

521718

GEOPHYSICAL REPORT

ON THE

GOLDEN AND SIDE CLAIMS [32 UNITS]

Lat. $53^{\circ}30'N$

Long. $132^{\circ}18'W$

NTS 103F/8, 9W

SKEENA M.D.

QUEEN CHARLOTTE ISLANDS, B.C.

for

ASHCROFT RESOURCES LTD.

and

BURLINGTON GOLD MINES LTD.

Vancouver, B.C.

by

A.F. ROBERTS, P. ENG.

September 15, 1980

*Report taken from the VSE - Statement of Material
Facts - BURLINGTON GOLD MINES - (A to Z file)*

A. F. ROBERTS, P.ENG.
CONSULTING MINING ENGINEER

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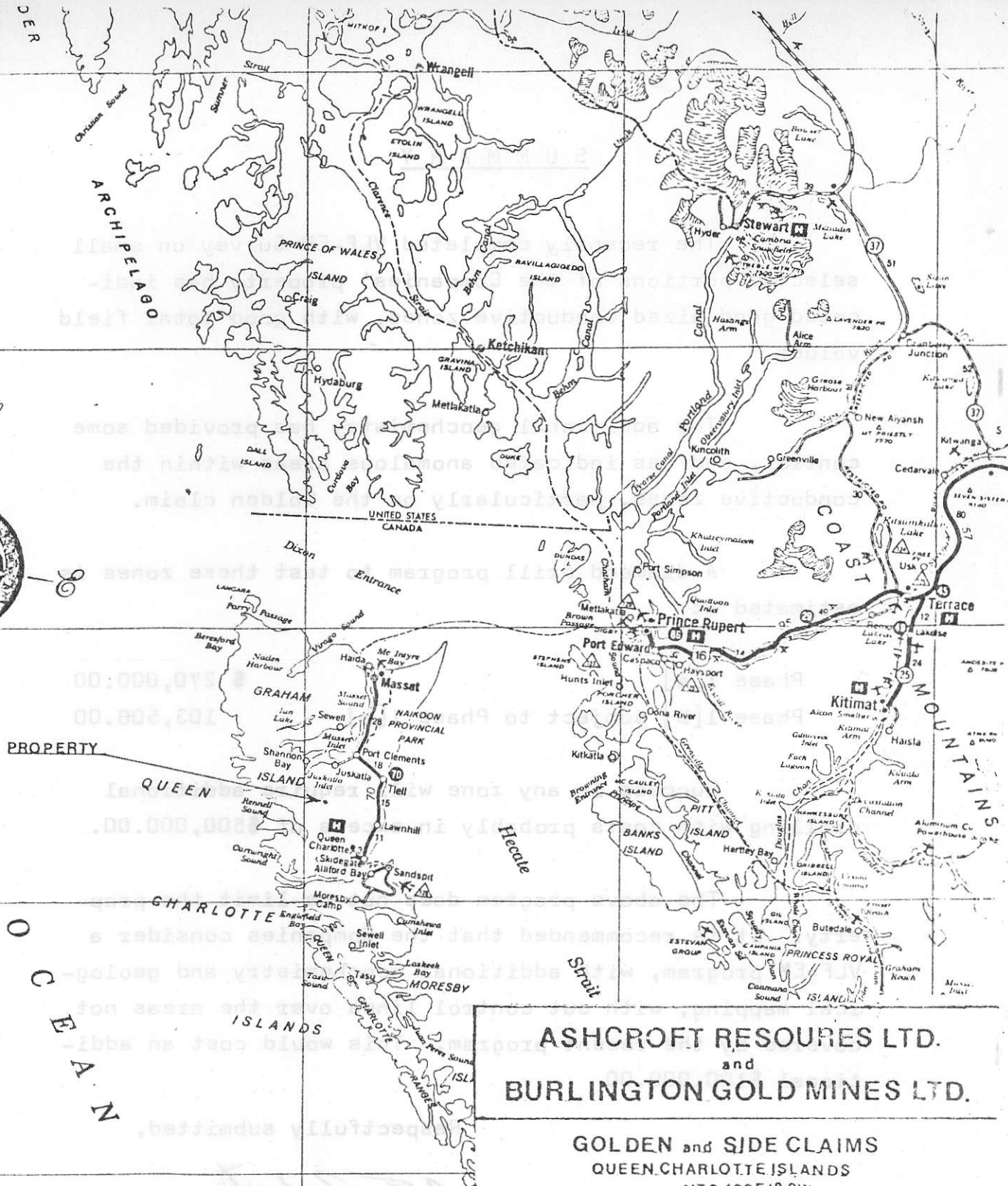
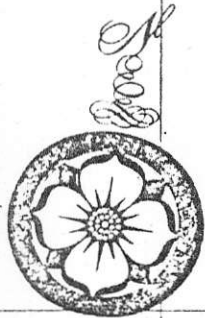
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APPENDICES

- 11] Appendix A - Assay Certificates
and Procedures.....[End of Report]
- 19] Appendix B - Operating Instructions
Fraser Filter Calculations.....[End of Report]

REFERENCES

- 1] Geochemical, Geophysical Report on the Golden and Side
Claims for Ashcroft Resources, A.F. Roberts, P. Eng.,
June 28, 1980
- 7] B.C. Department of Mines & Petroleum Resources, Bulletin
54, Geology of the Queen Charlotte Islands, B.C., A. Suth-
erland Brown 1968
- 8] B.C. Department of Mines & Petroleum Resources, Babe Gold
Prospect, Queen Charlotte Islands, B.C., 103F/9E;
A. Sutherland Brown, T.G. Schroeter, 1977
- 9] Reports for Ashcroft Resources Ltd., A.F. Roberts, P.Eng.,
February 14, 1979; December 28, 1979
- 10] Reports for Consolidated Cinola, with drill logs, A.F.
Roberts, P.Eng., 1977-1979
- 16] Geochemistry Reports for Ashcroft Resources Ltd., and
other companies, A.F. Roberts, P.Eng., 1979 to date
- 17] GSC Bulletin 280, Geochemistry of Gold and its Deposits,
R.W. Boyle, 1979
- 18] Economic Geology, Vol. 64, 1969; A Simplified Statistical
Treatment of Geochemical Data by Graphical Representation
by Claude Le Peltier

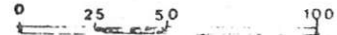


ASHCROFT RESOURCES LTD.
and
BURLINGTON GOLD MINES LTD.

GOLDEN and SIDE CLAIMS
QUEEN CHARLOTTE ISLANDS
NTS 103F/8.9W

VLF-EM SURVEY
LOCATION MAP

Drawn by: *QFA*
Scale: 1cm 25m
Date: Sept. 15, 1980



To Accompany Report by A. F. Roberts, P. Eng.,
dated September 15, 1980.

Summer cruises along the Pacific Coast are
operated by Royal Viking Lines; Pacific Far

S U M M A R Y

The recently completed VLF-EM Survey on small selected portions of the Companies' property has indicated good sized conductive zones, with good total field values.

The additional geochemistry has provided some control, and has indicated anomalous areas within the conductive zones, particularly on the Golden claim.

A diamond drill program to test these zones is estimated at

Phase 1[a]	\$ 270,000.00
Phase 1[b] subject to Phase 1[a]	103,500.00

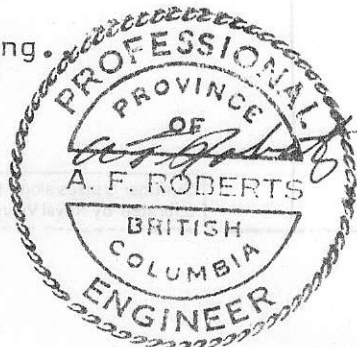
Success in any zone will require additional drilling with costs probably in excess of \$500,000.00.

The above program does not de-limit the property. It is recommended that the Companies consider a VLF-EM program, with additional geochemistry and geological mapping, with cut control lines over the areas not covered by the recent program. This would cost an additional \$100,000.00

Respectfully submitted,



A.F. Roberts, P. Eng.
September 15, 1980



A. F. ROBERTS, P.ENG.
CONSULTING MINING ENGINEER

GEOPHYSICAL REPORT
ON THE
GOLDEN AND SIDE CLAIMS [32 UNITS]
Lat. $53^{\circ}30'N$ Long. $132^{\circ}18'W$
NTS 103F/ 8W, 9W
SKEENA M. D.
QUEEN CHARLOTTE ISLANDS, B.C.
for
ASHCROFT RESOURCES LTD.
and
BURLINGTON GOLD MINES LTD.
Vancouver, B.C.
by
A.F. ROBERTS, P. ENG.
September 15, 1980

INTRODUCTION ^{1]}

This report is authorized by the Directors of the Companies.

Its purpose is to analyze the results of a VLF-EM survey conducted over two limited areas of the Side and Golden claims in the period August 25 - August 31, 1980.

In conjunction with this survey, soil samples were taken on all stations that could be sampled to correlate with the geochemical survey done previously, the lines of which could not be re-established with any certainty. No "A" horizon samples were taken on this survey.

The original geochemical survey was done on north-south lines, with no cut lines for control, and

1] Geochemical, Geophysical Report on the Golden and Side Claims for Ashcroft Resources Ltd., A.F. Roberts, P.Eng., June 20, 1980

FOREST

CONCINOLA

F C

PROPERTY

ASHCROFT RESOURCES LTD.

and

BURLINGTON GOLD MINES LTD.

GOLDEN and SIDE CLAIMS

QUEEN CHARLOTTE ISLANDS

M.T.S. 103F/8.9W

VLF-EM SURVEY

TOPOGRAPHIC MAP

Drawn by: JFB

Scale: 1cm 25m

Date: Sept. 15, 1980

0 25 50 100

To Accompany Report by A. F. Roberts, P. Eng.

appears to have a westerly drift, especially in the steep northerly elevations.

The VLF-EM survey was done on east-west lines, from a cut N-S base line between the two claims and with some control from the west claim line of the Golden claim.

The field work was done by Team Mineral Services Inc. of Delta, B.C.

This report is based on the results submitted by the above contractor.

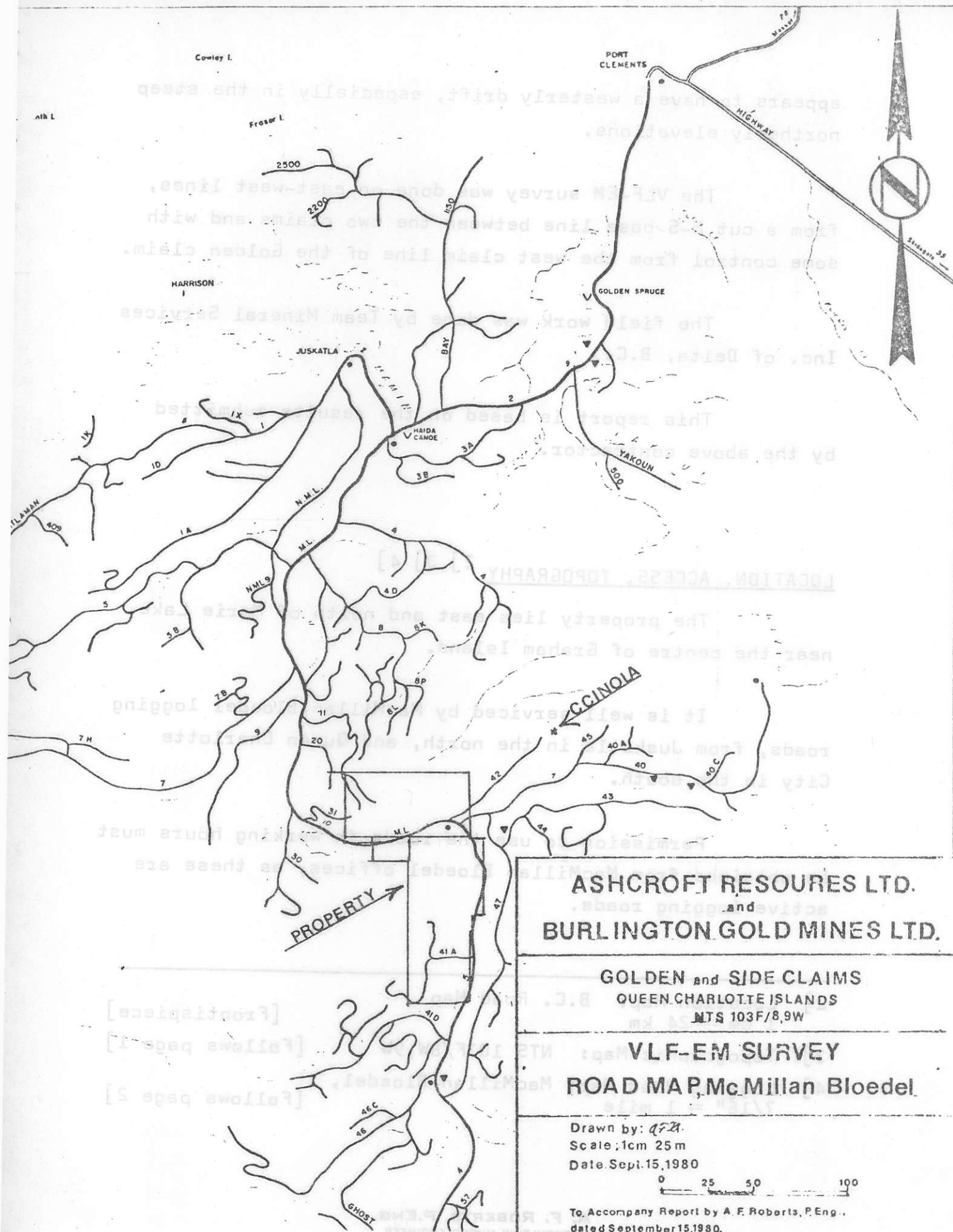
LOCATION, ACCESS, TOPOGRAPHY 2] 3] 4]

The property lies east and north of Marie Lake, near the centre of Graham Island.

It is well serviced by MacMillan-Bloedel logging roads, from Juskatla in the north, and Queen Charlotte City in the south.

Permission to use the roads in working hours must be obtained from MacMillan Bloedel offices, as these are active logging roads.

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- | | | |
|----|--|------------------|
| 2] | Location Map: B.C. Road Map
1 cm = 24 km | [Frontispiece] |
| 3] | Topographic Map: NTS 103F/8W,9W | [Follows page 1] |
| 4] | Logging Road Map; MacMillan-Bloedel,
7/16" = 1 mile | [Follows page 2] |



The Gold, Golden and Side claims rise steeply from an elevation of 60 metres at Marie Lake to a maximum of 350 metres along the north boundary.

They are 50% covered with virgin timber, and 50% with slash, and dense second growth timber.

CLAIMS ^{5]}

The claims covered by this report are described as follows:

<u>Name</u>	<u>Units</u>	<u>Record No.</u>	<u>Expiry Date</u>
Golden	16	898	January 12, 1983
Side	16	902	January 12, 1983

The Legal Corner Post, and other posts examined were made and marked in accordance with the Mining Act.

The exact location of, and the amount of ground covered can only be determined by a legal survey.

5] Claim Map, B.C. Department of Mines
& Petroleum Resources, 103F/8W, 9W,
1:50,000

[Follows page 3]

GENERAL GEOLOGY 6] 7] 8] 9] 10]

According to Bulletin 54, the claims are underlain by:

- 1] Cretaceous Haida Formation of green glauconitic, and grey, sandstones and siltstones, about the east half of the Side Claim.
- 2] Covering the other half of the Side and all of the Golden, is the overlying Masset Formation [Paleocene] consisting of rhyolite and ash flows, and breccia.

At the Marie Lake quarry the rocks are brownish rhyolite flow and breccias, with one dacite dyke. All well fractured and pyritized. Samples taken here by the writer across 121 metres assayed from 0.001 to 0.005 oz/ton in gold, and 0.80 ozs/ton in silver.

On the Golden claim in the area of 8+00N the rocks consist of brecciated, highly pyritized rhyolites, while at 6+00N, 6+00 to 7+50W, flow breccias, and silicified tuff are reported, with overlying basalt.

-
- 6] Geology Map: Bulletin 54, 1:1,250,000 [Follows page 4]
 - 7] B.C. Department of Mines & Petroleum Resources, Bulletin 54, Geology of the Queen Charlotte Islands, B.C.; A. Sutherland Brown, 1968
 - 8] B.C. Department of Mines & Petroleum Resources; Babe Gold Prospect, Queen Charlotte Islands, B.C., 103F/9E, A. Sutherland Brown, T.G. Schroeter, 1977
 - 9] Reports for Ashcroft Resources Ltd., by A.F. Roberts, P.Eng., February 14, 1979; December 23, 1979
 - 10] Reports for Consolidated Cinola, with drill logs; A.F. Roberts, P.Eng., 1977-1979



ASHCROFT RESOURCES LTD.
and
BURLINGTON GOLD MINES LTD.

GOLDEN AND SIDE CLAIMS
QUEEN CHARLOTTE ISLANDS
MTS 103F/8,9W

VLF-EM SURVEY
GEOLOGY MAP

Drawn by: *ASD*
Scale: 1cm = 25m
Date: Sept. 15, 1980



To Accompany Report by A.E. Roberts, P.Eng.,
dated September 15, 1980.

- LEGEND**
- QUATERNARY**
Q Recent alluvium, Pleistocene till
Q-S Quaternary overlying Skanun Formation
- TERTIARY**
PALEOCENE - EOCENE
TM MASSET FORMATION: subaerial basalt flows and breccias
TMB Tertiary member
- CRETACEOUS**
ALBIAN - TURONIAN
KHa HAIDA FORMATION: green glauconitic and gray sandstone
- JURASSIC**
BAJOCIAN - CALLOVIAN
JY YAKOUN FORMATION: porphyritic andesite agglomerate

NOTE: GEOLOGY MAP FROM BULLETIN 54, B.C. DEPT. OF MINES & PETROLEUM

On the Side Claim, at 12+00N - 12+00E, vesicular basalt float, interbedded andesite and argillite, striking 20° , are reported. At 8+00E on the same line argillite is present striking 20° , dip 30° SE.

No obvious structure is present, or been observed, although the fracturing is stronger in the northeasterly direction.

Bulletin 54 indicates a strong fault and a lineament on the Side claim.

GEOCHEMISTRY 11] 12] 13] 14] 15] 16] 17] 18]

This minor geochemistry program was conducted to obtain some control, and relate to the previous program.

Only the results of this program are mapped.

-
- | | | |
|-----|---|------------------|
| 11] | Appendix A, Assay Certificates and Analysis Procedures | [End of Report] |
| 12] | Golden Claim, Geochemistry, Au-Ag, Plate D | [Back Pocket #1] |
| 13] | Golden Claim, Geochemistry, As-Ag, Plate E | [Back Pocket #1] |
| 14] | Side Claim, Geochemistry, Au-Ag, Plate I | [Back Pocket #2] |
| 15] | Side Claim, Geochemistry, As-Ag, Plate J | [Back Pocket #2] |
| 16] | Geochemistry Reports for Ashcroft Resources Ltd., and other companies, A.F. Roberts, P.Eng., 1979 to date | |
| 17] | GSC Bulletin 280, The Geochemistry of Gold and its Deposits, R.W. Boyle, 1979 | |
| 18] | Economic Geology, Vol. 64, 1969. A Simplified Statistical Treatment of Geochemical Data by Graphical Representation, by Claude Le Peltier | |

The samples were all from the "B" horizon, or in some cases mixed "B-C" horizon, where there was no clean break between them. No "A" horizon samples were taken.

Samples were mostly augered, stored in wet-proof kraft paper bags, and sent to Acme Analytical Labs. Ltd., Vancouver, for assay. Results are reported in ppm for arsenic, and silver; in ppb for mercury and gold.

Separate maps were made for gold-silver and arsenic, mercury, for each claim.

From previously accumulated data by the writer the following values were used:

Gold background	5 ppb	anomalous	10 ppb
Arsenic threshold	17 ppm	anomalous	21 ppm
Mercury threshold	300 ppb	anomalous	400 ppb
Silver threshold	0.5 ppm	anomalous	0.75 ppm

In this steep terrain, there must be some downhill migration of anomalies, which must be considered when comparing to other survey data.

Golden Claim:

The most northerly line [8+70N] is anomalous for gold, mercury from 11+00W to 15+00W, extending in part through Line N8+35.

Smaller gold anomalies occur on Line N+35 at 8+75, W8+50N.

There are a few single spot anomalous gold values on Lines 6+00N and N7+65.

Silver shows only two threshold values on line N7+65, with a few values 2 to 4 times background.

Almost all the samples taken show the area to be highly anomalous in mercury, with several coincident arsenic anomalies. Many arsenic values, although not anomalous are well above background.

This area appears to be open to the north and west for extension.

Side Claim:

Gold anomalous values report only as scattered values, Line N14+00 has four in closer proximity.

Silver values remain at background, with one at threshold.

Mercury shows areas of interest on Lines N7+00 to N9+00, 0 to E7+00, with association of anomalous arsenic.

Mercury shows a tendency to strike northeasterly in narrow bands - 25 to 50 metres wide which may be the direction of fracturing.

The lines are not close enough together, and there is an insufficient number of samples to draw a definite conclusion.

The previous geochemistry indicated considerably more interesting values in this area, but there were a lot more samples on 200 m spaced lines.

VLF-EM SURVEY 19]

This survey is a repeat of an earlier program as the results using a Sabre Model VLF-EM unit, and a Ronka EM-16 were incompatible.

The new survey was limited to portions of the previous program that indicated areas of interest.

Two instruments were used - Serial No. 103, and No. 104. These instruments provide readings of the dip angle, and a total field measurement as a percentage above a threshold value of 50%, set at the same station every day.

Readings were taken at 25 metre intervals on the selected lines.

Fraser Filter values were calculated, and with the total field, and dip angle readings were plotted on cross sections.

Fraser Filter and total field values were also plotted in plan, and contoured.

Axis of conductors were taken from the cross sections and plotted on both the Fraser Filter, and total field plans.

19]	Appendix B, Operating Instructions, and Fraser Filter Calculations		[End of Report]
20]	Cross Sections Plate A]		
21]	Plan, Fraser Filter Plate B]	Golden	[Envelope #1,
22]	Plan, Total Field Plate C]	Claim	End of Report]
23]	Cross Sections, Plates F1, F2]		
24]	Plan Fraser Filter Plate G]	Side	[Envelope #2,
25]	Plan, Total Field, Plate H]	Claim	End of Report]

Golden Claim:

The Fraser Filter plan indicates a large positive area, open north and south, and over 100 meters wide in this section, with an east-west width of 120 meters on Line 8+70N, and 300 meters on Line N7+65, wider on the two intervening lines. Two northeast trending axes dominate the strong section of this conductor zone, which overlies a strong total field area.

Line 6+00N at N7+50 shows a strong conductor axis over a width of 250 meters trending northeasterly through Line N7+65. This conductive zone also overlies a reasonably strong total field area.

Side Claim:

The Fraser Filter conductive zones are almost perfectly aligned with the anomalous mercury zones, but of greater width. The axes tend to center on the geochemical anomalies, and coincide with the strongest areas of total field.

The strongest and largest areas are in the southwest, with a northeasterly trend, and substantial widths.

CONCLUSIONS

The survey has located a number of conductive axes, on both claims; the associated zones being of good widths.

The limited geochemistry, has provided some control, and shows a few anomalies associated with the EM conductors.

Auguring through the "A" horizon has provided "B" horizon samples, that show more consistency than surface "A" horizon. This method is recommended for further work.

Unless two instruments can be adequately synchronized, only one instrument should be used on a property. The error is probably due to personnel, and also moisture getting into the instrument.

RECOMMENDATIONS

The number of possible drill locations is large, therefore only a few are recommended to test both claims, and will be subject to changes by the field supervisor, both as to exact location and total depth.

The program has not delimited the property. Further work should be conducted along the present lines to the limits of the property, with concurrent soil sampling, and to the areas not properly covered by geochemistry.

Diamond Drill Holes:

The following locations are considered the best sites for testing the conductive zones. All holes are -45° , and 150 metres deep.

Reasons for the locations are given with a brief note.

DDH - Golden Claim

All holes - Azimuth 300°
Dip -45°

GH-1 - N8+60, W13+20
Negative filter, very strong total field [T.F.]
Anomalous Au, Ag, As

- GH-2 - N7+80, W12+00
Strong filter, strong T.F. Anomalous Hg
Sub anomalous As, Ag
- GH-3 N+40, W10+85
Strong filter, strong T.F. Anomalous Hg
Subanomalous, As, Ag
- GH-4 - N8+10, W11+35
Strong filter, strong T.F. Anomalous Au, Ag
- GH-5 N5+85, W14+35
Good filter, low T.F. [instrument reading low?]
Anomalous As, Ag
- GH-6 W5+85, W8+15
Strong filter, Fair T.F.
Anomalous Au, Hg, sub anomalous As

Total - 900 metres

An additional six holes are plotted in, indicated with dashes, but no numbers.

DDH - Side Claim

All holes Azimuth 290°
Dip -45°

- SH-1 N8+00, E6+60
Strong filter, fair T.F.
Low arsenic, near anomalous Au value
- SH-2 N10+80, E9+25
Strong filter, good total field, anomalous Ag,
Sub anomalous As, Hg
- SH-3 N6+90, E0+80
Strong filter, strong T.F.
Anomalous As, Hg
- SH-4 N9+85, E10+00
Strong filter, good T.F. No recent geochem.
Post geochem suggests good As, Au, Hg.
- SH-5 N13+80, E8+50
Strong filter, good T.F.
Anomalous Ag, Au, Sub anomalous As

SH-6 N16+75, E12+15
 Strong filter, strong T.F.
 Anomalous Hg, anomalous Au to north
 Low As

Total - 900 metres

Eight other possible locations marked on the map,
 with dashes, but not numbered.

ESTIMATED COSTS

Phase 1[a]

Golden Claim:

Drill holes numbered GH-1, 2, 3 and 6.
 These test the stronger anomalies.

600 metres

Side Claim:

Drill holes numbered 1, 2, 3 and 6.
 These also test the stronger anomalies.

Total Phase 1[a] - 1,500 metres

Phase 1[b]

Golden Claim:

Drill holes 4, 5 to back up favourable re-
 sults from Holes 1, 2 and 3.

- 300 metres

Side Claim:

Drill holes 4, 5 to to back up favourable
 results from Holes 1, 2, 3 and 6.

Note: Exact locations of holes and depths
 subject to field supervision.

The attitude may have to be changed
 to cut all formations to the base-
 ment argillites. Subject to field
 supervision, and consultation.

Phase 1[a]

Roads		\$ 50,000
Mobilization, demobilization		5,000
Diamond Drilling @ \$100/metre	100.00	
Assaying	8.75	
Core Boxes, etc.	5.00	
Camp, Supervision, labour, etc.	<u>35.00</u>	
Total		\$148.75/metre

Say \$150/metre

1,200 metres @ \$150/metre	<u>180,000</u>
Sub-total	235,000
15% Contingencies	<u>35,200</u>
Total	270,200

Say \$270,000

Phase 1[b]

600 metres @ \$150/metre	90,000
15% Contingencies	<u>13,500</u>
Total	<u>\$103,500</u>

Phase II

If success is had in any anomalous zone, further drilling will be required, the cost of which cannot be estimated at this time.

Consideration should be given to drilling the supplementary holes within these anomalies, and in the weaker anomalies.

The above program[s] can be expected to cost an additional \$500,000.

Also, further consideration should be given to extending the geophysical-geochemical program across the remainder of the property on cut lines, which will give

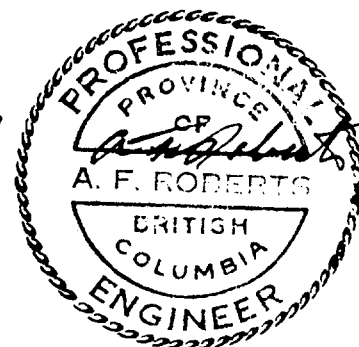
proper control and permit proper geological mapping.

Previous experience has indicated that this would be expensive, costing as much as \$100,000.

Respectfully submitted,



A.F. Roberts, P. Eng.,
September 15, 1980



CERTIFICATE

I, A.F. Roberts of 812 Fairbrook Crescent, Richmond, B.C., do hereby certify that:

- [1] I am a graduate of the University of British Columbia [B.Ap.Sc.] in Mining Engineering, 1951.
- [2] I am registered as a Professional Engineer of the Province of British Columbia, and am a member of The Canadian Institute of Mining and Metallurgy.
- [3] I have practiced my profession since 1951 with Quatsino Copper Gold Mines Ltd., Giant Mascot Mines Ltd., Cochenour Willans Gold Mines Ltd., Mogul Mines Ltd., Kerr Addison Gold Mines Ltd., Atlantic Coast Copper Corporation Ltd., Wasamac Mines Ltd., Brenda Mines Ltd., and T.C. Explorations Ltd. Since January of 1970 I have been an independent Consultant.

Previous to, and during University, I worked as a miner underground, and on several exploration-development projects.

- [4] The accompanying report is based entirely on my personal analysis of the reports and other data referred to in the text, and on a visit to the property on February 3-5, 1979.
- [5] I have no interest, direct or indirect, in the Ashcroft Resources Ltd. and the Burlington Gold Mines Ltd. property, or adjacent properties, nor have I any interest, direct or indirect, in any companies controlled by Ashcroft Resources Ltd. or Burlington Gold Mines Ltd. I have not, nor do I expect to receive any interest in the shares of the Companies, in their securities, or in those of any company with they may become associated.
- [6] I consent to the use of this report, in or in connection with a prospectus, or a statement of material facts relating to the raising of funds for this project.

DATED at Vancouver, British Columbia, this 15th day of September, 1980.

"A. F. Roberts"
A.F. Roberts, P. Eng.

ACME ANALYTICAL LABORATORIES LTD.

Assaying & Test Analysis
823 E. Hastings St., Vancouver, B.C. V6A 1H6
Phone: 253-3158

To: Asarco Resources Ltd.
758 - 510 W. Hastings St.,
Vancouver, B.C.
V6B 1E8



For No. 80-986

Type of Sample: Soil

GEOCHEMICAL ASSAY CERTIFICATE

GOLDEN

SAMPLE No.	As	Av	As	Hg
200W	2.00	10.00	2.75	
252	2.00	16.00	2.50	
280	2.00	11.00	3.00	
275	2.00	4.00	3.80	
275A	1.00	11.00		
625	1.00	7.00		
625	1.00	6.00	3.85	
625	1.00	13.00	3.65	
675	1.00	5.00	3.10	
700	1.00	8.00	3.00	
725	1.00			
750	1.00			
775	1.00			
800	1.00			
825	1.00			
850	1.00			
875	1.00			
900	1.00			
925	1.00			
950	1.00			
975	1.00			
1000	1.00			
1025	1.00			
1050	1.00			
1075	1.00			
1100W	1.00			
1125W	1.00			
1150	1.00			
1175	1.00			
1200	1.00			
1225	1.00			
1250	1.00			
1275	1.00			
1300	1.00			
1325	1.00			
1350	1.00			
1375	1.00			
1400W	1.00			

APPENDIX "A"

ASSAY CERTIFICATES

ASSAY PROCEDURES

DATE SAMPLES RECEIVED SEPT. 3, 1980
DATE REPORTS MAILED SEPT. 18, 1980
ASSAYER
DEAN TOYE, B.Sc.
CHIEF CHEMIST
CENTRAL B.C. ASSAYER

All reports are the confidential property of client.
All results are in PPM.
DIRECTION:
DETERMINATION:
P = -50 mesh and pulverized



To: Ashcroft Resources Ltd.,
728 - 510 W. Hastings St.,
Vancouver, B.C.
V6B 1L8

ACME ANALYTICAL LABORATORIES LTD.

Assaying & Trace Analysis

852 E. Hastings St., Vancouver, B.C. V6A 1R6

phone: 253-3158

File No. 80-986

Type of Samples Soil

Disposition

GEOCHEMICAL ASSAY CERTIFICATE

GOLDEN

SAMPLE No.		Ag	Au	As	Hg							
600N	500W	.2	.005	10	.275							1
	525	P .2	.005	16	.520							2
	550	P .2	.005	11	.300							3
	575	P .1	.005	4	.080							4
	575A	.1	.005	11	.600							5
	625	P .1	.005	7	.450							6
	650	.1	.005	6	.085							7
	675	.1	.005	13	.165							8
	700	.1	.005	5	.110							9
	725	P .1	.005	8	.200							10
	750	N.S.										11
	775	P .1	.005	13	.220							12
	800	P .1	.005	15	.060							13
	825	.2	.010	16	.550							14
	850	P .1	.005	11	.045							15
	875	P .1	.005	12	.350							16
	900	P .1	.005	14	.185							17
	925	P .2	.005	7	.155							18
	950	P .1	.005	16	.280							19
	975	P .1	.005	15	.230							20
	1000	P .1	.005	7	.190							21
	1025	P .2	.005	8	.330							22
	1050	P .1	.005	6	.150							23
	1075	P .1	.005	26	.650							24
600N	1100W	P .1	.005	10	.530							25
												26
600N	1125W	P .1	.005	13	.270							27
	1150	P .2	.005	8	.700							28
	1175	P .1	.005	9	.430							29
	1200	P .1	.005	10	1.200							30
	1225	P .1	.010	13	1.630							31
	1250	P .1	.005	5	.030							32
	1275	P .1	.005	6	.080							33
	1300	P .1	.005	13	.495							34
	1325	P .1	.005	12	.410							35
	1350	P .1	.005	15	6.800							36
	1375	P .1	.005	13	.185							37
600N	1400W	P .1	.005	12	.570							38
												39
												40

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DIGESTION:.....

DETERMINATION:.....

P= -20 mesh and pulverized

DATE SAMPLES RECEIVED SEPT. 3, 1980

DATE REPORTS MAILED SEPT. 18, 1980

ASSAYER

DEAN TOYE, B.Sc.
CHIEF CHEMIST
CERTIFIED B.C. ASSAYER



To: Ashcroft Resources Ltd.,

ACME ANALYTICAL LABORATORIES LTD.

Assaying & Trace Analysis

852 E. Hastings St., Vancouver, B.C. V6A 1R6

phone: 253 - 3158

File No. 80-986

Type of Samples Soil

Disposition

GEOCHEMICAL ASSAY CERTIFICATE

Golden

P.2

SAMPLE No.		Ag	Au	As	Hg							
600N	1425W	.1	.005	12	.550							1
	1450	.2	.005	12	.330							2
	1475	.2	.010	10	.120							3
600N	1500W	.1	.005	17	.300							4
												5
765N	550W	.2	.005	13	.475							6
	575	.1	.005	9	.430							7
	600	.1	.005	16	.725							8
	625	.1	.005	2	.310							9
	650	.1	.005	5	.060							10
	675	.1	.005	8	.165							11
	700	.1	.005	2	.145							12
	725	.1	.005	7	.210							13
	750	.1	.005	14	.135							14
	775	.1	.005	10	.150							15
	800	.1	.005	19	.515							16
	825	.1	.005	15	.620							17
	850	.2	.005	11	.250							18
	875	.2	.005	19	.270							19
	900	.3	.005	17	.470							20
	925	.1	.005	13	.185							21
	950	.3	.005	16	.360							22
	975	.2	.005	8	.185							23
	1000	.1	.005	4	.300							24
	1025	.1	.005	10	.230							25
	1050	.1	.005	9	.400							26
	1075	.4	.005	4	.300							27
	1100	.1	.005	9	.150							28
	1125	.4	.005	13	.380							29
	1150	.3	.005	15	.750							30
	1175	.5	.005	16	.835							31
	1200	.4	.005	12	.770							32
	1225	.3	.005	14	.410							33
	1250	.3	.005	16	.360							34
	1275	.1	.005	9	.185							35
	1300	.1	.005	7	.150							36
	1325	.5	.005	12	.380							37
765N	1350W	.4	.005	13	.230							38
												39
												40

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DIGESTION:.....

DETERMINATION:.....

All the samples in this page are
-20 mesh and pulverized

DATE SAMPLES RECEIVED SEPT. 3, 1980

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ASSAYER

DEAN TOYE, B.Sc.
CHIEF CHEMIST
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ACME ANALYTICAL LABORATORIES LTD.

Assaying & Trace Analysis

852 E. Hastings St., Vancouver, B.C. V6A 1R6

phone: 253 - 3158

To: Ashcroft Resources Ltd.,

File No. 80-986

Type of Samples Soil

Disposition

GEOCHEMICAL ASSAY CERTIFICATE

Golden

SAMPLE No.			Ag	Au	As	Hg						
765N	1375W	P	.1	.005	9	.480						1
	1400	P	.2	.005	8	.890						2
	1425	P	.2	.005	8	2.700						3
	1450		.1	.010	17	.910						4
	1475		.1	.005	11	.135						5
765N	1500W		.1	.005	20	.310						6
												7
800N	650W		.1	.010	15	.150						8
	675		.1	.005	14	.150						9
	700		.1	.005	6	.140						10
	725	P	.1	.010	10	.110						11
	750	P	.1	.005	8	.035						12
	765		.1	.005	13	.200						13
	775	P	.1	.005	15	.525						14
800N	800W	P	.1	.005	11	.070						15
												16
835N	700W		.1	.010	14	.300						17
	725		.1	.005	15	.230						18
	750		.1	.040	5	.050						19
	775		.1	.015	2	.125						20
	800	P	.1	.005	9	.460						21
	825		.1	.045	2	.080						22
	850		.1	.065	32	2.200						23
	875		.1	.010	24	.970						24
	900		.1	.010	4	1.200						25
	925		.2	.015	19	1.700						26
	950		.1	.030	7	.640						27
	975		.1	.010	8	.470						28
	1000		.1	.005	13	.980						29
	1025		.1	.010	17	1.600						30
	1050		.1	.010	13	1.400						31
	1075		.1	.005	18	.950						32
	1100	P	.1	.010	11	3.100						33
	1125	P	.1	.005	9	1.600						34
	1150	P	.2	.020	9	2.700						35
	1175	P	.1	.005	7	1.200						36
	1200	P	.2	.005	12	.310						37
835N	1225W	P	.1	.005	9	.440						38
												39
												40

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DIGESTION:.....

DETERMINATION:.....

P = -20 mesh and pulverized

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ASSAYER

DEAN TOYE, B.Sc.
CHIEF CHEMIST
CERTIFIED B.C. ASSAYER



To: Ashcroft Resources Ltd.,

ACME ANALYTICAL LABORATORIES LTD.

Assaying & Trace Analysis

852 E. Hastings St., Vancouver, B. C. V6A 1R6

phone: 253 - 3158

File No. 80-986

Type of Samples Soils

Disposition

GEOCHEMICAL ASSAY CERTIFICATE

Golden

4

SAMPLE No.		Ag	Au	As	Hg						
835N 1250W		.1	.005	7	.440						1
1275		.1	.015	8	.180						2
1300		.1	.010	4	.370						3
1325		.1	.005	12	2.600						4
1350		.1	.015	11	.345						5
1375		.1	.005	9	.180						6
1400	P	.1	.030	14	2.000						7
1425	P	.1	.005	12	.270						8
1450		.1	.005	21	.220						9
1475		.1	.005	8	.090						10
835N 1500W		.2	.005	11	.165						11
											12
870N 700W		.1	.005	6	.410						13
725	P	.1	.005	12	.525						14
750		.1	.005	10	.630						15
775		.1	.005	17	.540						16
800		.1	.005	7	.720						17
825		.1	.005	10	.850						18
850		.1	.005	5	.350						19
900		.2	.005	14	.860						20
925		.1	.005	6	.430						21
950		.1	.005	12	.400						22
975		.1	.005	6	.220						23
1000		.1	.005	9	.740						24
1025	P	.1	.005	17	.650						25
1050		.2	.005	13	1.050						26
1075		.1	.005	13	.540						27
1125		.1	.015	10	.760						28
1150		.1	.005	8	.235						29
1175		.1	.010	10	.275						30
1200		.1	.010	16	.400						31
1225		.1	.015	8	.385						32
1250		.1	.020	9	.700						33
1275		.1	.005	3	.050						34
1300		.1	.010	3	.495						35
1325		.1	.010	4	.400						36
1350	P	.1	.010	8	.950						37
870N 1375W		.1	.015	14	2.600						38
											39
											40

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DIGESTION:

DETERMINATION:

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ASSAYER

DEAN TOYE, B.Sc.
CHIEF CHEMIST
CERTIFIED B.C. ASSAYER

DEAN TOYE, B.Sc.
CHIEF CHEMIST
CERTIFIED B.C. ASSAYER



To:

Ashcroft Resources Ltd.,

ACME ANALYTICAL LABORATORIES LTD.

Assaying & Trace Analysis

852 E. Hastings St., Vancouver, B. C. V6A 1R6

phone: 253 - 3158

File No. 80-986

Type of Samples Soils

Disposition

GEOCHEMICAL ASSAY CERTIFICATE

Side

6

SAMPLE No.		Ag	Au	As	Hg								
700N	OE	.1	.005	5	.115								1
	25	.1	.005	17	.250								2
	50	P .1	.005	9	.185								3
	75	P .1	.005	12	.435								4
	100	P .1	.005	9	.440								5
	125	.1	.005	14	.275								6
	150	.1	.005	10	.380								7
	175	.1	.005	8	.300								8
	200	.1	.005	14	.365								9
	225	P .1	.005	11	.250								10
	250	P .1	.005	15	.580								11
	275	P .1	.005	7	.260								12
	300	P .1	.005	19	.130								13
	325	P .2	.005	10	.365								14
	350	P .1	.005	15	.370								15
	375	.2	.005	15	.220								16
	400	P .1	.005	14	.510								17
	425	P .1	.005	7	.295								18
	450	P .1	.005	13	.240								19
	475	P .1	.005	12	.165								20
	500	P .1	.005	11	.155								21
	525	P .1	.005	17	.180								22
	550	P .1	.005	12	.400								23
	575	.1	.005	15	.365								24
	600	P .1	.005	10	.410								25
	625	P .1	.005	7	.145								26
	650	P .1	.005	6	.080								27
	675	P .1	.005	8	.155								28
700N	700E	P .3	.005	56	.270								29
													30
800N	OE	.1	.005	2	.210								31
	25	.1	.005	13	.240								32
	50	P .1	.005	11	.155								33
	75	P .1	.005	11	.100								34
	100	.1	.005	11	.390								35
	125	.1	.005	12	.400								36
	150	.1	.005	17	.530								37
	175	.1	.005	12	.530								38
800N	200E	.2	.005	10	.385								39
													40

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ASSAYER

DEAN TOYE, B.Sc.
CHIEF CHEMIST
CERTIFIED B.C. ASSAYER



To: Ashcroft Resources Ltd.,

ACME ANALYTICAL LABORATORIES LTD.

Assaying & Trace Analysis

852 E. Hastings St., Vancouver, B.C. V6A 1R6

phone: 253 - 3158

File No. 80-986

Type of Samples Soils

Disposition

GEOCHEMICAL ASSAY CERTIFICATE

Side

SAMPLE No.			Ag	Au	As	Hg													
7	800N 225E		.1	.005	8	.260													1
	250		.2	.005	7	.220													2
	275	P	.3	.005	2	.375													3
	300	P	.1	.005	3	.040													4
	325	P	.1	.005	8	.120													5
	350	P	.1	.005	9	.115													6
	375		.1	.005	11	.860													7
	400		.1	.005	13	.700													8
	425	P	.1	.005	5	.100													9
	450		.1	.005	11	.520													10
	475		.3	.005	16	.265													11
	500		.2	.005	13	.150													12
	525		.1	.005	10	.750													13
	550	P	.1	.005	7	.560													14
	575		.1	.005	13	.650													15
	600	P	.1	.005	14	.095													16
	625	P	.1	.005	10	.135													17
	650		.1	.005	13	.500													18
	675		.1	.005	11	.530													19
	800N 700E		.2	.005	5	.220													20
																			21
	900N 75E		.1	.005	10	.160													22
	100		.2	.005	6	.430													23
	125	P	.1	.005	10	.275													24
	175	P	.1	.005	8	.230													25
	200	P	.1	.005	5	.120													26
	225	P	.1	.005	6	.130													27
	250	P	.1	.005	5	.130													28
	325	P	.1	.005	6	.275													29
	350	P	.3	.005	9	.980													30
	375	P	.2	.005	4	.045													31
	400	P	.1	.005	5	.190													32
	425	P	.2	.005	8	.265													33
	450	P	.1	.005	11	.180													34
	525	P	.1	.005	7	.250													35
	550	P	.1	.005	4	.075													36
	575	P	.1	.005	7	.310													37
	900N 600E	P	.3	.005	5	.285													38
																			39
																			40

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DIGESTION:.....

DETERMINATION:.....

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ASSAYER

DEAN TOYE, B.Sc.
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To: Ashcroft Resources Ltd.

ACME ANALYTICAL LABORATORIES LTD.

Assaying & Trace Analysis

852 E. Hastings St., Vancouver, B.C. V6A 1R6

phone: 253-3158

File No. 80-986

Type of Samples Soils

Disposition

GEOCHEMICAL ASSAY CERTIFICATE

Side

SAMPLE No.			Ag	Au	As	Hg								
8														
900N	625E	P	.1	.010	4	.100								1
	650	P	.1	.005	12	.430								2
	675	P	.1	.005	6	.315								3
	700		.1	.005	4	.210								4
900N	750E		.1	.005	9	.155								5
														6
1100N	600E		.1	.005	10	.270								7
	625		.1	.005	21	.135								8
	650	P	.1	.005	7	.610								9
	675	P	.1	.005	7	.170								10
	700		.1	.005	8	.255								11
	725		.1	.005	6	.045								12
	750	P	.1	.005	8	.230								13
	775		.4	.005	16	.110								14
	800	P	.1	.005	14	.075								15
	825		.2	.005	14	.120								16
	850		.9	.005	10	.340								17
	875		.3	.005	8	.230								18
	900		.1	.005	8	.230								19
	925		.1	.005	7	.165								20
	950		.1	.005	9	.175								21
	975		.1	.005	6	.160								22
	1000		.1	.005	9	.195								23
	1025		.3	.005	12	.175								24
	1050		.4	.005	10	.210								25
	1075		.1	.015	10	.065								26
	1150		.2	.010	8	.095								27
	1175		.2	.005	7	.260								28
1100N	1200E		.4	.005	6	.290								29
														30
1400N	600E		.1	.005	7	.075								31
	625		.1	.010	8	.115								32
	650		.1	.005	6	.195								33
	675		.2	.005	2	.230								34
	700		.1	.015	3	.185								35
	725		.1	.005	2	.095								36
	750		.1	.015	2	.180								37
1400N	775E		.1	.005	5	.120								38
														39
														40

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DIGESTION:.....

DETERMINATION:.....

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To: Ashcroft Resources Ltd.,

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Assaying & Trace Analysis
852 E. Hastings St., Vancouver, B.C. V6A 1R6
phone: 253 - 3158

File No. 80-986

Type of Samples Soils

Disposition

GEOCHEMICAL ASSAY CERTIFICATE

Side

SAMPLE No.	Ag	Au	As	Hg							
1400N 800E	.1	.005	11	.300							1
825	.1	.015	3	.300							2
850	.1	.005	6	.155							3
875	.2	.005	9	.145							4
900	.1	.005	7	.165							5
925	.1	.005	17	.230							6
950	.2	.005	9	.210							7
975	.1	.005	8	.375							8
1400N 1000E	.2	.005	14	.210							9
1800N 400E	.1	.005	1	.230							10
450	.1	.005	3	.770							11
475	.1	.005	6	.500							12
500	.1	.005	4	.135							13
525	.1	.005	8	.085							14
550	.1	.005	5	.250							15
600	.1	.005	4	.050							16
1800N 675E	.1	.005	1	.110							17
1800N 1000E	.1	.005	2	.220							18
1025	.1	.005	5	.180							19
1050	.1	.005	4	.130							20
1075	.2	.010	2	.120							21
1125	.1	.005	7	.230							22
1150	.1	.005	10	.555							23
1175	.1	.005	8	.180							24
1175A	.1	.005	7	.330							25
1200	.1	.005	7	.260							26
1225	.1	.005	7	.290							27
1250	.1	.005	4	.360							28
1275	.2	.010	5	.195							29
1300	.1	.005	2	.210							30
1325	.1	.005	3	.200							31
1350	.2	.005	3	.290							32
1375	.2	.005	16	.200							33
1800N 1400E	.1	.005	10	.330							34
											35
											36
											37
											38
											39
											40

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DIGESTION:

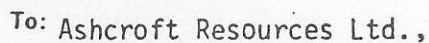
DETERMINATION:

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CERTIFIED B.C. ASSAYER



Assaying & Trace Analysis

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phone:253 - 3158

File No. 80-986

Type of Samples ----- Soils

Disposition.

Side

10

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DIGESTION:.....

DETERMINATION:.....

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CHIEF CHEMIST

CERTIFIED B.C. ASSAYER

Geochemical Analysis of Mo, Cu, Pb, Zn, Ag*, Ni, Co,Mn, Bi*, V, Fe, Cd*, & Sb*Sample preparation

Soil samples are dried at 75°C and sieved to -80 mesh.

Rock samples are ground to -100 mesh.

Digestion

A .50 gram sample is digested with dilute aqua regia in boiling water bath and diluted to 10 mls with demineralized water.

Determination

All the above elements are determined by Atomic Absorption from the solution.

* With background correction.

Geochemical Analysis of AuDigestion and extraction

A 10 gram sample which has been ignited over night at 600°C is digested hot with dilute aqua regia, and the clear solution is extracted with Methyl Isobutyl Ketone.

Determination

Au is determined by AA from the MIBK extractant with background correction.

Geochemical Analysis of Ba

A .100 gram sample is digested hot with NaOH and EDTA solution. The solution is analysis for Ba by AA.

Geochemical Uranium AnalysisDigestion

A .50 gram sample is digested hot with nitric and perchloric acid and diluted to 10 mls.

Fusion

An aliquot is solvent extracted with salting agent and aliquot of is fused with NaF, K₂CO₃, & Na₂CO₃ flux in platinum dish.

Determination

The fluorescence of the pellet is read in the Turner fluorometer.

ACME ANALYTICAL LABORATORIES LTD.
ASSAYERS & CHEMISTS
6455 LAUREL STREET, BURNABY 2, B.C.
Telephone (604) 299-5242

Geochemical Analysis for Tungsten

A 1.00 gram sample is fused with KCl , KNO_3 , & Na_2CO_3 flux in a test-tube, is leached with 10.0 mls water. An aliquot is used to develop a complex with $SnCl_2$, $KSCN$, and HCl which is extracted by n-tributylphosphate and carbon tetrachloride.

Geochemical Analysis for Fluorine

A .25 gram sample is fused with sodium hydroxide and is leached with water. The solution neutralized, buffered and adjusted to pH 7.8 and diluted to 100 mls. Fluorine is determined by specific ion electrode with specific ion meter, Orion Model 404.

Geochemical Analysis for Tin

A 1.0 gram sample is fused with ammonium iodide in a test-tube. The decomposed iodine is leached with dilute hydrochloric acid; an aliquot is used for colorimetric development with gallein in a buffered solution.

Geochemical Analysis for Platinum

A 10 gram sample is digested with aqua regia to dryness. An aliquot of HCl leached solution is reduced by stannous chloride and extracted into MIBK. The extracted Pt is determined by AA with background correction.

Geochemical Analysis of As

Digestion

A .50 gram digested hot with 5 mls of 50% HCl , and then diluted to 10 mls.

Determination

The As is evolved from solution of KI , $SnCl_2$ by Zn metal into $AgDDC$ solution which is read colorimetrically.

ACME ANALYTICAL LABORATORIES LTD.

ASSAYERS & CHEMISTS

6455 LAUREL STREET, BURNABY 2, B.C.

Telephone (604) 299-5242

Geochemical Analysis of Hg

Digestion

A .50 gram sample is digested with nitric and perchloric acid and diluted with 20% HCl.

Determination

Hg is determined by cold vapour AA using F & J scientific Hg assembly. An aliquot is added to stannous chloride-hydrochloric acid solution. The reduced Hg is carried by bubbling air through the solution and passed into the Hg cell determined by AA.

Oxalic Acid Leach of Rock, Soil & Silt Samples

A .50 gram sample is digested hot with 10 mls 5% oxalic acid solution. The oxalic acid will dissolve Fe and Mn from their oxides of M - 1 fraction (but not from magnetite & ilmenite) limonites and clays. The following metals are analysed by atomic absorption: Cu, Zn, Pb, Ni, Mo, Fe, & Mn.

Cold HCl Acid Extraction

A .50 gram sample is leached at room temperature for 2 hours with 10 mls 5% HCl solution. This will dissolve Cu from the organic and surface of clay fractions.

EDTA Extraction

A .50 gram sample is leached at room temperature for 4 hours with 10 mls of 2.5% EDTA solution.

CORE & ROCK ASSAYS SOIL, ROCK & WATER GEOCHEM ANALYSIS

ACME ANALYTICAL LABORATORIES LTD.

MAIN LAB - 6455 LAUREL ST.
BURNABY, B.C. V5B 3B4
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ROSS RIVER - YUKON - (403) 969-2217

DEAN TOYE, B.Sc.
CHIEF CHEMIST, CERTIFIED B.C. ASSAYER
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APPENDIX "B"

OPERATING INSTRUCTIONS

SABRE MODEL 27

VLF-EM INSTRUMENT

FRASER FILTER CALCULATION METHODS

SABRE ELECTRONIC
INSTRUMENTS LTD.

4245 EAST HASTINGS STREET

BURNABY, B.C. V5C 2J5

TELEPHONE: 291-1617

SABRE MODEL 27 VLF-EM RECEIVER

The model 27 EM unit was designed originally for a large Canadian mining company to overcome the deficiencies inherent in existing units.

The instrument is so stable and selective that completely reliable measurements can be made on distant stations without interference from nearby powerful transmitters. Stability and selectivity are especially important when making field-strength measurements, which are now being emphasized as a means of locating conductors.

This EM receiver is very compact, requires no earphones or loudspeakers and is housed in a heavy scotch saddle leather case. All of these features add up to make an ideal one-man EM unit of unexcelled electrical performance and mechanical ruggedness.

SPECIFICATIONS

Source of Primary Field - VLF radio stations (12 to 24 KHz.)

Number of Stations - 4, selected by switch; Cutler, Main on 13.8 KHz. and Seattle, Washington on 18.6 KBz. are standard, leaving 2 other stations that can be selected by the user.

Types of Measurement

1. Dip angle in degrees, read on a meter-type inclinometer with a range of $\pm 60^\circ$ and an accuracy of $\pm \frac{1}{2}^\circ$.
2. Field strength, read on a meter and a precision digital dial with an accuracy exceeding 1%.
3. Out of phase component, read on the field strength meter as a residual reading when measuring the dip angle.

VLF-EM OPERATING INSTRUCTIONS

The equipment is operated in the usual way as follows:

1. With the instrument held horizontal in front of you, turn around until a null appears on the field strength meter. You should now be facing the station.
2. With the receiver still facing the station, lift it to the vertical position and rotate it slightly in the vertical plane to your right or left until the best null appears on the field strength meter. Record the angle on the inclinometer at which the null appears. This is the DIP ANGLE (Positive or negative).
3. Return the instrument to the horizontal plane and turn around until the field strength meter is at its maximum reading. Set this maximum reading at 100 on the meter and record the reading on the gain control dial. This is the Field Strength Reading.
4. Repeat steps 1, 2 and 3 at each station.
5. To test the batteries turn the power switch on and push the test button. The field strength meter should read above the red mark. Battery life is approximately 200 hours and if the instrument is turned off between readings, the batteries should last for an entire season.

NOTE: An alternative way of measuring field strength is as follows:

Proceed as in step 3, setting the meter to 100. Now push the field strength button (marked FS) and the meter will read 50. (If it doesn't, adjust the gain control slightly). Leave the Gain Control setting where it is and take comparative Field Strength readings at each station by pressing the Field Strength button and recording the meter reading, which will vary from its Base Station Reading as you pass over conductive zones.

PREFERRED
METHOD →

SABRE MODEL 27 VLF-EM RECEIVER - (Continued)

Dimensions and Weight

Approx. $9\frac{1}{2}$ " x $2\frac{1}{2}$ " x $8\frac{1}{2}$ "; Weighs 5 lbs.

Batteries

8 alkaline penlite cells. The instrument will run continuously on 1 set of batteries for over 200 hours; So that in normal on-off use, the batteries will last all season. The battery condition under load is shown by pushing a button and reading voltage on the field strength meter.

SELECTION OF STATIONS:

The stations are selected by the switch on the control panel, with the following abbreviations being used;

C = Cutler, Maine.	Frequency = 17.8 Khz.
S = Seattle, Wash.	Frequency = 18.6 Khz.
A = Annapolis, Md.	Frequency = 21.4 Khz.
H = Hawaii.	Frequency = 23.4 Khz.

The two most useful stations are Cutler and Seattle and these will be used almost exclusively. Note that Seattle is off the air for several hours on Thursdays for maintenance (between 10 A.M. and 2 P.M. usually). Cutler is off the air for the same length of time every Friday.

If Equipment fails to operate:

- (a) Check that station is transmitting (see above). If one station appears to be dead, check another one to see if it is operating normally.
- (b) Check batteries. If they read low or the reading begins to drop after the test button is held down for a few seconds, replace them. Note also that there are 8 batteries in the instrument and they cannot be individually checked by the test button. If the batteries have been in the unit for a long time it is possible that one is dead or very weak but that the total voltage indicated by the test button is near normal. It is cheap insurance to instal new batteries before starting a big survey.
- (c) If unit still fails to operate check that battery connectors are tight, then check wiring of battery connectors for breaks or damage.

DETAILED
OPERATING INSTRUCTIONS
SABRE VLF-EM RECEIVER

INTRODUCTION:

The VLF-EM method utilizes electromagnet field transmitted from radio stations in the 15-25 K Hz range. The signals are propagated with the magnetic component of the field being horizontal in undisturbed areas.

Conductivity contrasts in the earth create secondary fields, producing a vertical component and changes in the field strength or amplitude. These conductive areas may be located, and to a degree, evaluated by measuring the various parameters of this electromagnetic field.

The Sabre VLF-EM receiver is tuned to receive any 4 transmitter stations: usually C-Cutler Maine, S-Seattle, H-Hawaii and P-Panama.

The station used in the survey should be selected so that the direction of the signal is roughly perpendicular to the direction of the grid lines which, in turn, should be laid out perpendicular to the regional strike.

MEASUREMENTS:

The Sabre VLF-EM receiver can be used to measure the following characteristics of the VLF field.

- (a) Tilt angle of resultant field;
- (b) Field strength of (a) horizontal component of field
(b) vertical component of field

Field Procedure

The following procedure should be followed to measure the dip angle of null and the field strength of the horizontal component of the VLF field.

Initial Field Strength Adjustment

Adjust the gain control to provide a suitable relative field strength measurement, as follows:-

(a) hold receiver in horizontal position (meter faces horizontal) and rotate in a horizontal plane until a null is indicated on the F.S. meter; rotate 90° in this horizontal plane (F.S. meter reads maximum)

(b) adjust gain control so that the F.S. meter reads 100

(c) record gain control setting (000 to 999).
Close guard over gain control and do not readjust unless a major field strength occurs.

The above procedure should be carried out at the beginning of each day's survey and checked during the day.

Dip Angle Measurement Procedure

1. Hold receiver in horizontal position and rotate in the horizontal plane until a null is observed. This aligns receiver in the field and the operator should be facing southerly or easterly depending on transmitter location.

2. Bring receiver up to the vertical position (meter faces vertical) and rotate the receiver in the vertical plane perpendicular to the transmitter direction until a null or minimum reading is observed on the field strength meter.

3. Hold the receiver in this field strength null position and read the inclinometer in degrees. Record this dip angle of null along with sign (+ or -).

Horizontal Field Strength Measurement Procedure

1. Return receiver to the horizontal position.
2. Reestablish null bearing in horizontal plane.
3. Rotate receiver 90° in the horizontal plane.

4. Depress ^{F.S.}~~damp~~ push button switch and observe field strength meter reading for sufficient time to obtain an average F.S. meter reading. (depressed ^{F.S.}~~damp~~ switch slows needle action and reduces meter reading by half. The reading will normally range around 50).

5. Record F.S. reading.

Filtering Technique For VLF-EM Dip Angle Data

The standard profile method of presenting dip angle data may be difficult to interpret. A filtering technique, described by D.C. Fraser 1969 (Geophysics, V.34 No. 6, P. 958-967) enables the data to be presented on a plan map with conductive areas defined by contours.

The following explains the calculation:-

<u>Line</u>	<u>Station</u>	<u>Null</u>	<u>Filter</u>
8N	0 E	+ 3	
	1 E	+ 4	
	2 E	+ 4	
	3 E	+ 6	
	4 E	+ 7	
	5 E	+ 9	
	6 E	+ 12	
	7 E	+ 16	
	8 E	+ 2	
	9 E	- 4	
	11 E	- 6	
	12 E	- 1	
		+ 3 + 4 = + 7	
		+ 4 + 4 = + 8	
		+ 4 + 6 = + 10	
		+ 13	
		+ 16	
		+ 21	
		+ 28	
		+ 18	
		- 2	
		- 14	
		- 16	
		- 6 - 1 = - 7	
		+ 7 - (+10) = - 3	
		+ 8 - (+13) = - 5	
		+ 10 - (+16) = - 6	
		- 8	
		- 12	
		+ 3	
		+ 30	
		+ 32	
		+ 14	
		- 14 - (-7) = - 7	

Fig. 1 is an example of a field sheet showing null angle reading, filtered reading and relative field strength. Fig. 2 shows the field sheet with filter card overlaid. The small window in the side of the card shows the four readings used to calculate the filtered reading, and an arrow showing that the filter reading is to be plotted between station 8E and 9E as indicated in fig. 1. The card is moved down the field sheet, one reading at a time as a guide while carrying out the filtering procedure. Throughout the survey care must be taken to ensure that the filtered data has the correct sign. The positive values only are plotted and contoured while for negative values, only the negative sign is plotted.

Crone suggests in instructions for the Radem VLF-EM, the use of N-S or E-W notation instead of (+ or -) signs, however for filtering a sign must be substituted.

The following convention may be used to ensure the correct sign of filtered data and provide a consistent crossover pattern when studying the profiled null angle data.

1. When taking a reading, always face southerly, on east-west lines, and always face easterly on north-south lines.

2. Record data on field sheets (top to bottom) as follows: on N-S lines record from south to north
: on E-W lines record from west to east

3. Plot and profile dip angle data on plan maps facing map north or map west.

The above convention will provide correct data regardless of the property location relative to the transmitter being used.

J.T. WALKER

MAY 17, 1974

Station - 024

PROPERTY G.I.T.S. TRANS SARTLE PAGE 1

Q. TATOR _____ INSTR. SARTLE DATE NOV 4/74

VLF-EM SURVEY

Line	Stn.	Null	Filter	F. S.
8N	0E	+3		50
(1E	+4	-3	50
	2E	+4	-5	52
	3E	+6	-6	52
(4E	+7	-3	52
	5E	+9	-12	52
	6E	+12	+3	52
	7E	+16	+20	60
	8E	+2	+32	65
	9E	-4	+14	62
	10E	-10	-7	50
	11E	-6	-15	48
	12E	-1	+14	48
	13E	+3	-5	50
	14E	+4	-1	52
(15E	+4	+6	50
	16E	+4	+10	55
	17E	-2	+1	55
(18E	0	-2	50
	19E	+1		
	20E	-1		

X OVER

X OVER

Fig. 1 Example of Field Sheet

PROPERTY G.I.T.S. TRANS SEATTLE PAGE 1
Q LATOR _____ INSTR. SOREL DATE 11/17/74

Fig. 2 Field Sheet with Filter Card Overlayed

ENVELOPE #1

GOLDEN CLAIM

PLATE A	-	CROSS SECTIONS
PLATE B	-	PLAN FRASER FILTER
PLATE C	-	PLAN TOTAL FIELD
PLATE D	-	GEOCHEMISTRY Au, Ag
PLATE E	-	GEOCHEMISTRY As, Hg