5755

REPORT ON A

GEOPHYSICAL SURVEY

OF #5755

THE KU CLAIM GROUP

C411

CHEHALIS LAKE AREA

(49°29'N, 122°02'W)

NEW WESTMINSTER MINING DIVISION

BRITISH COLUMBIA

BY

G.W. LAFORME

GEOLOGIST

CHEVRON STANDARD LIMITED,
MINERALS STAFF,
#901 - 355 Burrard Street,
Vancouver, B.C. V6C 2G8

December 31, 1975

TABLE OF CONTENTS

INTRODUCTION:

The 1975 survey of the Ku mineral claim group was an attempt to determine by geophysical methods the presence and grade of sulphides coincident with previously established geochemical anomalies.

The field work was carried out by Chevron Standard Limited, Minerals Staff, #901 - 355 Burrard Street, Vancouver, B.C. V6C 2G8 with the assistance of Mauro G. Berretta, 21141 - 117th Avenue, Maple Ridge, B.C., consulting geophysicist.

The 52 claims and 2 fractions are registered in the name of Standard Oil Company of British Columbia Limited.

CLAIM NAME	RECORD NUMBERS
KU #1 to #30 inclusive	28663 to 28692 inclusive
KU #2 Fraction	28979
KU #31 to #38 inclusive	29051 to 29058 "
KU #1 Fraction	29746
KU #39 to #52 inclusive	29732 to 29745 "

Access to the property, and across the western portion, is by a main logging haul road from highway #7, a distance of 24 miles.

Secondary logging roads, negotiable in almost every case by 2-wheel drive vehicles, traverse the north and north central portions of the group.

GEOGRAPHIC:

Location - Latitude 49°29'N Longitude 122°02'W
Altitude - 2,500 to 4,500 feet A.Sl.
Terrain - Moderately steep in general, precipitous locally.

VEGETATION:

Fir, cedar, hemlock with balsam at higher elevations. The more northerly and all the westerly claims have been logged. Growth is very thick in the Chehalis River valley bottom with a mixture of devil's club, salal, salmonberry, elderberry, huckleberry bushes, alders, maples, and young coniferous trees. Black bears are in abundance during the berry season, July and August.

CLIMATE:

Coastal. Snow cover from late September to Mid-June. There is adequate water for drilling purposes.

GEOLOGY:

The area is underlain by shallow marine Jurassic volcanics, pyroclastics and related sediments; locally disrupted by cretaceous intrusions.

Previous mapping has established the following stratigraphic sequence.

Echo Island Formation -	Unbedded Dacitic Tuffs	1,500' +
	Well Bedded Marine Sediments Cherty and Argillaceous	1,700' +
Conformable Contact		
Harrison Formation	Felsic Tuffs Andesitic Tuffs	2,760 +

The KU claims are so situated as to cover the conformable contact between the Harrison Formation and the overlying Echo Island Formation.

GEOPHYSICAL:

An induced polarization survey was carried out by M.G. Berretta, using a portable Sabre, Mark 21-1, 450 watt Frequency-Domain I.P. system, employing a Dipole-Dipole Array with a = 200 feet, n = 1 and a frequency span of 0.3 - 10 HZ.

An electromagnetic survey covered 3.1 miles, using a Crone CEM shootback system, horizontal transmission, 200 foot spacing, 1830 HZ. No recognizable metallic conductors were indicated. Even when traversing a strong I.P. anomaly located at 5 + 00N 6 + 00W, no indication of conductivity was obtained.

A further electromagnetic survey covering 1.1 miles was carried out using a Geonics EM-15. The Vlf Transmitter was located at Seattle, Washington, U.S.A. This resulted in indication of several anomalies. Fraser filtering of the data removed variations caused by topography. The results are shown on Figure No. 5.

CONCLUSIONS:

Regarding the induced polarization survey, high resistivity results delineate an elongate zone that is coincident with a relatively unfractured member of the Harrison Formation.

The percentage frequency effect data outlined 5 anomalous areas, 2 of which are coincident with earlier established lead, zinc geochemical anomalies. Another (Pfe) anomaly is located at 30 + 00S 23 + 00E upslope from a minor PbZn geochemical anomaly at 30 + 00S 28 + 00E.

Previously Established PbZn Geochemical Anomalies Centred At:		Induced Polarization Pfe Geophysical Anomalies Centred At:	
0 + 00	10 + 00W	5 + 00N	6 + 00W
20 + 00S	5 + 00W	10 + 00S	12 + 00E
35 + 00S	5 + 00E	35 + 00S	5 + 00E
0 + 00	30 + 00W	2 + 50S	30 + 00W
30 + 00S	28 + 00E	30 + 00S + 23 + 00E	

The CEM shootback survey detected no significant conductors.

The Geonics EM-15 VLF survey detected 4 conductors, all of which appear to be associated with shear zones or faults.

RECOMMENDATIONS:

Areas centred at 35 + 00S 5 + 00E and at 0 + 00, 30 + 00W have coincident geochemical (Pb, Zn) and geophysical (I.P.) anomalies (Figure No. 5). Soil samples taken from both these areas should be re-analysed by cold extraction methods. If a non-hydromorphic origin is indicated the anomalies should be drilled.

Respectfully submitted by:

G.W. LAFORME,
Geologist

GWL:kin

APPENDIX I

(a) Summary of Costs

Reproduction (Report)	$ 40.70	
Telephone	10.35	
Truck Rental (½-ton)	155.00	
Gas, Oil	83.22	
Equipment Rental	562.50	$ 851.77
Camp Expenses		
Travel	84.00	
Meals, Groceries	458.11	
Supplies	24.22	566.33
Consultant, Berretta, Mauro G.	4,103.20	4,103.20
Wages		3,384.00
Arscott, D.		1,103.80
Dodson, E.D.		323.80
Laforme, G.W.		2,008.26
		$12,341.16

(b) Summary of Wages

Name	Type of Work	Days Worked	No. of Days	Rate	Amount
Conway, J.	Cook	July 2 - 23	22	$ 54.00	$ 1,188.00
King, R.	Assistant	July 2 - 22	21	48.00	1,008.00
Mayberry, M.	Geologist's Assistant	July 2 - 23	22	54.00	1,188.00
					$ 3,384.00
Arscott, D.	Supervisor	June 20, 21 July 2, 3, 19, 20, 24, 25 Aug. 8, Dec. 16	10	110.38	$ 1,103.80
Dodson, E.D.	Manager	June 17, Sept. 5	2	161.90	323.80
Laforme, G.W.	Supervisor	July 2 - 23 Dec. 11, 12, 15 - 17	27	74.38	2,008.26

I, MAURO G. BERRETTA, do hereby certify that I have the following qualifications :

ACADEMIC

1964 - B.Sc. (Physics) - University of Windsor

1965 - M.Sc. (Physics) - University of Windsor

1967-69 - Ph.D. Studies (Geophysics) - U.B.C.

PROFESSIONAL and RELATED EXPERIENCE

1963-64 - oceanography and marine geophysics research with Great Lakes Institute, University of Toronto

1968-69 - lecturer in exploration geophysics (GP400,GP402) with Dept. of Geophysics, U.B.C.

1970-present - instructor in mining and petroleum geophysics with British Columbia Institute of Technology

1968-present - geophysical exploration as an employee, consultant, joint-venture partner with numerous mining companies in B.C., Yukon, and U.S.A.

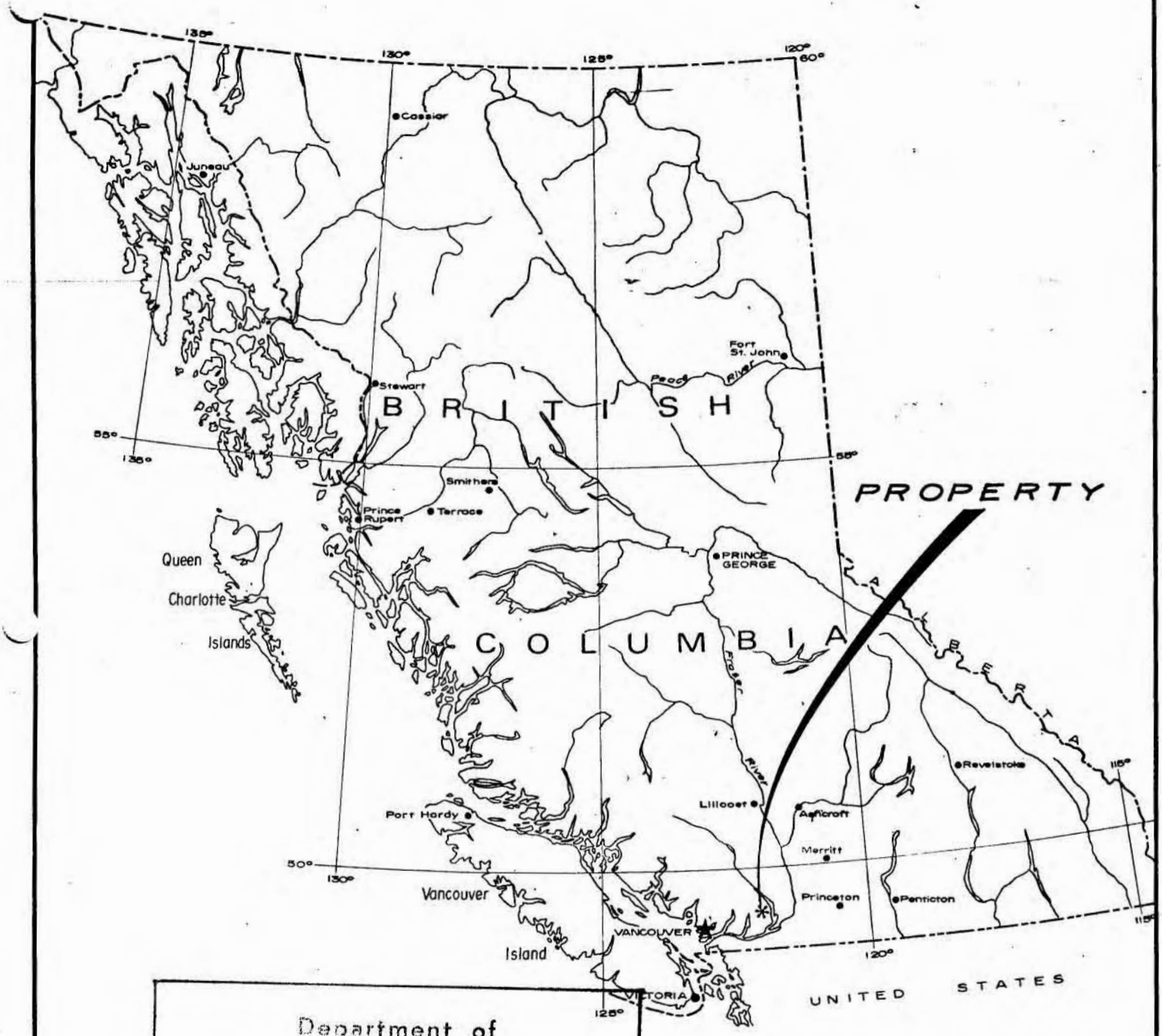
- experience in all phases of geophysics (i.p., mag, e.m., seismic, gravity) with special concentration on i.p. and e.m. methods (in excess of 500 survey miles)

PROFESSIONAL ASSOCIATIONS

Active Member in British Columbia Geophysical Society

1974-75 - President , British Columbia Geophysical Society

Mauro G. Berretta



Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 5755 MAP 1

FIG. -1

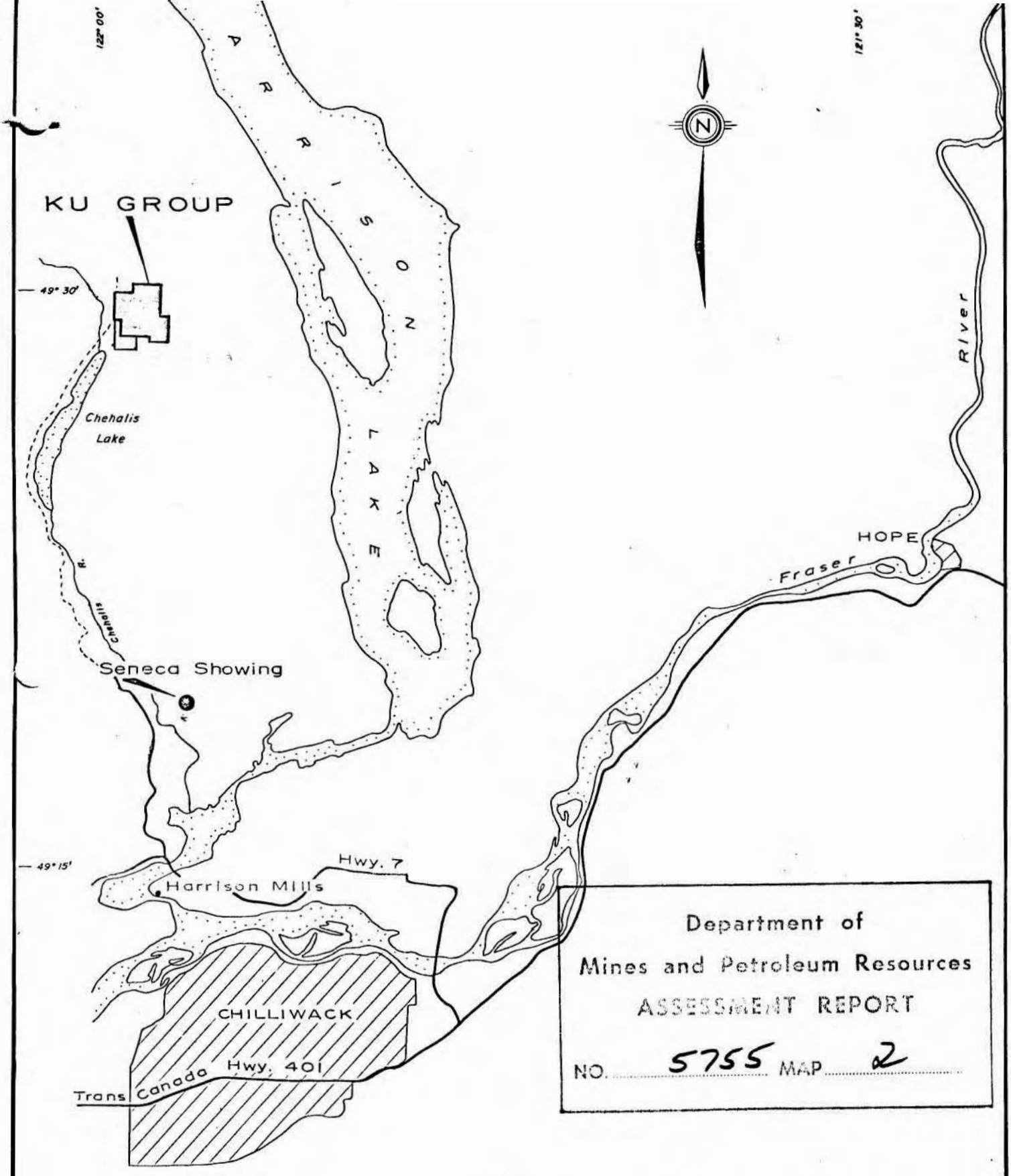
GENERAL INDEX MAP

KU GROUP

SCALE
1" = 136 Miles

DEC 1975

ALTAIR drafting services ltd.



Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 5755 MAP 2

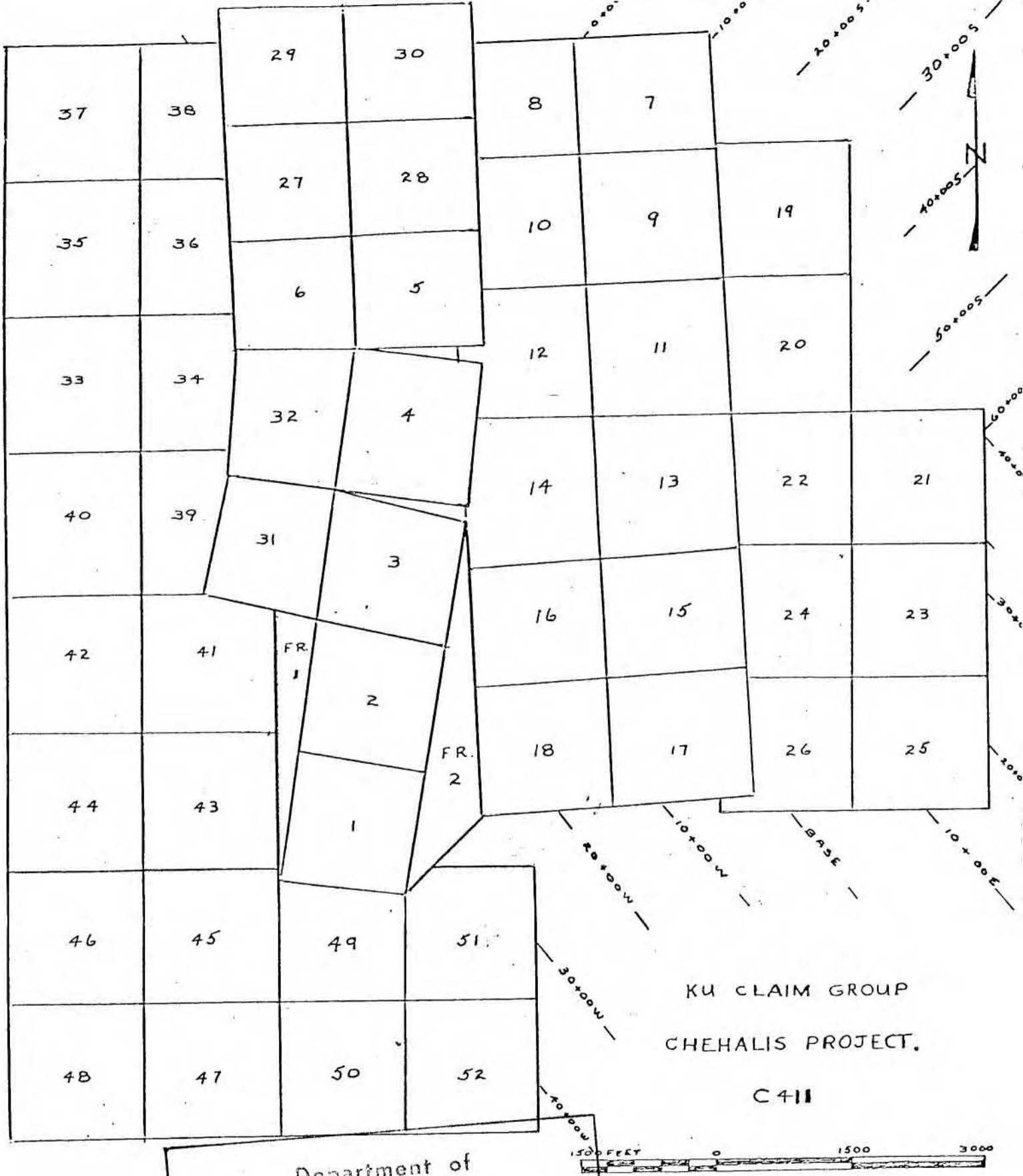
FIG. -2

PROPERTY LOCATION MAP

KU GROUP

SCALE
1" = 4 Miles

DEC 1975



Department of
Mines and Petroleum Resources
ASSESSMENT REPORT

NO. 5755 MAP 3

DEC. 1975.

FIG. 3

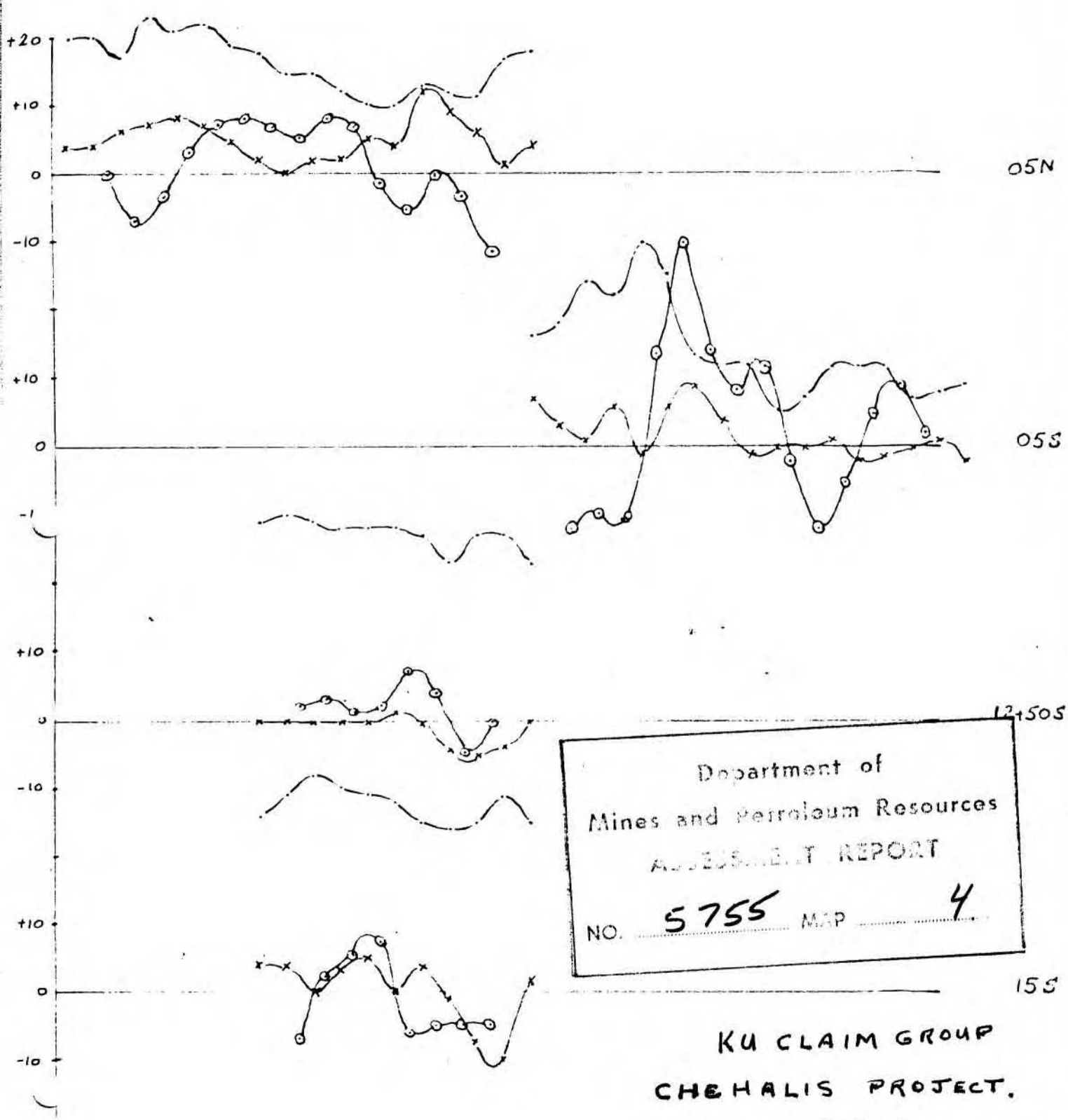
VLF PROFILES

TILT ANGLE DEGREES

QUADRATURE %

FRASER FILTERED

DIRECTION FACING →

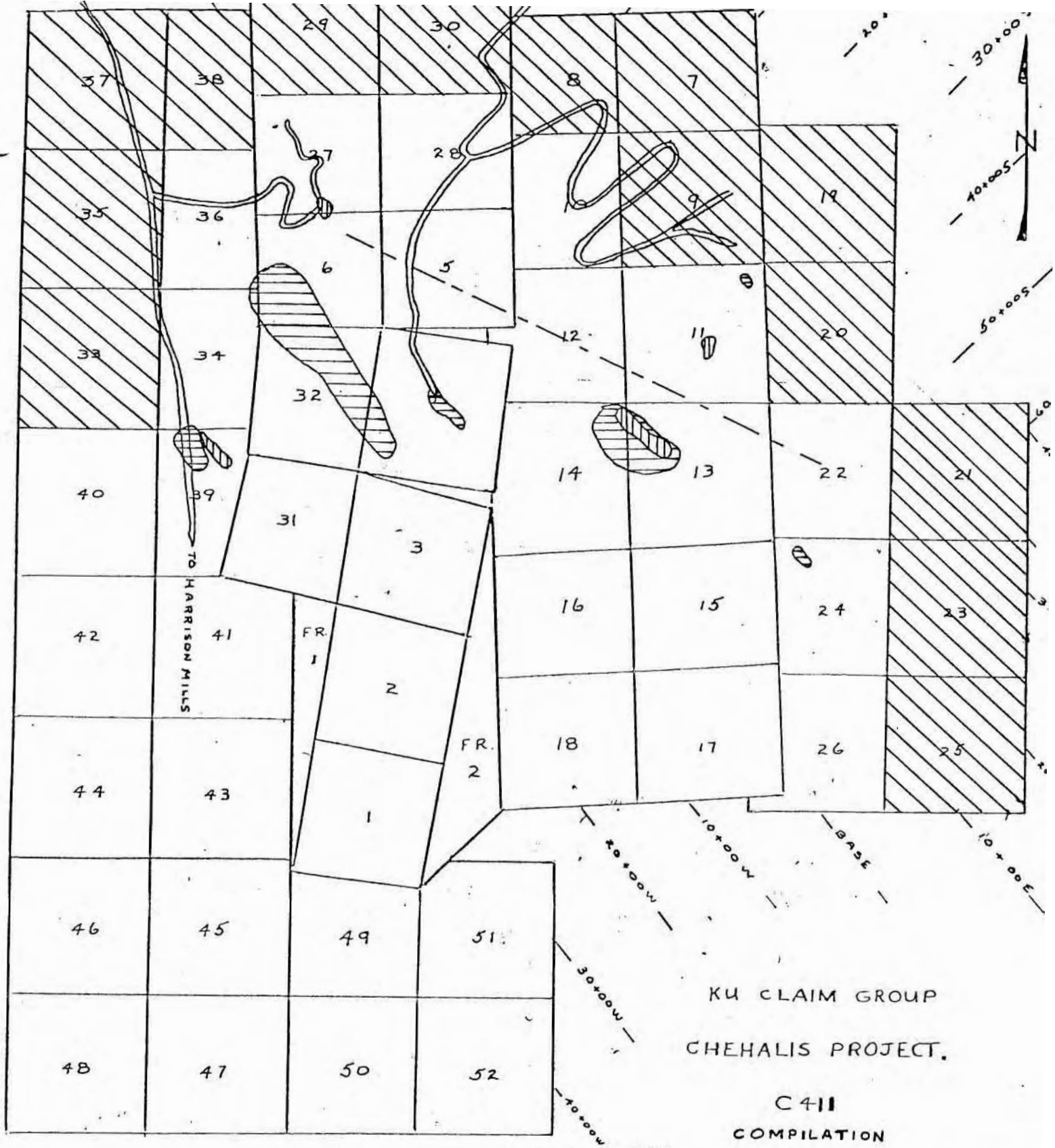


KU CLAIM GROUP

CHEHALIS PROJECT.

6411

FIG. 4


29
30
37
38
8
7
28
27
35
36
9
19
6
5
12
11
20
38
34
32
14
13
22
21
40
39
31
3
16
15
24
23
42
41
FR. 1
2
FR. 2
18
17
26
25
44
43
1
46
45
49
51
48
47
50
52
TO HARRISON MILLS
20+00S
30+00S
40+00S
50+00S
10+00W
BASE
10+00E
30+00W
40+00W
KU CLAIM GROUP
CHEHALIS PROJECT.
C411
COMPILATION
1500 FEET
0
1500
3000
I.P. Pfe > 20%.
GEOCHEM Pb > 60 PPM. Zn > 270 PPM.
RESISTIVITY > 4000 Ω M.
835 GROUPING
FOR ASSESSMENT
Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 5755 MAP 5
DEC. 1975
FIG. 5

REPORT ON

AN INDUCED POLARIZATION AND ELECTROMAGNETIC SURVEY ON THE KU PROPERTY, CHEHALIS LAKE B.C., OF CHEVRON STANDARD MINERALS

by

Mauro G. Berretta, B.Sc., M.Sc.

Consulting Geophysicist

July 31, 1975

SUMMARY

An induced polarization survey carried out on the Ku property has outlined five anomalous zones, two of which coincide with lead-zinc-copper geochemical anomalies. All of the responses indicate the presence of sulphide minerals such as pyrite, chalcopyrite, galena etc.,in unknown relative quantities, of up to 6% by volume, if disseminated, and higher if semi-massive to massive. Resistivity results indicate two distinct rock types as well as some faulting. CEM electromagnetic traverses along selected lines detected no obvious conductors. VLF measurements, also on selected lines, detected four conductors which appear to be caused by ionic conductivity associated with faults and shear zones.

Further exploration is recommended in the form of detailed geological mapping and prospecting over the anomalous zones. Depending on the results of this investigation, drilling is also recommended.

TABLE OF CONTENTS

LIST OF FIGURES

I INTRODUCTION

The data presented here represents the results of an induced polarization survey and some electromagnetic testing conducted on the Ku Mineral Claims, from July 12 to July 22 1975, on behalf of Chevron Standard Minerals Staff.

The property is located about 2 miles north-east of the north end of Chehalis Lake, approximately 23 miles, via logging roads, north of Harrison Mills, and 70 miles east of Vancouver. (Figures 1 & 2). The survey area ranges in elevation from about 2500' to 4500' above sea level, and is generally steep with scattered precipitous areas and some flat areas. The bush is quite variable, partly logged, partly very thick, and in places quite pleasant.

A portable Sabre, Mark 21-1, 450 watt frequency domain i.p. system was used, employing a dipole-dipole array with a = 200', n = 1 and a frequency span of 0.3-10 Hz. EM equipment consisted of a Geonics EM-15 VLF unit and a CEM Shootback system.

5755

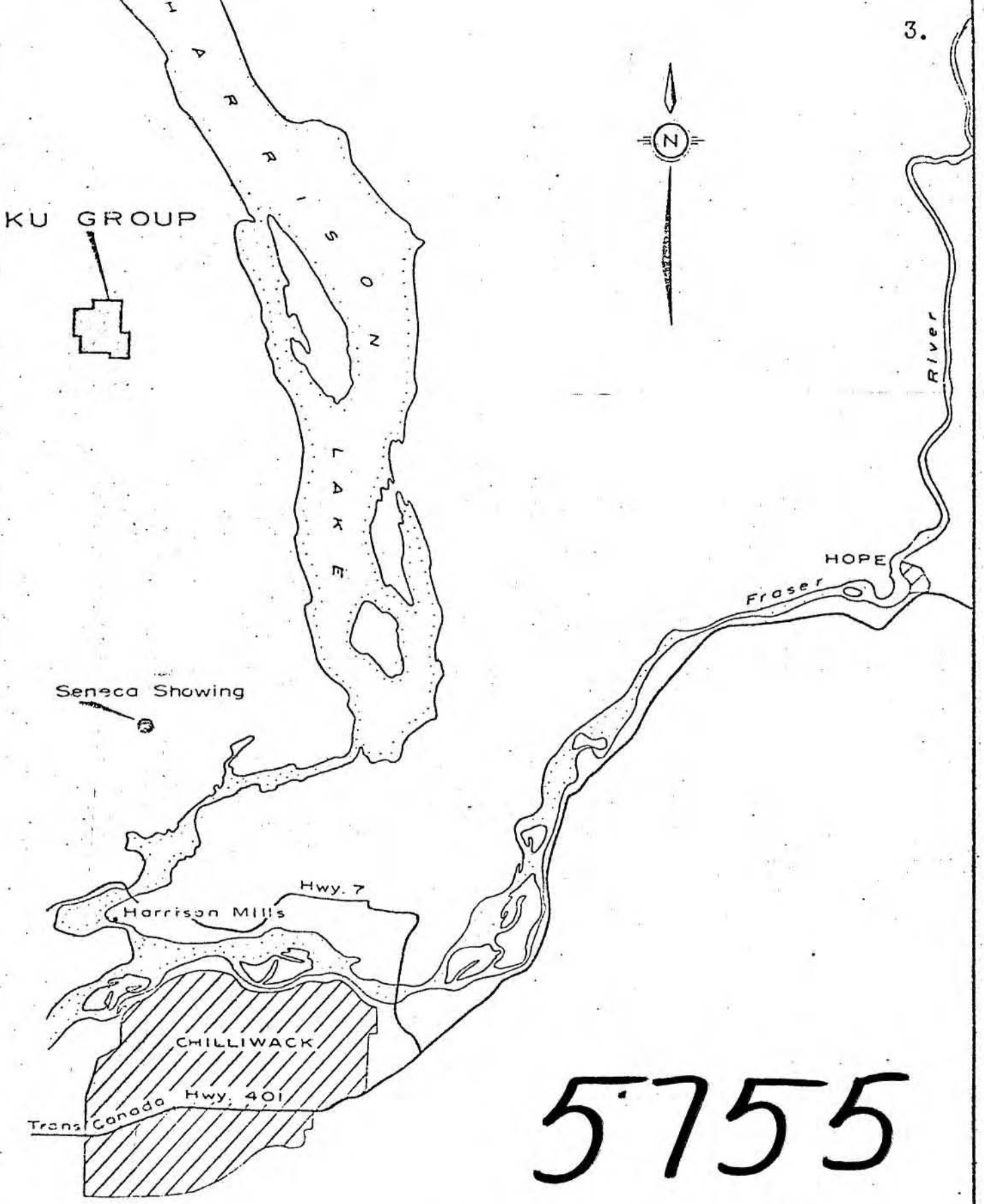
FIG. -1

GENERAL INDEX MAP

KU GROUP

SCALE

1" = 136 Miles



5755

FIG. -2

PROPERTY LOCATION MAP

KU GROUP

SCALE

1" = 4 Miles

AUG. 1973

II GEOLOGY AND GEOCHEMISTRY

The purpose of this survey was to investigate the property for the presence of volcanogenic lead-zinc-copper mineralization similar to the Seneca sulphide deposit, some 10 miles to the south. The central part of the property is situated on a suspected contact between the older Harrison Formation, consisting of pyroclastics, and the younger Echo Formation, made up mostly of marine sediments. A high degree of folding, faulting and superimposed recent volcanic flows and minor intrusions, make this region very complex. As a result, only an approximate zone of possible contact can be described. A geochemical survey over the property has outlined four coincident lead-zinc anomalies, three of which lie in close proximity to the zone of contact, with the fourth in the western edge of the property.

III INDUCED POLARIZATION RESULTS AND INTERPRETATION

ORIENTATION

In order to choose optimum parameters for the Ku property i.p. survey, one day was spent doing test runs over the Seneca deposit. (It should be mentioned here that the Seneca deposit

has been established as a geophysical test site by agreement between the B.C. Geophysical Society and the owners of the deposit). A total of 4700' of data was obtained by surveying the access road that lies above a small lens of mineralization that has been exposed by trenching and blasting. Using a dipole-dipole array, measurements were made on three traverses corresponding to a = 100' n = 1, a = 200' n = 1, and a = 200' n = 2. The results (Figure 7) show that this is indeed a small pocket of mineralization, as only the shallowest sensing array (a = 100' n = 1) decisively detected the presence of sulphides. The percent frequency effect (pfe) response is about 10% within a background of 2% to 4%, and extends over a length of 400'. The arrays with a = 200' n = 1,2 yield only a marginal anomaly at best. The resistivities over the lens are in the range of 300-600 ohm-metres, probably due to fracturing and sulphide content. Away from the mineralization the resistivities climb above 1000 ohm-metres, due to the presence of either a different rock unit or a less fractured version of the same rock hosting the sulphides. A possible fault is indicated at station 15E.

A brief analysis of the Seneca data suggested that a dipole-dipole array with a = 200' n = 1 and a frequency span of 0.3-10 Hz would be an optimum system for the Ku survey.

Although these parameters were just barely responsive to the Seneca, it was kept in mind that the Ku property was being explored for a similar but substantially larger deposit. The effective depth of penetration of the system chosen is about 100'-125', which is well within bedrock in view of the very shallow overburden cover, and which was thought quite adequate in sensing sulphides that according to the geochemistry would exist very close to bedrock surface.

KU SURVEY

A total of 8 line miles were surveyed with a station interval of 200' (Figure 3), with emphasis being placed on that part of the property within and upslope of the geochemical anomalies.

The resistivity data (Figure 4) will be discussed first as this is more indicative of geology. The main feature is an elongated zone of high resistivity, in the range of 1000-4000 ohm-metres with isolated values as high as 8000 ohm-metres, striking roughly east-west. The observation of rock outcrop in this area indicates that this zone is due relatively unfractured Harrison volcanics. About 1000' to the east are a series of three resistivity high features. These may be representative of younger volcanic flows and/or Harrison pyroclastics, which appear to have been intersected by two faults striking roughly north-south. Elsewhere the resistivities

are lower and in the range of 200-800 ohm-metres. These are thought to be representative of a different and more fractured rock unit, probably the Echo marine sediments. Isolated readings of 100 ohm-metres or less appear to be caused by narrow tongues of highly fractured shales and argillites, in many cases verified by visual observation of outcrops. At the western edge of the survey is an open region of high resistivity (above 2000 ohm-m) bounded by lower resistivities to the east. This may represent another contact between volcanics and sediments. On the other hand, the high resistivities may be due to a concentration of boulders in the overburden, since this part of the property is in the Chehalis valley.

The pfe map (Figure 5) shows that a large part of the property is anomalous. Background for the volcanics is in the range of 0-3%, while in the sediments it appears to be in the range of 4-8%. With 10% being taken as the lower anomalous limit, there are five distinct pfe anomalies. The first, centered on line 30S at 23E, is roughly circular in shape, about 600' in extent, and has an amplitude of 30%. The second, centred on line 10S at 12E, is irregular in shape, about 1000' by 1500', and has an amplitude of 20%. The third anomaly, situated on line 05N at 6W is also somewhat circular in shape, about 600' in extent, and displays an amplitude of 30%. Since the strike of the sedimentary beds in these three areas

is roughly parallel to the survey lines, and the dip coincides in a general way with the topographic slope, then any sulphides within these would produce anomalies with broad, extended shapes such as the above. The fourth anomaly, centred on line 35S at 9E, is about 150' wide, 1000' long, roughly parallels the baseline and has an amplitude of 23%. The fifth anomaly is a small feature at 29E on line 05S, with a width of 150' a length of 500' and an amplitude of 25%. The shape of the last two anomalies suggests that the sulfide sources occur in narrow, steeply dipping structures. This is also indicated by detail traverses with the dipole-dipole array expanded to a = 200' n = 2 (Figure 6). The fourth anomaly displays a decrease and a broadening with depth as well as a shift in peak to the southwest of about 100'. This does not necessarily imply a steep south-westerly dip, because the topography here drops off sharply to the south-west. Thus, a nearly vertical structure would produce similar results. The fifth anomaly displays neither a decrease in amplitude nor a broadening with depth, but undergoes also a shift in peak of about 100' to the north-east. In view of the rather flat topography here, the dip is probably steep and to the north-east.

All of the anomalous regions are thought to be caused by sulphide mineralization such as pyrite, pyrrhotite, galena etc. Unfortunately, it is not possible from i.p. data to distinguish

between the various sulphide minerals or their relative proportions. The widespread presence of rust in outcrop in the areas of the first three anomalies indicate that these are at least in part due to pyrite. In the vicinity of anomaly four some pyritized dacite was found. However, it was difficult to ascertain whether this was in float or in place. Similarily, the location of the fifth anomaly offered no obvious geological evidence that could be correlated with the i.p. results. On the other hand, lead-zinc geochemical anomalies 'C' and 'D' coincide remarkably with pfe anomalies four and five.

The 20-30% amplitudes of all anomalies would normally be indicative of sulphide concentrations of up to 6% by volume, if disseminated, and substantially higher if massive.

It was also noticed from the i.p. profiles (Figure7) that almost all of the pfe responses occur where the resistivity undergoes a transition from high to relatively low values, that is, in close proximity to geological contacts and/or zones of fracturing and faulting.

Finally, on the north-western edge of the property are a series of isolated pfe highs accompanied by very low values in resistivity. Visual observation of exposed rock indicates that these are due to finely disseminated pyrite in shales.

IV ELECTROMAGNETIC RESULTS AND INTERPRETATION

Several lines were traversed by Chevron Standard Minerals Staff personnel using a Crone CEM Shootback system. The results (not shown in this report) gave no indication of near surface metallic conductors. An additional line was traversed, line 05N, along which exists a substantial i.p. anomaly. Here also, no indication of conductivity was obtained. It would then appear that the sulphide sources of the i.p. anomalies are either of a disseminated nature, or of a semi-massive to massive nature which is not continuously electronically conducting. This might be the case with sphalerite associated with disseminated pyrite, for example, or with massive mineralization occurring in small, separate pockets.

A Geonics EM-15 VLF unit was also used to survey lines 05N, 05S, 12+50S and 15S. The results are shown in Figure 7. The observed tilt angles were Fraser filtered in order to remove substantial variations caused by topography. The data indicates the presence of several conductors. The first is on line 05N from 5W to 13W. Since the CEM gave no response on this line, it is highly unlikely that the cause is a metallic conductor. One would rather suspect a fault , since a steep gulley runs parallel and adjacent to the the line. The extremely high

frequencies used in VLF systems make them quite responsive to surface ionic conductors such as faults, shear zones etc. This is not the case with the CEM which employs much lower frequencies. The second conductor is on line 05S at 6E. It coincides with a pronounced resistivity low (180 ohm-metres) and with the flank of a pfe high. This could be due to either massive sulphides or to a fault or shear zone within a region of disseminated sulphides. Unfortunately, no CEM data is available on this line to aid in the interpretation. The third and fourth conductors are on lines 12+50S and 15S. These are much less pronounced, and in view of the low pfe's in this area, they are thought to be due to surface ionic conductivity.

V RECOMMENDATIONS

It is recommended that the anomalous i.p. zones be further investigated for the presence of economic mineralization. Detailed prospecting and geological mapping on selected lines over each anomaly may shed more light on the nature of the sulphides causing the anomalies. Subsequent to this work and a reinterpretation of the i.p. data, a drilling program could

be implemented to conclusively determine the economic potential of the property.

Respectfully submitted,

Mauro G. Berretta

Maple Ridge, B.C.
July 31, 1975

Mauro G. Berretta, B.Sc., M.Sc.
Geophysicist

CERTIFICATE

I, David Philip Arscott, am a Professional Engineer, registered in British Columbia, with office address at #901 - 355 Burrard Street, Vancouver, British Columbia.

I hereby certify that the 1975 exploration program on the KU claims at Chehalis Lake, B.C. was carried out at my direction.

I certify the attached statements of expenses to truly represent the value of the program as detailed in the accompanying report.

David Arscott

David Arscott, P. Eng.

20 + 00 N
10 + 00 N
0 + 00
10 + 00 S
20 + 00 S
30 + 00 S
40 + 00 S
50 + 00 S
60 + 00 S

40 + 00 E
30 + 00 E
20 + 00 E
10 + 00 E
Base Line
10 + 00 W
20 + 00 W
30 + 00 W
40 + 00 W

LRD

LMR

M-6
5755

FIGURE - 3

IP GRID & STATION MAP

KU CLAIMS

CHEHALIS PROJECT

SCALE

STATION INTERVAL = 200'

JULY 1975 | MAURO G. BERRETTA

— 20 + 00 N —
— 10 + 00 N —
— 0 + 00 —
— 10 + 00 S —
— 20 + 00 S —
— 30 + 00 S —
— 40 + 00 S —
— 50 + 00 S —
— 60 + 00 S —

— 40 + 00 E —
— 30 + 00 E —
— 20 + 00 E —
— 10 + 00 E —
— Base Line —
— 10 + 00 W —
— 20 + 00 W —
— 30 + 00 W —
— 40 + 00 W —

FIGURE - 4

RESISTIVITY | DIPOLE—DIPOLE a=200' n=1 0.3-10 HZ | SABRE 21-1 450 W

KEY CLAIMS

CHEHALIS PROJECT

CONTOUR INTERVAL 1000 Ωm

JULY 1975 | MAURO G. BERRETTA

20 + 00 N | 10 + 00 N | 0 + 00 | 10 + 00 S | 20 + 00 S | 30 + 00 S | 40 + 00 S | 50 + 00 S | 60 + 00 S

40 + 00 E
30 + 00 E
20 + 00 E
10 + 00 E
Base Line
10 + 00 W
20 + 00 W
30 + 00 W
40 + 00 W

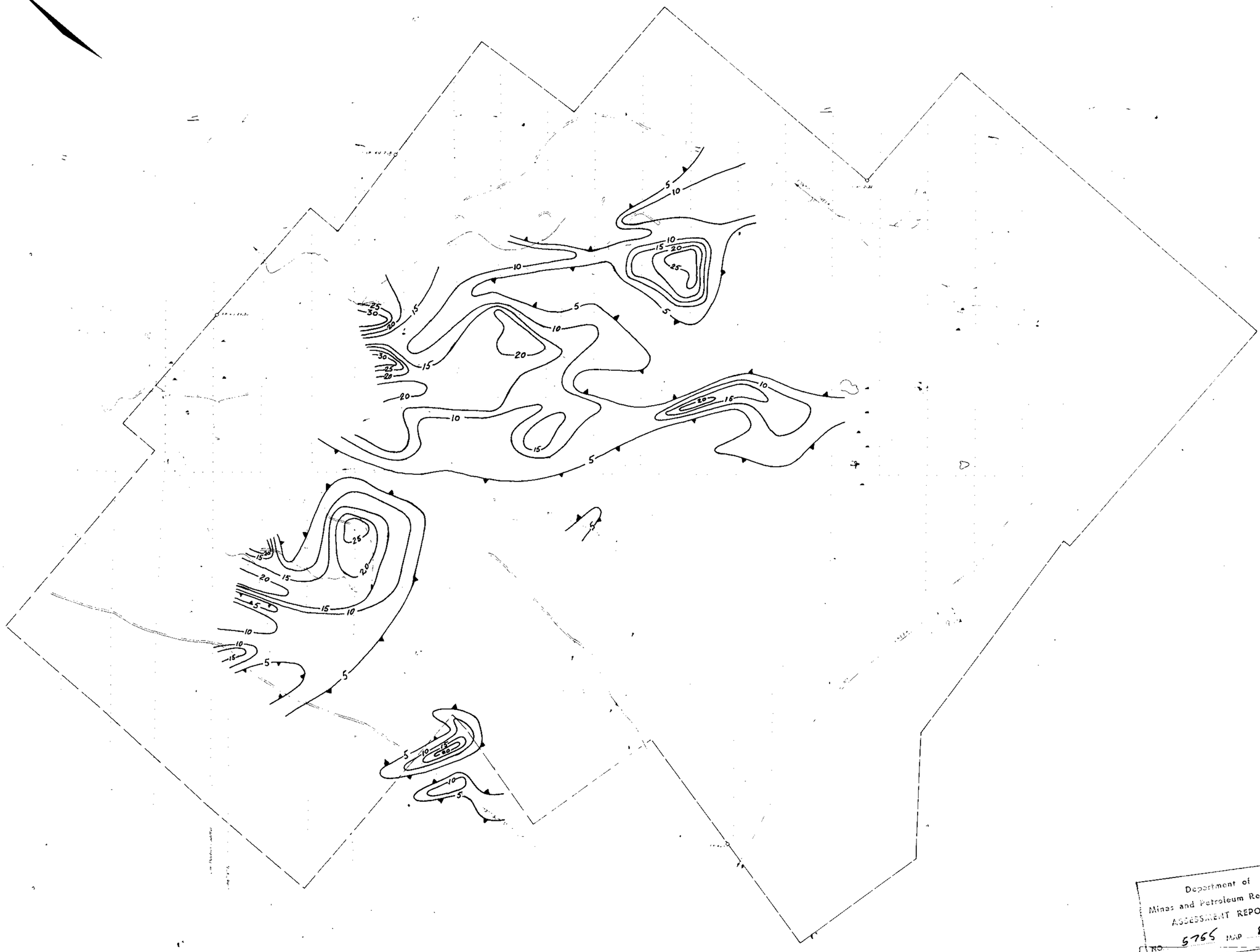


FIGURE - 5

PFE	DIPOLE – DIPOLE a= 200' n = 1 0.3-10 HZ	SABRE 21-1 450 W

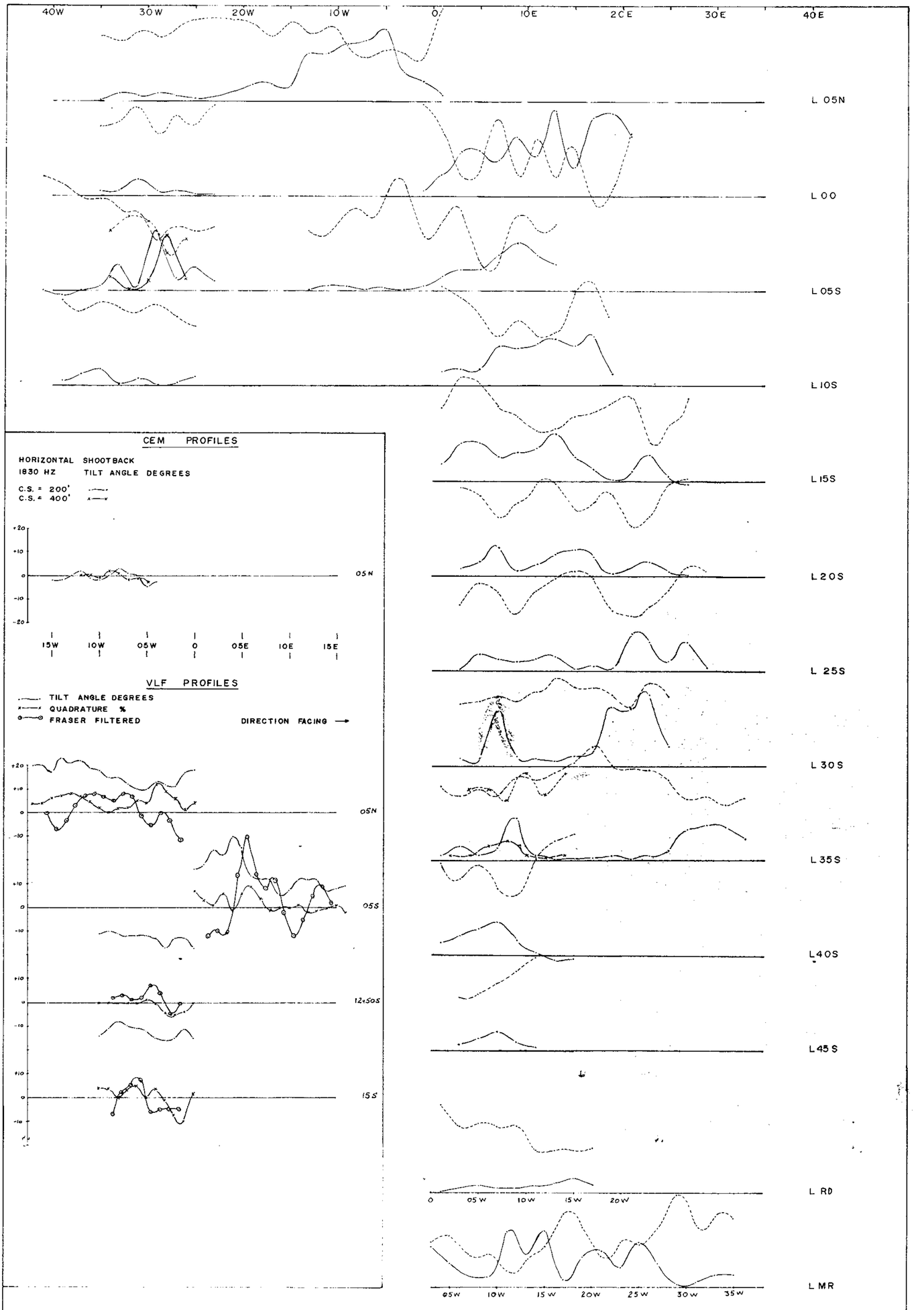
KU CLAIMS

CHEHALIS PROJECT

SCALE

CONTOUR INTERVAL 5 %

JULY 1975 | MAURO G. BERRETTA



CEM PROFILES

HORIZONTAL SHOOTBACK
1830 HZ TILT ANGLE DEGREES

C.S. = 200' ·—·
C.S. = 400' x—x

VLF PROFILES

·—· TILT ANGLE DEGREES
x—x QUADRATURE %
o—o FRASER FILTERED

DIRECTION FACING →

FIGURE – 6

IP AND EM PROFILES

KU CLAIMS

CHEHALIS PROJECT

CHEVRON STANDARD MINERALS

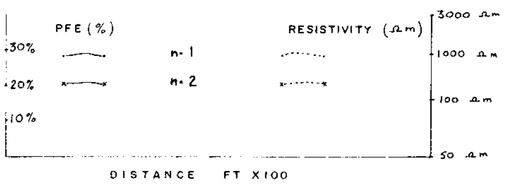
SCALE 1" = 500'

JULY 1975

MAURO G. BERRETTA

I.P. PROFILES - LEGEND

DIPOLE – DIPOLE , a = 200', .3-10 HZ



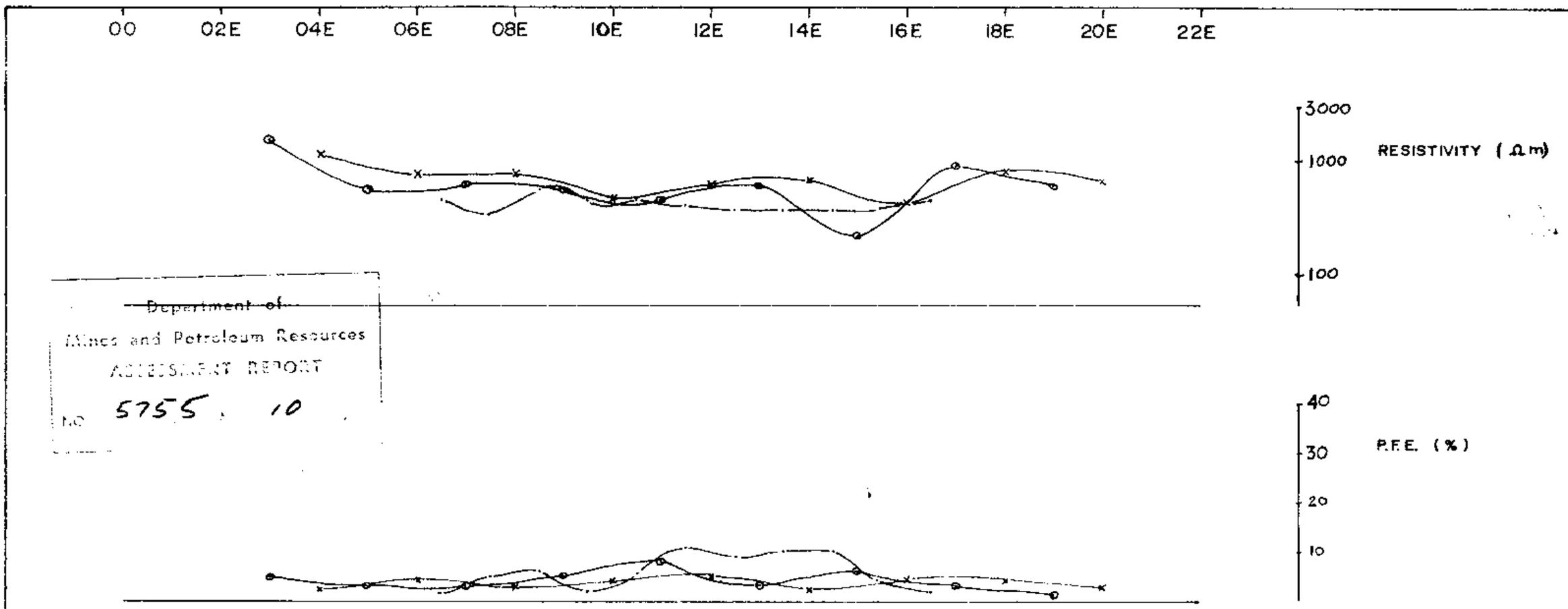


FIGURE – 7

PFE AND RESISTIVITY

SENECA DEPOSIT – LINE ROAD

SABRE 21-1
450 W
DIPOLE-DIPOLE
0.3-10 HZ

a = 100' n = 1
a = 200' n = 1
a = 200' n = 2

JULY 1975

MAURO G. BERRETTA