85-802-14030

REPORT ON

LARGE LOOP GENIE

GEOPHYSICAL SURVEYS

ON THE

JOSH 1 - 5 MINERAL CLAIMS

LIARD MINING DIVISION

104I/1W

58°12 N, 128°28'

Owned by:

ESSO RESOURCES CANADA LTD.

Operated by:

ESSO MINERALS CANADA

By:

P. Holbek
Z. Doborzynski

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LIST OF MAPS AND FIGURES

(KUTCHO CLAIMS)

PROJECT	CLAIM	RECORD NUMBER	UNITS	RECORD DATE	EXPIRY DATE
Antler -MA80	Antler 001	4090	04	Oct 26/81	1993/10/26
Kutcho - MA22	Andrea	444	14	July 27/77	1993/07/27
Kutcho - MA22	CGL 001	560	12	June 26/78	1993/06/26
Kutcho - MA22	CGL 002	561	08	June 26/78	1991/06/26
Kutcho - MA22	CGL No 1 Fr.	1088		Oct 22/79	1989/10/22
Kutcho - MA22	Jeff 001	70301		Aug 27/73	1991/08/27
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Kutcho - MA22	Josh 3	3360	18	July 17/85	1989/07/17
Kutcho - MA22	Josh 4	3361	18	July 17/85	1989/07/17

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Kutcho - MA22	Kris 005	70472		Sept 7/73	1993/09/07
Kutcho - MA22	Kris 006	70473		Sept 7/73	1993/09/07
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Kutcho - MA22	Lin 040	70913		Nov 13/73	1991/11/13
Kutcho - MA22	Lin 011	70884		Nov 13/73	1993/11/13
Kutcho - MA22	Moe 001	00007	06	May 12	1991/05/12
Kutcho - MA22	Pond 001	3169	14	Aug 14/84	1993/08/14
Kutcho - MA22	Pond 002	3170	04	Aug 14/84	1993/08/14
Kutcho - MA22	Py 66	1909	12	May 15/81	1995/05/15
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Kutcho - MA22	Py 68	2813	14	June 21/83	1990/06/21
Kutcho - MA22	Py 69	2814	09	June 21/83	1990/06/21
Kutcho - MA22	Py 70	2815	18	June 21/83	1990/06/21
Kutcho - MA22	Rex 1 Fr.	72033		Aug 27/77	1993/08/27
Kutcho - MA22	Rex 2 Fr.	72034		Aug 27/77	1991/08/27
Kutcho - MA22	Rex 3 Fr.	72035		Aug 27/77	1993/08/27
Kutcho - MA22	Rex 4 Fr.	72036		Aug 27/77	1993/08/27
Kutcho - MA22	Stu	443	06	July 27/77	1991/07/27
Kutcho - MA22	Svea	445	06	July 27/77	1993/07/27
Kutcho - MA22	Tail	3168	20	Aug 14/84	1993/08/14

1. INTRODUCTION

1.1 Location and Access

The Kutcho Creek property is located within the Liard Mining Division, NTS 104I/1, approximately 100 km east of Dease Lake. Geodetic coordinates are 58°12'N and 128°22'W.

Access to the property is by fixed wing aircraft from Watson Lake, Dease Lake or Smithers to the Kutcho Airstrip. The property is connected to the airstrip by an 8 km long road.

1.2 Property and History

The claim area has undergone exploration and development for the last eleven years.

The Josh 1 claim was staked in August 1984, Josh 2, 3 and 4 were staked in June 1985 and Josh 5 in July 1985. Details of pertinent claims are given in Table 1.1.

1.3 Climate and Physiography

Located within the Cassiar Mountains, on the divide between Arctic and Pacific watersheds, the area is moderately rugged with elevations ranging from 1,400 to 2,200 m. Most of the area is alpine with treeline at approximately 1500 m. Two periods of glaciation have produced an intersecting pattern of east-west and north-south ridges and filled the major valleys with a deep layer of till.

The climate is northern alpine resulting in snow cover for nine months of the year.

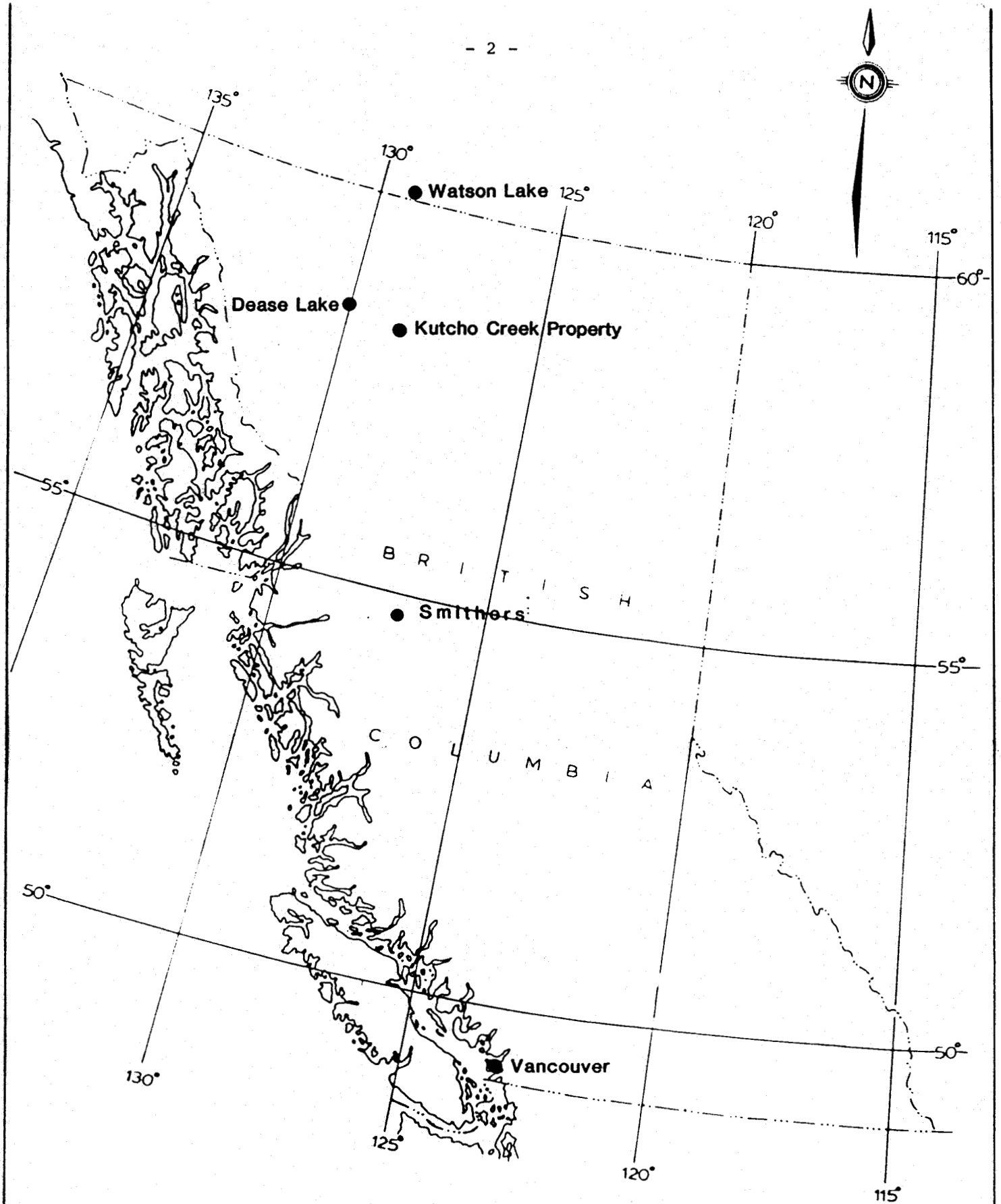
1.4 Work Done

During July 1985, a fixed source, large loop GENIE geophysical survey was run on the Josh 1 to 5 claims. Twenty six line kilometers were run for a total survey area of 3.9 square kilometers. A 2.7 km baseline was cut for grids 5, 6 and 7.

Claim boundaries, topography and position of the grids and conductors are shown in Figure 2.4. Profiles and contoured, filtered data are given in Figures 2.5 through 2.19.

Table 1.1 Summary of Claim Data

Claim Name	Units	Date Located	Date Recorded	Record No.
Josh 1	16	Aug 25/84	Sept 7/84	3185
Josh 2	18	June 21/85	July 17/85	3359
Josh 3	18	June 21/85	July 17/85	3360
Josh 4	18	June 21/85	July 17/85	3361
Josh 5	20	July 21/85	Aug 19/85	3371



ESSO MINERALS CANADA

LOCATION MAP FOR KUTCHO CREEK

Fig. 1.1

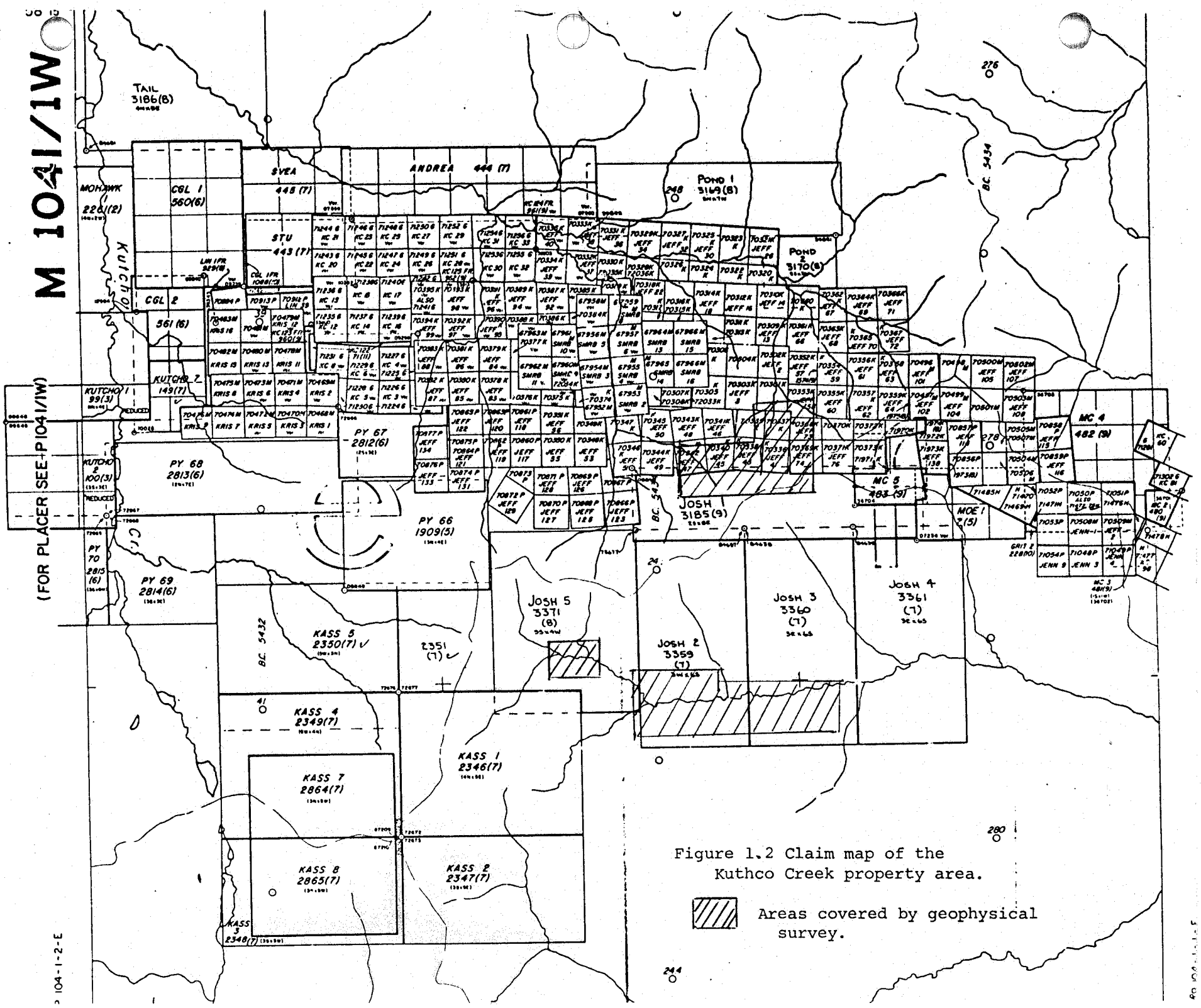


Figure 1.2 Claim map of the Kuthco Creek property area.

Areas covered by geophysical survey.

2. GEOPHYSICAL REPORT

2.1 Equipment

The system used is a Scintrex GE-88 GENIE system. The transmitter was the new fixed source version designed to complement the existing system. Field layout consisted of laying down a loop of 18 gauge wire 1000 m by 500 m which is connected to the transmitter (Fig.2.1). The long edge of this loop was laid parallel to the geological strike in the area. Surveying is carried out off the long sides of the transmitter loop.

The transmitter is a continuous wave system, simultaneously transmitting up to five frequencies (37.5, 112.5, 337.5, 1012.5 and 3037.5 Hz) either from a large loop or grounded wire. The sinusoidal output currents are scaled as per the frequencies in ratios of 8:6:4:2:1 starting at 37.5 Hz. Relative and absolute current stabilization is maintained at better than 0.1%. The output voltage is adjustable between 250 and 1000 volts to accomodate a wide range of loop sizes, grounded core lengths and contact resistances. Maximum output currents are dependent on the output voltage selected ranging from 4.5 amps rms at 37.5 Hz (0.5 amps rms at 3037.5 Hz) at 250 volts to 1.125 amps rms at 37.5 Hz (0.125 amps rms at 3037.5 Hz) at 1000 volts.

The power source is a Briggs & Stratton 5 horse power motor-generator with a running time of over 5 hours on one tank of gas and full transmitter load.

Operation consists of selecting the desired frequencies to be transmitted and adjusting the output voltage for maximum current output. If some of the frequencies are not used, the current amplitudes at the remaining frequencies can be increased by up to a factor of two.

The motor generator weights 25 kgs including the backpack. The transmitter console is of a similar weight.

Measurements are taken off the long sides of the transmitter loop (Fig.2.1) with the standard GENIE receiver unit. Readings can be made at nine possible frequency pairs, measuring the amplitude of the EM fields at two frequencies. One is called the reference frequency, which is relatively unaffected by ground conductivity. These frequencies can be used as the reference - 37.5, 112.5 and 3337.5 Hz. The other is called the signal frequencies which can be 112.5, 337.5, 1012.5 or 3037.5 Hz. The measurement made for each frequency pair is defined by the equation:

$$R = \frac{As}{Ar} - 1 \quad \times 100\%$$

where: As = the amplitude at the signal frequency
Ar = the amplitude at the reference frequency
R = the resulting ratio measurement in %

FIXED SOURCE GENIE

LARGE LOOP ON SURFACE

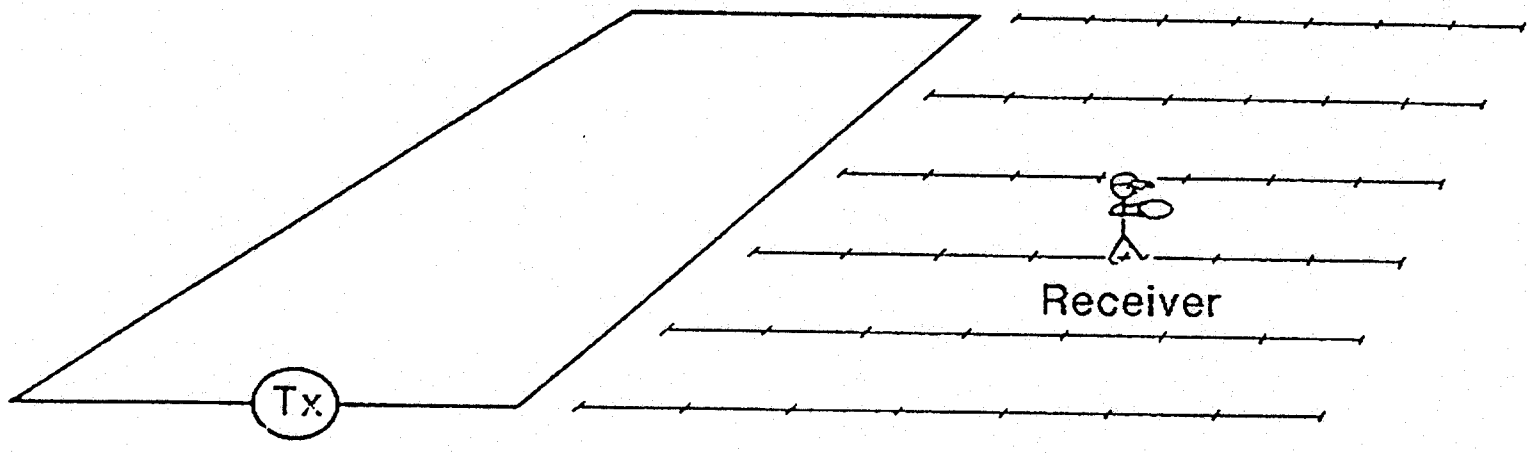


Figure 2.1 Illustration showing configuration of transmitter loop relative to grid lines

As mentioned, 9 frequency pairs can be measured. These are: 3037.5/37.5, 1012.5/37.5, 337.5/37.5, 112.5/37.5, 3037.5/112.5, 1012.5/112.5, 337.5/112.5, 3037.5/337.5 and 1012.5/337.5. The receiver output is the normalized amplitude ratio with a resolution of 0.1%.

The large loop GENIE response to a vertical conductor is shown in Fig.2.2. The response is characterized by a crossover at the conductor. The quality of response is given by the responses at different frequency pairs, as shown on the response curves (Fig.2.3). If pronounced ratios are measured at the two highest frequency ratios with little response at the two lower frequency pairs, a poor conductor is indicated. A strong conductor is indicated where the amplitude at all frequency pairs are relatively the same.

2.2 Survey Procedure

At both the Josh Creek Area and Imperial Ridge grids, measurements were made for 4 frequency pairs using the 37.5 Hz reference frequency (3037.5/37.5, 1012.5/37.5, 337.5/37.5 and 112.5/37.5). Readings were taken at 25 m intervals along flagged lines.

Data is plotted for each loop layout at a scale of 1:2500 and an amplitude scale of 1 cm = + 20%.

2.3 General Geology

All grid areas are underlain by rocks of the Kutcho Formation. These rocks are predominantely mafic to felsic pyroclastics and flows with minor epiclastics and limestone, typical of island arc sequences. The formation has been metamorphosed to greenschist facies and is open to tightly folded with a well developed foliation striking 190^{o} dipping 60^{o} to the north.

Rocks on Imperial Ridge (Josh 1 claim) are well exposed and consist of quartz feldspar crystal tuffs intercalated with lapilli and crystal ash tuffs. Narrow zones of sericitization containing trace amounts of pyrite follow the structural trend.

Exposure is poor on the Josh Creek Area grids (Josh 2, 3, 4 and 5 claims) with the only outcrop being within the stream canyon just north of the baseline. Rocks exposed in the creek are siliceous lithic and crystal ash tuffs interbedded with mafic ash tuffs. Pyrite concentrations within the felsic rocks range from trace to 10% as disseminations or fine laminations. Most of the rocks within the stream canyon show evidence of shearing and fault zone is postulated for this area.

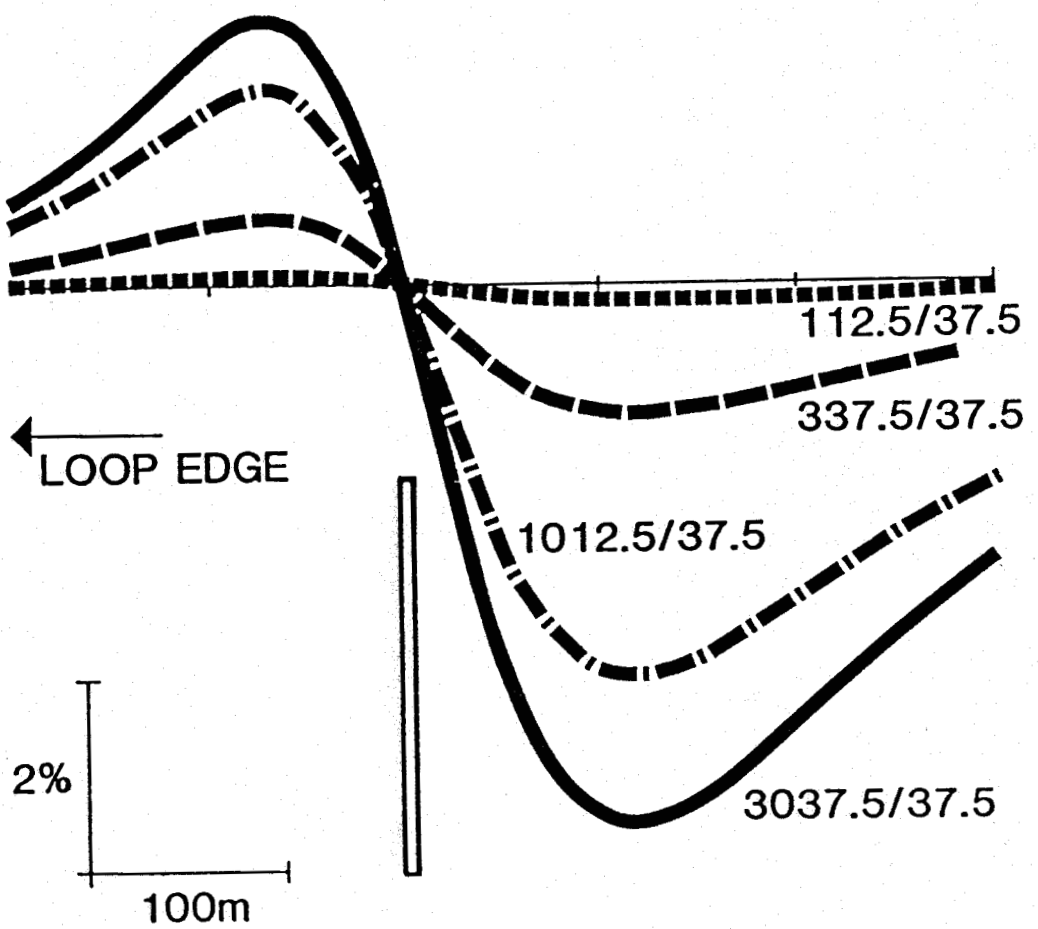


Figure 2.2 Diagram of idealized profile of large loop GENIE response of 4 frequency pairs to a vertical conductor

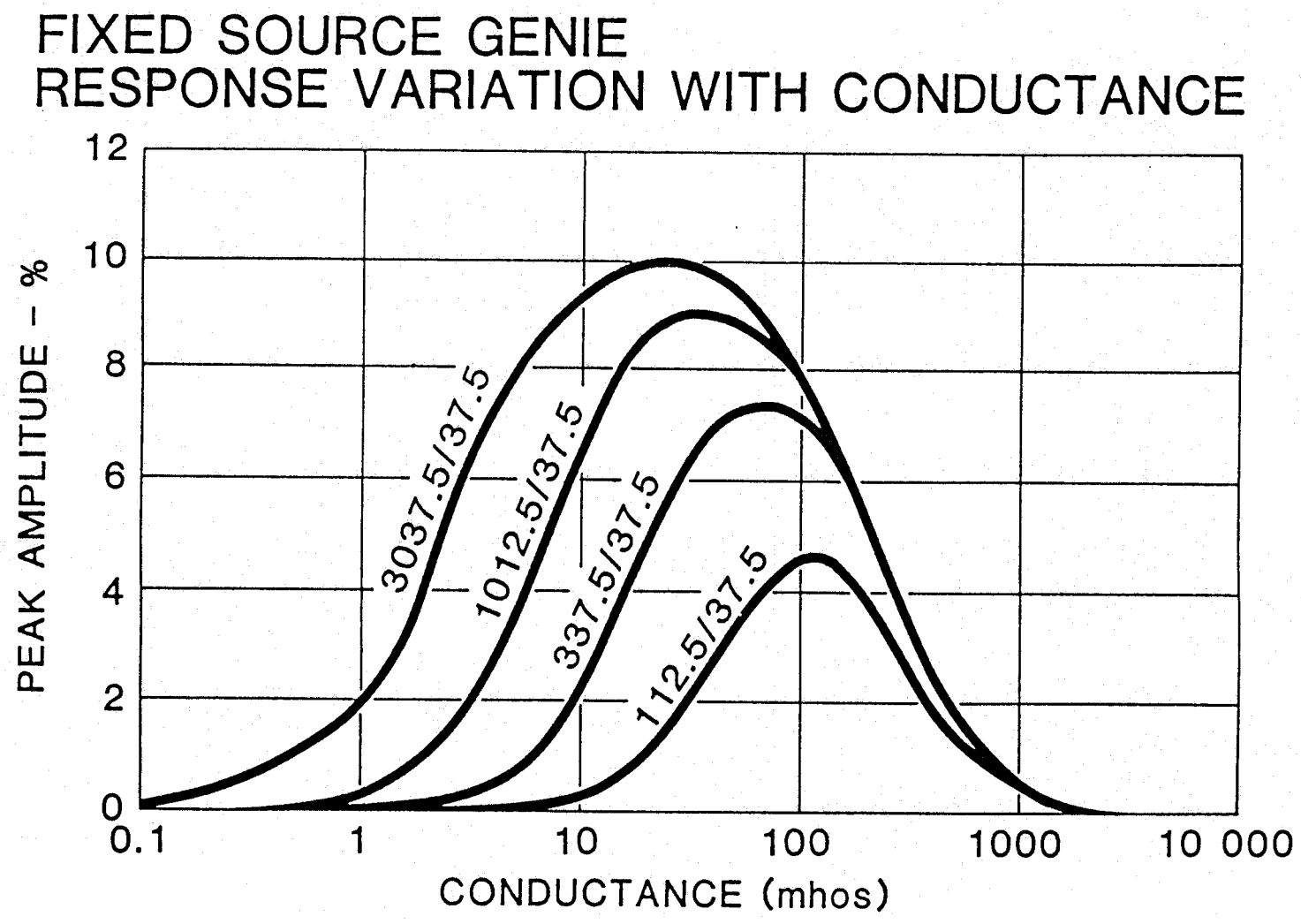

FIXED SOURCE GENIE
RESPONSE VARIATION WITH CONDUCTANCE
PEAK AMPLITUDE - %
12
10
8
6
4
2
0
3037.5/37.5
1012.5/37.5
337.5/37.5
112.5/37.5
0.1
1
10
100
1000
10 000
CONDUCTANCE (mhos)

Figure 2.3

2.4 Discussion of Results

Surveys on grid 4 and grid 8 display very limited response. Single frequency crossovers on the positive side with no buildup may indicate lithological contacts. The G-4 extension grid shows a positive buildup with single frequency crossovers suggestive of a weak conductor such as a structural break.

The P.S. grid has negligible responses with a single frequency crossover located on line 450E coincident with break in slope and the edge of a swamp.

Three sub-continuous conductors were identified along the Josh Creek Area grids. Continuity from line to line of 2 to 3 frequency crossovers parallel to the structural trend indicates lithologically controlled conductors. Dispersion of frequency crossovers indicates an approximate depth of 70 m for the conductors.

3. CONCLUSIONS

The linear anomalies within the Josh Creek Area should be tested by drilling at depths of approximately 100 m. the northern-most conductor is strongest in the center of the Grid 5 Extension and on the east end of Grid 7. The southern conductor is strongest on the west end of Grid 6. Geophysical surveys on the Josh Creek Area should be extended to the east and north.

Further work should be done east of the Grid 4 Extension to determine if the response strengthens in that direction.

ITEMIZED COST STATEMENT

Geophysical Survey between July 15 and 27		
P. Holbek, Project Geologist	5 days @ 234/day	$ 1,170
Z. Doborzynski, Geophysicist	11 days @ 352/day	3,872
S. Lowe, Geophysical Tech.	13 days @ 174/day	2,275
D. Hadzick & M. Lautenbacher, Line cutters, Labourers (Van Alphen Exploration Services)	11 days @ 350/day	3,850
R. Cranswick, Student Assistant	2 days @ 110/day	220
S. Duguid, Student Assistant	2 days @ 110/day	220
Salaries Total:		11,607
Food & Accomodation		
55 Mandays @ 50/day		2,750
Expediting (Van Alphen Exploration Services)		600
Related camp costs (Toyota Landcruiser, ATV's etc)		2,250
Geophysical Equipment Rental		2,500
Food & Accomodation Total:		8,100
Transportation		
Central Mountain Air Services Beech 18 Flights from Smithers to Kutcho		
June 28, Aug 5, Geophysical Gear in/out		5,080
July 15, July 25 (1/2) July 31 (1/2) Personnel in/out		
Yukon Air Hughs 500C July 16, 19, 21		3,985
Okanagan Helicopters 206B from Sturdee Strip		
July 17, 18, 200		4,063
Pacific Western Vancouver - Smithers		640
Freight		1,200
Transportation Total:		14,968
Draughting, Report Preparation		1,400
GRAND TOTAL:		$ 36,075

STATEMENT OF QUALIFICATIONS

I hereby certify that:

1) I graduated from the University of B.C. in 1980 with B.Sc.(Hons) Degree in Geological Sciences,

2) I have completed three years of post-graduate work in preparation for an M.Sc. Degree in Geology at the University of B.C.,

3) I have practiced my profession in B.C. for the last five years, and

4) The work described herein was done under my direct supervision.

Peter Holbek, B.Sc.

STATEMENT OF QUALIFICATION

I am a graduate of McGill University, with a Bachelor of Engineering Degree in Mining Engineering and Applied Geophysics and a Master of Science Degree in Applied Geophysics. I have been employed as an exploration geophysicist with Esso Minerals Canada for the last eight years.

Zbigniew B. Doborzynski.

SMRB Claims

Grid 4 Ext.

Imperial Ridge Zone

Grid 8

Grid 4

JOSH 1

JOSH 5

JOSH 2

JOSH 3

JOSH 4

P.S. Grid

Joshua Creek Area

Grid 5 Ext.

Grid 5

Grid 6

Grid 7

STRUCTURAL RESPONSE
Weak
Fair

CONDUCTORS
Weak
Fair
Good
Very Good

0 200 400m.
SCALE 1: 10,000

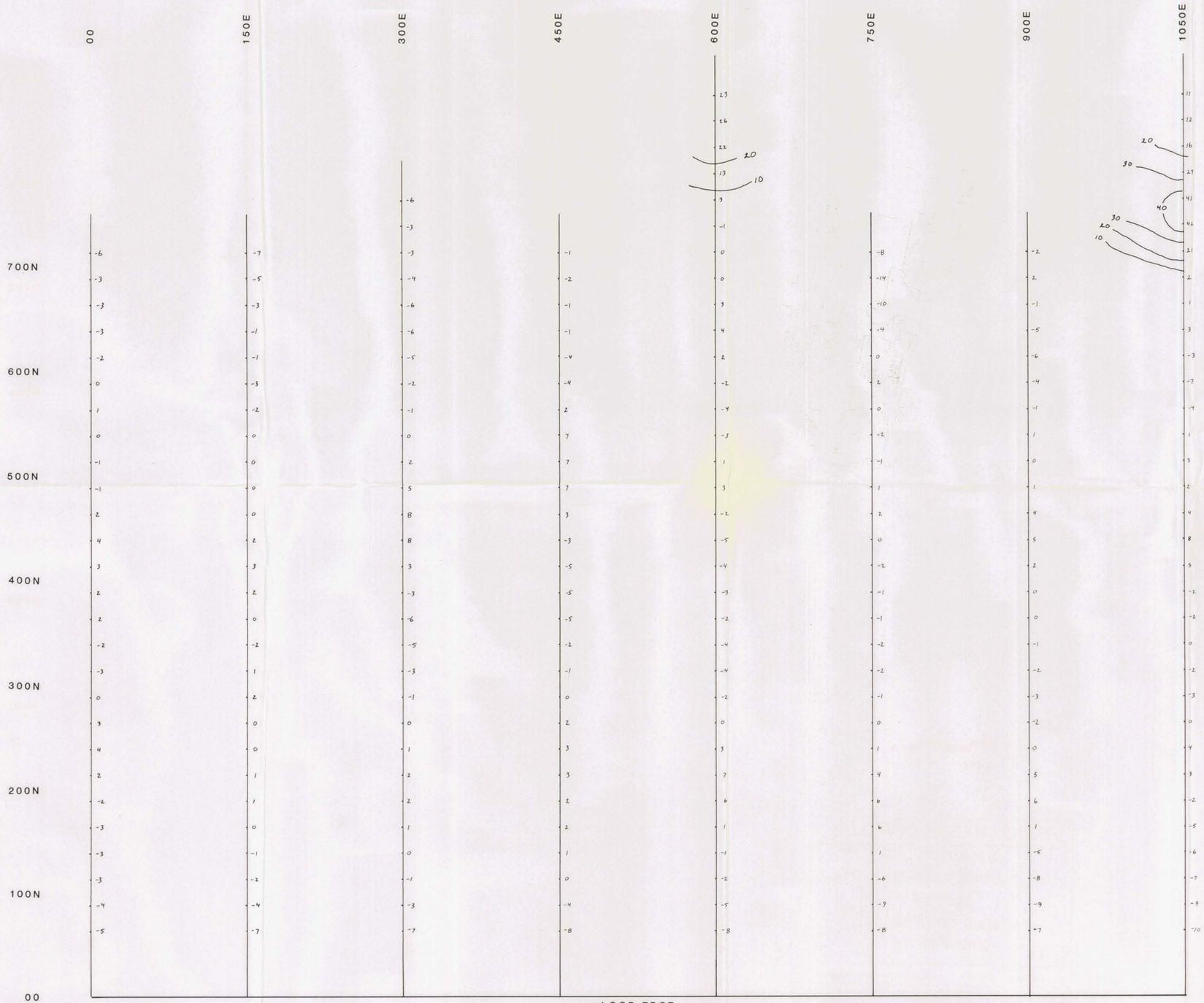
GEOLOGICAL BRANCH
ASSESSMENT REPORT
14,030

ESSO MINERALS CANADA

KUTCHO PROJECT

1985 GEOPHYSICS

Project No. Ma22	Mining Division Liard
N.T.S. 104 I	Drawn By P.H.
Date Nov. 12 1985	Map No. 2.4



GEOLOGICAL BRANCH
ASSESSMENT REPORT

14,030

0 50 100m.

SCALE: 1:2500

ESSO MINERALS CANADA	
KUTCHO PROJECT LARGE LOOP EM 3037/37 FILTERED CONTOUR MAP GRID 4	
Project No. Ma22	Mining Division Liard
N.T.S. 104 I	Drawn By S.L.
Date 23 Sept. 1985	Map No.

00 150E 300E 450E 600E 750E 900E 1050E

1000N

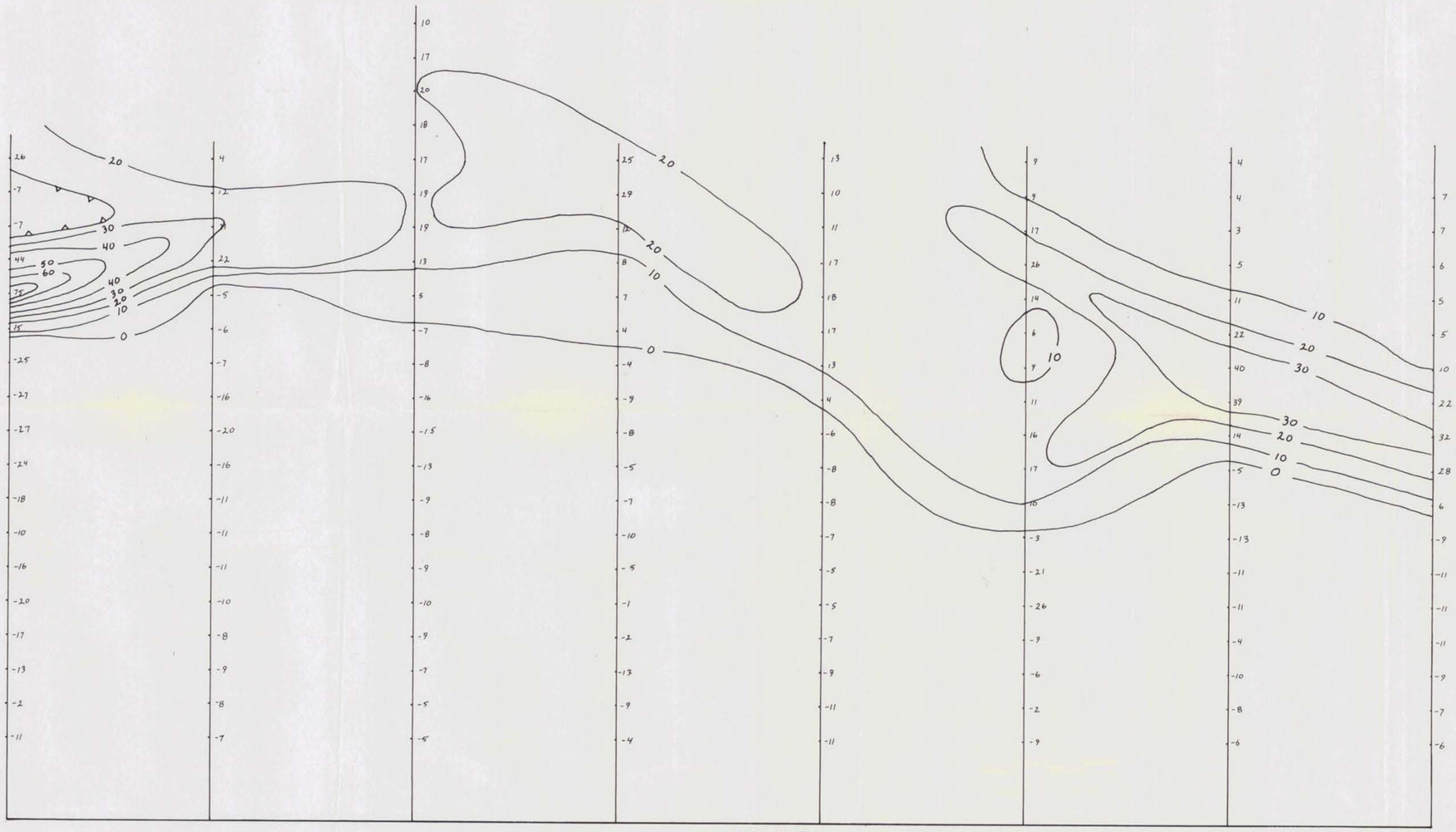
900N

800N

700N

600N

500N



LOOP EDGE

0 50 100m.

SCALE: 1:2500

ESSO MINERALS CANADA

KUTCHO PROJECT

LARGE LOOP EM

3037/37

FILTERED CONTOUR MAP

GRID 4-EXTEN.

Project No. Ma22	Mining Division Liard
N.T.S. 104 I	Drawn By S.L.
Date 23 Sept. 1985	Map No.

00
150E
300E
450E
600E
750E
900E

700N
600N
500N
400N
300N
200N
100N
00

LOOP EDGE

GEOLOGICAL BRANCH
ASSESSMENT REPORT

14,030

0 50 100m.

SCALE: 1:2500

ESSO MINERALS CANADA

KUTCHO PROJECT

LARGE LOOP EM

3037/37

FILTERED CONTOUR MAP

GRID 5

Project No. Ma22	Mining Division Liard
N.T.S. 104 I	Drawn By S.L.
Date 23 Sept. 1985	Map No.

900E 1050E 1200E 1350E 1500E 1650E 1800E

700N

600N

500N

400N

300N

200N

100N

00

LOOP EDGE

GEOLOGICAL BRANCH
ASSESSMENT REPORT

14,030

0 50 100m.

SCALE: 1:2500

ESSO MINERALS CANADA

KUTCHO PROJECT

LARGE LOOP EM

3037/37

FILTERED CONTOUR MAP

GRID 6

Project No. Ma22	Mining Division Liard
N.T.S. 104 I	Drawn By S.L.
Date 23 Sept. 1985	Map No.

0 50 100m.

SCALE: 1:2500

ESSO MINERALS CANADA	
KUTCHO PROJECT LARGE LOOP EM 3037/37 FILTERED CONTOUR MAP GRID 5-EXTEN.	
Project No. Ma22	Mining Division Liard
N.T.S. 104 I	Drawn By S.L.
Date 23 Sept. 1985	Map No.

1800E 1950E 2100E 2250E 2400E 2550E 2700E

700N

600N

500N

400N

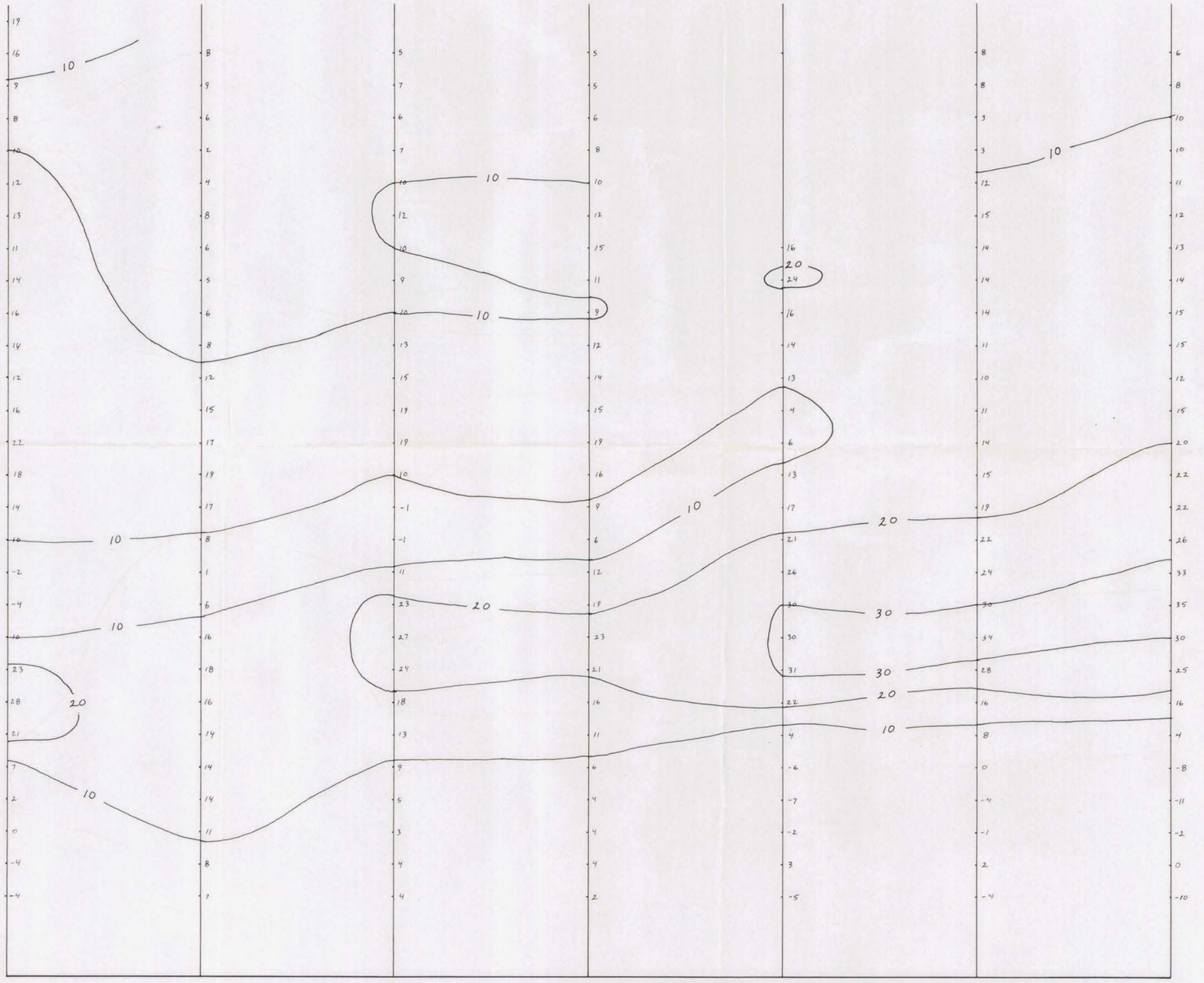
300N

200N

100N

00

LOOP EDGE



GEOLOGICAL BRANCH
ASSESSMENT REPORT

14,030

0 50 100m.

SCALE: 1:2500

ESSO MINERALS CANADA

KUTCHO PROJECT

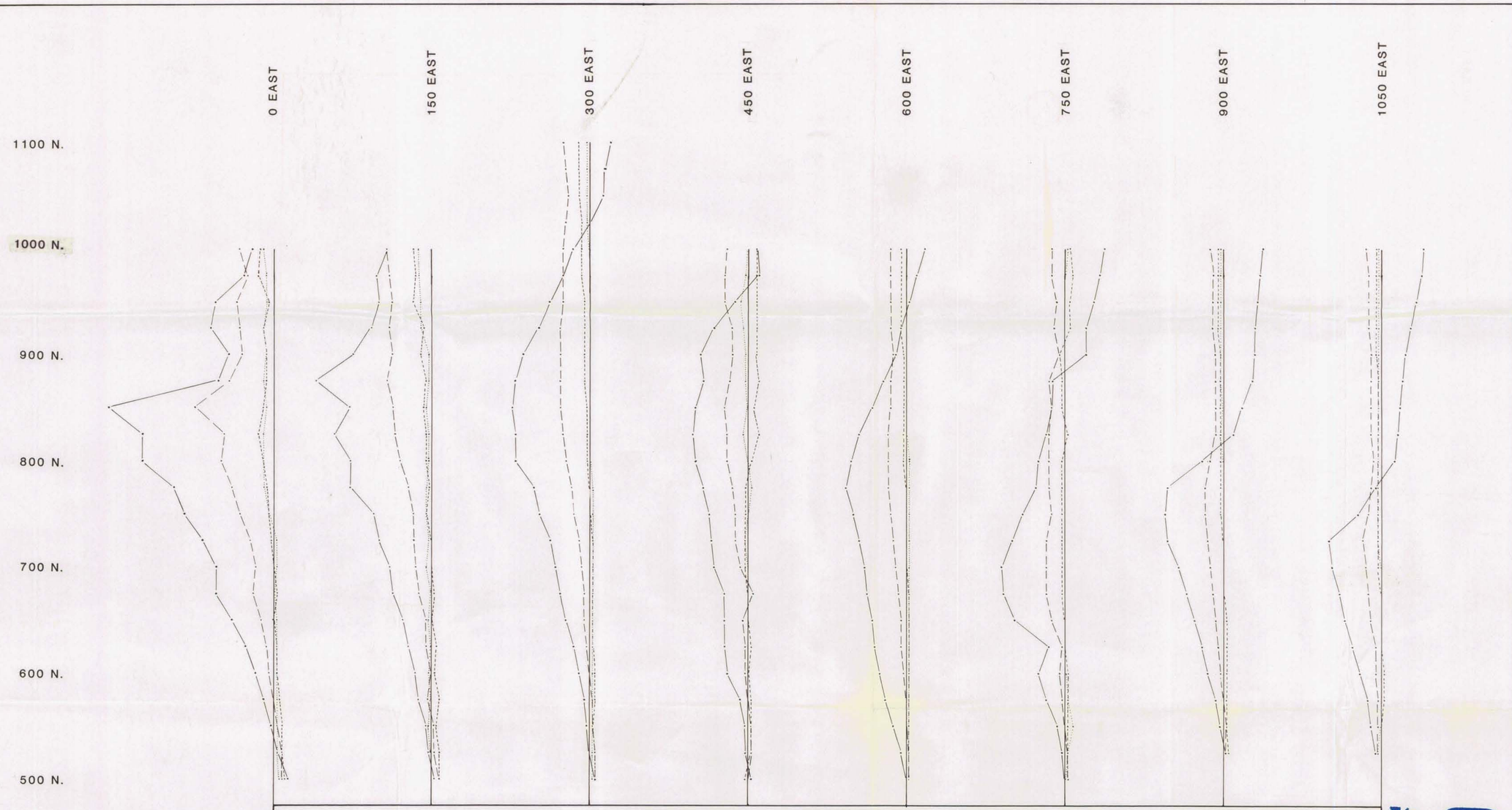
LARGE LOOP EM

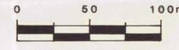
3037/37

FILTERED CONTOUR MAP

GRID 7

Project No. Ma22	Mining Division Liard
N.T.S. 104 I	Drawn By S.L.
Date 23 Sept. 1985	Map No.





SCALE : 1: 2500

ESSO MINERALS CANADA

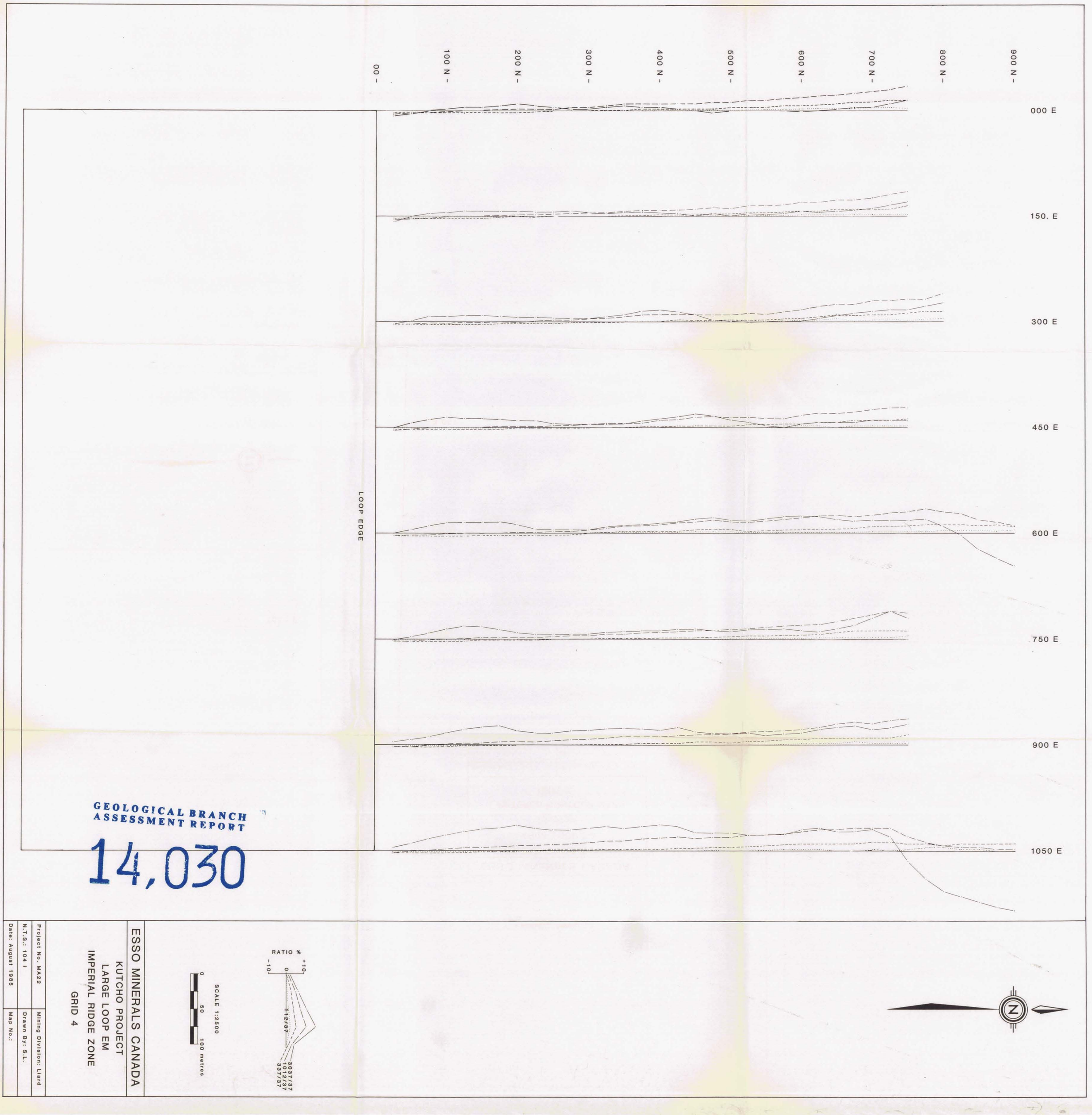
KUTCHO PROJECT

LARGE LOOP EM

IMPERIAL RIDGE ZONE

GRID 4 EXTENSION

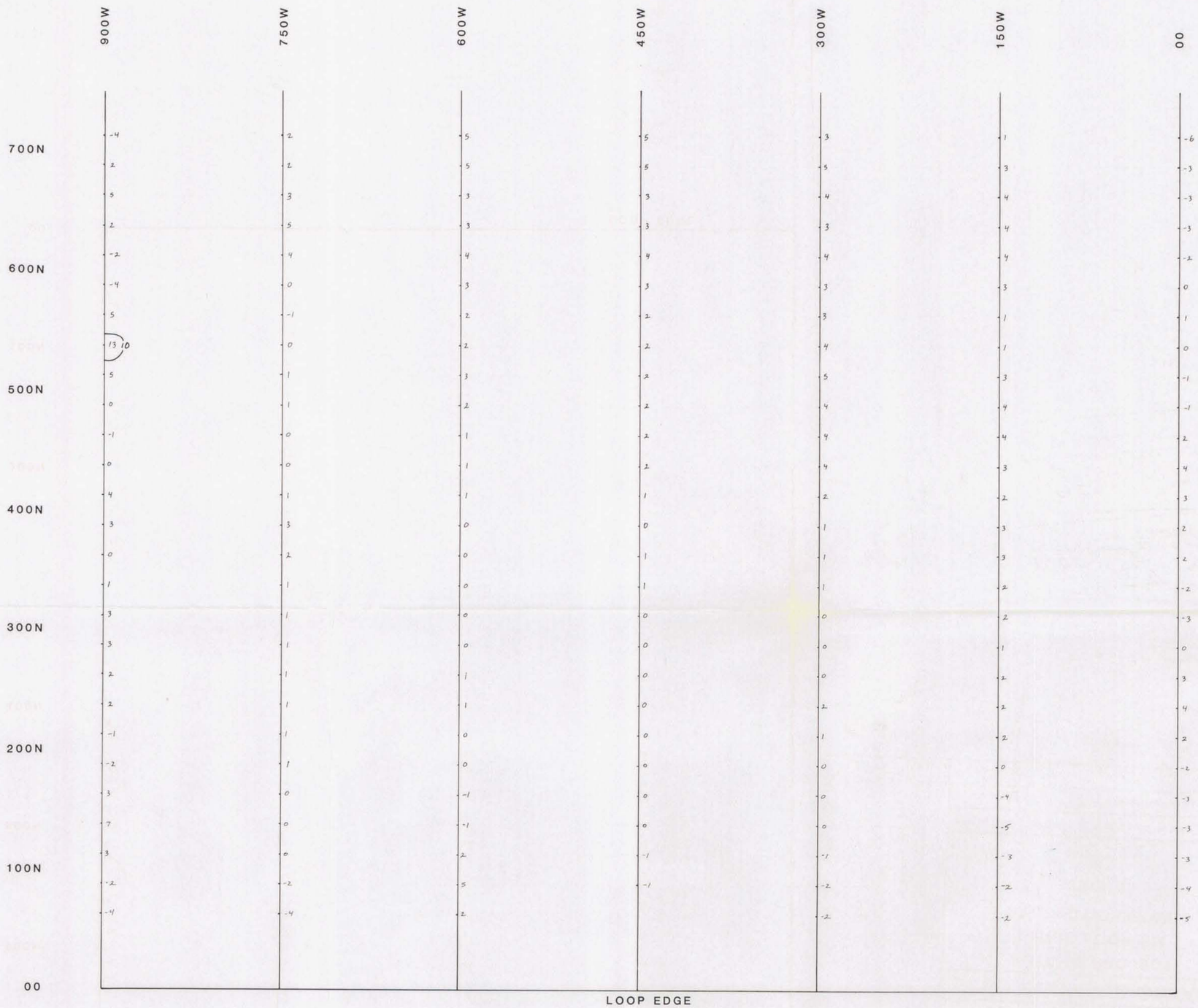
Project No. 2122	Mining Division Liard
N.T.S. 104 I	Drawn By S.L.
Date 07 Aug. 1985	Map No.



ESSO MINERALS CANADA

KUTCHO PROJECT
LARGE LOOP EM
IMPERIAL RIDGE ZONE
GRID 4

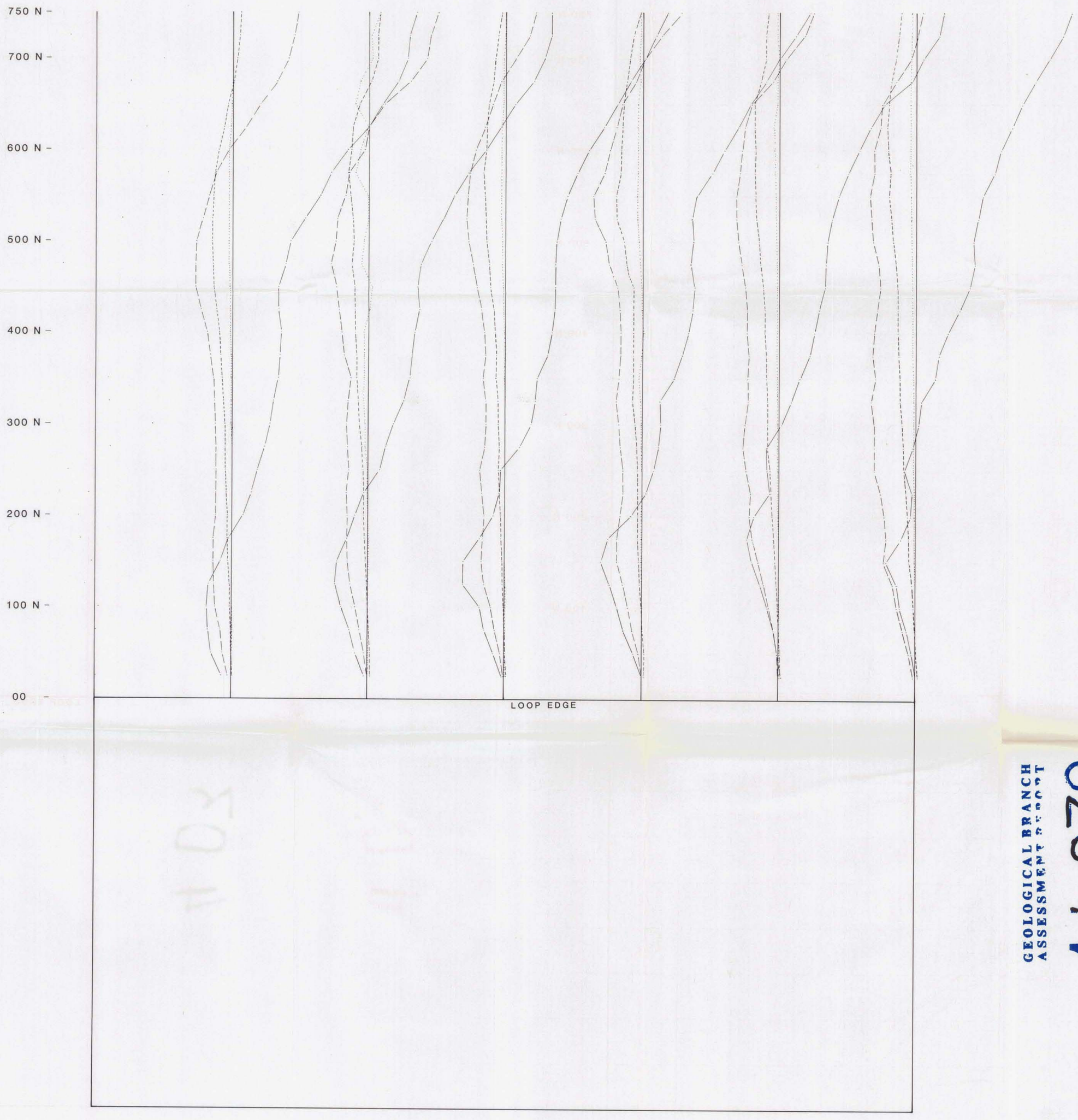
Project No.: MA22	Mining Division: Liard
N.T.S.: 104 I	Drawn By: S.L.
Date: August 1985	Map No.:

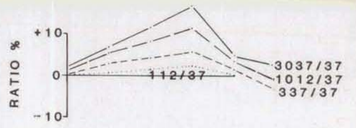


0 50 100m.

SCALE: 1:2500

ESSO MINERALS CANADA	
KUTCHO PROJECT LARGE LOOP EM 3037/37 FILTERED CONTOUR MAP GRID 8	
Project No. Ma22	Mining Division Liard
N.T.S. 104 I	Drawn By S.L.
Date 23 Sept. 1985	Map No.





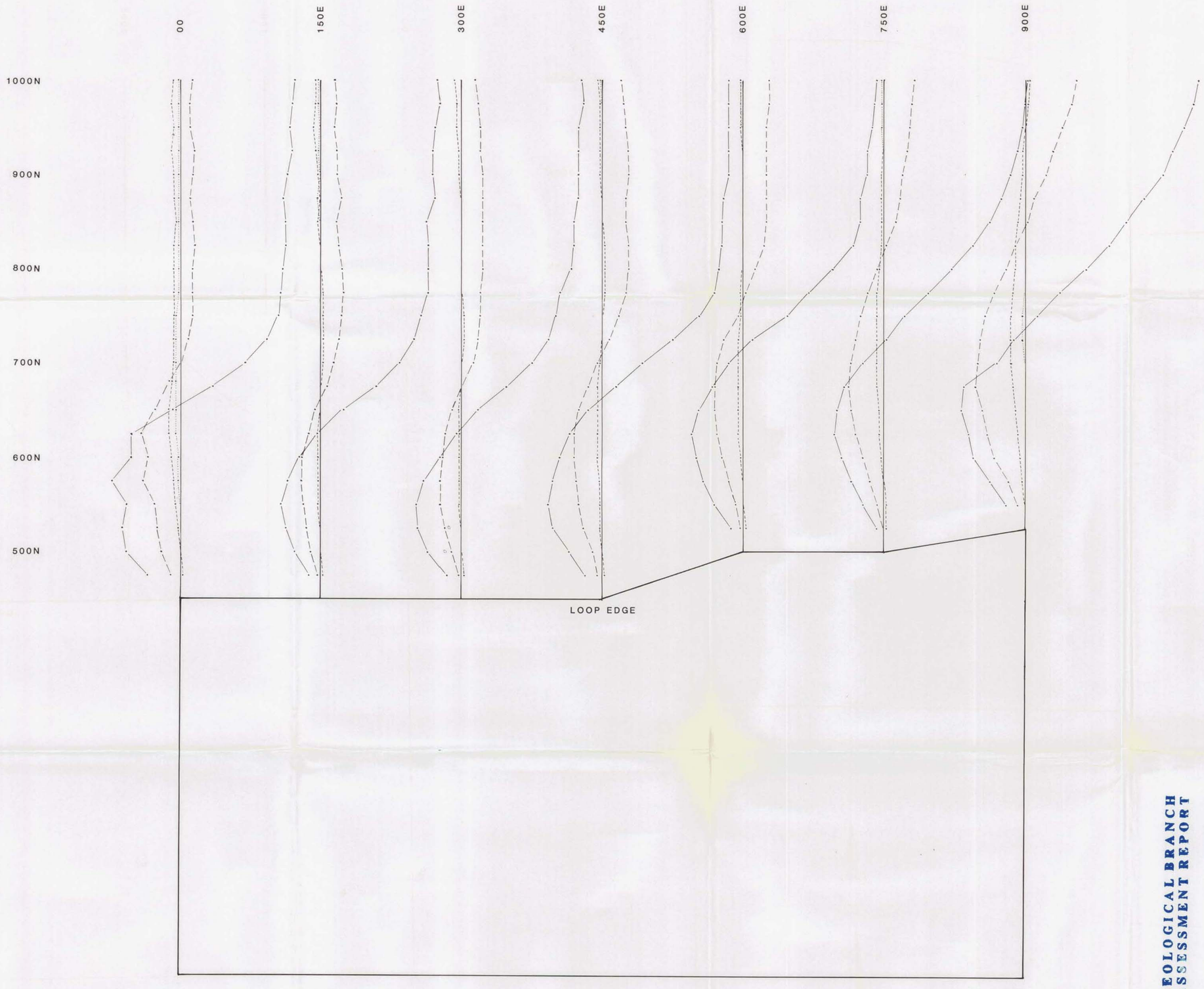
SCALE 1:2500

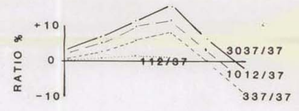
0 50 100 metres

ESSO MINERALS CANADA

KUTCHO PROJECT
LARGE LOOP EM
PRODUCTION ZONE
GRID 5

Project No.: MA22	Mining Division: Liard
N.T.S.: 104 I	Drawn By: K.S.
Date: August 1985	Map No.:





0 50 100m.

SCALE : 1 : 2500

GEOLOGICAL BRANCH
ASSESSMENT REPORT

14,030

ESSO MINERALS CANADA

KUTCHO PROJECT
LARGE LOOP EM
PRODUCTION ZONE
GRID 5 EXTENSION

Project No. 2122	Mining Division Liard
N.T.S. 104 I	Drawn By S.L.
Date 07 Aug. 1985	Map No.

900E
1050E
1200E
1350E
1500E
1650E
1800E

750N
700N
600N
500N
400N
300N
200N
100N
00

SEE GRID 5 FOR LINE 900 PLOT

LOOP EDGE

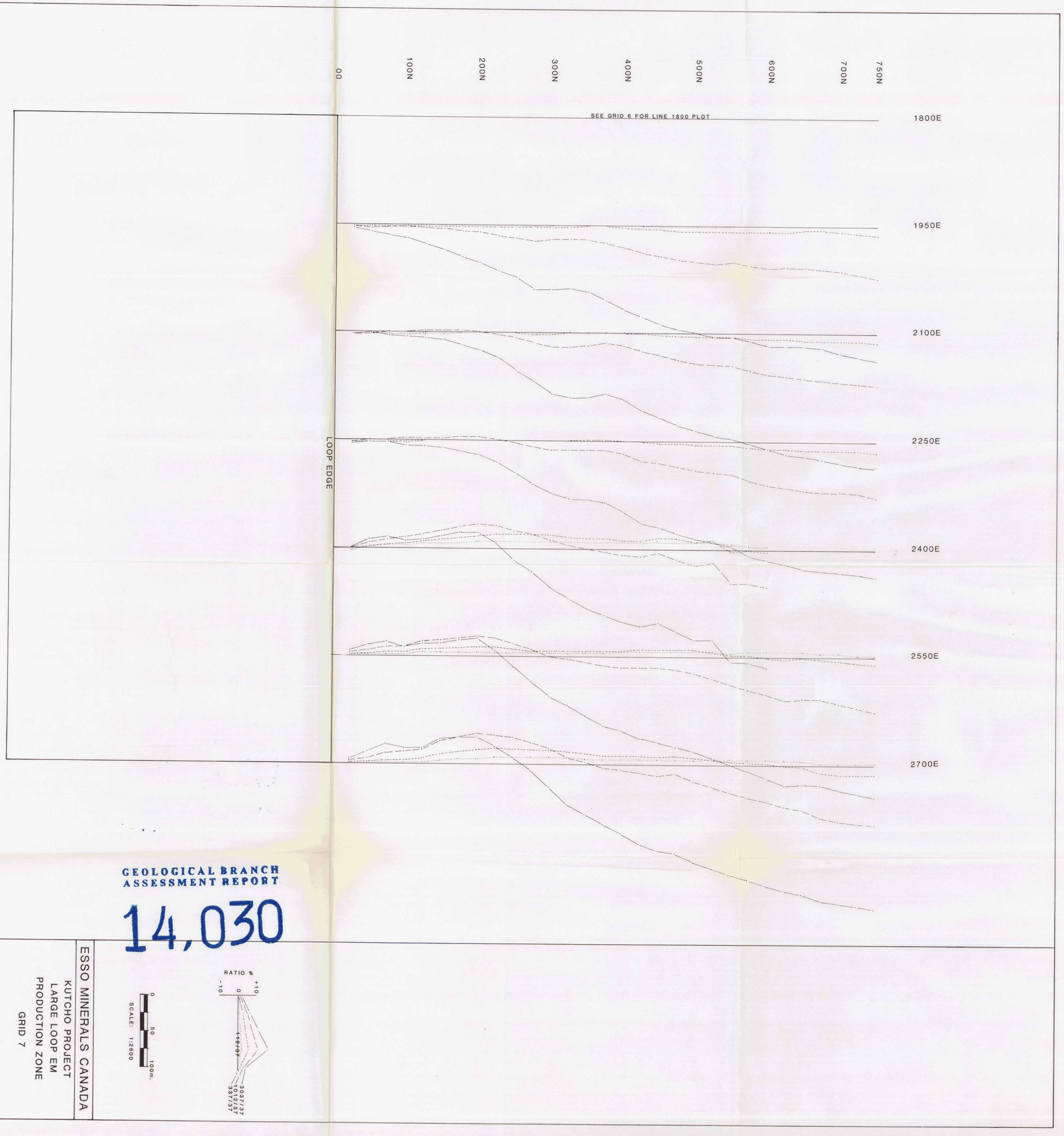
RATIO %
+10
0
-10
112/37
3037/37
1012/37
337/37

0 50 100m.
SCALE: 1:2500

ESSO MINERALS CANADA

KUTCHO PROJECT
LARGE LOOP EM
PRODUCTION ZONE
GRID 6

Project No. Ma22	Mining Division Liard
N.T.S. 104 I	Drawn By S.L.
Date 09 Sept. 1985	Map No.



GEOLOGICAL BRANCH
ASSESSMENT REPORT

14,030

RATIO %
-10 0 +10
112/37
3037/37
1012/37
337/37

0 50 100m.
SCALE: 1:2500

ESSO MINERALS CANADA

KUTCHO PROJECT
LARGE LOOP EM
PRODUCTION ZONE
GRID 7

Project No. Ma22	Mining Division Liard
N.T.S. 104 I	Drawn By S.L.
Date 10 Sept. 1985	Map No.

00 150 E 300 E 450 E 600 E 750 E 900 E

750 N
700 N
600 N
500 N
400 N
300 N
200 N
100 N
00

LOOP EDGE

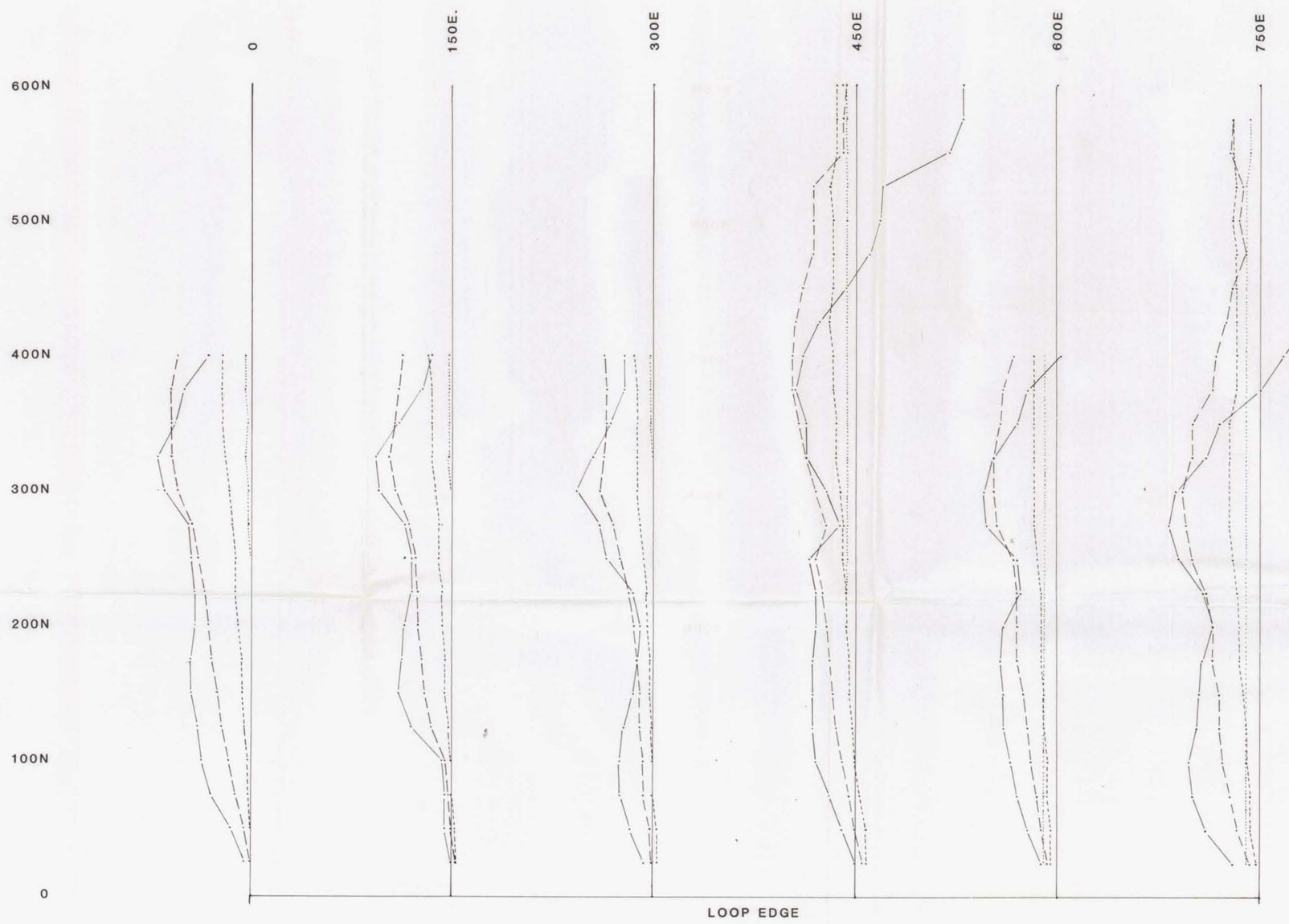
SCALE 1:2500

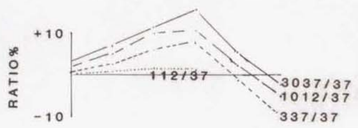
0 50 100

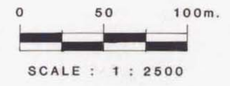
ESSO MINERALS CANADA

KUTCHO PROJECT
LARGE LOOP EM
IMPERIAL RIDGE ZONE
GRID 8

Project No.: MA22	Mining Division: Liard
N.T.S.: 104 I	Drawn By: K.S.
Date: August 1985	Map No.:







ESSO MINERALS CANADA

KUTCHO PROJECT

LARGE LOOP EM

P.S GRID

Project No. Ma22	Mining Division Liard
N.T.S. 104 I	Drawn By S.L.
Date 13 Nov. 1985	Map No.