3382

Report on an Induced Polarization Survey
on Coronado Property, Cranbrook, B.C.

Eighteen Miles Northeast of Cranbrook, B.C.
Lat 49°43'N; Long 115°29'W
82 G / 11W

PLACID OIL COMPANY

September 16th-25th, 1971

P. E. Lane

November, 1971

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INTRODUCTION

Between September 16 and September 25, 1971 an Induced Polarization (I.P.) survey was carried out by Eagle Geophysics Limited for Placid Oil Company over the Coronado property located 35 miles by road, northeast of Cranbrook, B.C.. The property is comprised of mineral claims COR 1, NEW COR 3, NEW COR 4, and Mineral Lease 50 and is located in the Fort Steele Mining Division.

The geophysical crew was managed by Mr. J. Lloyd, of Eagle Geophysics Limited. Areas of detail work were selected by myself in consultation with Mr. Lloyd.

The I.P. survey consisted of reconnaissance and detail phases using an electrode configuration called the "pole-dipole" array. A total of 3.7 line miles was read over a 3.1 mile grid cut with cross-lines running approximately east-west and picketed at 100' stations. Apparent chargeability and apparent resistivity data are presented in profile form at a scale of 1" - 100'.

SURVEY SPECIFICATIONS

The equipment used was a pulse-type I.P. instrument manufactured by Huntec Limited in Toronto. Power is obtained from a gasoline motor, coupled to 2.5 kw, 400 cycle, three-phase generator, providing a maximum of 7.5 kw d.c. to the ground. The cycling rate is 1.5 seconds "current on" and 0.5 second "current off", the pulses reversing continuously in polarity. The data recorded in the field consists of careful measurements of the current (I) in amperes flowing through electrodes C_1 and C_2, the primary voltage (V_p) appearing between P_1 and P_2 during the "current on" part of the cycle, and a secondary voltage (V_s) appearing between P_1 and P_2 during the "current off" part of the cycle. The apparent chargeability (M_a) in milliseconds is calculated by dividing the secondary voltage by the primary voltage and multiplying by 400, which is the sampling time in milliseconds of the receiver unit. The apparent resistivity in ohmmeters is proportional to the ratio of the primary voltage and the measure current, the proportionality factor depending on the geometry of the array used. The resistivity and chargeability obtained are called "apparent" as they are values which that portion of the earth sampled by the array would have if it were homogeneous. As the earth sampled is usually inhomogeneous, the calculated apparent resistivity and apparent chargeability are functions of the actual resistivity and chargeability of the rocks sampled and of the geometry of the rocks.

The survey was carried out using the "pole-dipole array" system. In this system, the current electrode(C_1) and two potential electrodes (P_1 and P_2) are moved in unison along the survey lines. The spacing between C_1 and P_1 (nx) and P_1 and P_2 (x) is kept constant for each traverse: The figure (nx) roughly equals the depth to be explored by that traverse. The second electrode (C_2) is kept fixed at "infinity".

Thus, on a pole-dipole traverse with a spacing (nx) of 200 feet, a body lying at a depth of 100-300 feet will produce a strong response whereas one at a depth of 400 feet will react very weakly. By running subsequent traverses at different electrode spacings more precise estimates can be made of depth to the top of causative bodies as well as more detailed information on the geometry and extent of the bodies.

Initially it was intended to cover the area at 100 and 200 foot C_1-P_1 separations but the rate of progress was slow. A reconnaissance C_1-P_1 spacing of 200 feet was tried, but due to low rock resistivities it was necessary to use a 100 foot C_1-P_1 separation over most of the grid.

On selected lines several spacings were used to obtain information as to the depth of the causative bodies.

INTERPRETATION PROCEDURES

I.P interpretation procedures are more reliably applied to horizontally layered bodies and for porphyry copper bodies of large lateral extent. In attempting to interpret effects of steeply dipping bodies of limited width and depth extents, covered by overburden, in areas with a variety of country rocks, there are no theoretical guidelines. Interpretation has to be made on empirical results obtained from other surveys.

The technique responds well to disseminated sulphides and perhaps more variably to massive sulphides, probably because of their more localized nature.

An increase in apparent chargeability readings above background may indicate the presence of metallic sulphide mineralization (except sphalerite (zinc sulphide) which does not respond). Responses may also be obtained from clay minerals, graphite and magnetite.

Different rock types give widely different background responses. Shales, carbonaceous limestone, basic and ultrabasic rocks are among types giving generally higher background responses.

Resistivity values vary widely depending on rock type. Mineralization, does not necessarily mean a more highly conductive rock. However, resistivity lows are frequently associated with mineralization and also with overburden.

INTERPRETATION

General

The survey grid is underlain by a sedimentary sequence of dolomite, argillites, conglomerate, schists, limestone and quartzite trending very close to north-south.

Apparent chargeability values range widely from 1.6 to 27.0 milliseconds, probably reflecting the variety of rock types as much as mineralized horizons. This variety of rock types within such a limited areal extent prevents background values from being determined. Consequently the significance of the increase of chargeability values is difficult to assess. Within a uniform rock-type anomalies could be evaluated according to intensity and size but in this case such a classification is not meaningful.

Resistivity values are very variable from less than 10 ohm-metres to 5000 ohmmetres. The lower value is exceptionally low while the higher values are within the range for the rock units concerned. The severe terrain could affect resistivity values considerably due to distortion of current flow. The lower resistivity values usually occur in the valley bottom where overburden is likely to be deeper and conduction may be increased. A combination terrain, overburden or rocky-type (or any one factor) could produce the very low resistivities.

A pronounced linearity parallel to the geological strike, is evident in apparent chargeability and apparent resistivity data.

Three zones have been delineated on the basis of the I.P. data (see Plate 1), although the continuity of two of the zones is questionable.

Zone 1 is of prime interest as it coincides with the dolomite horizon carrying copper sulphide mineralization. Zones 2 and 3 are, at least partially, of less significance due to probable unfavorable geology.

It is possible that faulting interrupts Zones 1 and 2 between Lines 12S and 14S.

Zone 1

The zone is underlain by dolomite containing areas of tetrhedrite mineralization occurring as blebs and short discontinuous veinlets. A gossan underlies the southerly part of the zone.

Apparent chargeability values commonly reach 20 milliseconds in this zone and although no background value is established these values are higher than is usually expected from this rock-type.

The zone has a possible strike length of 1700 feet and an average width of 250 feet. It is open to the north and south. The continuity of the zone appears to be interrupted between Lines 12S and 14S by faulting.

The gossan was not adequately covered due to steep terrain but the available data indicate the presence of sulphide mineralization, as would be expected.

Multiple-spacing electrode coverage of Lines 2S,4S,6S,8S and 10S shows a consistently uniform response on all electrode spacings. This may be interpreted in two ways:

(a) The rock-type is producing an I.P. response,

(b) The rock is uniformly mineralized from the surface down to at least 200 feet (the maximum penetration likely for the electrode separations used).

The zone is not conductive. There is a close correlation between the I.P. response and the pronounced resistivity increase of Zone A (Plate 2). If sulphide mineralization is in the form of discreet, unconnected, grains or blebs the host rocks could still exhibit a high resistivity.

The response may be due to widespread sulphide mineralization or an as yet unrecognized source within the dolomite.

Zone 2

The zone contains apparent chargeability values as high as 27 milliseconds. Background values are not established.

The zone has a minimum strike length of 2000 feet and is very variable in width from 100 feet to 600 feet on Lines 2S and 4S. From the geological information it is doubtful if the zone is continuous and it is divided into three units: Zone 2a, Zone 2b, and Zone 2c.

Zone 2a extends from Lines 2S to 12S. The zone is open to the north and may be truncated by faulting to the south. Between Lines 2S and 6S the position of the eastern edge is uncertain as it is adjacent to Zone 2b.

Between Lines 6S and 12S the zone is underlain by shale containing specks of pyrite which would account for the I.P. response. It is assumed that this shale horizon continues along the zone to Lin e2S and presumably beyond. The body extends to at least 200 feet in depth.

The zone has a general correlation with a resistivity low indicating electronic or electrolytic conduction. The former would confirm the presence of metallic sulphides.

Zone 2b is continuous from the eastern edge of Zone 2a.

It is open to the north but does not reach Line 6S. Limited rock exposure indicates that it is at least partially underlain by dolomite.

The I.P. response indicates a large mass of chargeable material extending to within less than 100 feet of the surface. It is accompanied by a resistivity low which has probably been enhanced by topography or a thicker overburden cover in this locality.

The zone is interpreted to be due to metallic sulphide mineralization or a rock-type, possibly dolomite, with a very high chargeability.

Zone 2c is poorly defined. Its strike is variable and oblique to geological and resistivity trends. It extends to less than 100 feet of the surface and is probably due to changes in lithology and overburden thickness.

Zone 3

The zone straddles a dolomite/schist contact. A well defined strike extent of 1000 feet and widths up to 200 feet are interpreted. The zone is dying out to the south and insufficient data is available to determine its northward extension.

The zone correlates with a sharp increase in resistivity values over the schist, indicated by Zone B (Plate 2).

No multiple-spacing electrode coverage was done and no depth estimate is possible, except to say that the causative body comes to within less than 100 feet of the surface.

The intensity of the zone is greatest on Lines 10S and 12S. This is probably in part due to thinner overburden cover. The responses to the south are situated in an area of heavier overburden and the magnitude of the anomalies are reduced.

The zone is most likely to be due to the localization of chargeable material along the schist/dolomite contact.

CONCLUSIONS

(1) Three zones of higher I.P. response were detected.

(2) Assessment of the zones is complicated because background values cannot be established due to the limited lateral extent of the rock units.

(3) Zone 1 is underlain by the mineralized dolomite. The I.P. responses in this zone could be due to the rock-type or sulphide mineralization, although they are reported to be much higher than would normally be expected from unmineralized dolomite.

(4) Zone 2a is probably due to disseminated specks of pyrite in a shale horizon. No economic mineralization has been seen.

(5) Zone 2b may be due to sulphide mineralization or a rock-type with exceptionally high chargeability. Geology indicates this rock type is dolomite and the response may be analogous to that obtained in Zone 1.

(6) Zone 2c is interpreted as variations in rock-type and/or overburden thickness.

(7) Zone 3 is probably due to the localization of chargeable material along the schist/dolomite contact.

RECOMMENDATIONS

Zone 1

Diamond drilling should be undertaken because of the coincidence of sulphide mineralization and a high I.P. response, regardless of the fact that the data tends to the interpretation of a response due to rock type rather than mineralization.

The location of the hole should be such that an intersection along Line 6S is obtained which will give a representative sample across the entire thickness of the rock unit. The hole should intersect at a point beneath station 4+00W at a point about 150 feet perpendicular to the slope of the terrain.

A precise co-ordinate for the drill hole collar cannot be given until the ground profile is determined using a hand level.

Zone 2a

(a) Chip samples should be collected where possible, in the following locations:

Line 6S between 0+50W and 2+50W
Line 8S between 3+00W and 4+00W
Line 10S between 3+50W and 5+00W
Line 12S between 5+50W and 7+00W

Samples should be assayed for copper, silver and gold.

Zone 2b

Work on this area would be contingent on the results from Zone 1 and/or Zone 2a.

Zone 2c

No work is recommended in this area on the basis of the I.P. data.

Zone 3

(a) The cause of the I.P. anomaly should be confirmed by bulldozer trenching and sampling. Either one of the following locations would be suitable:

Line 10S between 2E and 3E
Line 12S between 0+50E and 2E.

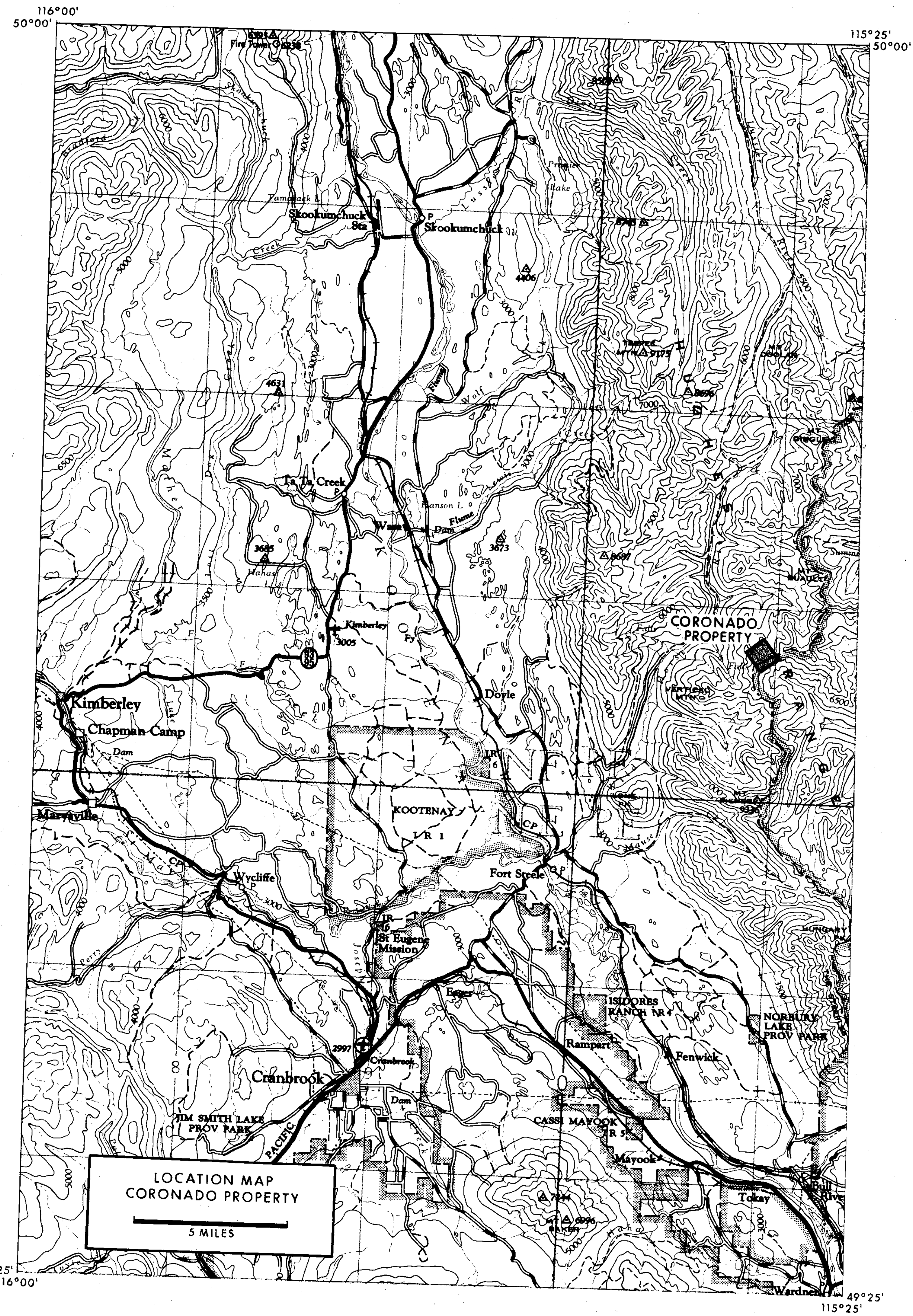
General

It is not recommended that diamond drilling of Zones 2 and 3 be undertaken before an attempt is made to determine the cause anomalies by less expensive means such as stripping, geological mapping, or sampling.

Respectfully submitted;

P. E. Lane

P. E. Lane, M.Sc.



LOCATION MAP
CORONADO PROPERTY

5 MILES

PERSONNEL EMPLOYED

Between September 16th and 28th, the following personnel were employed in carrying out the I.P. survey.

J. Lloyd	Eagle Geophysics Ltd.
R. Harvey	Eagle Geophysics Ltd.
P. Grove	Eagle Geophysics Ltd.

SURVEY COSTS

The cost of the contracted I.P. survey carried out by Eagle Geophysics Limited is shown on the included invoice.

A P P E N D I X

TELEPHONE 938/6488

XXXXXXXXX NELSON STREET
XVANCOUVER 5 B.C.

EAGLE GEOPHYSICS LIMITED

575 Lucerne Place
North Vancouver, B.C.

TO Placid Oil Company,
340-2 Cranbrook Street,
Cranbrook, B.C.

DATE Sept. 30/71

TERMS: Nett 10 days

MINING DIVISION MINING DIVISION

	DESCRIPTION	AMOUNT
	Re: IP Survey, Coronado Property, Wildhorse Creek, Cranbrook, B.C. As per Contract dated Sept. 4, 1971	
Re:Clause 1.	(a) 9 Survey Days @ $275.00 per day (See attached FIELD REPORTS)	$2,475.00
	(b) Not applicable	N/C
	(c) 4 Travel Days @ $165.00 per day	660.00
2.	Provision of geophysical operator P. Grove to work as helper @ $30.00/day	
	14 days @ $ 30.00 per day	420.00
3.	Provision of 4 X 4 Power Wagon @ $18.00/day + 0.15/mile	
	14 days @ $ 18.00 per day	252.00
	1780 miles @ 0.15 per mile	267.00
4.	(a)Mobilisation of crew: Vancouver/Cranbrook/Vancouver at cost plus 10% (see attached expense report)	
	At cost	90.51
	Plus 10%	9.05
	Sub-Total	$4,173.56
	Less Initial Deposit of $1,000.00	1,000.00
	TOTAL PAYABLE	$3,173.56

PLEASE NOTE OUR NEW ADDRESS

1% PER MONTH CHARGED ON OVERDUE ACCOUNTS.

Approved for payment

Additions, totals checked

OUR ACCOUNT NO. E 164 Cge AFE 1880

[signature]

INVOICE № 1165

APPROVED FOR PAYMENT
LEASE Coronado
WELL NO. IP Survey (general exploration)
USED FOR AFE 7880
WMR #____ FWO #____ FT #____
SIGNED

Copy for J. Jenks, Cranbrook

Aug 7 / Oct 71

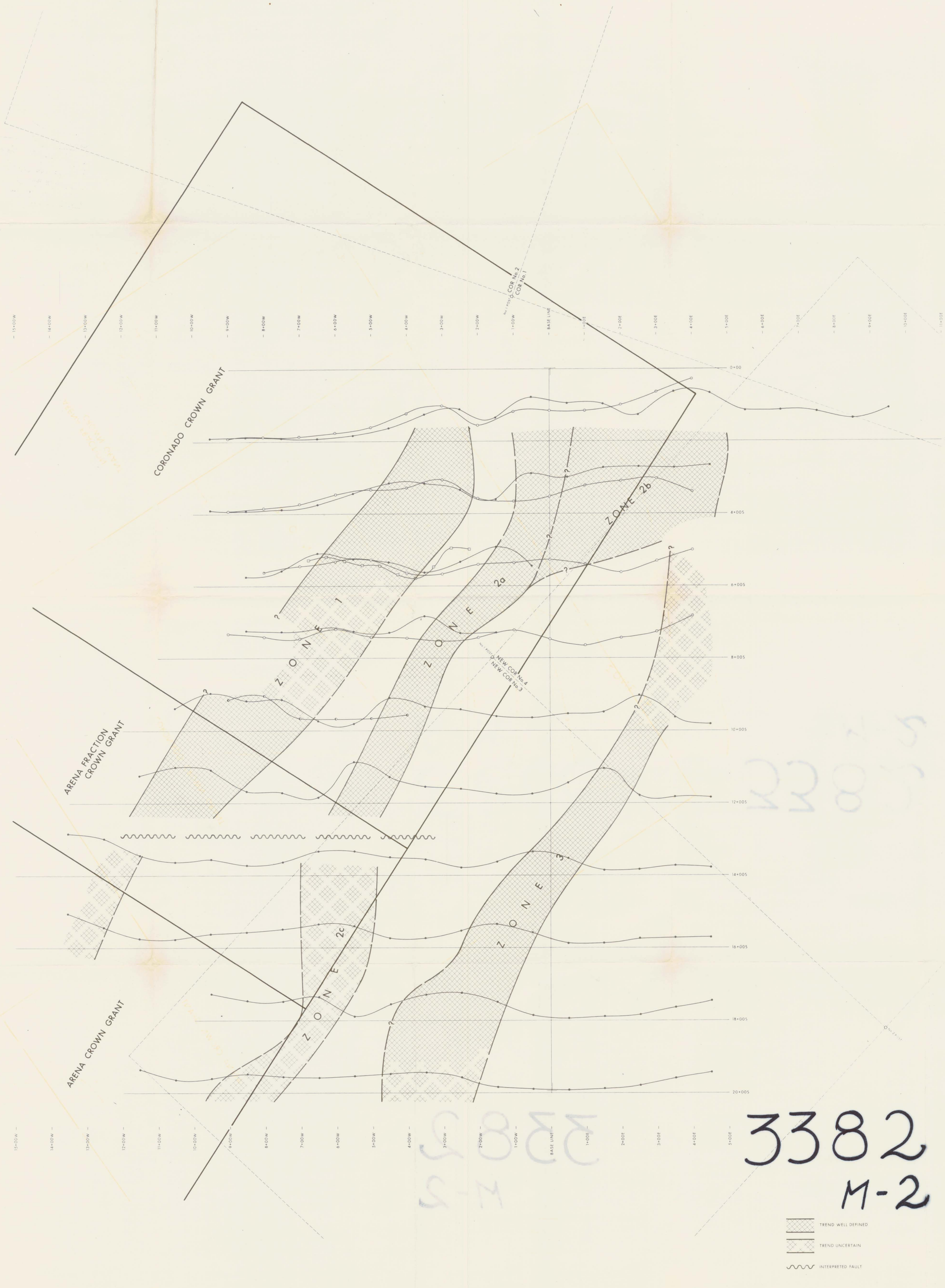
STATEMENT OF QUALIFICATIONS

1. I graduated from the University of London in 1964 as a Bachelor of Science in Geology and Physics.

2. I obtained a Master of Science degree in Geophysics from the University of London and a Diploma of Imperial College in Geology and Geophysics in 1967.

3. I have six years experience in mineral exploration involving geophysical surveys including carrying out and interpreting Induced Polariztion surveys.

P. E. Lane



3382
M-2

ELECTRODE ARRAY- POLE DIPOLE

C_2 — >7nx — P_2 — x — P_1 — nx — C_1

APPARENT CHARGEABILITY-

x=200; n=1
x=100; n=2
x=100; n=1
x=50; n=1

C_1 leading West to East except lines 2+00S and 4+00S where C_1 leads from East to West.

To accompany geophysical report by P.E. Lane M.Sc., on Cor, New Cor and M.L. 50, East Fork Wildhorse Creek, Fort Steele Mining Division, dated the 23 of November, 1971.

P.E. Lane.

PLACID OIL COMPANY

CHARGEABILITY TRENDS
INDUCED POLARIZATION SURVEY
CHARGEABILITY PROFILES

CORONADO PROPERTY

SCALE 1 INCH TO 100 FEET

VERTICAL SCALE - 1 INCH = 20 MILLISECONDS

CONTOUR INTERVAL — DATE - NOV. 23, 1971

INTERPRETATION BY-	SURVEY BY-	MAP NO
PETER LANE	EAGLE GEOPHYSICS LTD.	1

ELECTRODE ARRAY - POLE DIPOLE

C_2 P_2 P_1 C_1 — x — nx —

APPARENT RESISTIVITY -

- x=100; n=2
- x=100; n=1
- x=50; n=2

C_1 leading West to East except lines 2+00S and 4+00S where C_1 leads from East to West.

To accompany geophysical report by P.E Lane M.Sc., on Cor, New Cor and M.L. 50, East Fork Wildhorse Creek, Fort Steele Mining Division, dated the 23 of November, 1971.

P. E. Lane.

PLACID OIL COMPANY

RESISTIVITY TRENDS

INDUCED POLARIZATION SURVEY

APPARENT RESISTIVITY PROFILES

CORONADO PROPERTY

FEET 0 100 200 300 FEET

SCALE - 1 INCH TO 100 FEET

VERTICAL SCALE - 0.5 INCHES = 2 CYCLES LOGARITHMIC

CONTOUR INTERVAL - DATE - NOV. 23, 1971

INTERPRETATION BY -	SURVEY BY -	MAP NO.
PETER LANE	EAGLE GEOPHYSICS LTD.	2