northeast) to obtain the In-Phase dip angle. The dip angle was also recorded for each grid station. The In-Phase readings, Fraser Filtered In-Phase values, and Field Strength readings have all been plotted in profile form for each line surveyed, and these profiles are attached as Appendix "A". The Fraser Filtered data has also been plotted and contoured on Map B-84-3.

The Fraser filtering technique has had widespread use in the handling of Radem VLF-EM data for over ten years. By means of simple mathematical operations the tilt data can be transformed into contourable form, and the effects of noise and topography can be filtered from data. By averaging pairs of stations and taking differences between pairs separated by the appropriate distance, values may be plotted and contoured in plan that transform cross-overs into peaks and a low-pass smoothing operator reduces noise.

#### 1984 RADEM VLF-EM SURVEY Continued

A full explanation of the Fraser filtering technique is given in geophysical papers by Fraser, Peterson and Ronka that are listed under references at the end of this report.

The VLF-EM survey required 3 man days to carry out.

## DISCUSSION OF THE RESULTS OF THE RADEM VLF-EM SURVEY

Five strong conductors with Fraser filtered values in excess of 30% have been identified as A,B,C,D, and E on Map B-84-3.

Conductor A is located near the quartz diorite intrusive contact, and it appears to indicate a possible southern extension of the major pyritized gossan zone on the Burr #1 mineral claim into an area where bedrock is obscured.

Conductor B lies immediately south of the suspected quartz diorite intrusive contact, and this conductor may indicate another area of fracturing and pyritization that is obscured by overburden. (It should be mentioned that some geological interpretation was used in contouring this anomaly, backed by some random VLF-EM readings taken during the course of the grid survey).

Conductors C and D are well within the Nicola volcanics proper and they coincide with shallow ravines. These anomalies could represent secondary faults parallel the Barnes Creek Fault, and they too could represent pyritized zones. Again overburden masks the geology.

Conductor E coincides with a ravine well within an area mapped to be underlain by Kamloops Group volcanics. This conductor has a northeasterly strike direction, at odds with all others in the survey area.

#### CONCLUSIONS AND RECOMMENDATIONS

The Radem VLF-EM survey did not prove useful in tracing the Barnes Creek Fault southeastward across the Burr #2 mineral claim, because of the thick (50 to 100 m) accumulations of Kamloops Group volcanics that cover much of the claim. The survey did, however, show a conductive zone fringing the Guichon quartz diorite intrusive, and it is suspected that the intrusive is in fault contact with the Nicola Group volcanic rocks on the concealed south side just as it is on the well exposed west side on the Burr #1 mineral claim.

Limited work in 1983 indicated that the heavily altered and pyritized rock of the main gossan zone on the Burr #1 mineral claim contained no anomalous amounts of economic elements. However, the gossan is spectacular in its size and intensity, and the pyritization and clay alteration is thought to represent intensive hydrothermal activity. It seems reasonable to suspect that economic minerals such as copper, gold or silver could have accompanied these hydrothermal solutions at some point along the intrusive contact zone. Such an area could well be represented by Conductor B.

At this point a north-south grid should be laid out over Conductor B with lines spaced at 100 metre intervals, and further VLF-EM readings should be taken using a more suitable signal station for an east-west conductor (ie. Seattle or Hawaii).

The strongest point of Conductor B should be tested to a depth of 100 metres with a percussion drill, and samples taken at 3 metre intervals should be analyzed for copper, gold and silver.

Conductors C and D could also be tested with a percussion drill if there is any encouragement from Conductor: B.

Cont....

# CONCLUSIONS AND RECOMMENDATIONS - Continued

Conductor B is located on a dirt road, while Conductors C and D will require modest road building to reach.

April 15, 1984

Kelowna, B. C.

M. S. MORRISON B.Sc.

#### REFERENCES

Duffell, S. and McTaggart, K.C.

1952: Ashcroft Map-Area, British Columbia, G.S.C. Memoir 262.

Fraser, D.C.

1969: Contouring of VLF-EM Data, Geophysics, Vol 34, No. 6 December 1969.

Mc Millan, W. J.

1976: Geology and Genesis of the Highland Valley
Ore Deposits and the Guichon Creek
Batholith. Porphyry Deposits of the
Canadian Cordillera, C.I.M. Special
Volume 15, pp. 85-103.

Morrison, M. S.

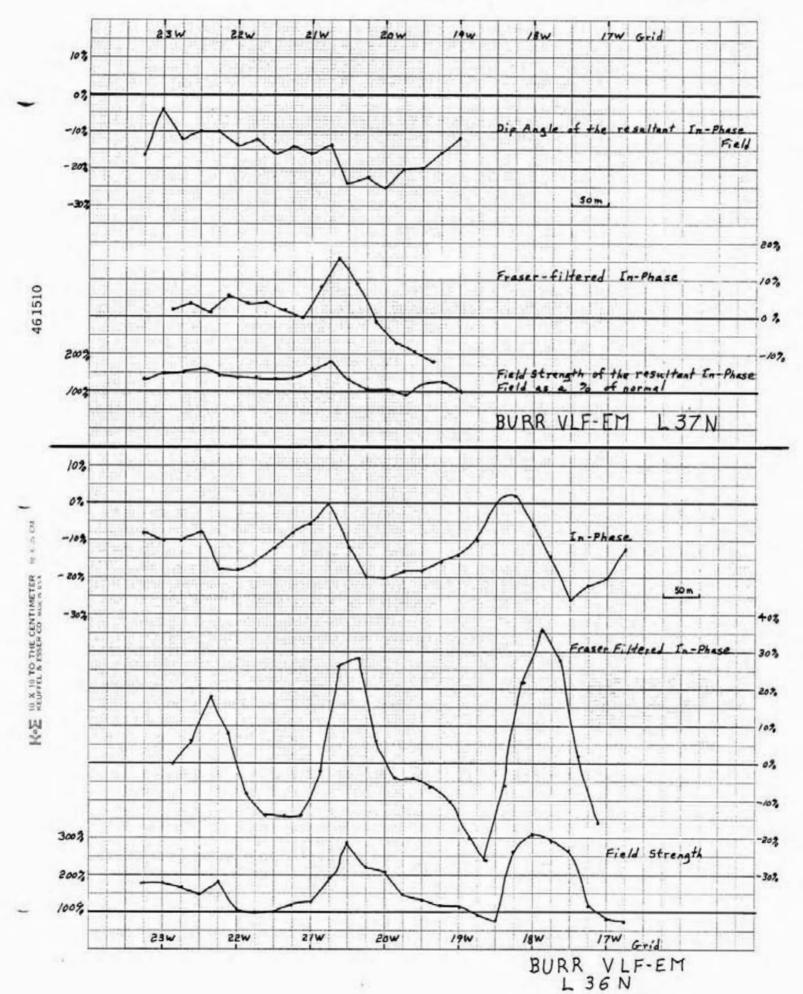
1983: Prospecting Report on the Burr #1 Mineral Claim, Ashcroft Area, Kamloops Mining Division (Filed as an Assessment Report with the Ministry of Mines and Petroleum Resources, B. C.).

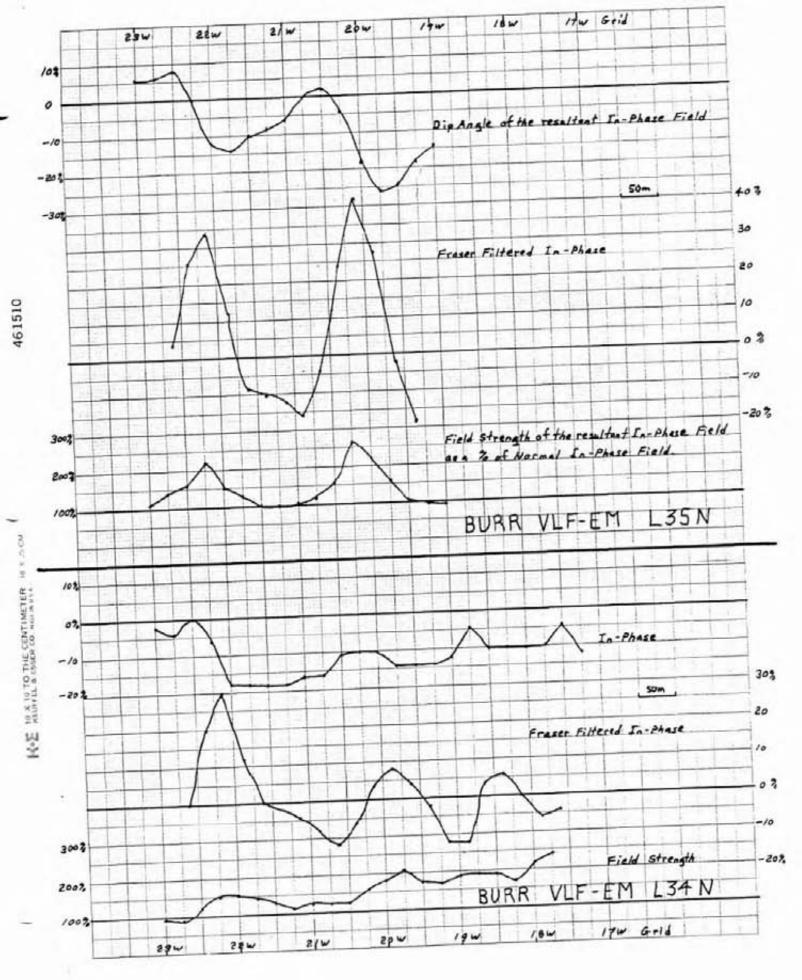
Northcote, K. E.

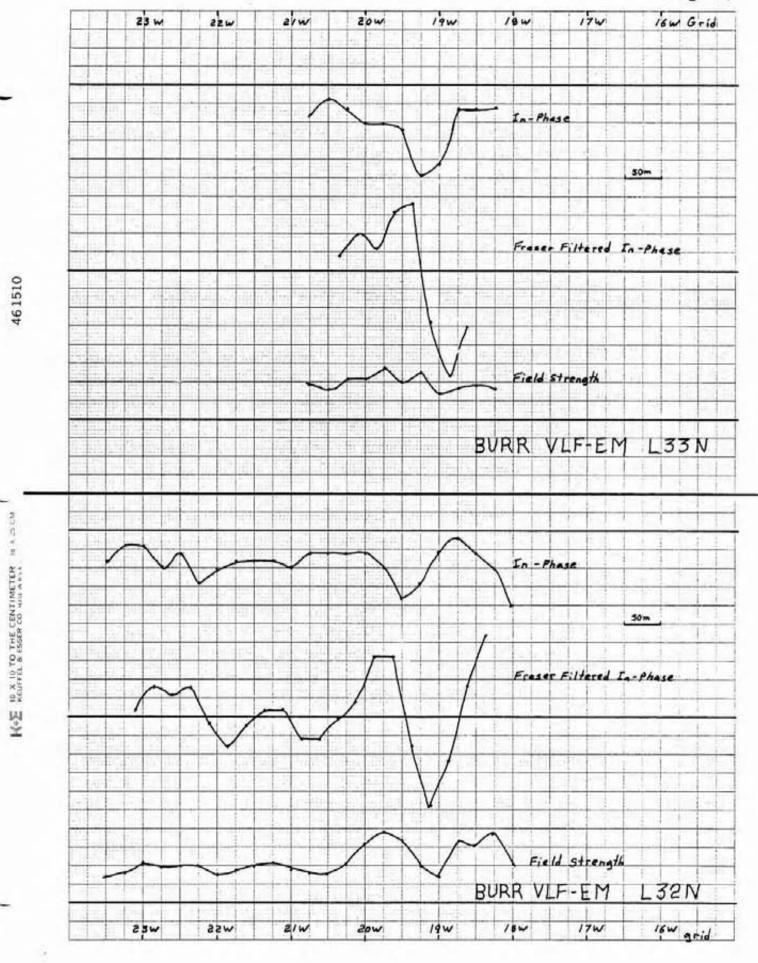
1969: Geology and Geochronology of the Guichon Creek Batholith, B. C. Dept. of Mines and Petroleum Resources, Bulletin No. 56.

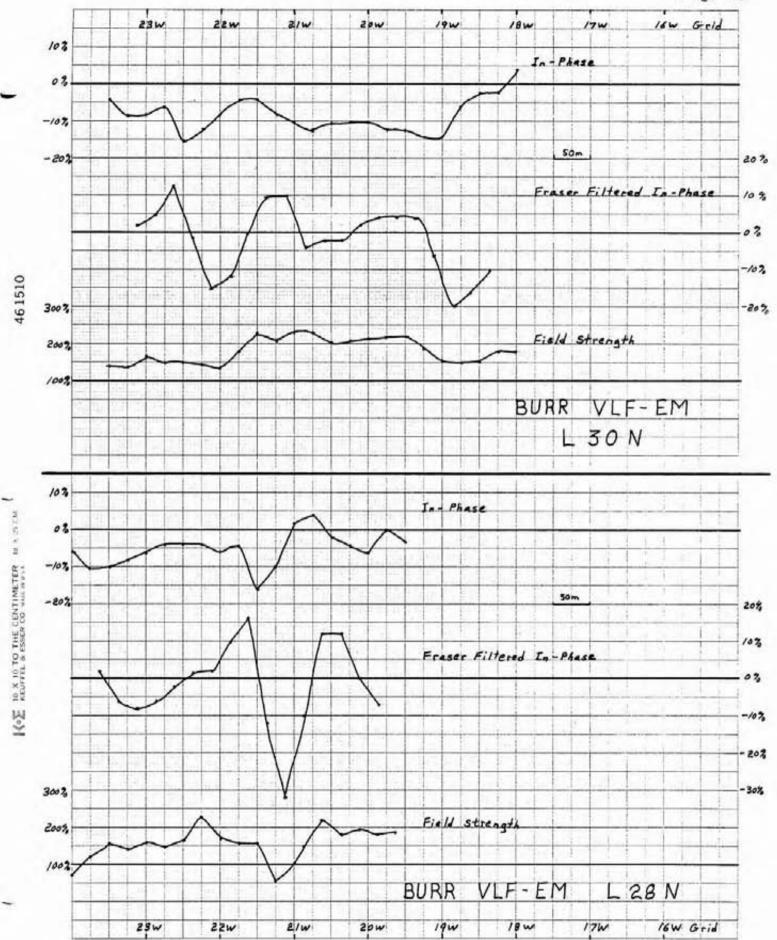
Peterson, N. R. and Ronka, V.

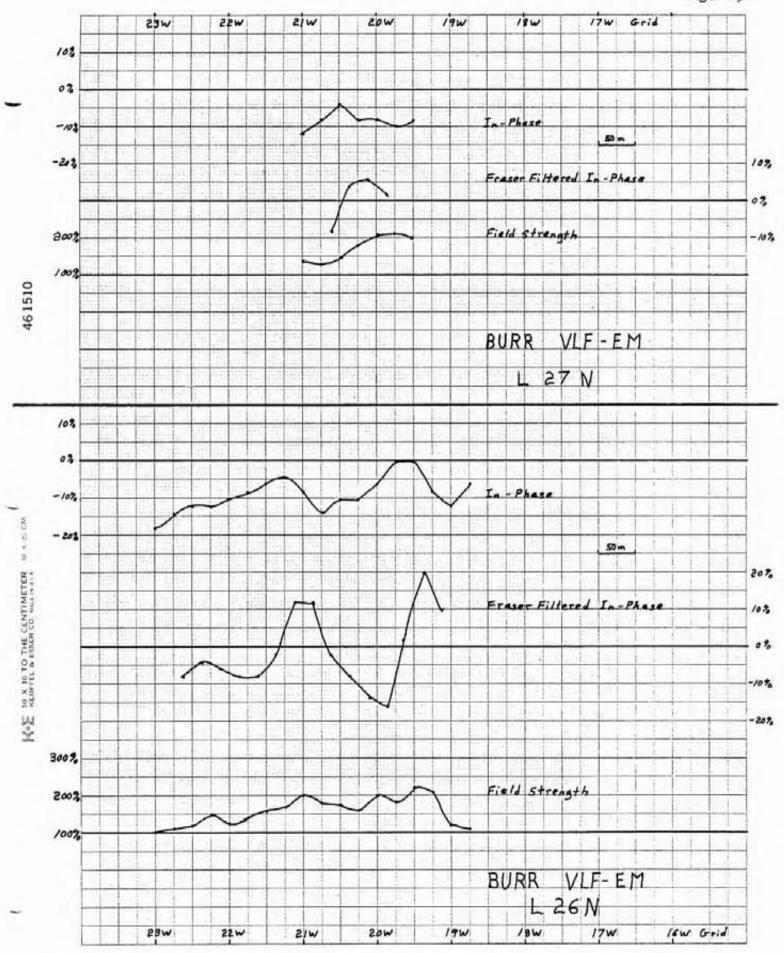
1969: Five Years of Surveying with the VLF-EM Method, a paper presented at the 1969 Annual Meeting, Society of Exploration Geophysicists.











17W

18W

300%

2002

100%

Field Strength

20 W

19W

BURR VLF-EM LIBN

16W

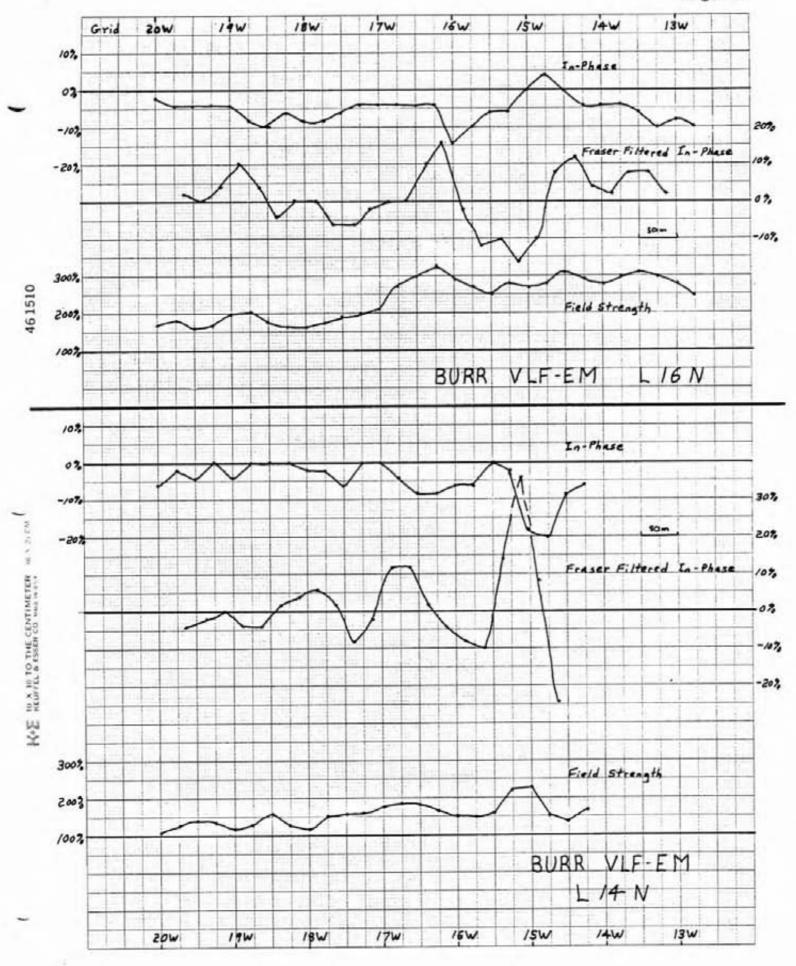
15W

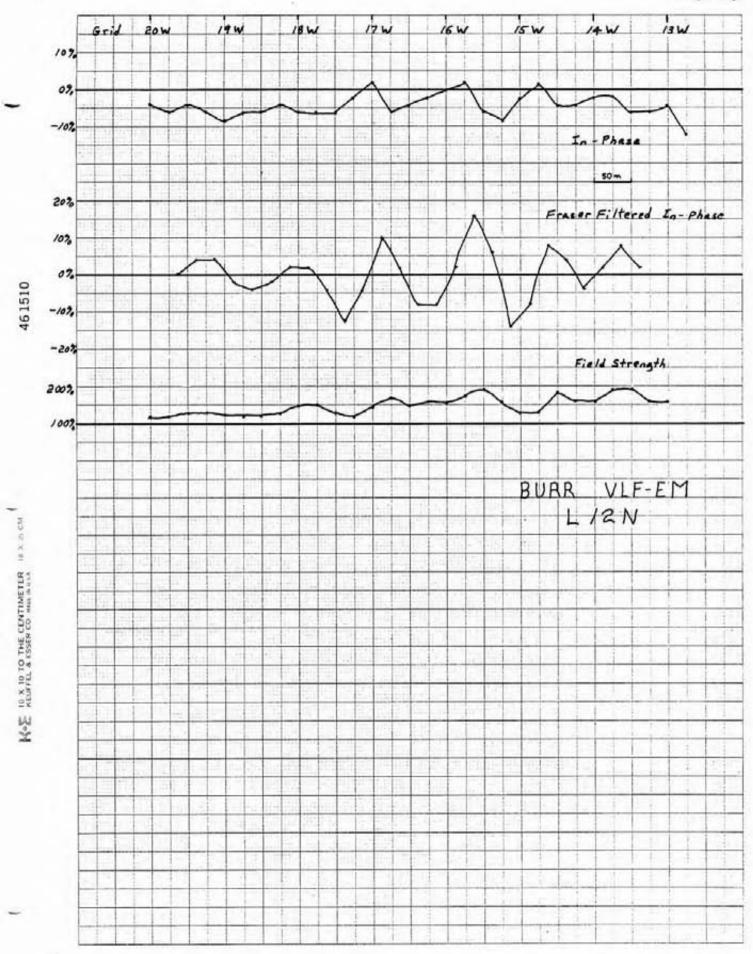
14W

13W

-20%

12W





#### APPENDIX B

## STATEMENT OF QUALIFICATIONS:

- I, Murray Morrison, of the City of Kelowna, in the Province of British Columbia, do hereby state that:
- I graduated from the University of British Columbia in 1969 with a B.Sc. Degree in Geology.
- I have been working in all phases of mining exploration in Canada for the past fourteen years.
- 3. During the past fourteen years, I have intermittently held responsible positions as a geologist with various mineral exploration companies in Canada.
- 4. I have examined many mineral properties in Southern British Columbia during the past fourteen years.
- I personally carried out the Radem VLF-EM survey outlined in this report.
- I own full title to the Burr 1 & 2 mineral claims described in this report.

May 1, 1984 Kelowna, B.C. Murray Morrison, B.Sc.

#### APPENDIX "C"

STATEMENT OF EXPENDITURES ON THE BURR 1&2 MINERAL CLAIKS. Statement of Expenditures in connection with the Radem VLF-EM Survey carried out on the Burr 1&2 mineral claims, N.T.S. 92-I-11&14, Ashcroft, B. C. for the year 1984. FIELDWORK - ESTABLISHING FLAGGED BASE LINE (2.5 km),

AND FKAGGE	GRID	LINES	(8.5	km) .
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AND FRAGGED GRID	LINES (8.5 km).	
M. MORRISON, Prospector	3 days @ \$80/day	\$ 240.
Lodging	3 days @ \$32/day	96.
Meals	3 days @ \$23/day	69.
Truck (4x4, incl. gasoline)	3 days @ \$55/day	165.
Flagging, belt chain thread		30.
	sub-total	600.
FIELDWORK - RADEM VLF - EM S	URVEY.	
M. MORRISON, Geologist	3 days @\$160/day	480.
Lodging	3 days @ 32/day	96.
Meals	3 days @ 23/day	69.
Truck (4x4, incl. gasoline)	3 days @ 55/day	165.
VLF-EM instrument rental	3 days @ 18/day	_ 54.
	sub-total	864.
REPORT PREPARATION COSTS		
Geologist (calculations, prof	iles, maps, and	
report)	12 days @\$160/day	240.
Drafting	1 day @ 80/day	80.
Typing		50.
Copying maps and reports - tw	12.	
	sub-total	382.
	GRAND TOTAL	\$ 1846.

I hereby certify that the preceding statement is a true statement of monies expended in connection with the Radem VLF-EM survey carried out April 5-15, 1984.

April 15, 1984

MURRAY MORRISON - GEOLOGIST

BURR N o. 1 Instrument : Crone Geophysics Rodem VLF-EM 10% contour intervals 20% contour axis of conductor Please see detailed line profiles with report. Please see Map 8-84-4 for grid and geology. L.C.P. BURR #1 BURR N o. 2 GEOLOGICAL BRANCH ASSESSMENT REPORT L.C.P. BURR 2 BURR PROPERTY Ashcroft Area, Kamloops Mining Division, B.C. Radem VLF-EM Survey Fraser Filtered Oata Burr 1+2 Mineral Claims Legal Corner Posts tie-in with compass and belt chain. April 1984 N.T.S. 92-1-11+14 To Accompany a Geoghysical Report by M. Morrison. In American Draunby M.M. Contoured by M.M. Scale 1: 50,000 Map 8-84-3

