2660

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT

NO. 2660 MAP .....

SELF-POTENTIAL AND ELECTROMAGNETIC REPORT

92H/6W ON

PART OF THE SWEDE GROUP
HOPE, B. C.
NEW WESTMINSTER M.D.

LOCATION:	49, 121 SE Approximately six miles north of Hope, B.C.
CLAIM OWNER:	Kelso Explorations Ltd. [N.P.L.] 470 Granville Street Vancouver 2, B. C.
DATE OF WORK:	August 5-9, 13, 14, 25-27, September 2-3, 1970
REPORT BY:	L. W. Saleken, B.Sc. Geologist

October 21, 1970

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SUMMARY:

Three self-potential anomalies A, B and C, of a magnitude greater than -200 mV were located by a self-potential survey for Kelso Explorations Ltd., near Hope, B. C. A follow-up electro-magnetic horizontal-loop survey over the three zones did not locate any near surface electro-magnetic conductors. Consequently, the cause of the electro-chemical phenomena associated with the S.P. anomalies was not clarified.

Interpretation as to the possible causes of the S.P. anomalies is based on geological and geochemical data.

INTRODUCTION:

At the request of Mr. S. Faider, President of Kelso Explorations Ltd., the writer conducted a self-potential and a detailed electro-magnetic survey on the Swede Group of claims near Hope, B. C. The results of the work are described herein.

Consultation and engineering were under the supervision of Donald W. Tully, P. Eng., and Dr. D. Smellie, Geophysicists. The field work was conducted by L. W. Saleken, Geologist, and a field technician. The field work was performed on the following dates: August 5 to 9, 13, 14, 25 and 27 and September 2 - 3, 1970. The survey was confined to the following claims: Swede 5, 6, 7, 8, 9, 42, 49 and Swede 50 Fraction.

PROPERTY, LOCATION AND ACCESS:

Kelso Explorations Ltd. own a number of full size and fractional mineral claims located approximately six miles north of Hope, British Columbia in the New Westminster Mining Division. The approximate co-ordinates to the center of the claim group are 49° 26' W Latitude and 121° 30' N Longitude.

Access to the property is by a logging road up American Creek. A 400 foot grid has been established over the survey area and the location lines have been bulldozed for easy access.

TOPOGRAPHY:

The Swede Group of claims is situated along the upper reaches of American Creek and its tributaries. The claims occupy an area of rugged and locally inaccessible relief at elevations between 2,000 and 3,500 feet above sea level.

The slope in the survey area is moderate and averages 15 - 20 degrees in a southerly direction. The area is well drained.

HISTORY:

Geological mapping along with soil sampling and magnetic surveying over the grid area early in 1970 located several areas favourable for self-potential and electro-magnetic investigations.

GENERAL GEOLOGY:

The regional geology from GSC Map 12-1969 indicates the area of interest to be underlain by a complex structural pattern of metamorphosed sediments and volcanics intruded by ultramafic and granitic rocks.

The metamorphosed sediments and volcanics, Upper Paleozoic in age, consist of biotite schist, quartz- sericite-biotite schist, hornfels, garnetiferous gneiss and various local assemblages of ortho and paragneissic rocks.

The ultramafics consist of serpentinite, serpentinized peridotite, minor hornblendite, pyroxenite and dunite with locally associated gabbro, diorite and altered volcanic rocks. Nickel-copper mineralization occurs associated with gabbro-peridotite-dunite complexes. The age of the ultramafics is unknown but considered Upper Paleozoic.

Upper Cretaceous quartz diorites and granitic equivalents comprise the bulk of the other intrusives.

For a detailed account of geologic conditions on the Swede Group, reference should be made to the geological report on the Swede claims as reported by Donald W. Tully, P. Eng., 1970.

SELF-POTENTIAL SURVEY:

Instrumentation & Field Procedure:

A McPhar, model SP30, unit was used to conduct the survey. To avoid errors due to topography, the self-potential gradient method of surveying was utilized. Readings were taken at 100 foot intervals and 50 foot intervals for detail to an accuracy of $\pm$ 1 millivolt [mV]. The survey was conducted over the grid and along the road as indicated on Figures SP 1 and SP 6. The results were compiled and plotted as self-potential values as shown on Figures SP 1 to SP 6.

Interpretation of Results:

Self-potential values, -200 millivolts or greater, were considered significant. As shown on Figure SP 1, three anomalies, A, B, and C, were discovered.

Anomaly A located between L0 +00, 6E and L4N, 8E is approximately 100 feet wide and 500 feet long with its northeastern end open. The anomaly trends N 35^{0} E and has a magnitude of greater than -300 mVs. The source

of electro-chemical phenomena is estimated to be approximately 25 to 50 feet below the surface.

Anomaly B and C are centered around L4N, 1E and LO +000, 7+50E respectively. Anomaly B is approximately 100 feet by 75 feet while Anomaly C is about 75 feet by 25 feet. Both have a general trend that parallels Anomaly A and SP readings ranging from -200 to -300 mVs and greater.

Geologically, "A", "B" and "C" are underlain by paragneiss and garnet-sericite schist, gabbro and diorite respectively [detailed geology, Donald W. Tully]. The contact between paragneiss-schist and diorite is defined by Anomaly A. All three anomalies probably represent a zone of structure weakness since their northeasterly trend parallels other known lineaments on the property.

Based on detailed surveying, Anomalies B and C were found to be localized while Anomaly A was open to the northeast implying an extension in that direction. Of the three, Anomaly A offers the greatest potential for further investigations.

ELECTROMAGNETIC SURVEY:

Instrumentation and Field Procedure:

To further evaluate the self-potential anomalies, an electro-magnetic, horizontal-loop survey was conducted. A Sharpe, model SE-600, electro-magnetic horizontal-vertical loop unit, frequency 1600 c.p.s., was used. Readings for in-phase and out-of-phase measurements were taken at 100 foot intervals. A coil separation of 200 feet was used. Accuracy of the readings was taken to $\pm$ 1%. The results were plotted on profiles as shown on Figures EM 1 and EM 2.

Interpretation of Results:

The EM survey failed to locate any near surface electro-magnetic conductors that may be causing the self-potential anomalies. The survey as carried out was intended to locate massive conductors at shallow depths.

Irregularities in the in-phase and out-of-phase readings as illustrated on the profiles are mostly due to survey error and instrument calibration. Slightly conductive overburden and sub-surface ground conditions also

add to the EM background. The pronounced dips in the in-phase readings along BL-4N; D-11, 1E; and D-11 6-7E are due to a shortening in coil separation.

DISCUSSION OF SP AND EM RESULTS:

The results of the two surveys do not correlate therefore the cause of the electro-chemical phenomena was not substantiated by the electro-magnetic survey. As self-potentials do not depend on any definite physical property but are due to differences in chemical activity in the ground, they give no clue about any distinct physical parameters associated with the body causing them. Further, it is not possible to say from the SP anomalies alone whether they are due to sulphides, oxides, graphite or something else. The clue to this is obtained through other studies.

The electro-magnetic method was chosen to clarify if a massive body was causing the SP anomalies. If the SP anomalies responded to the method, the approximate dip and strike, depth and extent of the conductors could have been calculated. Since the necessary data was not gathered by the EM survey, interpretation of the SP anomalies is dependent on geologic and geochemical data.

The possible causes of the SP anomalies are summarized as follows:

a] Leakage anomalies caused by metal ions migrating up fractures that are inferred to be associated with the three zones.

b] Metal ions accumulation in groundwaters from trace amounts of mineralization and sulphide disseminations known to occur in the surrounding rocks. The fracture zones act as catchment areas for the groundwaters that percolate along the bedrock-drift covered interface.

c] Small amounts of graphite that may be associated with the paragneiss, garnet-sericite schist and shears would create electro-chemical responses.

There is some probability that the SP anomalies are caused by massive sulphide mineralization. If so, the

mineralization may be at depth, or a poor electro-magnetic conductor. Since the EM survey was intended to locate near surface bodies, massive mineralization at depth would have been missed. A poor electro-magnetic conductor may be caused by the following:

a] The body may be disseminated enough that EM methods will not respond. The massive sulphide content would have to be in the order of greater than 15%.

b] Sulphide minerals within the body may be insulated and not interconnected to form a conductor.

c] Other unexplainable causes.

Whatever the case may be, the two surveys are not conclusive in evaluating the potential of the area.

CONCLUSIONS & RECOMMENDATIONS:

The cause of the self-potentials was not clarified by the electro-magnetic survey. Some inference as to their cause was deduced from geological and geochemical data.

The SP anomalies constitute a target area. Further evaluation of anomalies is warranted, particularly Anomaly A. Diamond drilling or an induced polarization survey or both are recommended. The IP survey should be conducted before drilling over an area north of 0+00 and east of the baseline. Additional lining cutting is required to tighten the grid. If the evaluation is taken directly to the drill stage, Anomaly A is the most appropriate. A hole located near the northwest end of "A" should be drilled in a southeast direction at -40 to -60 degrees.

Respectfully submitted,

L. W. Saleken

L. W. Saleken, B. Sc.
Geologist

C E R T I F I C A T E

I, Leonard William Saleken, of the City of Vancouver, in the Province of British Columbia, hereby certify THAT:

1] I am a consulting Geologist [B.Sc.] with an office at 327 - 470 Granville Street, Vancouver 2, B. C., engaged in geological field consulting;

2] I graduated from the University of British Columbia with a Bachelor of Science degree in Geology in 1968;

3] I have prospected and actively pursued geology prior to my graduation, and have practiced my profession since 1968;

4] I have no direct, indirect or contingent interest in the claims held by Kelso Explorations Ltd. [NPL] or in the securities of Kelso Explorations Ltd. [NPL], nor do I intend to receive any interest.

5] This report is based on the results of the Self-Potential and Electro-magnetic Surveys conducted for Kelso Exploration Ltd. on August 5-9, 13, 14, 25-27, and September 2-3, 1970.

DATED at Vancouver, B. C., this 21st day of October, 1970.

L. W. Saleken

L. W. Saleken, B.Sc.
Geologist

REFERENCES

Aho, A. E., 1967, Pacific Nickel Property, in Structural Geology of Canadian Ore Deposits, Vol. II, pp. 27-36, CIMM 1957.

Clarke, W. E., 1969, Geology and Ore Controls at Giant Mascot Mines Ltd., Western Miner, June 1969, pp 41-46.

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Monger, J. W. H., 1970, Hope Map-Area, West Half, British Columbia, GSC Paper 69-47.

Parasnis, D. S., 1966, Mining Geophysics, Elsevier Publishing Company, New York

Tully, D. W., 1969, Report on a Geological and Geochemical Reconnaissance Survey, Kelso Explorations Ltd. Property, Hope, B. C.

CERTIFICATION

I, DONALD WILLIAM TULLY, of the City of West Vancouver, Province of British Columbia, Canada, hereby certify as follows:

1. I am a geologist residing at 2222 Bellevue Avenue, West Vancouver, B.C.

2. I am a registered Professional Engineer of the Provinces of British Columbia and Ontario.

3. I graduated with a degree of Bachelor of Science from McGill University in 1943.

4. I have practiced my profession for twenty-five years.

5. I have no interest in the securities of Kelso Explorations Ltd., (N.P.L.) or do I intend to have any such interest.

6. The accompanying report by Leonard W. Saleken dated October 21, 1970 is in accordance with my findings during a personal field examination I made on August 7, 14 and 19, 1970, on Swede claims 5, 6, 7, 8, 9, 42, 49 and Swede 50 Fr.

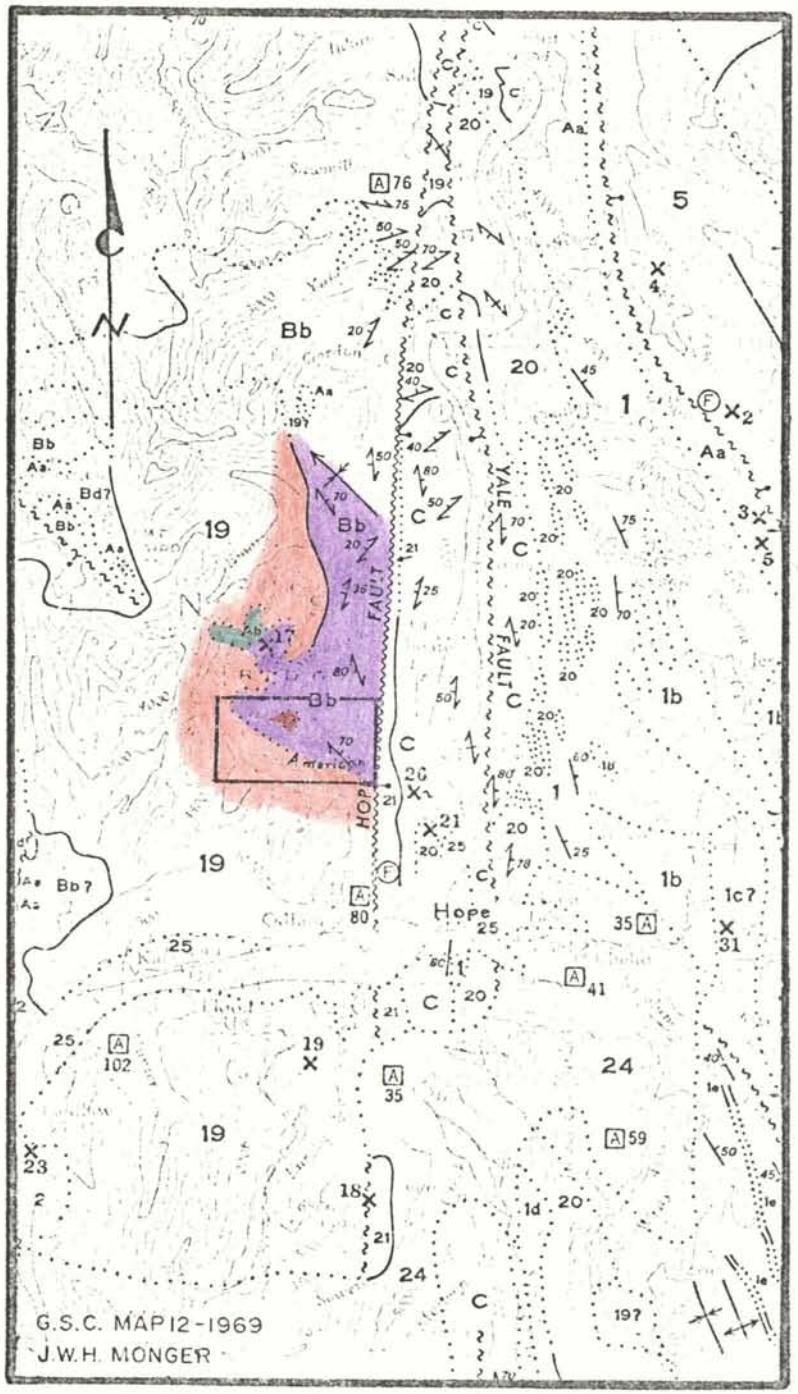
7. I have examined the Swede 9, 11, 41, 42 claim posts and find them in accordance with the requirements of the laws or the Province of British Columbia.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D. W. TULLY

DATED AT West Vancouver, B.C. this 28th day of October, 1970.

Donald W. Tully

Donald W. Tully, B. Sc., P. Eng.



GEOLOGY

HOPE, B.C.

SCALE: 1:250,000

KELSO

X17 PRIDE OF EMORY MINE

LEGEND

19 CRETACEOUS QUARTZ DIORITE

A ULTRAMAFIC ROCK

Aa, serpentine, peridotite

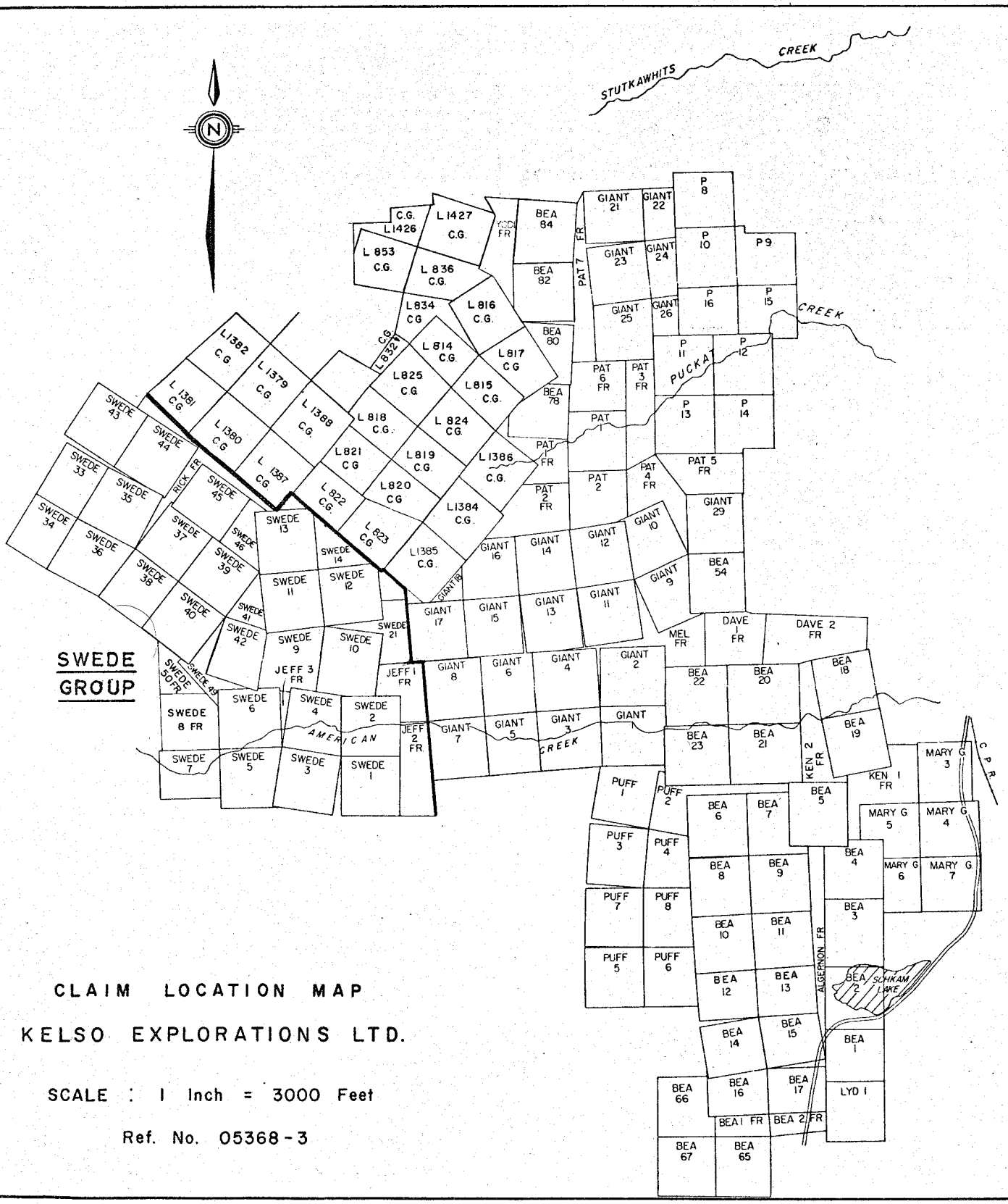
Ab, pyroxenite

Ac, hornblendite

B SHIST AMPHIBOLITE AND PHYLLITE

Ba, graphitic and quartzose phyllite

Bb, schist, amphibolite



CLAIM LOCATION MAP

KELSO EXPLORATIONS LTD.

SCALE : 1 Inch = 3000 Feet

Ref. No. 05368-3

Department of
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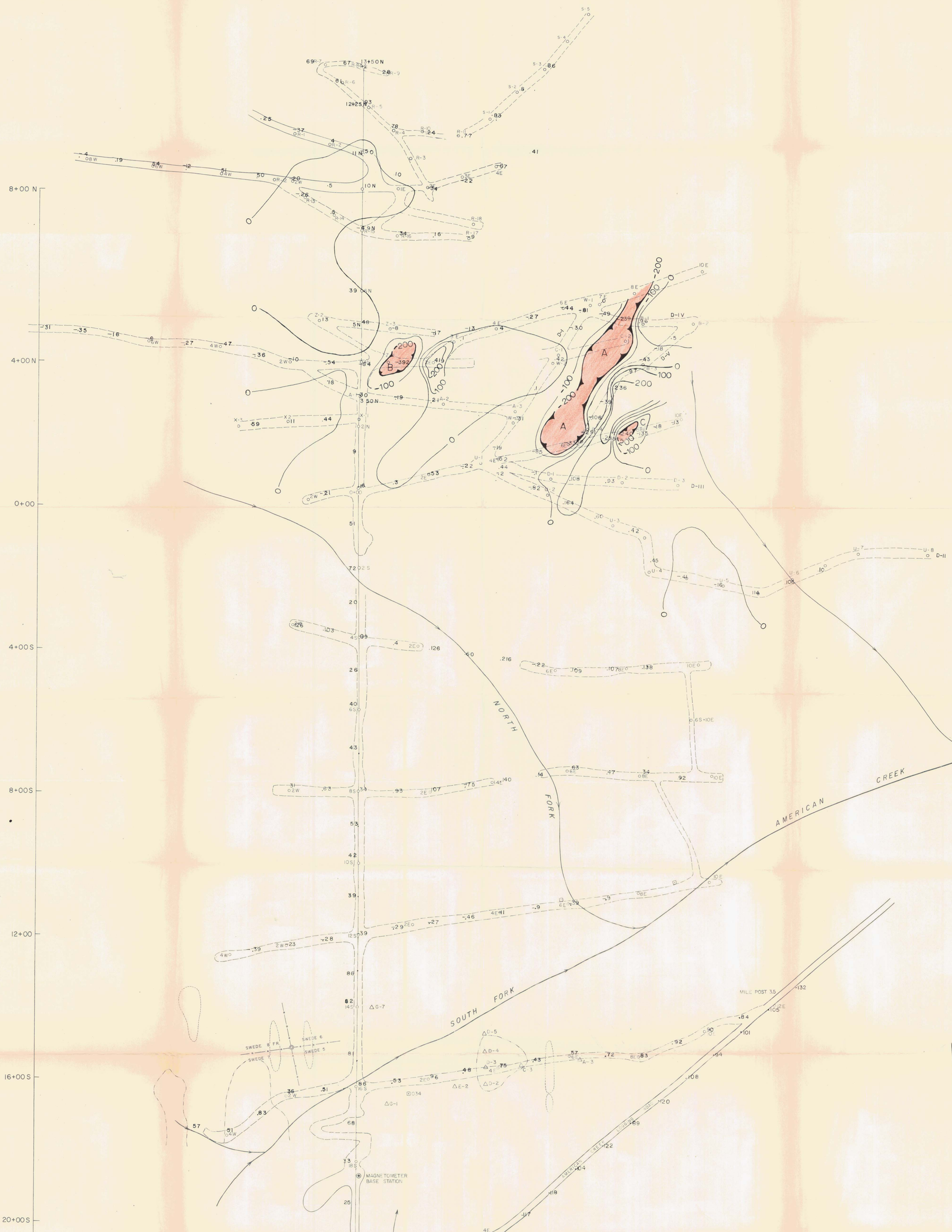
NO. 2660 MAP #2



KEY PLAN
1 in = 4 mi.

LEGEND

- CREEK
- LOGGING ROAD
- BULLDOZER TRENCHING
- O (R-9) (12S,8E) TRANSIT AND CHAIN STATION
- △ G-7 FORMER GRAVITY SURVEY STATION
- AREA OF FORMER GRAVITY SURVEY
- ⊡ PREVIOUS MAGNETOMETER SURVEY STATION
- AREA OF PREVIOUS MAGNETOMETER SURVEY
- ◎ CLAIM POST
- • 100 POTENTIAL VALUE (mV)
- ANOMALOUS AREA
- CONTOUR 100 mV.

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FIGURE 1

TO ACCOMPANY REPORT BY
L.W. Saleken Oct 21, 1970

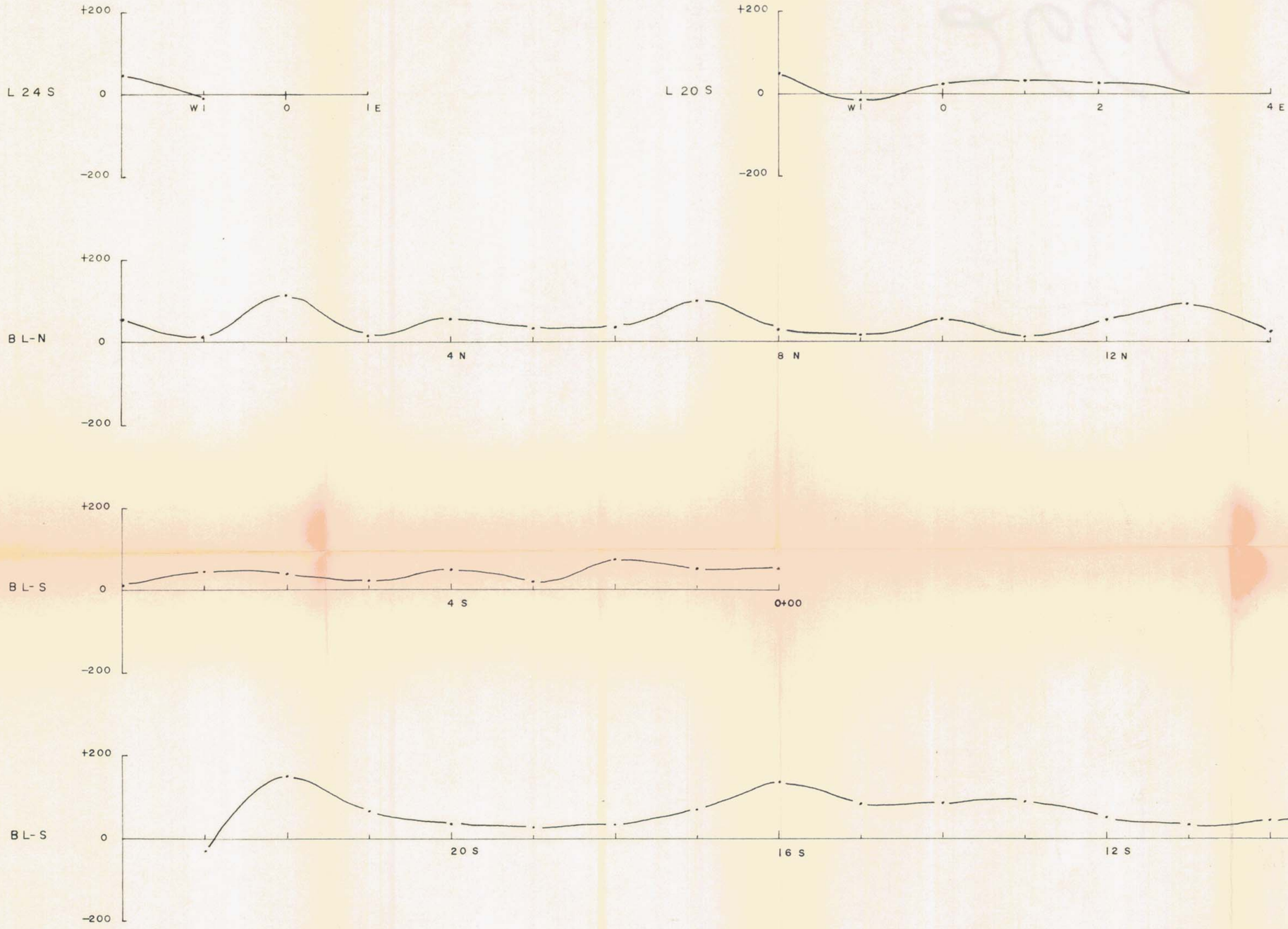
HOPE, B.C.

KELSO EXPLORATIONS LTD. N.P.L.

SELF-POTENTIAL SURVEY
CONTOUR MAP

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA

SCALE: 1 in. = 100ft. | L.W. SALEKEN-GEOLOGIST | DATE: AUG. 1970



LEGEND

SCALE: VERT. 1in. = 200 mv.

HOR. 1in. = 100 ft.

~·POTENTIAL IN mV.

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HOPE, B.C.

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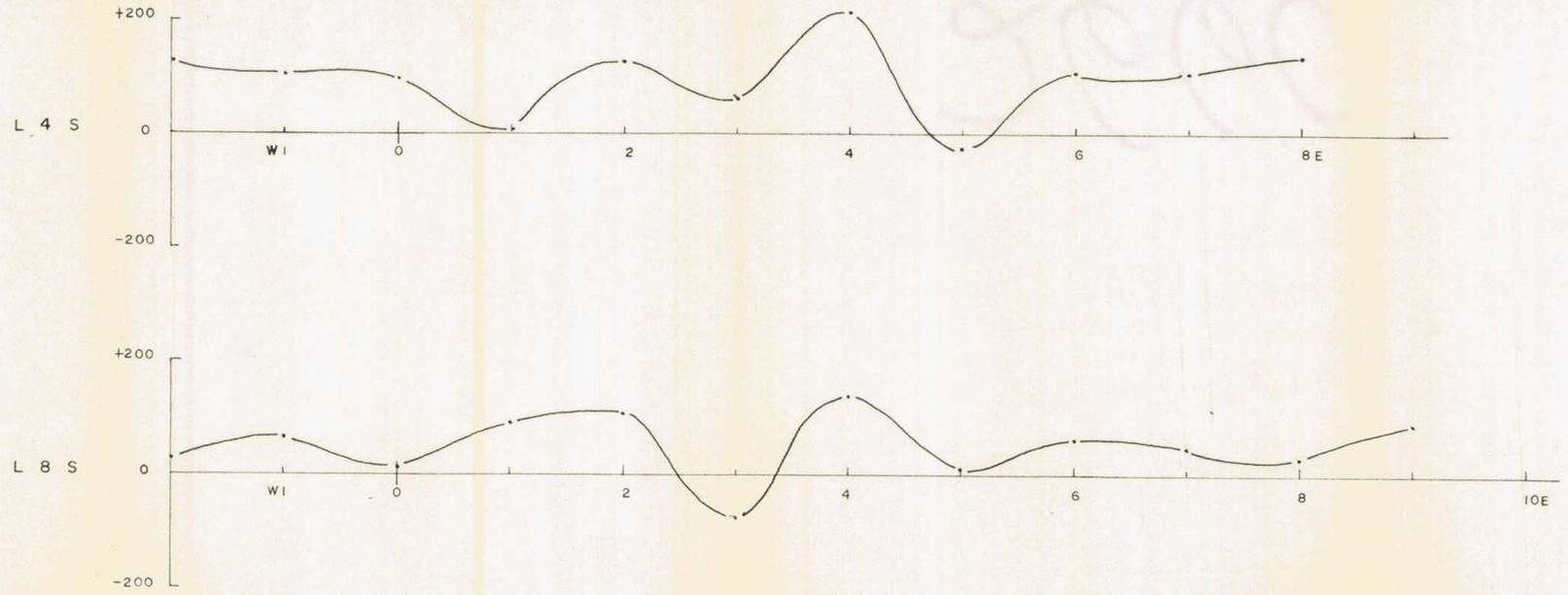
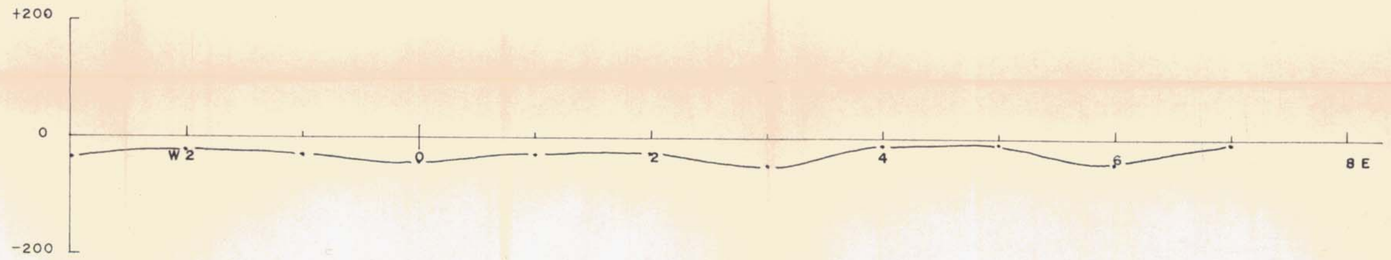
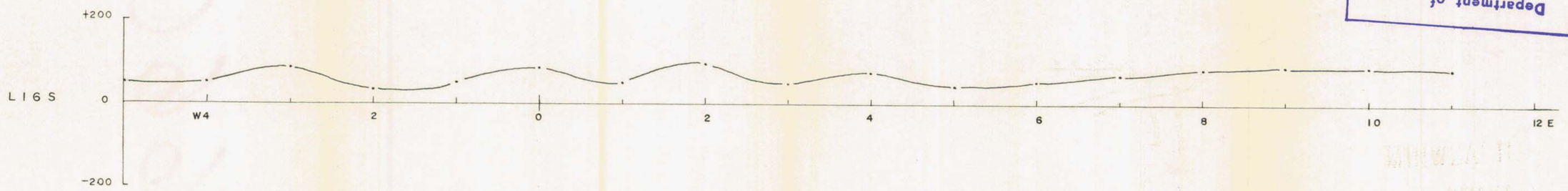
SELF-POTENTIAL SURVEY

FIG: 2	L.W. SALEKEN - GEOLOGIST	AUG. 1970







LEGEND

SCALE: VERT. 1in.= 200 mv.

HOR. 1in.= 100 ft.

POTENTIAL IN mV.

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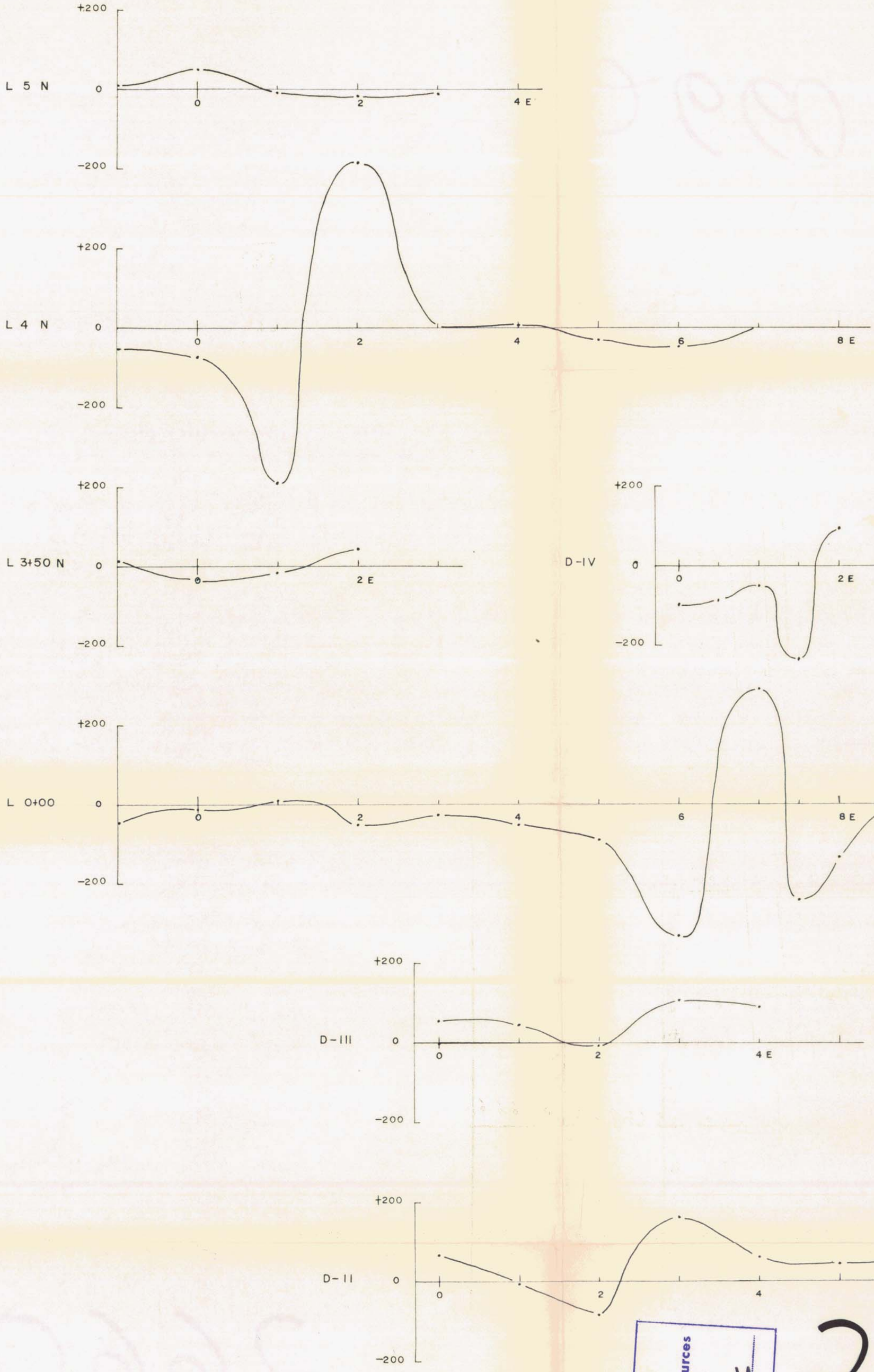
SELF-POTENTIAL SURVEY

FIG. 3	L.W. SALEKEN - GEOLOGIST	AUG. 1970

PROFESSIONAL ENGINEER PROVINCE OF B.C. D.W. TULLY



LEGEND

SCALE: VERT. 1in.= 200 mv.
HOR. 1in= 100ft.
POTENTIAL IN mV.

TO ACCOMPANY REPORT BY
L. W. Saleken Oct 21, 1970

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HOPE

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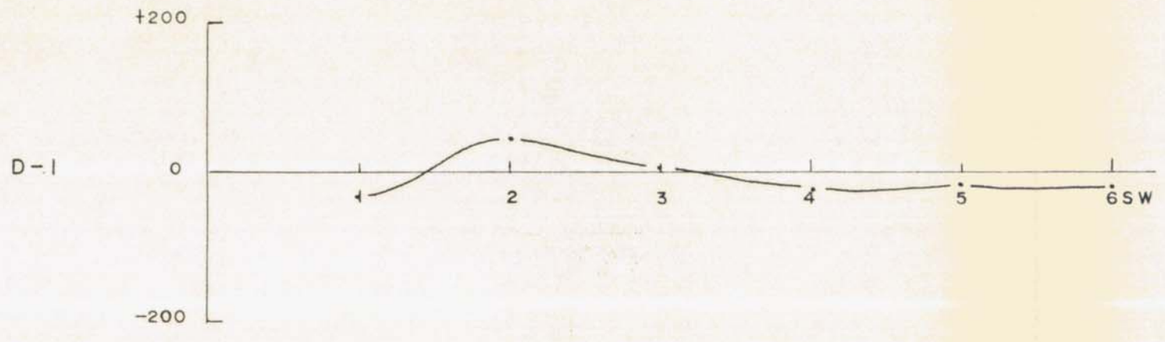
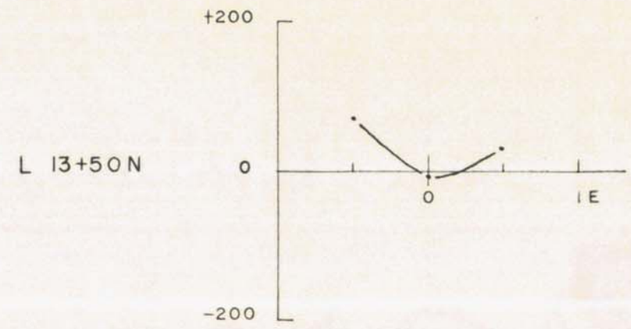
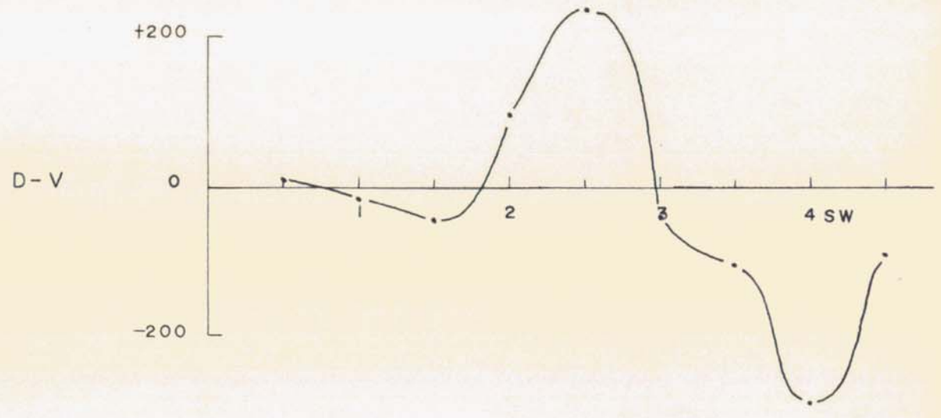
SELF-POTENTIAL SURVEY

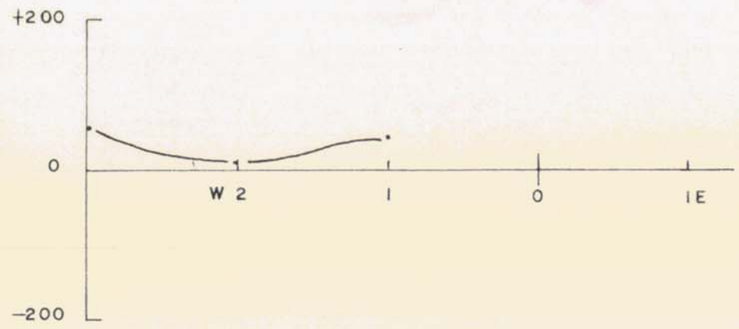
FIG. 4	L.W. SALEKEN - GEOLOGIST	AUG. 1970

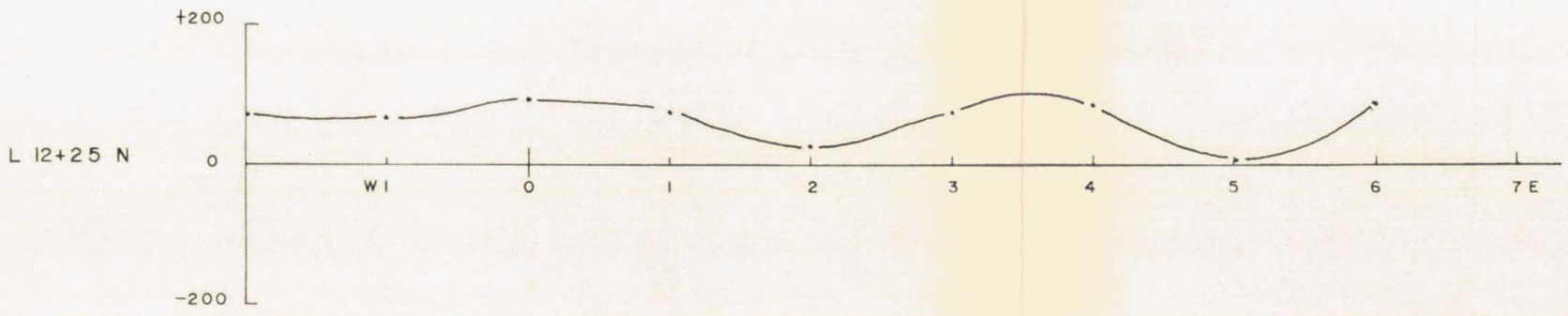
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D. M. TULLY

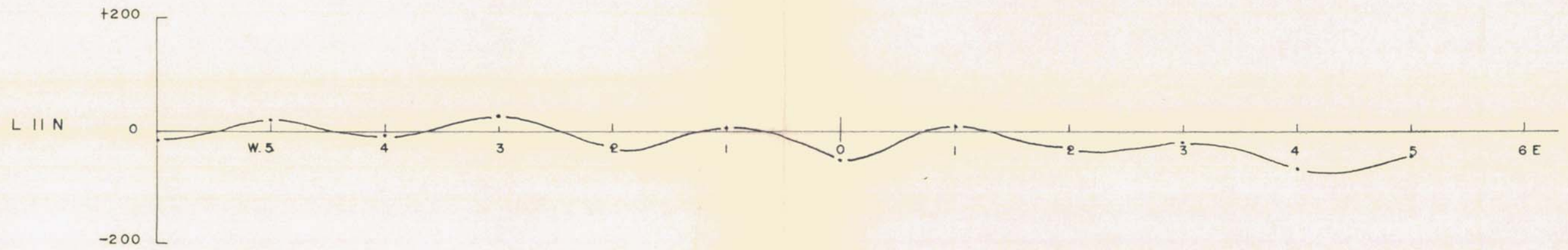


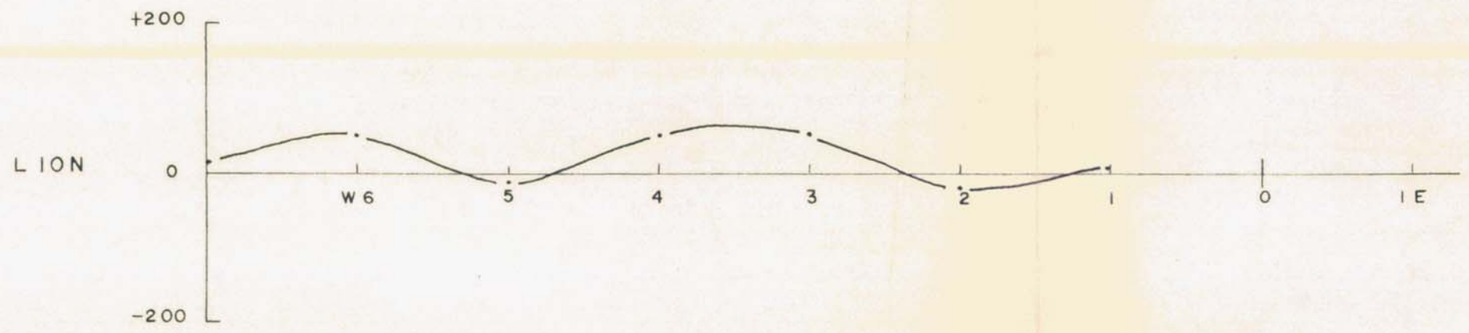


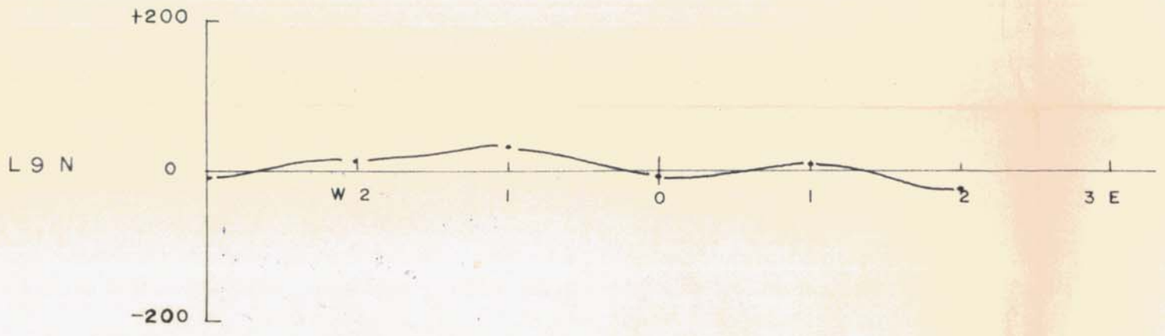












LEGEND

SCALE: VERT. 1in. = 200 mv.

HOR. 1in. = 100ft.

POTENTIAL IN mV.

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TO ACCOMPANY REPORT BY
L. W. Saleken Oct 21, 1970

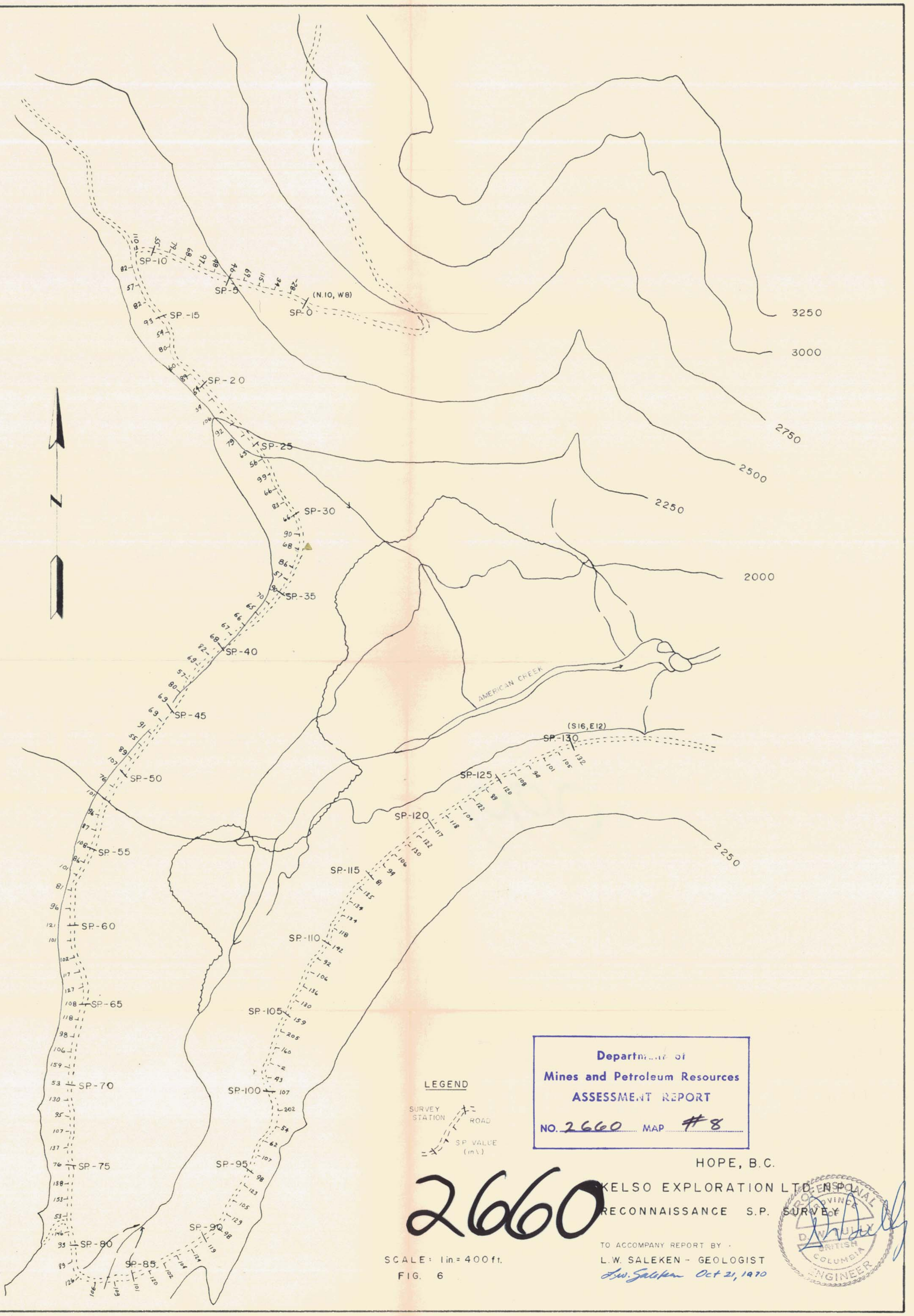
PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — D. M. TULLY

HOPE, B.C.

KELSO EXPLORATION LTD. (N.P.L.)

SELF-POTENTIAL SURVEY

FIG. 5	L.W. SALEKEN- GEOLOGIST	AUG. 1970



LEGEND

SURVEY STATION — ROAD

S.P. VALUE (mV)

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HOPE, B.C.

KELSO EXPLORATION LTD. INDUCED

RECONNAISSANCE S.P. SURVEY

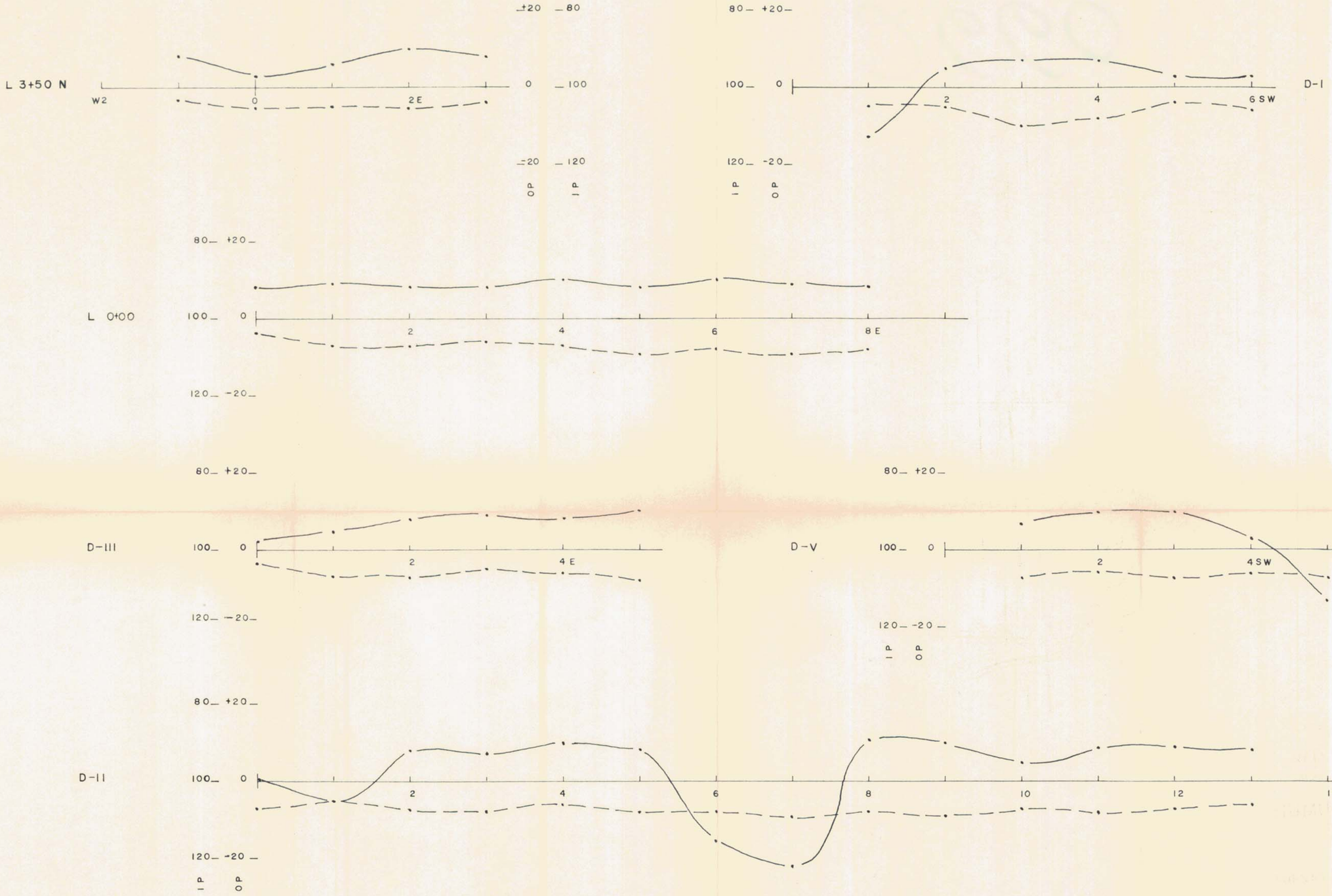
2660

SCALE: 1 in. = 400 ft.

FIG. 6

TO ACCOMPANY REPORT BY
L.W. SALEKEN - GEOLOGIST
L.W. Saleken Oct 21, 1970

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D. W. JULY



LEGEND:

SCALE: VERT. 1 in = 20 %
HOR. 1 in = 100 ft.

FREQUENCY 1600 cps

IN PHASE (I.P.)

OUT OF PHASE (OP)

COIL SEPARATION - 200 ft., READING EVERY 100 ft.

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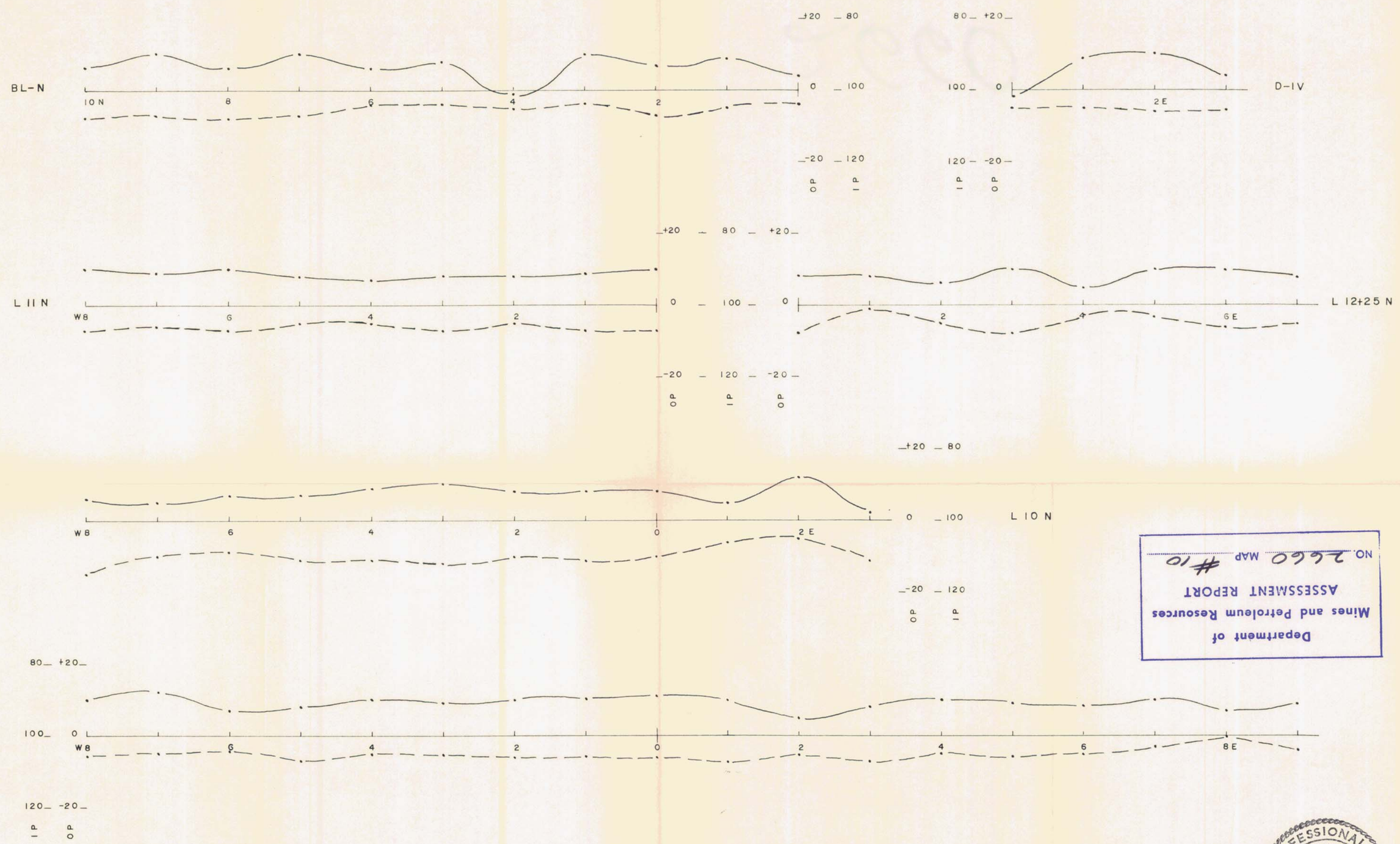
L.W. Saleken Oct 21, 1970

HOPE, B.C.

KELSO EXPLORATION LTD. (N.P.L.)

ELECTROMAGNETIC HORIZONTAL LOOP SURVEY

FIG. 1	L.W. SALEKEN, GEOLOGIST	AUG. 1970



LEGEND:
SCALE: VERT. 1in. = 20 %
HOR. 1in. = 100ft.
FREQUENCY: 1600 c.p.s.
IN PHASE (I.P.)
OUT OF PHASE (O.P.)
COIL SEPARATION - 200ft., READING EVERY 100ft.

2660

TO ACCOMPANY REPORT BY
L.W. Saleken Oct 21, 1970

HOPE, B.C.
KELSO EXPLORATION LTD. (N.P.L.)

ELECTROMAGNETIC HORIZONTAL LOOP SURVEY

FIG. 2 | L.W. SALEKEN, GEOLOGIST | AUG. 1970