

93M/5E

Report
of the
Geophysical Survey

conducted on property of

NATIONAL EXPLORATIONS LIMITED

Comprising mineral claims: Joe No's 1-17, Hazelton No's
1-14 and 17-20, Ace No's 1-10, Star No's 1-8, Jack M.C.,
Jack Fr. M.C., John Fr. M.C., Sun M.C., Sun No. 1 and 2,
Rib M.C.

at Hazelton, B.C., Omineca Mining Division 55° 127° S.W.

During July, August and September, 1950
and January, February and March, 1951.

Author:

G.L. Oates - Field Representative,
Vancouver, B.C.

Consultant:

Dr. Joseph T. Mandy, M.E., Ph.D., P.Eng.
Vancouver, B.C.

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Hazelton, B. C.
July 5, 1951.

P.J. Mulcahy,
Chief Gold Commissioner,
Victoria, B. C.

Dear Sir:

I have your note of June 20 re a statement of my qualifications as a geophysicist.

My experience in this field has been gained through working throughout areas in northern Ontario and Quebec, British Columbia, Washington State, and the Philippine Islands, over a period of approximately 6 years. My early work was with the Radiore Company of Canada, later with Developments Incorporated - an American firm - and later during the past 10 years have completed surveys for a number of companies in western Canada. I am not a graduate engineer, having left university after my second year at Queens University. My experience during the past 27 years since leaving university has been mostly in connection with the exploration end of mining.

In connection with the above I wish to refer you to Mr. C.V. Brennan, Howe Sound Exploration, Seattle, Wash. and to Dr. Joseph T. Mandy, consultant for National Explorations Ltd., for whom the work in question was done. I believe that Dr. Walker may have a previous statement provided several years ago which may still be on file. Please advise if you wish a written statement from Mr. Brennan or Dr. Mandy.

Yours very truly,

"G.L.Oates"

DOMINION of CANADA :

Province of British Columbia. IN THE MATTER OF the Mineral Act and Geophysical work performed on Mineral Claims in the "Base", "Hazelton", "Star", "Rib" and "Toe" Groups of Claims.

TO WIT :

I. GEORGE LARMOUR OATES

of HAZELTON,

in the Province of British Columbia, do solemnly declare that

(1) Geophysical work to the value of Sixteen Hundred and Forty-five Dollars (\$1645.00) has been performed by me, under the supervision and direction of Dr. Joseph T. Mandy, on the following mineral claims:-

Hazelton numbers 1, 3, 10, 11, 12, 17 and 18.

Joe numbers 1, 2, 3, 7, 11 and 15 Jack Frac., John Frac., Jack No.1 and Star No.8.

(11) The work performed is strictly in accordance with, and as detailed in, the report and maps submitted to the Department of Mines of British Columbia, through the Mining Recorder, Smithers, B.C. for approval.

(111) The following wages have been paid to complete the field work (geophysical):-

Note:

J. Stone on 6 dy week actual pay was 7 dys and allowance was Sun. and compensation (Workmans)

<u>1950</u>	
J. Carson 18 dys @ 7.50 & board. July 28, 29, 31-Aug 1-4, 7-11, 14, Sept 1, 2 & 6-8	135.00
J. Stone 72 dys @ 60.00 per wk. July 14-31, Aug. 1-31, Sept. 1-30	570.00
J. Callie 15 dys @ 9.50 Aug. 15-18, 21-26, 28-31, Sept. 1	142.50
G.L. Oates 68 dys @ 350.00 per month July 18-31, Aug. 1-31, Sept. 1-23	793.33

<u>1951</u>	
J. Taylor 49 dys @ 60.00 per wk Jan 21-31, Feb. 1-28, Mar 1-10	420.00
A. Hankin 44 1/2 dys @ 9.50 Jan 29-Feb 4 (1/2 dy Jan 30), Feb. 6-10, Feb. 12-17, Feb. 19-24, 26-28, Mar 1 & 2, 5-10, 12-16, 19-22 and Feb. 26	422.75
F. Roth 8 dys @ 9.50 Mar. 14-16, 19-22 & Mar 26	76.00
G.L. Oates 66 dys @ 350.00 per month Jan 20-31, Feb. 1-28, Mar 1-26	770.00

Total 3329.58

And I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act."

Declared before me at the Settlement of Hazelton, in the Province of British Columbia this 21st day of July, A.D. 1951.

"G.L. Oates"

"C.H. Drake"
A Commissioner, etc.
Sub-mining Recorder.

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Hazelton, B. C.
July 22, 1951.

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Gold Commissioner,
Smithers, B. C.

Dear Sir:

I have under separate cover for your inspection the field notes of the geophysical survey made on the National Exploration Limited property at Hazelton, B.C. during the seasons of 1950 and 1951.

This information was as you know requested by the Chief Gold Commissioner at Victoria in a letter to you of July 6th, a copy of which I did not receive until July 13th. As you can see the work involved in making copies of the field notes is considerable. Before I was able to submit them I received the Chief Gold Commissioner's letter of July 17th stating that the geophysical work would not be allowed to apply in lieu of assessment. I wired him upon receipt of his letter as follows:

" data as requested in your letter of July sixth to Mining Recorder at Smithers is in mail, stop. Copy your July sixth letter forwarded to me by Mr. McRae and received July thirteenth and answered July fourteenth asking for several days to make copies of field observations for your inspection. Stop. Have your letter of July seventeenth today. Stop. In view of time schedule of letters and time needed to copy observations would ask your consideration and cooperation in the matter. My schedule here for past two weeks has been disrupted by inspection trips into bush."

An amended affidavit in duplicate covering evidence of expenditures incurred has been recorded in Hazelton and mailed to your office several days ago.

The Chief Gold Commissioner has asked for information as to the equipment used and the procedure followed in using it. The department will be conversant with the electromagnetic induction method. I have enclosed photographs of the equipment. The energizing or transmitting unit is powered by 450 volts 'B' supply and 6 no. 1 dry cells as an 'A' supply. A triangular- 7 feet to the side- loop or antennae is used in conjunction with the energizing unit. The detecting unit is mounted on a tripod and connected to a direction finding coil. Readings are determined by reading minimum sound with ear phones. The energizing unit works on a frequency of 55 kilocycles. The procedure used in the field is evident from the notes. A grid is surveyed with lines 100 or 125 feet apart with stations marked at 100 intervals. The energizing unit is placed at one of these stations and a number of readings made in the immediate area at the stations on the lines in the vicinity. The energizing unit is then moved to another location and the procedure

continued as at the first. The placing of the energizing unit is such that each individual station is read from 2 to 4 separate times.

I am not clear as to the amount of information requested as to the field procedure and the equipment used but trust that the above is sufficient. Dr. Black of the Mines Department was with us in the field in August of last year and I might refer you to him for additional data if needed.

Yours truly,

"G.L.Oates"

GLO for National Explorations Ltd

copy to Chief Gold Commissioner.

JOSEPH T. MANDY, M.E. Ph.D.
Consulting Mining Engineer

825 Vancouver Block
Vancouver, B.C.

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Nov.10th 1951.

To whom it may concern:

Over a period of several months, Mr. C.I. Oates carried out a detailed geophysical survey of 60 mineral claims in the Glen Mountain section of the Hazelton area, British Columbia, using the Electromagnetic Induction method. These claims are owned by the National Explorations, Limited.

Mr. Oates' field notes concerning this work, together with his plans and reports have all been carefully studied by me. His field grid and anomaly locations have also been examined on location by me.

Mr. Oates' work in this regard has been done most efficiently, with excellent detail and accuracy and technical competence.

That the field work is based and interpreted soundly and accurately is fully proved by the results of initial diamond-drilling of the first two anomalies which has located two important mineralized structures the "Oates" vein and the "CIW" vein.

"Joseph T. Mandy"

Report
of the
Geophysical Survey

conducted on property of

NATIONAL EXPLORATIONS LIMITED

Comprising mineral claims : Joe No's I-I7, Hazelton No's
I-I4 and I7-20, Ace No's I-IO, Star No's I-8, Jack M.C.,
Jack Fr. M.C., John Fr. M.C., Sun M.C., Sun No. I and 2
Rib M.C.

at Hazelton, B.C., Omenica Mining Division

During July, August and September, 1950
and January, February and March, 1951

Author :

G. L. Oates - Field Representative.
Vancouver, B.C.

Consultant :

Dr. Joseph T. Mandy, M.E., Ph. D., P. Eng.
Vancouver, B.C.

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~~APP~~

MMPS

- 11) NE-1 - Reconnaissance Survey Using Inductive Geophysical Method on
Property of National Explorations Limited, Hazelton, B.C.
- 12) NE-2 - Reconnaissance Survey Using Inductive Geophysical Method on
Property of National Explorations Limited, Hazelton, B. C.
- 13) NE-3 - Geophysical Survey - Electromagnetic Inductive Method - on
Property of National Explorations Limited Hazelton, B. C.
- 14) NE-4 - Geophysical Survey - Electromagnetic Inductive Method - on
Property of National Explorations Limited, Hazelton, B. C.

SUMMARY AND CONCLUSIONS

A reconnaissance type of survey employing the electromagnetic inductive method, has been completed over part of your property adjoining the Silver Standard Mine in the Hazelton District in Omenica Mining Division.

Favorable results were obtained in three separate areas of the property, justifying more intensive exploration of the holdings.

In attempting to locate extensions of the Silver Standard veins or vein system, cross-sections were surveyed in a general direction northwest and southeast across both groups of claims comprising your holdings. Approximately eleven miles of line were run with stations at 100 foot intervals, for purposes of accurate field procedure and plotting of results.

The three groups of anomalies discovered by the survey are positioned in such a manner as to suggest that they may be continuations of the vein system occurring on the Silver Standard Mine. The strike-trend of the anomalies more or less conforms to those of the Standard veins and their electrical characteristics indicate sufficient strength and continuity to warrant a detailed investigation. Geological features of the ground could not be mapped, since the areas are covered with overburden to a depth of probably 5 to 20 feet or more. With the permission of the management three days were spent on the Silver Standard property, where veins 0, 1, 6 and 7 were energized to learn the nature of the reactions from these known veins. The energizing unit of the geophysical equipment was placed about 450 feet below surface on the rich chute of ore on number 6 vein and readings made from a number of points on surface. All the veins surveyed gave definite reactions with the exception of vein number 0 where unsatisfactory results were obtained due to the presence of a number of artificial conductors in the form of power lines, surface trams, etc.

SUMMARY AND CONCLUSIONS (cont'd)

In planning further exploration additional ground should be surveyed adjacent to the three areas already found by reconnaissance, any additional anomalies discovered and those already found should be detailed before planning a program of diamond drilling, surface trenching, etc. This detail work is necessary to isolate the stronger anomalies and the stronger sections of each.

The approximate depths indicated by reconnaissance surveying vary from 50 to 250 feet (that is, the depths at which best concentration of mineralization occurs) When detailed geophysical work has been completed, it is suggested that preliminary exploration of the anomalies be done by diamond drilling with an X-Ray type of machine to these indicated depths.

GEOPHYSICAL METHOD USED AND ITS APPLICATION

An electromagnetic induction method was employed to complete a reconnaissance type of survey on this property.

An electrical geophysical method depends for its operation upon the effects produced by the flow of an electric current. By studying these effects it is possible to predict the general axis of current flow. The greatest flow of current is in the path of greatest effective conductivity; and since the effective conductivity of a mineralized body or zone is different from that of its surrounding envelope (usually much greater), it is possible to locate such a mineralized body or zone by observing the distribution of current. Due consideration must be given of course, to geologic structure, to type of mineralization, and to other factors.

In this report and attached maps NE-1 and NE-2 the electrical 8 axes ' or ' anomalies ' referred to as ' A-1 ', ' G-2 ', etc., represent the plan position

GEOPHYSICAL METHOD AND ITS APPLICATION (cont'd)

of the centre lines of the electrical axes or anomalies. When the exploration of an anomaly is planned reasonable allowance should be made for its possible dip, as the strike and position of its outcrop may vary considerably from the plan view of the electrical axis, due to the dip of the deposit and to the uneven nature of the topography.

Several axes may be found to occur over a width of several feet. This condition is encountered when a deposit of considerable width has been energized by placing the energizing apparatus at several locations in the area being surveyed. These closely spaced anomalies indicate an approximate width of the mineralized body. In addition to the tolerance for dip, an allowance of 15 to 20 feet is practical when exploring closely spaced or intersecting axes.

The testing of a mineral deposit by geophysical methods will not indicate values or percentages of the several minerals which it may contain. The inductive method used during this survey will outline a pattern of distribution of the mineralization, and will indicate the areas of greatest concentration. This information will aid the geologist in plotting the structural features of the area; hence the correlation of geophysical data with known geology and topography is an important feature of the interpretation of the survey and of the resultant recommendations for exploration. Close co-operation between the geophysicist and the geologist or engineer in charge of exploration is indicated.

OBJECT OF THE SURVEY

The productive veins of the Silver Standard Mine occur within a breadth of about 2300 feet, strike northeast, dip from 50 to 70 degrees southeast, and have been traced for distances up to 1000 feet. The object of the geophysical survey was to locate extensions of these veins or of the vein system in ground

OBJECT OF THE SURVEY (cont'd)

northeast and southwest of the Silver Standard Mine property. A reconnaissance type of survey was decided upon as the first step in exploration of the ground.

SUMMARY OF ELECTRICAL RESULTS

The attached maps ME-1 and ME-2 show the areas surveyed and the anomalies discovered.

In general the anomalies have a north-easterly strike and their electrical characteristics indicate good strength and continuity of mineralization. Detailed geophysical work should be done in these areas before surface trenching or diamond drilling is planned. In area 'D' anomalies 'N', 'O', 'P' and 'R' have a strike north to north 10 degrees west.

The three areas in which anomalies were found are overburdened to depths of probably 5 to 20 feet or more. The terrain is not rugged, the slopes reaching a maximum of not more than about 20 degrees.

GEOLOGY

The areas surveyed and adjacent ground are practically 100 percent overburdened so that geologic features could not be examined. The property of National Explorations Ltd. lies on the lower northeast and southwest slopes of Glen Mountain whose maximum elevation is 2200 feet. At a number of points on the Silver Standard Mines property outcrops occur and comment on geology by E. D. Kindle, Canada Department of Mines and Resources - Memoir 223, is of interest ;

" Glen Mountain is composed of a thick series of gently folded sedimentary rocks ranging from coarse, grey, impure ^{sand} limestones and greywacke to finely laminated, grey to green argillites. The sandstones contain numerous rounded fragments of lave and by admixture of material of direct volcanic origin graduate into beds of tuff. Some of the sandstone is highly feldspathic and grades into

GEOLOGY (cont'd)

arkose. On the west slope of the mountain, on the Silver Standard property, the sediments form a low anticline with the limbs of the fold dipping east and west and the axial plane striking north. At the lower mine adit the beds dip up to 35 degrees west, and east of the main shaft they dip from 5 to 15 degrees east. On the east side of the mountain the strata turn up again sharply. This broad structure is interrupted by numerous minor folds on the limbs of the anticline. The west limb of the anticline is intruded between elevations of 1300 and 1700 feet by two small stocks of porphyritic granodiorite. The largest of these has an average diameter of about 500 feet "



G. L. Gates - Field Representative

Vancouver, B. C.,

National Explorations Limited,
714 Hall Building, Vancouver, B.C.

April 6, 1951

Dear Sirs :

The detailing of the anomalies discovered during the past season on your property near Hazelton B.C. has been completed during the past three months. Additional areas were surveyed using the electromagnetic inductive method and detail work was completed on the new anomalies discovered.

In consultation with Dr. Joseph T. Mandy, your consultant, the anomalies listed for development are :

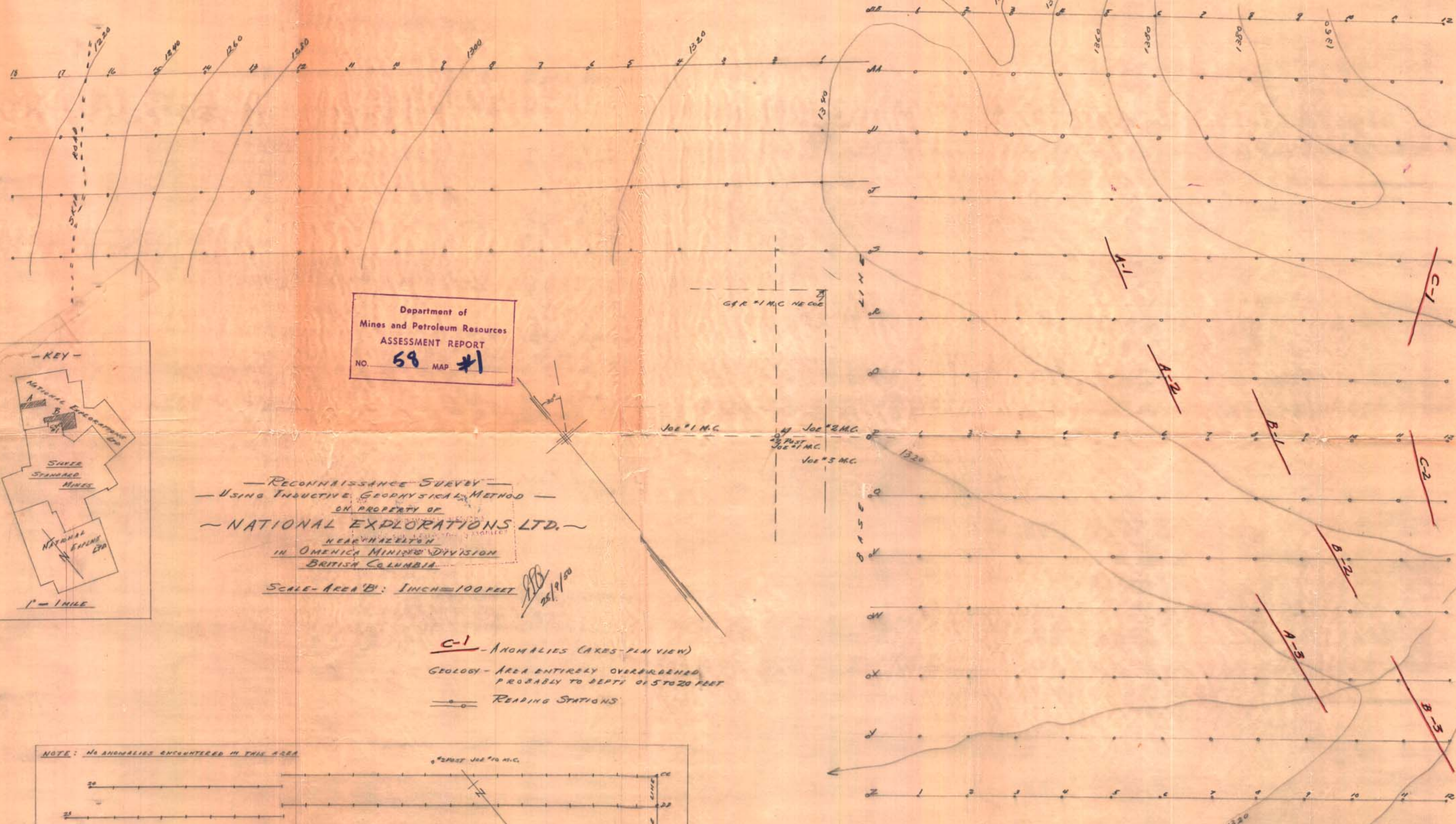
I-X, 2-X, 3-X, O-I, Ø-2, P-I, Q-I, I2-A, I3-A,
I4-A, I8-A, I9-A, K-2, K-3, J-I, 8-A.

These anomalies are to be explored by diamond drilling to start about May 1.

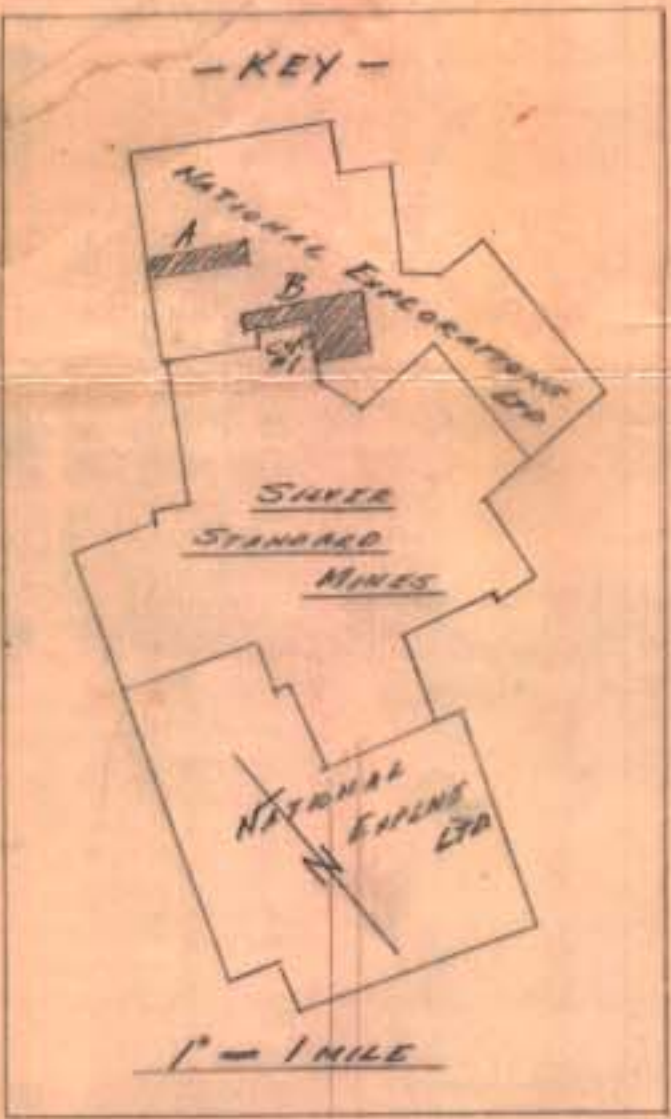
Yours very truly,


R. Bates
GEO

— AREA 'B' —

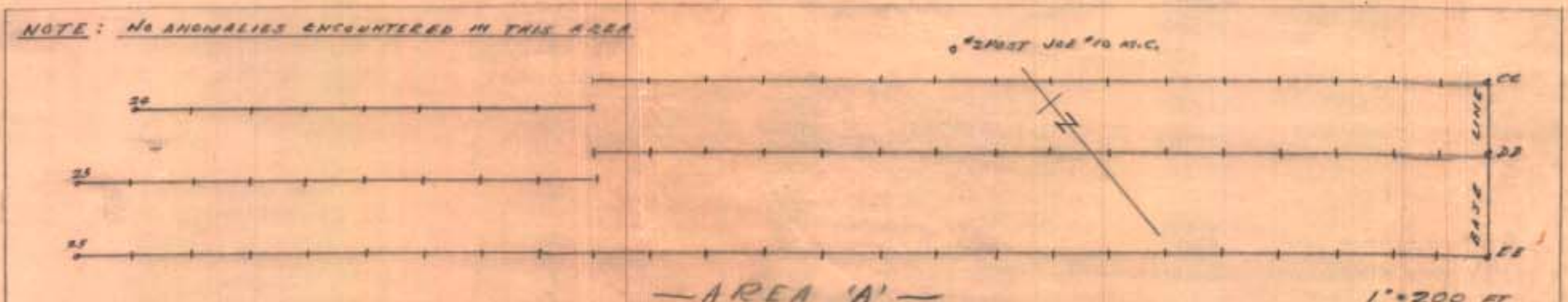


Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. **58** MAP #1



— RECONNAISSANCE SURVEY —
— USING INDUCTIVE GEOPHYSICAL METHOD —
ON PROPERTY OF
— NATIONAL EXPLORATIONS LTD. —
NEAR HAZELTON
IN OMEGA MINING DIVISION
BRITISH COLUMBIA
SCALE - AREA 'B': 1 INCH = 100 FEET

C-1 - ANOMALIES (AXES-PLAN VIEW)
GEOLOGY - AREA ENTIRELY OVERBURDENED
PROBABLY TO DEPTHS OF 15 TO 20 FEET
○ — READING STATIONS



REPORT #58
MAP #1

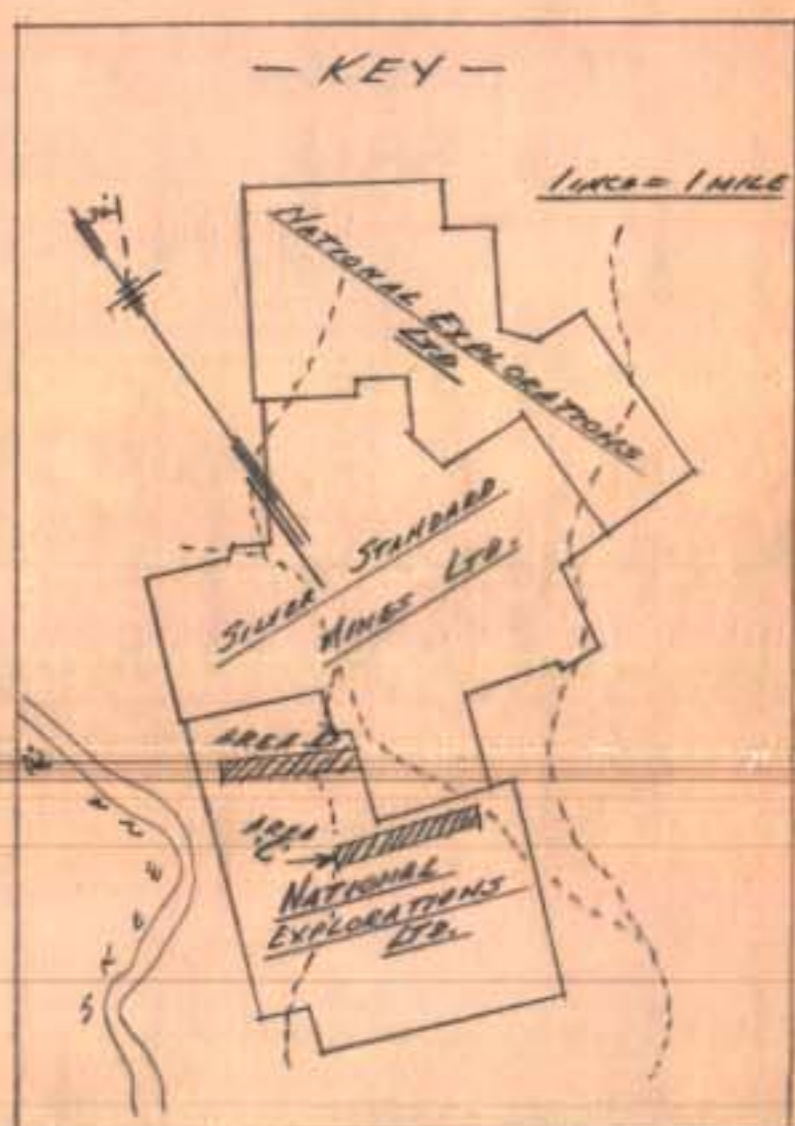
MAP - NE-1

NOTE: LINES I & J CONTINUE WEST AS
LINES M & N FOR 200 FT. NO
ANOMALIES ENCOUNTERED

— AREA 'C' —
1 INCH = 100 FEET

NOTE: LINES A B C & D CONTINUE WEST TO STA 20
NO ANOMALIES ENCOUNTERED

— AREA 'D' —
1 INCH = 100 FEET



LEGEND

- N-1 ANOMALIES (AXES-PLAN VIEW)
- READING STATIONS
- CLAIM BOUNDARIES
- CONTOUR INTERVAL 20 FT. (APPROX.)
- SEE ATTACHED REPORT FOR GEOLOGY

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 58 MAP #2

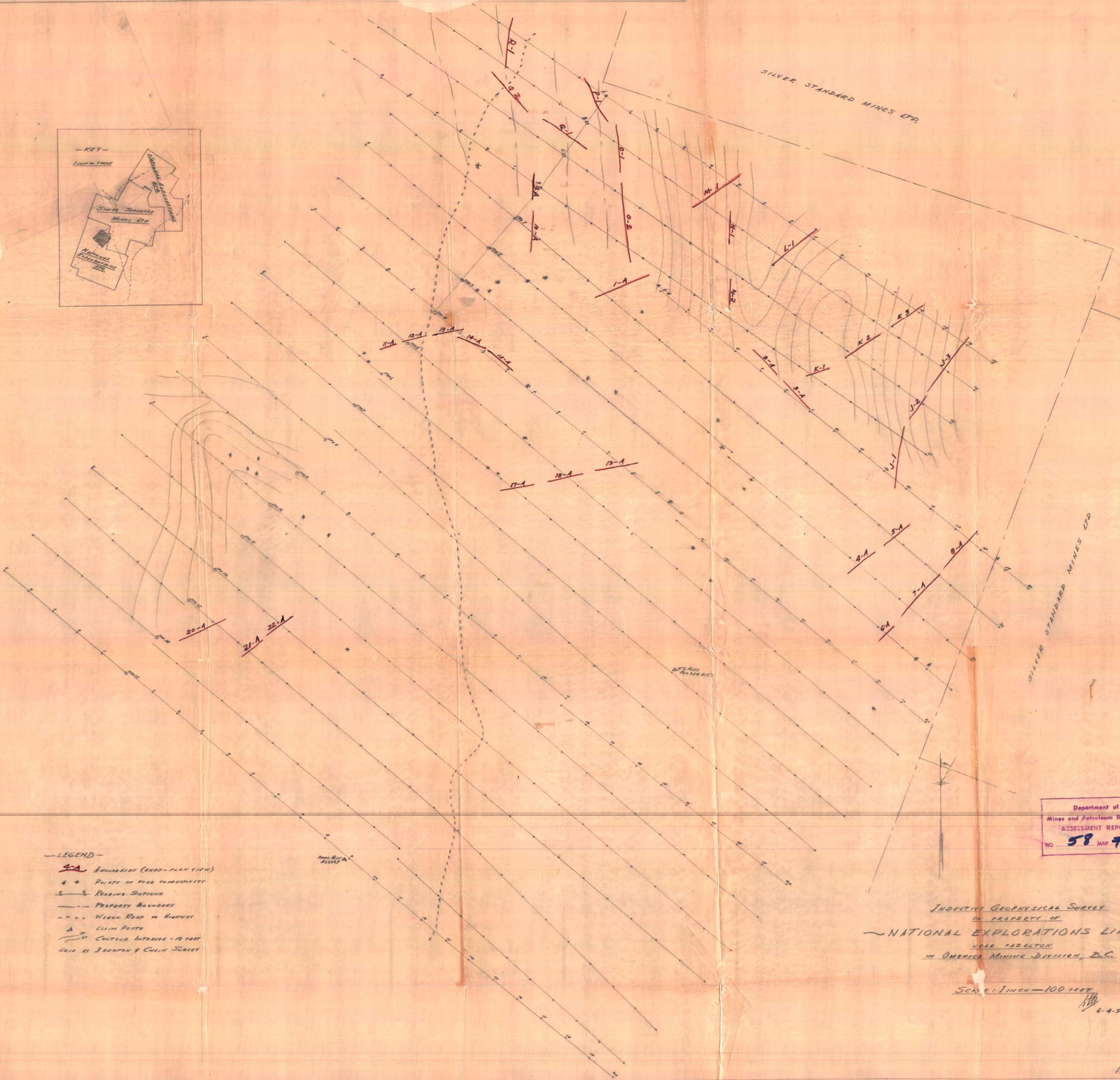
— RECONNAISSANCE SURVEY —
— USING INDUCTIVE GEOPHYSICAL METHOD —
ON PROPERTY OF
— NATIONAL EXPLORATIONS LTD —
NEAR HAZELTON
IN OMICA MINING DIVISION
BRITISH COLUMBIA

SCALE: 1 INCH = 100 FEET

REPORT #58
MAP #2

MAD: NE-2

SILVER STANDARD MINES LTD.



SILVER STANDARD MINES LTD.

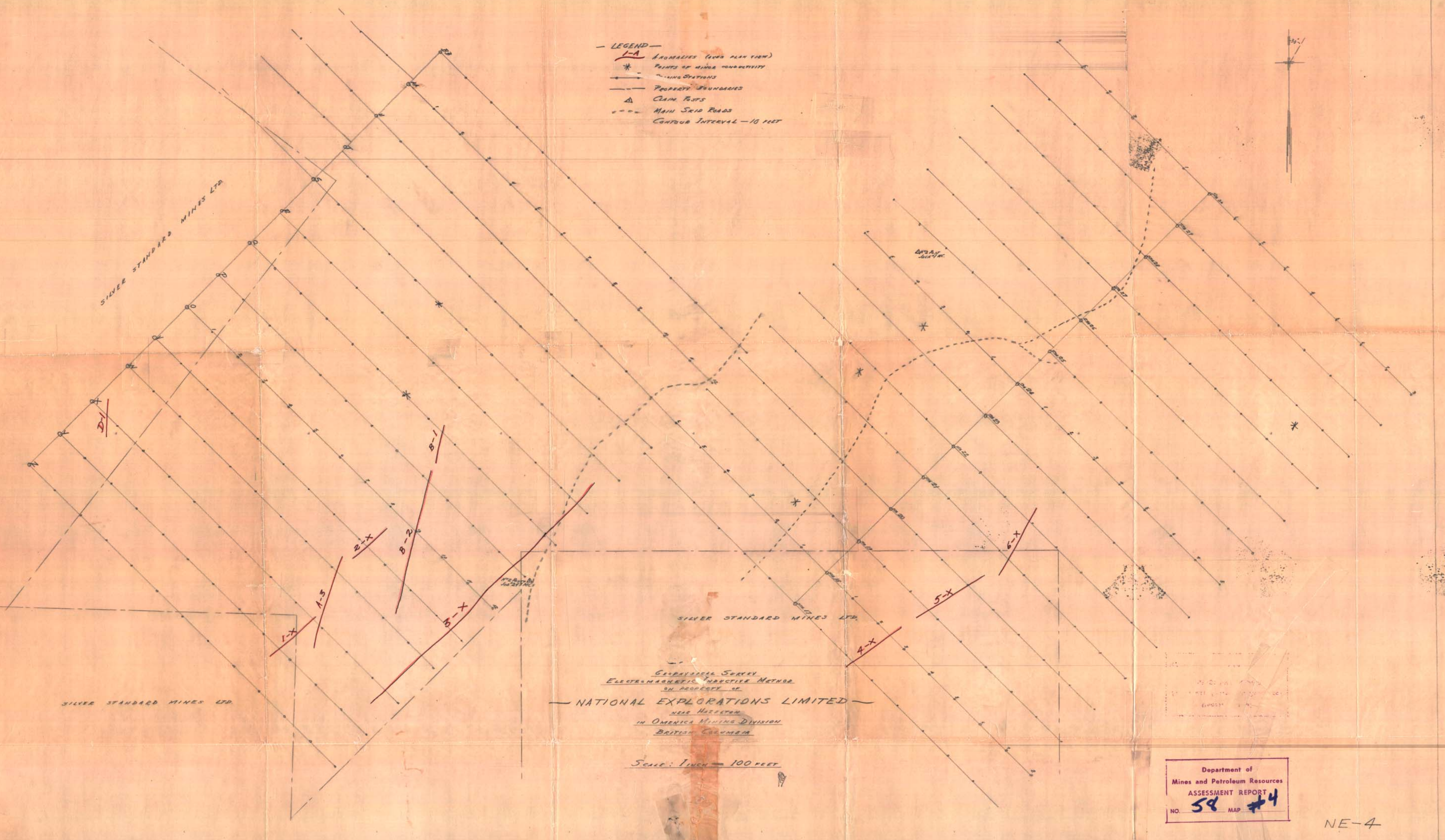
- LEGEND -
- 4-A ANOMALIES (CROSS-PLAN VIEW)
 - * * POINTS OF POLE CONDUCTIVITY
 - READING STATIONS
 - - - PROPERTY BOUNDARY
 - - - WAGON ROAD TO HIGHWAY
 - ▲ CLIMB POSTS
 - ~ CONTOUR INTERVAL - 10 FEET
 - GRID BY BRUNTON & CHAIN SURVEY

Department of
Mines and Petroleum Resources
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INDUCTIVE GEOPHYSICAL SURVEY
ON PROPERTY OF
NATIONAL EXPLORATIONS LIMITED
NEAR HAZELTON
IN ONTARIO MINING DIVISION, B.C.

SCALE: 1 INCH = 100 FEET
6-4-51

- LEGEND —
- 1-A ANOMALIES (SEE PLAN VIEW)
 - * POINTS OF HIGH CONDUCTIVITY
 - WINDING STATIONS
 - PROPERTY BOUNDARIES
 - △ CLAIM POSTS
 - - - MAIN GRID ROADS
 - CONTOUR INTERVAL - 10 FEET



SILVER STANDARD MINES LTD.

SILVER STANDARD MINES LTD.

SILVER STANDARD MINES LTD.

GEOLOGICAL SURVEY
ELECTROMAGNETIC INDUCTIVE METHOD
BY RESISTIVITY METHOD

NATIONAL EXPLORATIONS LIMITED
NEAR HAZLETON
IN OREGON DIVISION
BRITISH COLUMBIA

SCALE: 1 INCH = 100 FEET

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 58 MAP #4

NE-4