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REPORT ON AN

INDUCED POLARIZATION SURVEY

MERRITT, B. C.

FOR

BETHEX LIMITED

BY

HUNTEC LIMITED

TORONTO, ONTARIO

NOVEMBER, 1965

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INTRODUCTION

Between August 16th and September 5th, 1965, an Induced Polarization (I. P.) survey was carried out by Huntec Limited for Bethex Ltd. over a property located some 40 miles southwest of Merritt in the Coquihalla Valley, New Westminster Mining Division, British Columbia.

The geophysical crew was managed in the field by Mr. P. E. Lane and supervised from Toronto by Mr. R. K. Watson. Three other field personnel made up the rest of the crew and the periods of employment of all personnel are listed in the appendix to this report. Typing and drafting of the field report was done in the Toronto office of Huntec Limited.

The I. P. survey consisted of reconnaissance and detail phases using an electrode configuration known as the "three-electrode array" and covered a total of 8.32 miles along picket lines cut in east-west and NE-SW directions. In addition to the I. P. measurements, simultaneous readings of resistivity were made. The reconnaissance data are presented in plan form as contours of chargeability and resistivity. Detailed sections are shown in profile form. Geology as mapped by Bethex Ltd. is shown on the contoured chargeability map.

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 a 7.5 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 seconds "current off", the pulses reversing continuously in polarity. The data recorded in the field consist 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 measured 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 "three-electrode 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 is kept constant for each traverse, at the figure roughly equal to the depth to be explored by that traverse. The second electrode (C_2) is kept fixed at "infinity".

Thus, on a three-electrode traverse with a spacing of 400 feet, a body lying at a depth of 200 feet will produce a strong response, whereas one at a depth of 400 feet will only just be detected. 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.

The "three-electrode array" with a 200-foot electrode separation was used over the entire survey area to detect zones of sulphide mineralization. Further "three-electrode array" measurements were then taken at spacings of 100 and 400 feet to give additional information for the selection of drilling targets.

INTERPRETATION PROCEDURES

I. P. interpretation procedures have been most completely developed in situations of horizontal layering and for bodies such as porphyry coppers of large lateral extent. The complex problem of resolving the combined effects of depth, width, dip and true chargeability of steeply dipping bodies, together with the physical characteristics of overburden and country rocks, has not been solved theoretically. The interpreter must use empirical solutions plus experience gained from surveys over known bodies in other areas.

The interpretation maps submitted with this report indicate certain anomalous zones which may correspond to disseminated sulphide mineralization. The actual bodies are probably narrower than the indicated zones as shown on the accompanying profiles. Estimates of depth to the top of mineralization have been made on some anomalies by virtue of the three-electrode data. Drill holes have been spotted based on these depths and positions of the probable causative body.

RESULTS AND INTERPRETATION

NORTH AREA

The north area was covered by 17 survey lines from Line 0+00 to Line 72+00N.

Reconnaissance Survey

The survey results are shown on Plates 1 and 2. Plate 1 shows contours of chargeability combined with geology as mapped by Bethex Limited, and geology as interpreted from the chargeability data. The values are in milliseconds and the contour interval is one millisecond. On inspection of the chargeability results, it is evident that the rock type mapped as greenstone has a very high I.P. response north of Line 16+00N and extending up to and probably beyond Line 48+00N. It has been found in past surveys that certain serpentinized greenstones will respond strongly to I.P. and owing to this apparent direct correlation between greenstone and high chargeability it is concluded that this situation may prevail in the area under discussion. It may be noticed that two gabbro syenite dykes near the south boundary of claim Ponoka 5 would appear, if extended southward, to coincide with a large anomaly seen on Line 48, 44 and 36. However, coarse crystalline rock of this type seldom has a high I.P. response and it is felt that the greenstone is the more likely cause of the anomaly.

In spite of this conclusion, it is believed that the I.P. response is strong enough in some places to indicate the possibility of sulphide mineralization within the greenstone and that further investigation by drilling is warranted. To this effect, several of the larger anomalies were re-surveyed by detail profiles.

Detail Profiles

Lines 20N and 44N were covered in detail by three profiles using different electrode separations in order to assess more closely the position and size of the chargeable bodies within the greenstone. These profiles are shown on Plate 3. The areas within the interpreted greenstone that are highly responsive and which may contain sulphide mineralization are shown by single hatched or cross-hatched blocks under the profiles. These can be considered as schematic geologic sections at the scale of 200 feet to the inch, horizontal and vertical. To investigate these chargeable zones, the following drill holes have been located and are shown on the profiles:

Line 20N

1) 27+80E at 45° to the west, to a depth of 350 feet

or, as an alternative

2) 26+40E, vertical to a depth of 300 feet

Line 44N

1) 33+40E at 60°W, to a depth of 350 feet, and

2) 29+70E at 45°E, to a depth of 500 feet

or

3) 32+20E at 45°W, to a depth of 350 feet.

Should it be decided to investigate the anomaly more thoroughly the following additional I.P. reconnaissance survey would be necessary. All lines north of 12N, inclusive, should be extended by 1200 feet east in order that the extent of the anomaly may be defined. Further extension might prove necessary. The as yet uncut lines in the grid of 400-foot intervals should be completed to 72N and continued to at least 80N in the first instance. Provision for the possibility of further northerly lines should be made. At least one line of 3000 foot length should be cut south of line O to ascertain the southward extent of the anomaly. At the completion of that stage of the survey, it could be advantageous in locating the area of highest response, to cut lines at intermediate intervals between the original lines. These would be decided upon depending on previous results. The final phase of the survey would then be the detailing of the lines which showed the highest response on the reconnaissance survey. The detailing would consist of several profiles using multiple electrode spacings which are thought to give the most valuable information.

SOUTH AREA

The south area includes survey Lines 0+00, 1+00S and 2+00S lying in claims FRM 30, 31, 34 and 35. The chargeability and resistivity results are shown on Plate 3. On Line 2S, an anomaly with a peak value of 12.7 milliseconds above a background of about 5 milliseconds, is seen centred at 15W which does not appear to coincide with a greenstone formation and has, therefore, more likelihood of being caused by sulphide mineralization. This line was detailed using a 100- and 400-foot electrode separation in order to examine this anomaly more closely, and the results are shown with the other detailed lines on Plate 4. The anomaly is somewhat complex and the depth to the top of the causative body cannot be clearly defined. However, it does appear to have 200 feet of cover and to be dipping deeply to the west. Two drill holes have been located to investigate the source of this anomaly.

1) 17+80W at 60° E to a depth of 450 feet

or

2) 16+00W, vertical to a depth of 400 feet.

The anomaly does not have any resistivity expression which confirms the absence of a somewhat conductive ultrabasic greenstone and this supports the possibility of finely disseminated sulphides as the cause.

SUMMARY AND CONCLUSIONS

1. Two separate areas designated as North and South areas were covered by an I. P. survey.

2. In the North area, a group of strong anomalies appears to correlate directly with mapped greenstone. Past experience has shown that greenstones in the general area can have a high chargeability and it is concluded that this may be the case in this area.

3. Notwithstanding the above conclusions it is believed that some of the anomalies are strong enough to indicate the presence of metallic sulphide mineralization in the greenstones. Accordingly, detailed I. P. profiles were made and exploratory drill holes were located.

4. In the south area, one anomaly was found having no relation to the greenstone. This has more likelihood of being caused by sulphides than the others and drill holes have been located of the detail profiles.

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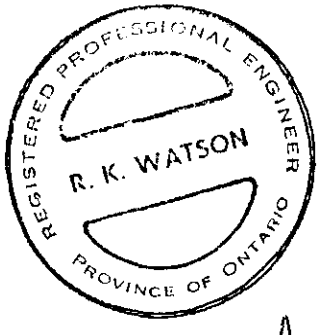


R. K. Watson

R. K. Watson, B. A. Sc., P. Eng.
Senior Geophysicist

R. K. Watson

for P. E. Lane, B. Sc.
Geophysicist

APPENDIX

1. Instrument

The geophysical instrument used was a Huntec pulse-type Induced Polarization unit, with a power rating of 7.5 kw.

2. Miles Surveyed

The induced polarization survey consisted of reconnaissance and detail phases using the "three-electrode array". The detail work entailed using various electrode spacings over lines selected on the results of the reconnaissance survey.

	Miles	Stations
Reconnaissance	6.84	219
Detail	1.48	103
	8.32 miles	322

3. Claims Covered

PONOKA 3, 5

FRM 7, 8, 10, 11, 13, 14, 15, 16, 18, 30, 34, 35

L-1694, 1695, 1696, and 1697

4. Assessment Work

	8-hour Man Days
Geophysical Survey	64
Calculations & Drafting	11
Interpretation & Report Writing	12 1/2
Office typing and supervision	2

Personnel Employed

Name	Occupation	Address	Dates
R. K. Watson	Senior Geophysicist	1450 O'Connor Dr.	November 2 - 11
P. E. Lane	Geophysicist	1450 O'Connor Dr.	Aug. 16, Aug. 24-Sept. 5
R. L. Stewart	Transmitter Operator	1450 O'Connor Dr.	Aug. 16, Aug. 19 Sept. 5
B. Howes	Operator	1450 O'Connor Dr.	Aug. 19, 20
J. Jhonnston	Geophysical Helper	Merritt, B. C.	Aug. 16, 19-20
B. McKenna	"	Merritt, B. C.	Aug. 16, 19-20
J. Johnston	"	Merritt, B. C.	Aug. 26, Sept. 5
B. Kolsen	"	Merritt, B. C.	Aug. 26, Sept. 5
J. Wilson	Drafting	1450 O'Connor Dr.	Oct. 17 - Nov. 11
H. Ricketts	Drafting	1450 O'Connor Dr.	Oct. 17 - Nov. 11
F. Egin	Typing	1450 O'Connor Dr.	November 12

LEGEND

Felspar Porphyry ..... FP

Quartz Porphyry, mineralized ..... M ıTry

Quartz Porphyry, fresh ..... TTry

Syenite ..... Sy

Gabbro-Syenite ..... Sy-GA

Gabbro ..... GA

Eagle Grano Diorite

Marginal Phase ..... M A Aplite

Normal ..... Gd

Nicola Greenstones ..... Gs

Schistose ..... GsS

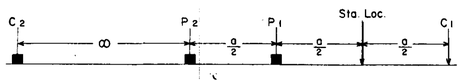
Faults .....

Known Geologic Contact .....

Assumed Geologic Contact .....

Interpreted Contact .....

POLE DIPOLE (or "abnormal 3 - Electrode") ARRAY
(a = 200 feet)



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INDUCED POLARIZATION SURVEY

MERRITT, B. C.

PLATE I

APPARENT CHARGEABILITY CONTOURS
with GEOLOGY — NORTH AREA

CONTOUR INTERVAL — 1·0 milliseconds

Scale: 1 inch = 200 feet

HUNTEC LIMITED, Toronto, Canada — November 1965

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POLE DIPOLE (or "abnormal 3 - Electrode") ARRAY
(a = 200 feet)

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INDUCED POLARIZATION SURVEY

MERRITT, B. C.

PLATE 2

APPARENT RESISTIVITY CONTOURS

NORTH AREA

CONTOURS AT (logarithmic intervals) 150, 200, 300, 400, 600, 800, 1000 ohm meters

SCALE: 1 inch = 200 feet

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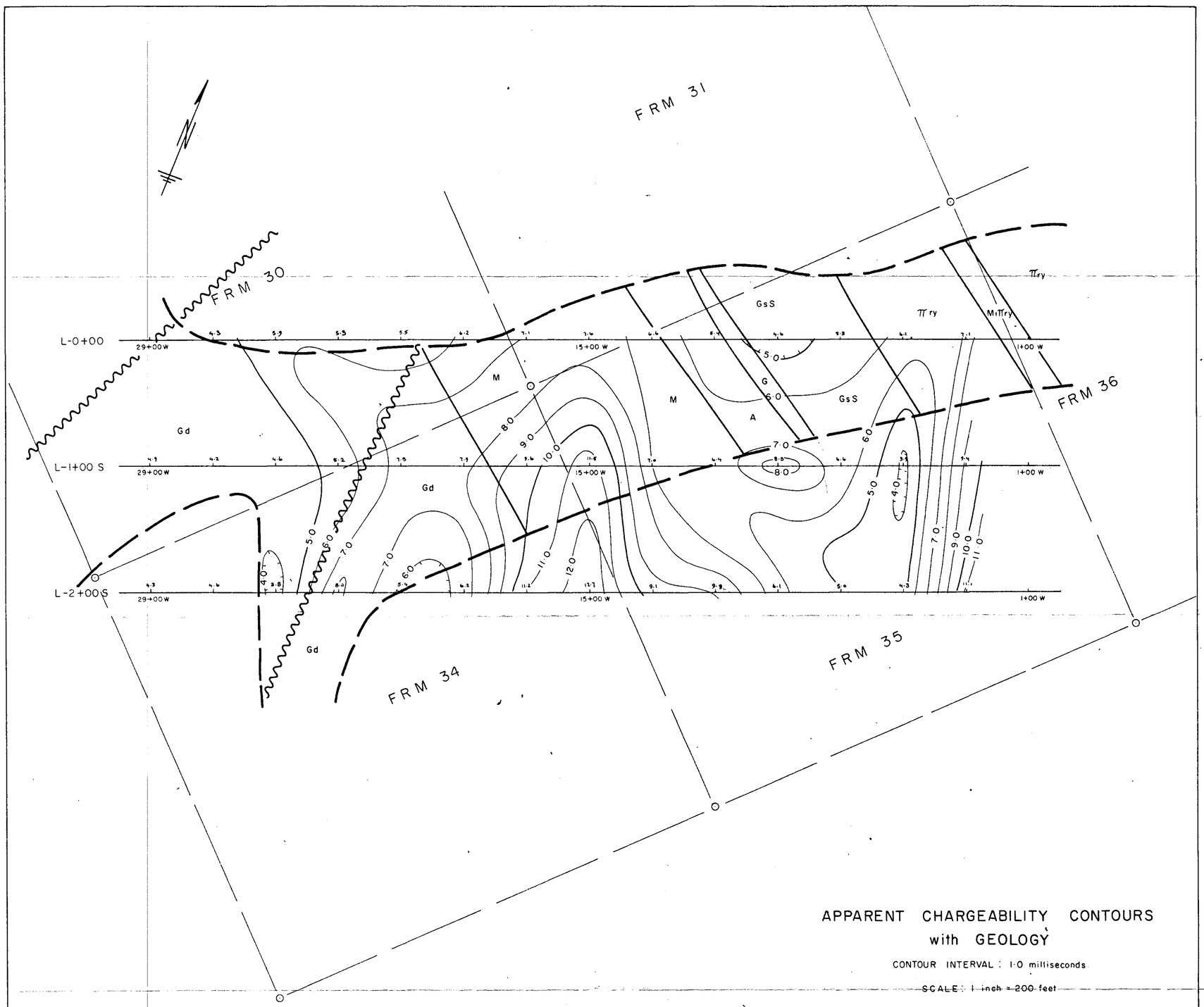


LEGEND

Quartz Porphyry, mineralized — MiTry

Quartz Porphyry, fresh — Try

Eagle Grano Diorite

Marginal Phase — M — A — Aplite

Normal — Gd

Nicola Greenstones — Gs

Schistose — GsS

Faults

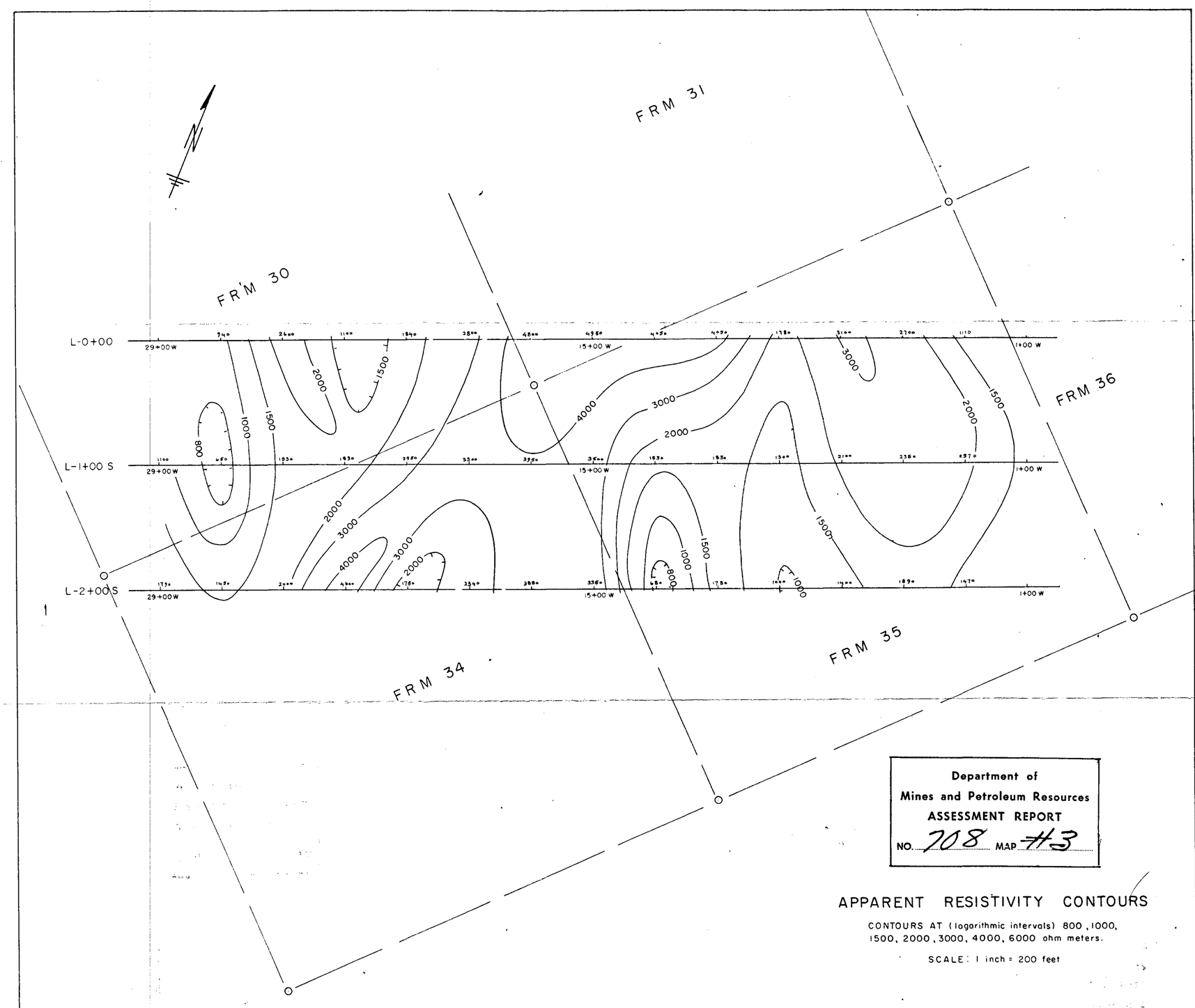
Known Geologic Contact

Assumed Geologic Contact

APPARENT CHARGEABILITY CONTOURS with GEOLOGY

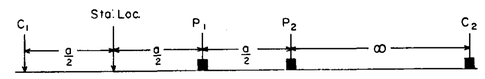
CONTOUR INTERVAL : 1·0 milliseconds

SCALE : 1 inch = 200 feet



POLE - DIPOLE (or "abnormal 3 - Electrode") ARRAY

(a = 200 feet)



Lines 1+00 S & 2+00 S - C_1 is to the West of Station Location

Line 0+00 - C_1 is to the East of Station Location

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APPARENT RESISTIVITY CONTOURS

CONTOURS AT (logarithmic intervals) 800, 1000, 1500, 2000, 3000, 4000, 6000 ohm meters.

SCALE : 1 inch = 200 feet

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MERRITT, B. C.

PLATE 3

SOUTH AREA 708

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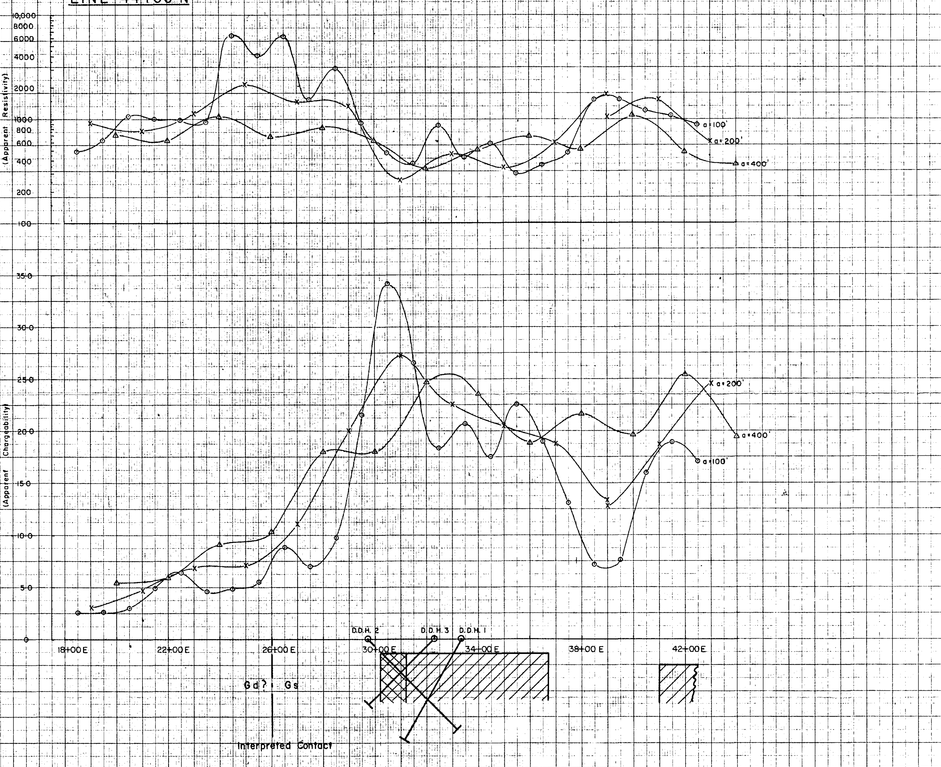
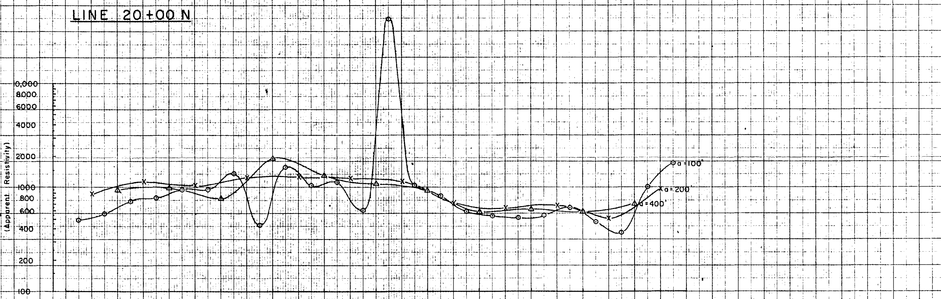
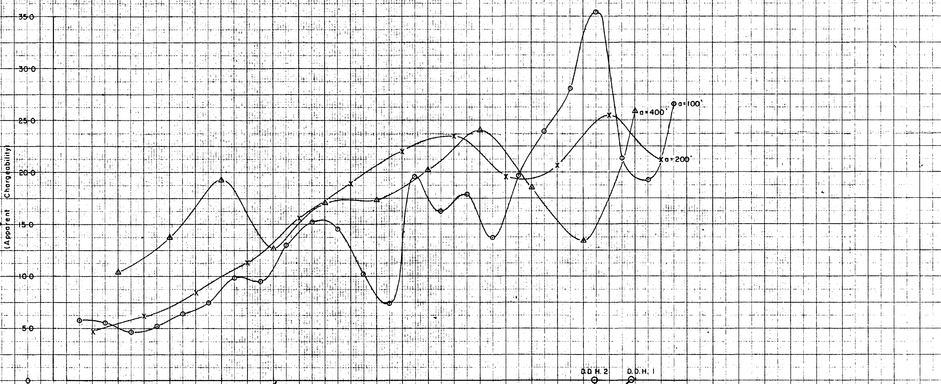
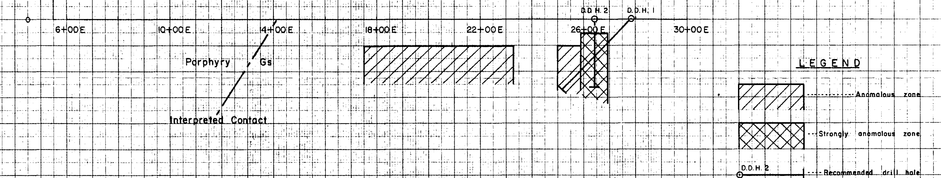
LINE 44+00 N



LINE 20+00 N



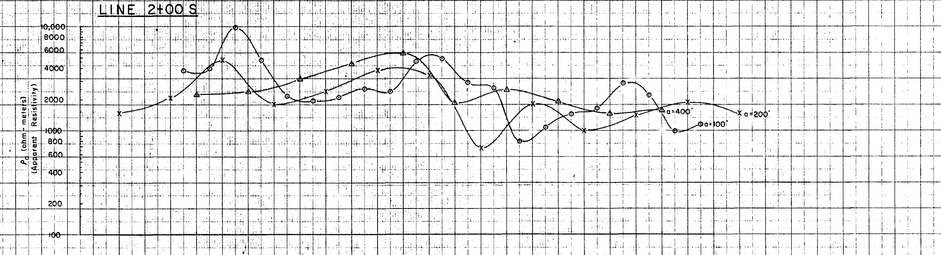


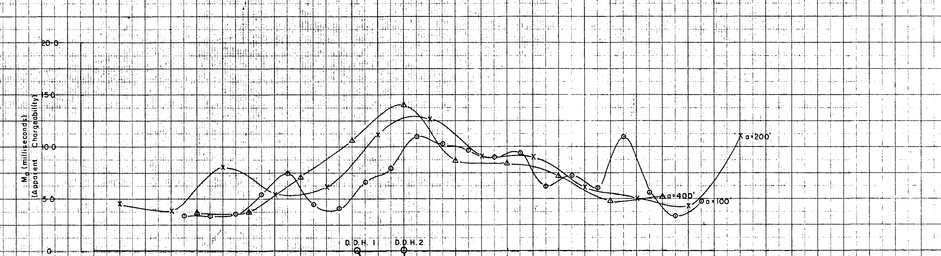


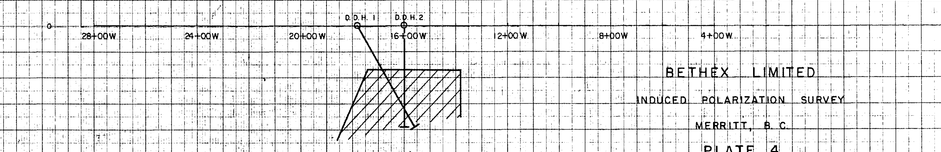
LEGEND

- Anomalous zone
- Strongly anomalous zone
- D.D.H. 2 — Recommended drill hole

LINE 2+00 S







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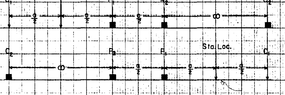
INDUCED POLARIZATION SURVEY

MERRITT, B.C.

PLATE 4

DETAIL PROFILES WITH INTERPRETATION

POLE-DIPOLE (or 'abnormal' 3 Electrode) ARRAY



Scales

Distance: 1 inch = 200 feet

Chargeability: 1 inch = 5·0 milli seconds

Resistivity: 2 inches = 1 cycle (logarithmic)

HUNTEC LIMITED, Toronto, Canada — November 1965

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R.K. Watson

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