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VLF-EM 16 GROUND SURVEY
ASSESSMENT REPORT

on the

J 1-5 MINERAL CLAIMS

CACHE CREEK AREA

KAMLOOPS MINING DIVISION

by

MURRAY MORRISON, B.Sc.

Claims:

J 1-5 (20 units)

Location:

The J property is situated on Highway 97,
15 km southeast of Clinton, B.C., or 23 km
northwest of Cache Creek, B.C.
Lat. 50°59'; Long. 121°29'; N.T.S. 92-I-13+14.

Owner:

Esso Minerals Canada

Operator:

Esso Minerals Canada

Date Started:

February 19, 1985

Date Completed:

March 25, 1985

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

Kelowna, B.C.

March 31, 1985

13,772

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SUMMARY

The J property situated immediately north of Highway 97 on Hart Ridge, 23 km northwest of Cache Creek, B.C., covers a gold bearing quartz-carbonate replacement zone in Permian Cache Creek Group volcanics and sediments.

A 3 metre intersection of 15 grams of gold per tonne was discovered during a 1973 percussion drill program by Peyto Oil Ltd. on ground that is now covered by the J 1-5 mineral claims. A widely spaced follow-up drill program in 1974 failed to extend the gold zone and the Peyto Oil claims were allowed to lapse.

An analysis of the 1973 and 74 data by the writer indicated that the 1974 drilling may have been conducted too far to the east to intercept the gold bearing horizon.

A VLF-EM 16 ground survey of 14.7 km was conducted over the J property during February and March of this year (1985) in an effort to delineate a graphitic argillite footwall unit lying below the gold-bearing quartz-carbonate replacement zone.

The results of the survey indicate that the VLF-EM may have been successful in identifying the graphitic footwall unit for at least 1400 metres across the J 5 mineral claim. The data also indicates that three of the 1974 drill holes were drilled into footwall rocks below the "ore" horizon.

A Reverse Circulation Percussion drill program of at least 380 metres is recommended in the immediate vicinity of the discovery hole, PDH 73-3, to test for an extension of the gold mineralization.

A conductor lying just to the east of the discovery hole, and identified as Anomaly "G" during the VLF-EM survey should be assumed to represent the graphitic footwall of the mineralized zone at this stage.

INTRODUCTION

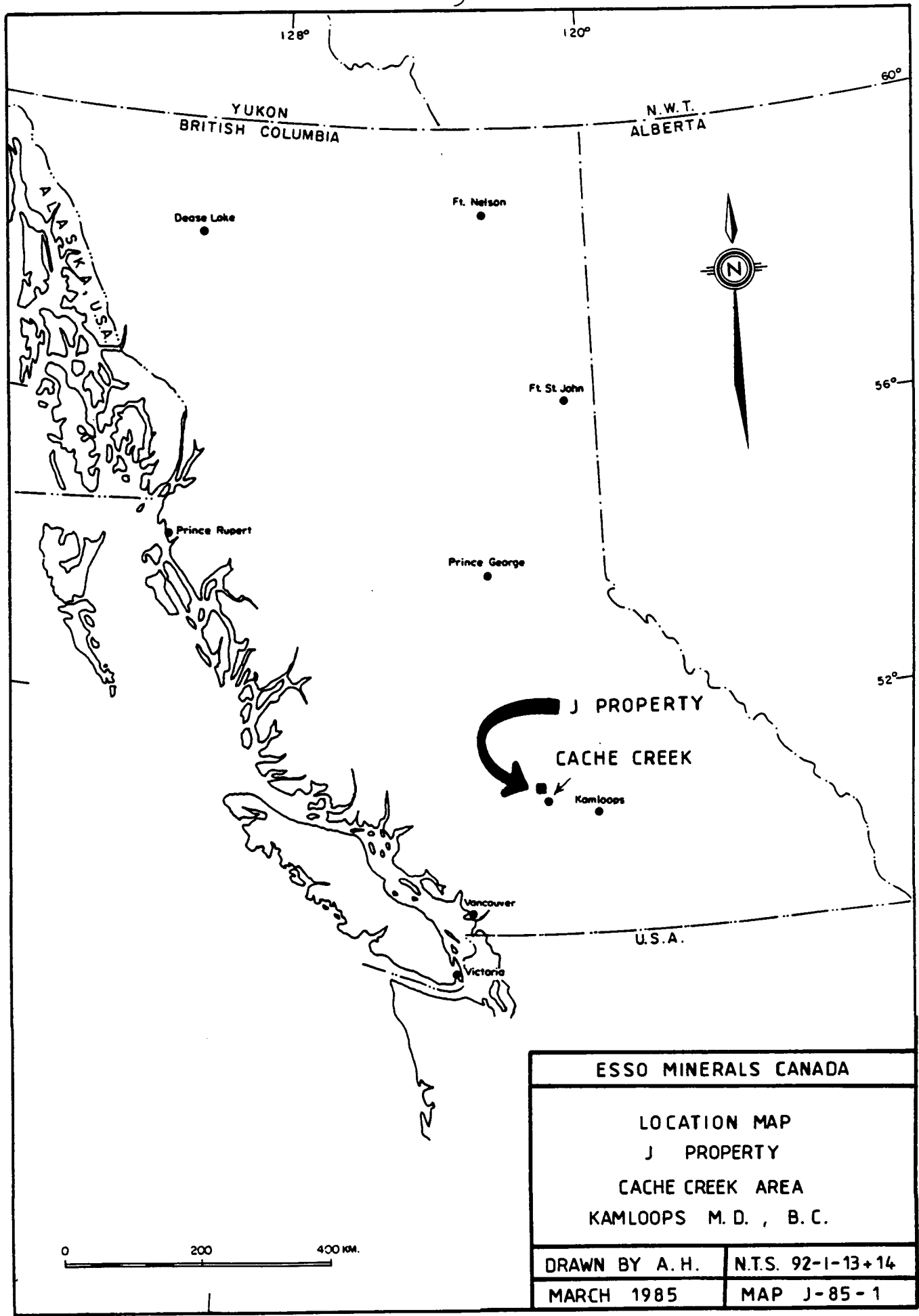
The J property, comprised of the J 1-4, 2-post mineral claims, and the J 5, 4-post mineral claim of 16 units, is situated on Highway 97, 23 km northwest of Cache Creek, or 15 km southeast of Clinton, B.C. (Lat. 50°59'; Long. 121°29'; N.T.S. 92-I-13 & 14). The original 2-post mineral claims were staked in 1982 to cover a gossanous, quartz-carbonate replacement zone in Cache Creek Group rocks that lies within sight of the highway. The larger, J 5, mineral claim was added to the property in 1984 to cover the geological projected extension of the replacement zone after it was learned that a 1973 percussion drill hole had intercepted 15 grams of gold per tonne over 3 metres in similar quartz-carbonate rock 2 km to the northwest.

The J mineral claims cover ground formerly covered by the Ranger and Paw mineral claims of Peyto Oil Ltd. of Calgary, Alberta. The Peyto Oil property originated with the Maggie Mines staking rush of 1970, when several major companies acquired ground within the Cache Creek Group of rocks in an effort to find more Maggie type copper-molybdenum porphyry ore bodies.

Work on the Peyto Oil property involved the traditional exploration techniques for finding porphyry deposits, including soil geochemical surveying and induced polarization surveying. In 1973 a percussion drill program under the direction of Cordilleran Engineering of Vancouver tested most of the induced polarization anomalies with negative results. A notable exception was P.D.H. 73-7 which encountered the 3 metres of 15 grams of gold per tonne in a quartz-carbonate zone already referred to above. A four-hole percussion drill program carried out in 1974 to further test the 1973 gold discovery along strike proved unsuccessful and the property was abandoned.

In the opinion of the writer three of the follow-up drill holes were spotted too far to the east of the west dipping mineralized horizon. These holes are believed to have been drilled

Continued . . .



ESSO MINERALS CANADA

LOCATION MAP

J PROPERTY

CACHE CREEK AREA

KAMLOOPS M. D. , B. C.

DRAWN BY A. H.

N.T.S. 92-1-13+14

MARCH 1985

MAP J-85-1

INTRODUCTION - Continued

entirely in footwall rocks lying below, and to the east, of the "ore" horizon. It is further felt that the follow-up drilling (at 265 to 900 metres from the "discovery hole") was much too widely spaced to properly test for a high grade gold zone.

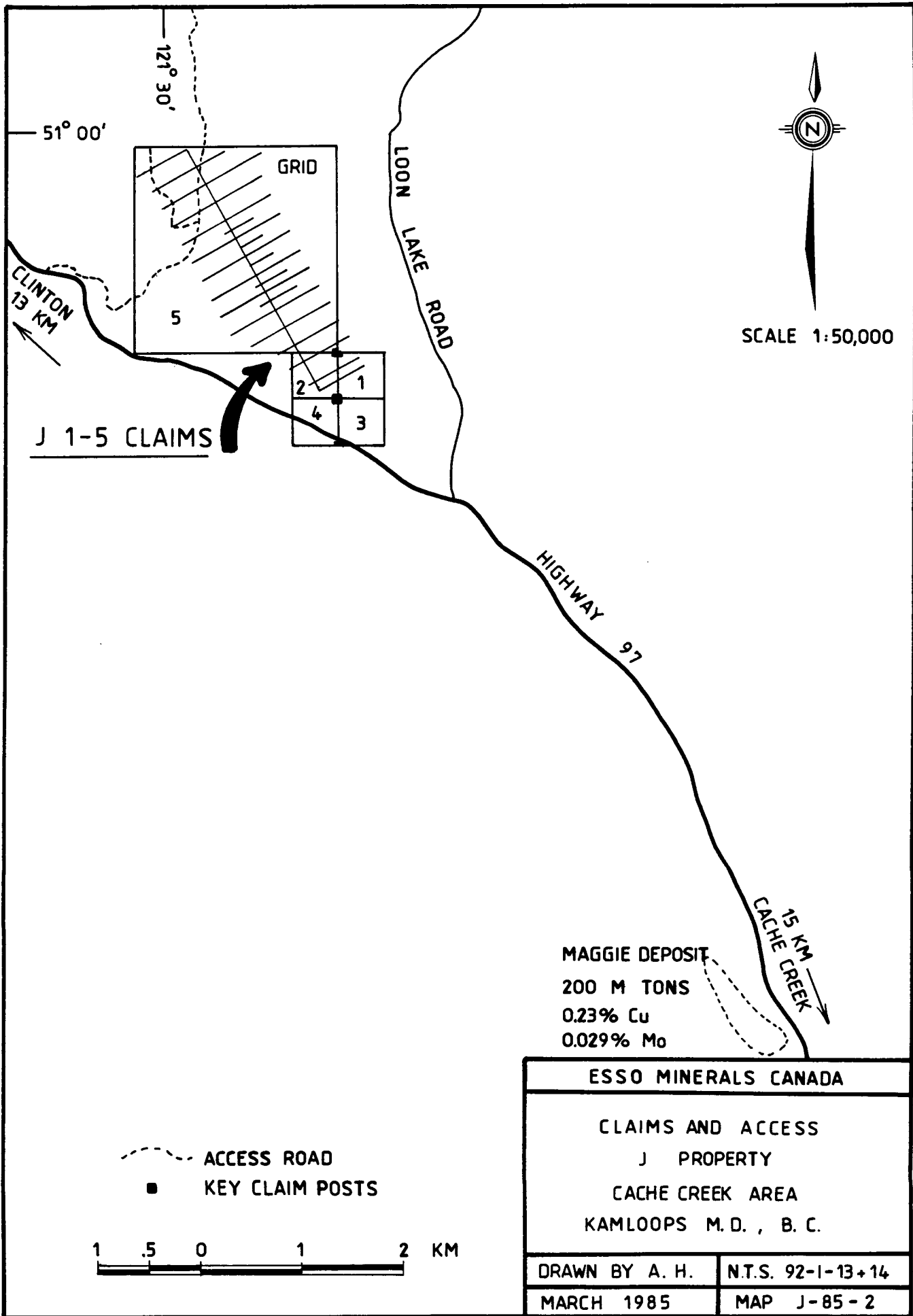
During February and March of this year (1985) a VLF-EM 16 Ground Survey was conducted over much of the J property in an effort to outline a graphite argillite horizon known to make up a portion of the footwall assemblage of rocks on part of the property. It was hoped that by outlining the trace of the footwall rocks that the mineralized quartz-carbonate horizon might also be delineated.

The results of the VLF-EM 16 survey conducted over 14.7 km of grid line are discussed within this report, while the three maps accompanying this report, Maps J-85-3, 4 & 5, display the results in Basic, Profile and Fraser Filtered form.

LOCATION AND ACCESS

Map J-85-2, on the following page, shows the location of the J property on Highway 97, 15 km southeast of Clinton, or 23 km northwest of Cache Creek, B.C. (Lat. 50°59'; Long. 121°29'; N.T.S. 92-I-13E & 14W). Access to the J 5 mineral claim is via a gravel logging road that leaves Highway 97 at a Rest Area 3.8 km west of the Loon Lake road turn-off.

The 1974 drill sites on the property were reached via a dirt trail that winds southeasterly across the ridge top from the logging road.



ESSO MINERALS CANADA	
CLAIMS AND ACCESS J PROPERTY CACHE CREEK AREA KAMLOOPS M.D. , B. C.	
DRAWN BY A. H.	N.T.S. 92-1-13+14
MARCH 1985	MAP J-85-2

PHYSICAL FEATURES AND CLIMATE

The J property straddles the southern end of Hart Ridge, a 1400 metre high spur of land that lies between the deeply dissected Bonaparte River Valley (580 m) on the east, and the un-named valley occupied by Highway 97 on the west. The upland surface of Hart Ridge is covered with deep accumulations of glacial drift and most rock exposures on the J property are on the steep slopes plunging from the spur down into the valleys.

The climate at Cache Creek is semi-arid, but precipitation increases with an increase in elevation towards Clinton on Highway 97. The highway climbs from the sagebrush valley of the Bonaparte River into the Douglas fir hills of Clinton. The J property with an average elevation of 900 metres is predominantly within the Douglas fir belt. Juniper bushes are common on the southern slopes of the J property.

The Douglas fir has been selectively logged from portions of the property, and a severe caterpillar infestation has killed half of the forest in recent years.

The winter snow covers the property from early November until mid-April and reaches up to 70 cm in depth. The snow was still 50 cm deep at the higher elevations near the end of March this year (1985).

CLAIM STATUS

The J property is made up of the J 1-4, 2-post mineral claims, and the J 5, 4-post mineral claim, all staked by the writer, M. Morrison. Particulars on the J claims are given on the following page:

Continued . . .

CLAIM STATUS - Continued

<u>Claim Name</u>	<u>Units</u>	<u>Date of Recording</u>	<u>Record No.</u>	<u>Mining Division</u>	<u>Expiry Date</u>	*
J 1	1	May 11/82	4022	Kamloops	May 11/88	
J 2	1	May 11/82	4023	"	May 11/88	
J 3	1	May 11/82	4024	"	May 11/88	
J 4	1	May 11/82	4025	"	May 11/88	
J 5	16	Apr. 3/84	5582	"	Apr. 3/86	

* New Expiry Date based on the acceptance of this report for Assessment Work requirements.

All of the above claims are presently held by Esso Minerals Canada, a Division of Esso Resources Canada Limited of Vancouver, under an option agreement dated February 6, 1985 and signed with M. Morrison of Kelowna, B.C. The agreement allows for the conditional transfer of 100% interest in all of the claims from M. Morrison to Esso Minerals of Canada.

HISTORY

The discovery of the Maggie Mine copper-molybdenum porphyry deposit by Bethlehem Copper Corporation in 1970 sparked a staking rush over the Cache Creek Group of rocks for several kilometres north and south of the discovery. The southern spur of Hart Ridge which is now covered by the J 1-5 mineral claims, was, in 1970, covered by the Ranger and Paw mineral claims of Peyto Oil Ltd. of Calgary.

The large property of 159 claims held by Peyto Oil was explored for its porphyry copper-molybdenum potential from 1970 until 1973. Exploration surveys were carried out under the direction of Cordilleran Engineering and others and included geological mapping, soil geochemical sampling for copper and molybdenum, magnetometer surveying, and induced polarization surveying. The geochemical results were negligible, but in 1973 fifteen percussion drill holes were drilled to test several of the induced polarization survey anomalies. No significant copper-molybdenum

Continued . . .

HISTORY - Continued

mineralization was discovered in any drill hole, but percussion drill hole 73-7 intersected 15 grams of gold per tonne from 140-150 feet (42.7 to 45.7 m). The gold was found to be associated with pyrite bearing, quartz-carbonate material.

In 1974, the original 159 claim property was reduced to 17 claims, covering much of the same country that is now covered by the J 1-5 mineral claims. Four widely separated percussion drill holes were drilled in an attempt to extend the gold zone discovered in P.D.H. 73-7. No gold was found and the property was allowed to lapse.

The ground remained open for staking until 1982 when the original J mineral claims were staked. A prospecting survey accompanied by some lithogeochemical sampling was carried out on the J 1-4 mineral claims in 1983. The J 5 mineral claim was added to the property in 1984.

REGIONAL GEOLOGY

G.S.C. Maps 1010A by Duffell and McTaggart and 1278A by Campbell and Tipper show a 10 by 75 km belt of Permian Cache Creek Group sedimentary and volcanic rocks to be centred at Cache Creek, B.C., and running south to Martel and north to Clinton. The rocks are highly faulted and disturbed over much of the belt. The J property covers one such highly faulted and disturbed area 7 km northwest of the well-known Maggie copper-molybdenum deposit.

The Maggie deposit, with published reserves of 200 million Tons of 0.23% copper and 0.029% molybdenum, is associated with an elongate Tertiary intrusive of biotite-quartz monzonite porphyry which strikes at 323°.

The fault controlled quartz-carbonate replacement zone on the J property "highway showing" strikes 330°, and may well be

Continued . . .

REGIONAL GEOLOGY - Continued

related to the regional faulting that played a role in the emplacement of the Maggie Tertiary intrusive.

PROPERTY GEOLOGY

The J property is underlain by a succession of Permian Cache Creek Group volcanic and sedimentary rocks that generally strike 330° and dip 60 degrees to the southwest. The main rock exposures are on the J 1-4 mineral claims directly north of Highway 97 where the rocks appear to grade upwards (southwesterly) from sediments into volcanics. Although there is much interbedding the succession appears to start with argillites, which are covered by interbedded argillites and cherts, which in turn are covered by interbedded argillites and dacite tuffs, and finally andesite flow rocks (greenstones). The tuff and chert units pinch and swell over distances of tens of metres.

A dacitic tuff unit near the Baseline on the J 1-4 mineral claims has been particularly disturbed by faulting and replaced by 20 to 80% ankerite, quartz and mariposite. This unit was mapped and sampled by the writer in 1983, and was found to contain anomalous arsenic (up to 1155 parts per million). It is this same dacitic tuff unit that is believed to continue northwest for 2 km to the site of percussion drill hole 73-7, where 15 grams of gold per tonne were intercepted in a quartz-carbonate zone. The replaced dacitic tuff is, therefore, the main economic geological target on the property.

Drilling in 1974, designed to expand the P.D.H. 73-7 gold zone, failed to find any gold. Overburden of 10 to 30 metres masks much of the geology on the J 5 mineral claim and it is believed that the 1974 drill holes were spotted too far to the east. It is believed that holes 74-1, 2 and 3 all drilled into the foot-wall interbedded cherts and argillites well below the "ore" horizon.

Continued . . .

PROPERTY GEOLOGY - Continued

During the 1983 mapping on the J 1-4 mineral claims it was noted that a 3 metre thick graphitic argillite bed underlies the quartz-carbonate replaced dacitic tuff unit. It was felt that the graphitic zone could be picked up as a VLF-EM conductor in spite of deep overburden on the J 5 mineral claim, and that the ore horizon might thus be indirectly traced across the property.

There is some evidence that late northeast and northwest transverse faults offset the main strike-fault a few tens of metres here and there across the property.

VLF-EM 16 GROUND SURVEY

Five man days were spent establishing a grid over the central portion of the J property with a Silva Ranger Compass and a Topolite Belt chain. Heavy late winter snow necessitated the use of snowshoes on much of the property. A flagged Baseline of 2.7 km was measured out at 330° across the property and flagged grid lines totalling 14.7 km were then established at right angles to the baseline at 100 to 200 metre spacing. Survey stations were marked at 25 metre intervals along the grid lines as shown on Map J-85-3 accompanying this report. The density of the grid lines was increased near the centre of the J 5 mineral claim where the geology was considered to be the most interesting.

A Geonics VLF-EM 16 model instrument was used to conduct the six day geophysical survey over the entire grid area. Some experimental readings were taken using the Annapolis, Maryland signal station before it was decided that the Seattle, Washington signal station yielded readings that were both strong and meaningful on the property. The Seattle signal was received from a direction of 175°, azimuth, and the readings were taken at right angles to the signal, or at 85°, azimuth. In-Phase Tilt Angles and Quadrature readings were recorded at each grid station. The Basic VLF-EM data is displayed on Map J-85-3, while the same data

Continued . . .

VLF-EM 16 GROUND SURVEY - Continued

in Profile form is shown on Map J-85-4. The Fraser Filtered In-Phase values have been plotted and contoured on Map J-85-5. All three maps may be found in the jacket pocket of this report.

The Fraser filtering of VLF-EM data has had widespread use for several years, and a full explanation of the technique is given in the geophysical papers by Fraser, Peterson and Ronka that are listed with references at the end of this report.

The Fraser filtering technique may be briefly summarized as follows: 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 mathematical operator reduces noise.

DISCUSSION OF THE RESULTS OF THE 1985 VLF-EM SURVEY

The 15 northwest trending conductors identified on Map J-85-5 accompanying this report are listed below with a comment on their relative strength, and an interpretation of what they are believed to represent.

<u>Anomaly</u>	<u>Length (metres)</u>	<u>Grid From</u>	<u>To</u>	<u>Conductor Strength</u>	<u>Interpretation</u>
A	1400	20N	34N	weak to moderate	discontinuous fault
B	100	33N	34N	moderately strong	local conductor
C	200	17N	19N	moderate	could be an offset extension of A
D	200	18N	20N	weak	near surface
E	800	15N	23N	moderately strong	graphite lenses associated with fault
F	1000	18N	28N	moderate	discontinuous fault
G	1400	14N	28N	weak to moderate	graphite lenses associated with fault
H	400	10N	14N	weak to moderate	possible offset extension of G
I	100	7N	8N	moderately strong	possible offset extension of G
J	900	7N	16N	moderate to strong	graphite lenses associated with fault
K	2200	8N	30N	moderate to strong	graphite lenses associated with fault
L	100	24N	24N	weak	near surface
M	200	18N	20N	moderate	fault, near surface conductor
N	200	14N	16N	weak to moderate	possible extension of M
O	200	14N	16N	weak to moderate	near surface

DISCUSSION OF THE RESULTS OF THE 1985 VLF-EM SURVEY - Continued

It may be seen from the foregoing that most of the anomalies are thought to represent faults striking north-westerly across the J property. Some of the stronger conductors are thought to represent graphitic mineralization within fault zones. The map shows that some of the anomalies are segmented, a condition most probably brought about by late northeast transverse faults. It may be, as the Table shows, that some of the anomalies given separate letter names may be simply offset extensions of other anomalies.

Anomaly K is believed to be useful in analyzing subcrop geology in that it crosses the entire grid area and the curves of this anomaly are believed to represent the curves of underlying geological formations that are largely covered by overburden on the property.

Anomaly G is the most interesting of all the anomalies in that it is thought to represent the graphitic footwall zone that lies below the gold bearing quartz-carbonate horizon on the property. The VLF-EM survey was conducted specifically to find the graphitic footwall, and Anomaly G appears to agree well with the geology as it is known at present. Anomaly G crosses the property just to the east of PDH 73-7, but to the west of PDH's 74-1, 2 & 3, and thus fits well with the fact that PDH 73-7 intersected the gold bearing, quartz-carbonate replacement zone, while PDH's 74-1, 2 & 3 did not. The three 1974 drill holes are believed to have been drilled too far to the east, or entirely within footwall argillites and cherts.

The VLF-EM survey indicates that Anomaly G, or the graphitic footwall, crosses the J 5 mineral claim for at least 1400 metres. Overburden in excess of 30 metres could account for the weakening of the anomaly to the northwest.

CONCLUSIONS AND RECOMMENDATIONS

The VLF-EM 16 survey appears to have been successful in outlining several faults that strike northwesterly across the property. The magnitude of some of the VLF-EM conductors suggests that some of the faults may contain graphitic zones.

It appears that the graphitic argillite footwall unit that is known to underlie the arsenic bearing quartz-carbonate replacement zone on the J 2 & 4 mineral claims can be indirectly traced across the J 5 mineral claim with the aid of the VLF-EM survey. Anomaly "G" which crosses the J 5 mineral claim for at least 1400 metres lies just to the east of percussion drill hole 73-7 and may represent a graphitic footwall zone lying below the gold bearing quartz-carbonate zone intercepted in that hole.

If Anomaly G does define the graphitic footwall unit of a sequence of rocks dipping steeply west, then it is known from the plotted positions of percussion drill holes 74-1, 2 & 3 that all of these drill holes fall on the eastern side of Anomaly G. It may, therefore, be concluded that all three of these 1974 follow-up holes drilled into footwall rocks well below the gold bearing quartz-carbonate horizon.

At this point it should be assumed that Anomaly G does outline the important graphitic footwall unit, and that the "ore" horizon lies above, or to the west of, Anomaly G.

Further percussion drilling should be carried out on the property. The first drill hole should be sited 25 metres to the west (grid west) of the discovery hole PDH 73-7. This drill hole will be located at grid 23+50N, 18+45W and should be drilled to intercept the quartz-carbonate replacement zone at a depth of less than 100 metres. Four more drill holes should be drilled at 50 metre intervals 25 metres to the west of Anomaly G at 24+00N, 18+10W; 24+50N, 18+15W; 23+00N, 18+40W; and 22+50N, 18+60W.

Continued . . .

CONCLUSIONS AND RECOMMENDATIONS - Continued

These drill holes should intercept the quartz-carbonate replacement zone at depths of less than 70 metres.

In all, 380 metres of reverse circulation percussion drilling are recommended at this stage of exploration. Samples should be taken at 1 metre intervals through the quartz-carbonate intersection in each hole, and these samples should be analyzed for gold (fire assay) and arsenic. If the samples are found to contain significant gold or arsenic then there is ample room to expand the exploration program along the 1400 metre strike length of Anomaly G, as well as down dip along the quartz-carbonate horizon.

Overburden is expected to be in the order of 30 metres deep in the proposed drilling area. The country is locally ridged with glacial drift, but the building of drill access roads is not expected to be a problem.

March 31, 1985



M. S. Morrison, B. Sc.

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APPENDIX "A"

STATEMENT OF QUALIFICATIONS:

I, Murray Morrison, of the City of Kelowna, in the Province of British Columbia, do hereby state that:

1. I graduated from the University of British Columbia in 1969 with a B.Sc. Degree in Geology.
2. I have been working in all phases of mining exploration in Canada for the past fifteen years.
3. During the past fifteen 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 fifteen years.
5. I personally carried out the VLF-EM 16 Ground Survey outlined in this report.
6. I am the vendor of the property to Esso Minerals Canada, and I retain a conditional interest in the property.

March 31, 1985
Kelowna, B.C.



Murray Morrison, B.Sc.

APPENDIX "B"

STATEMENT OF EXPENDITURES - ON THE J 1-5 MINERAL CLAIMS.

Statement of Expenditures in connection with the VLF-EM 16 Ground Survey carried out on the J 1-5 mineral claims, N.T.S. 92-I-13E & 14W, Cache Creek, B.C. for the year 1985.

FIELDWORK - ESTABLISHING FLAGGED BASELINE (2.7 km) AND FLAGGED GRID LINES (14.7 km) Feb. 19-23, 1985.

M. Morrison, Labour	5 days @ \$80/day	\$ 400.
Meals and Lodging	5 days @ \$45/day	225.
Truck (4x4, incl. gasoline)	5 days @ \$60/day	300.
Flagging, belt chain thread	5 days @ \$10/day	50.
	Sub-total:	\$ 975.

FIELDWORK - VLF-EM 16 SURVEY (14.7 km) March 20-25, 1985.


M. Morrison, Geologist	6 days @ \$200/day	\$ 1,200.
Meals and Lodging	6 days @ \$ 45/day	270.
Truck (4x4, incl. gasoline)	6 days @ \$ 60/day	360.
VLF-EM instrument rental	6 days @ \$ 20/day	120.
	Sub-total:	\$ 1,950.

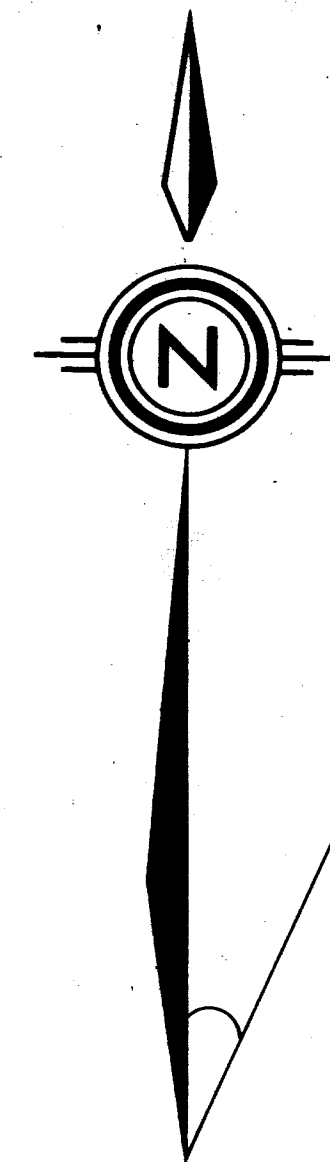
REPORT PREPARATION COSTS.

Geologist, (calculations, maps and report)	2 days @ \$200/day	\$ 400.
Drafting		60.
Typing		55.
Copying		15.
	Sub-total:	\$ 530.
	<u>GRAND TOTAL:</u>	<u>\$ 3,455.</u>

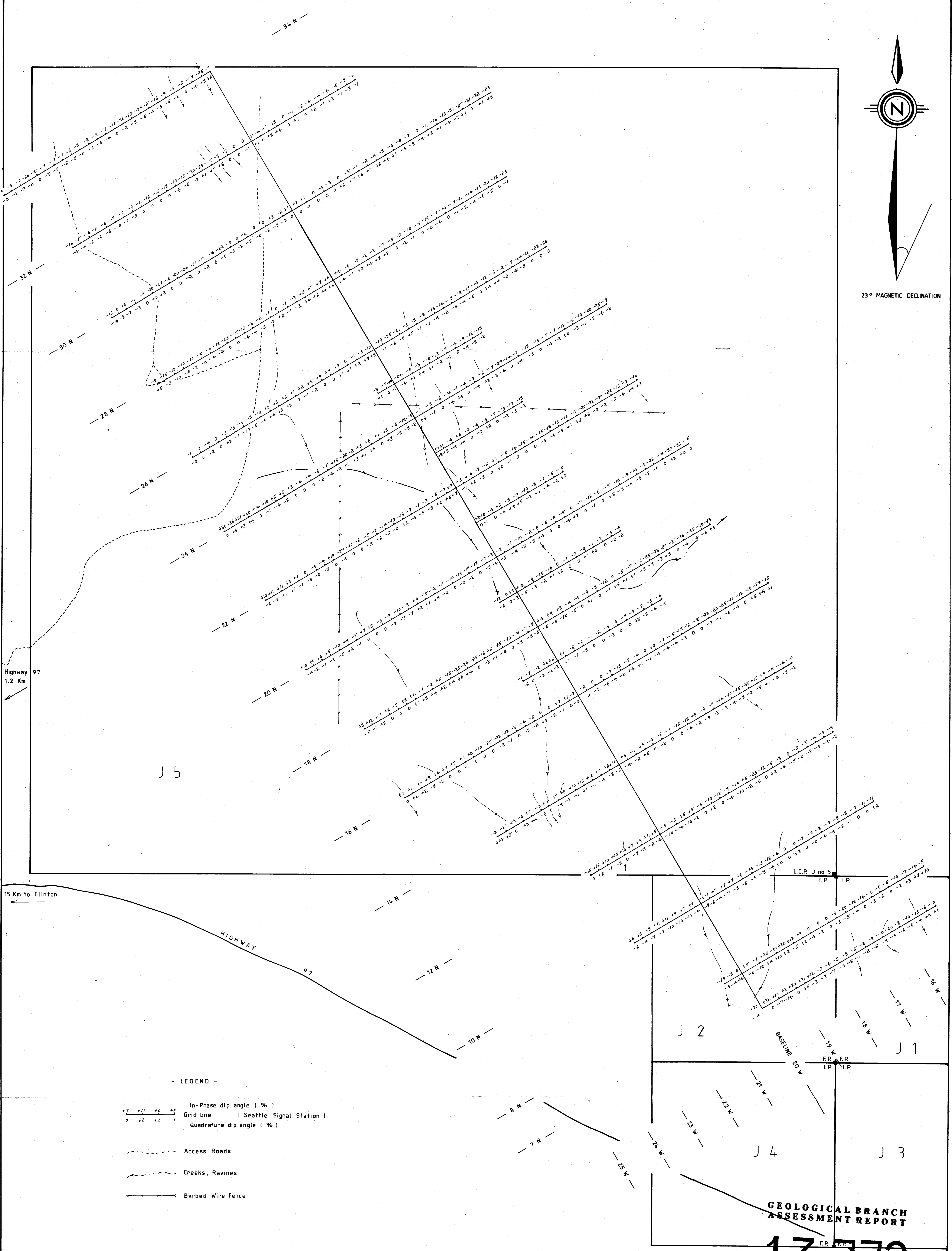
I hereby certify that the preceding statement is a true statement of monies expended in connection with the VLF-EM Survey carried out February 19-23 and March 20-25, 1985.

March 31, 1985


Murray Morrison - Geologist



23° MAGNETIC DECLINATION



- LEGEND -
- $\pm 7 \pm 1 \pm 6 \pm 8$ In-Phase dip angle (%)
 - $0 \pm 2 \pm 2 \pm 3$ Grid line (Seattle Signal Station)
 - Access Roads
 - ~~~~~ Creeks, Ravines
 - Barbed Wire Fence
 - Quadrature dip angle (%)

GEOLOGICAL BRANCH ASSESSMENT REPORT

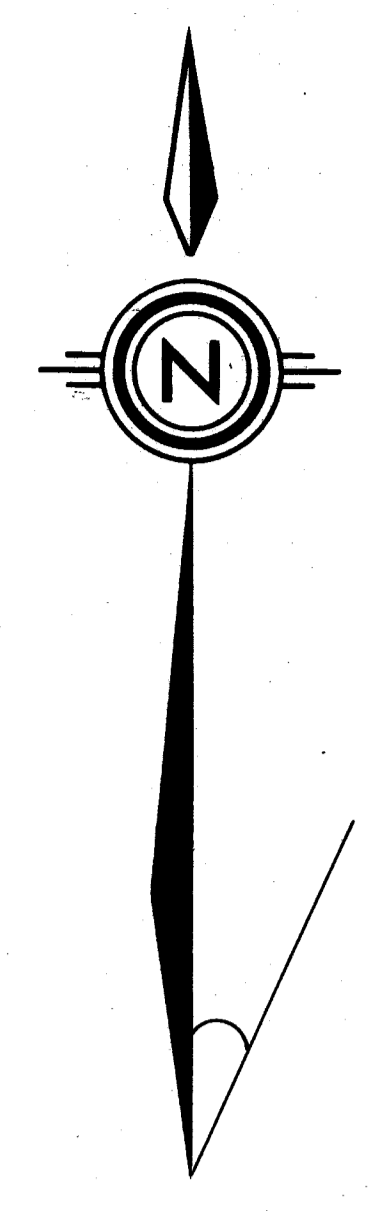
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To accompany a Geophysical Report by M. Morrison.

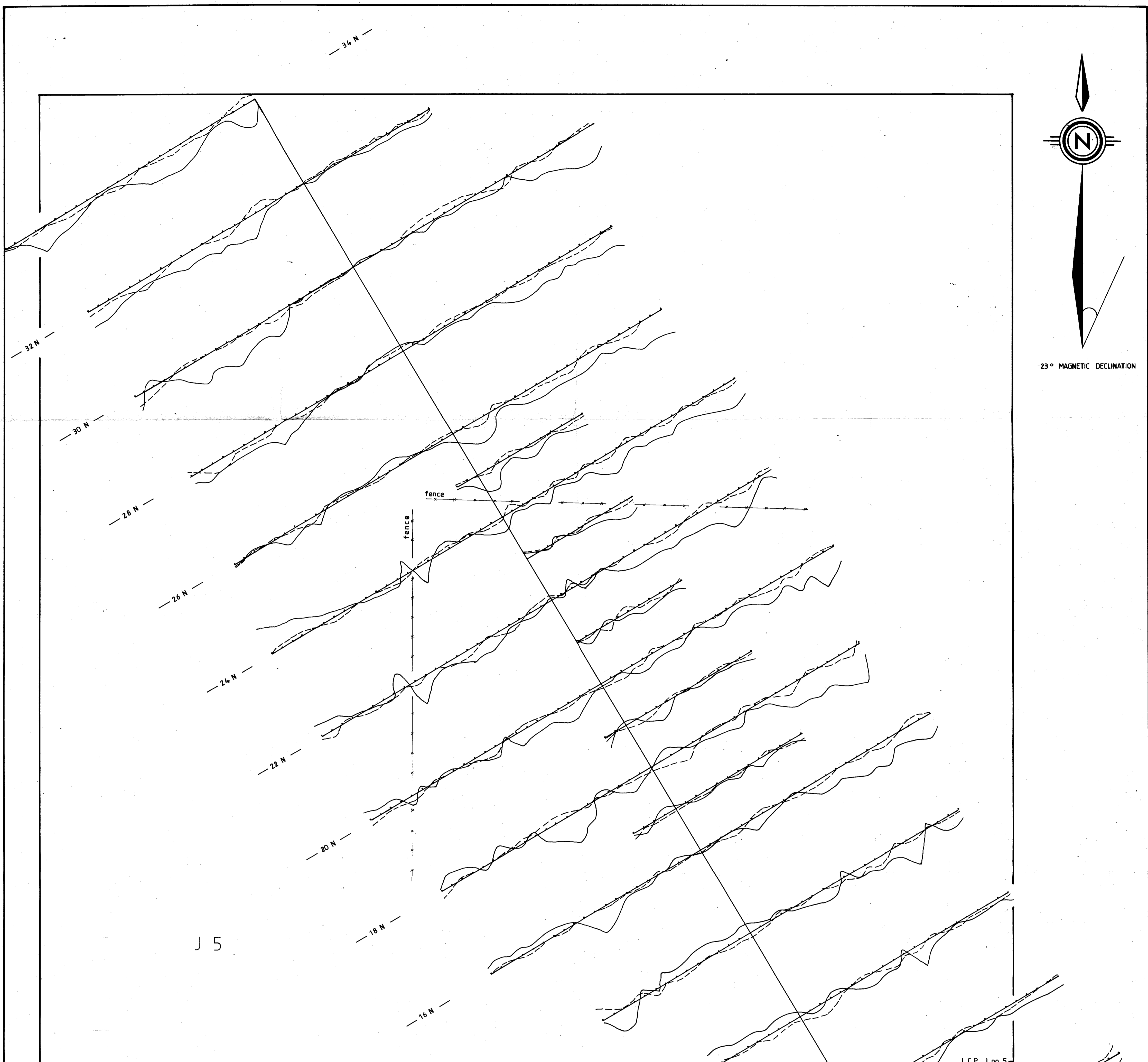
ESSO MINERALS CANADA		
J PROPERTY		
CACHE CREEK AREA, KAMLOOPS M. D., B. C.		
VLF-EM 16 GROUND SURVEY		
IN-PHASE AND FIELD STRENGTH BASIC DATA		
J 1 - 5 MINERAL CLAIMS		
SURVEY BY M. M.	MARCH 1985	N.T.S. 92-1-13+14
DRAFTED BY A. H.	SCALE 1:4000	MAP J-85-3

100 50 0 100 200 300 metres

Legal Corner Post and Initial Posts tied in with Compass and Belt Chain.



23° MAGNETIC DECLINATION

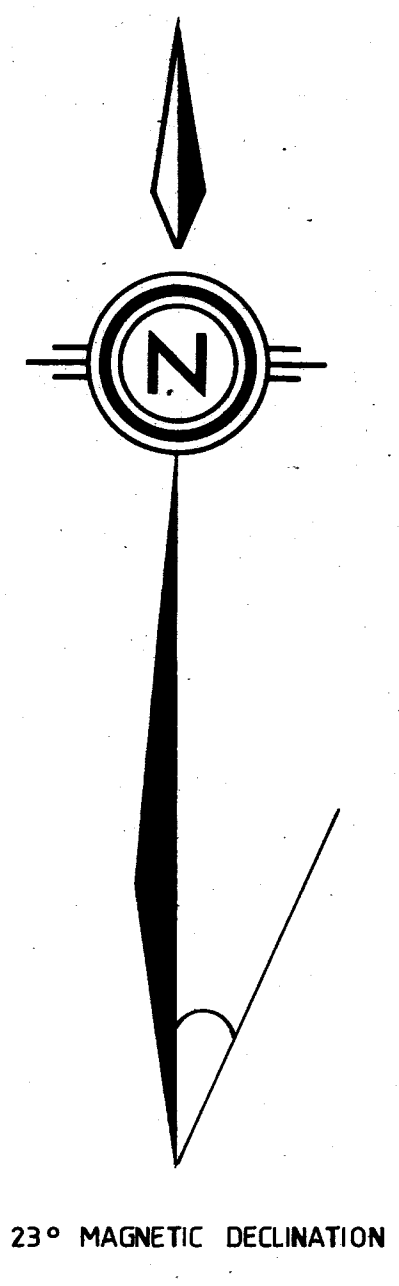


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J PROPERTY		
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SURVEY BY M.M.	MARCH 1985	N.T.S. 92-1-13+14
DRAFTED BY A.H.	SCALE 1:4000	MAP J-85-4



J 5

J 2

J 1

J 4

J 3

HIGHWAY 97

Seattle, Washington
Signal Station

Instrument : Geonics VLF-EM 16

Contour Interval - 10 %

--- Axis of Conductor

○ Percussion Drill Holes 1973 & 1974

100 50 0 100 200 300 metres

See Map J-85-3 for Access and Basic VLF-EM Data.

GEOLOGICAL BRANCH
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13,772

To accompany a Geophysical Report by M. Morrison.

ESSO MINERALS CANADA		
J PROPERTY		
CACHE CREEK AREA, KAMLOOPS M. D., B. C.		
VLF-EM 16 GROUND SURVEY		
FRASER FILTERED DATA		
J 1 - 5 MINERAL CLAIMS		
SURVEY BY M.M.	MARCH 1985	N.T.S. 92-1-13+14
DRAFTED BY A.H.	SCALE 1:4000	MAP J-85-5