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REPORT ON  
GROUND ELECTROMAGNETIC SURVEYS  
ON  
COAL LICENSE NO. 59 LAND

BIG SALMON MAP AREA, Y.T.  
105E - 15NW QUAD.  
61° 56' Lat. - 134° 52' Long.

F. CHOW

KERR ADDISON MINES LIMITED

AUGUST 11 - 17, 1977

This report has been examined; declared acceptable as Representation Work under Section 32 and Schedule B of the Canada Mining Regulations and valued <sup>part of</sup> in the amount of \$27,941.55

Chief: *[Signature]*

Date: Dec. 15, 1977.

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## INTRODUCTION

Kerr Addison Mines Limited was authorized to explore for coal within the lands bounded by the NW Quarter, NE Quarter and the SE Quarter of mineral claim staking sheet 105 E - 15. Coal exploration License Nos. 58, 59 and 60 were granted on November 9, 1976.

Geological mapping, prospecting and airborne electromagnetic plus magnetic surveys were proposed for the first year of the exploration programme.

One 2-man geological team commenced work in early June 1977, followed by an aero survey during the latter part of the month. The aero surveys were cancelled after three days of operation, due to malfunctioning of the magnetic recorder and then due to non-interpretable results of the electromagnetic data.

A combined Crone E.M. and Geonics E.M. survey was conducted during August 12 - 16, 1977 to test the immediate area of Jumpout Creek, where coal occurrences were located by this year's geological party. This survey was conducted to test the electromagnetic response of the coal-bearing formations and also to detect conglomerate - sandstone contacts where coal may occur as at Tantalus Butte near Carmacks, Y.T.

To minimize unproductive time, the geophysical survey party was located in Carmacks, Y.T. and ferried by Trans North Turbo helicopter each day.

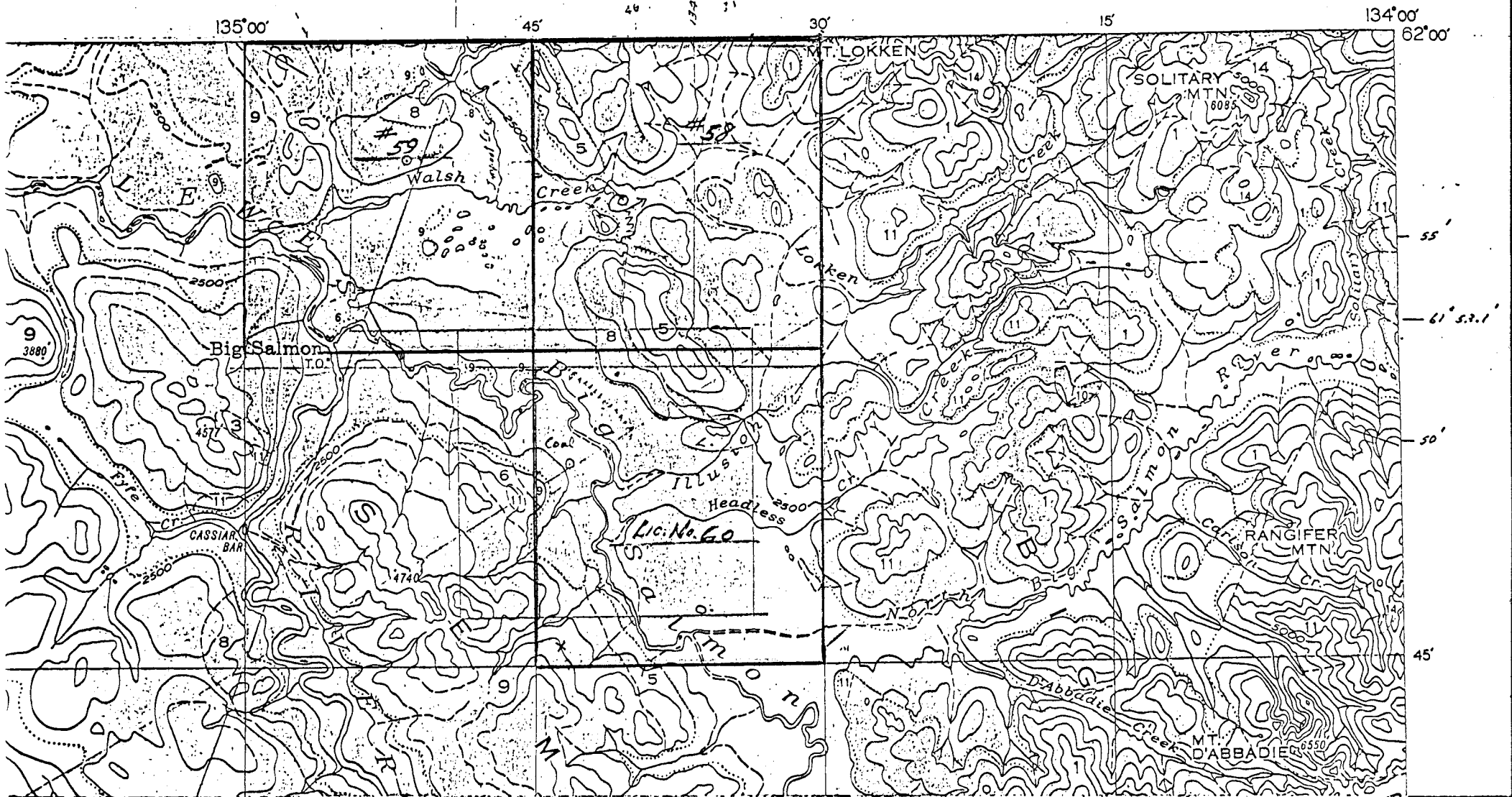
## SURVEY GRID

A central control line was established, bearing  $S41.5^{\circ}W/N41.5^{\circ}E$ , approximately perpendicular to the strike of the rocks and roughly along the SE side of Jumpout Creek where the coal occurrences were noted. It is located on the north-west corner of NTS sheet 105 E - 15W and is within Coal Exploration License No. 59. One line on each side of the control line, spaced 180 meters apart, was also surveyed. The lines were established by chain and compass, flagged by ribbon and marked every 30 meters. All lines were tied onto recognizable topographical features.

A base map with a scale of 1:12,500 (metric) was used in plotting the results.



Issued 1936



105 E NTS.

KERR ADDISON MINES LIMITED  
 BIG SALMON COAL PROJECT  
 1976-1977  
 LOCATION & PLAN OF PROPERTY  
 COAL EXPLORATION LICENCES  
 NOS. 58, 59 and 60  
 SCALE 1:125,000

Figure 2

## ELECTROMAGNETIC SURVEY

The Crone J.E.M. and Geonics E.M. 16 were both read on the same traverse. Readings were taken at 30-meter station intervals, the topography was noted and data all entered into the field book. A total of 7.5 line km. was completed.

### CRONE J.E.M. SURVEY

A Crone J.E.M. dual frequency unit was employed. It is manufactured by Crone Geophysics Ltd., Mississauga, Ontario. The instrument was read on the 3,600 cps. high frequency setting. Whenever a resultant reading is anomalous, that is numerically greater than  $\pm 4$  degrees, then a reading on the 1800 cps low frequency setting is taken.

In carrying out the survey the two operators traversed the same line, used similar E.M. units and kept a distance of 60 meters apart. At each station the chief operator first transmitted until the helper operator had oriented his coil and read a dip angle, and then their roles were reversed and the chief operator read a dip angle. The two dip angles read were recorded and the resultant obtained by adding the two readings was plotted on the station position of the mid-point between the two men.

The data is plotted on plan and section for a study of the contoured results and an analysis of the curves.

The electrically anomalous zones between 15E and 22E is outlined on the high frequency contour plan by the  $-8^{\circ}$  contour. The steepest dips obtained were in excess of  $-20^{\circ}$  and a good correspondence was obtained between high and low frequency readings.

The anomalous zone is interpreted to be two moderately strong conductors, flat, both dipping gently northeastward. Depth of burial is estimated to be near surface on the SW side to greater than 30 meters on the NE side. Such a conductor could result from carboniferous sediments such as the shaly coal beds found along Jumpout Creek.

The E.M. profiles do not show cross-overs or inflection points to indicate contacts between the conglomerate and sandstone rock formations. Most likely, the conglomerate beds are too thin in contrast to the sandstone units.

## RONKA E.M. 16 ELECTROMAGNETIC SURVEY

The VLF - EM receiver was manufactured by Geonics Ltd., Toronto, Ontario. The 18.6 KHz frequency signal, originating from the VLF station near Seattle, Washington, U.S.A., was utilized for the survey. This station gives a magnetic field approximately at right angles to the main strike of the geological structures of the area. When these magnetic fields meet conductive bodies in the ground, there will be secondary fields radiating from these bodies.

The instrument has two receiving coils: the signal coil with a normally vertical axis, and the reference coil with a horizontal axis. Each coil is tuned to the same primary signal. To obtain a reading the instrument is operated in the following manner:-

The direction of the primary field is first determined by holding the signal coil horizontal and orienting the instrument towards the transmitter station for minimum coupling. This is detected by a minimum audible signal in the loudspeaker.

The instrument is then held vertically with its reference coil in a direction at right angles to the transmitter location. The operator then rotates the instrument in the vertical plane until a minimum signal is registered. Holding the instrument steady in the minimum direction (tilt or angle), the "quadrature" knob is adjusted with the other hand to further minimize the sound. After finding the minimum signal strength on both adjustments, the inclinometer and quadrature is recorded. All topographical features and slope angles are also marked down.

During this field work, the E.M. 16 survey was conducted by one person on the same traverse as the J.E.M. survey.

The results are plotted on section and on plan when desirable, for interpretation. Results of this survey were not plotted on plan because the tilt angle readings were all low and likely inaccurate.


During the course of the survey, the in-phase (tilt angle) signals were noisy and too broad to accurately obtain the "null" point. A comparative test done by Sabre Electronics Ltd. of Vancouver, B.C. after the survey showed similar problems with the in-phase signals, a probable malfunctioning of the signal coil. Consequently, the E.M. 16 survey cannot be analysed.

In comparing the J.E.M. and E.M. 16 profiles, a slight similarity was noted in electromagnetic response. The only definite, superimposed anomaly from both surveys, is the one located on Line 2S between stations 9 + 60E to 11 + 10E. This anomaly is interpreted as a near surface, nearly vertical, moderate conductor. Such a conductor could result from a fault zone.

CONCLUSIONS AND RECOMMENDATIONS

The Crone J.E.M. is partially effective in picking up the coal formations, but indirectly by the conductivity of the associated carboniferous shales. Due to malfunction of the E.M. 16 instrument, no comparison can be made with the results obtained from the Carmacks coal survey. Also, no collaboration with the Crone E.M. results is possible.

It is recommended that the Crone J.E.M. instrument be used with discretion on a broad regional basis in the search for coal within carboniferous shale-sandstone formations. When a more definite geological cross-section is known, further assessment of both electromagnetic systems should be considered.



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F. CHOW

KERR ADDISON MINES LIMITED

Vancouver, B.C.

November 24, 1977

SURVEY PERSONNEL

F. Chow - #703, 1112 West Pender St., Vancouver, B.C.  
Chief Operator, Crone J.E.M. Survey,  
Chain & Compass Survey Operator, Ronka  
E.M. Survey.

Previous experience:

Mining Engineer and Geologist 1953 - 1964  
Exploration Engineer 1964 - 1977

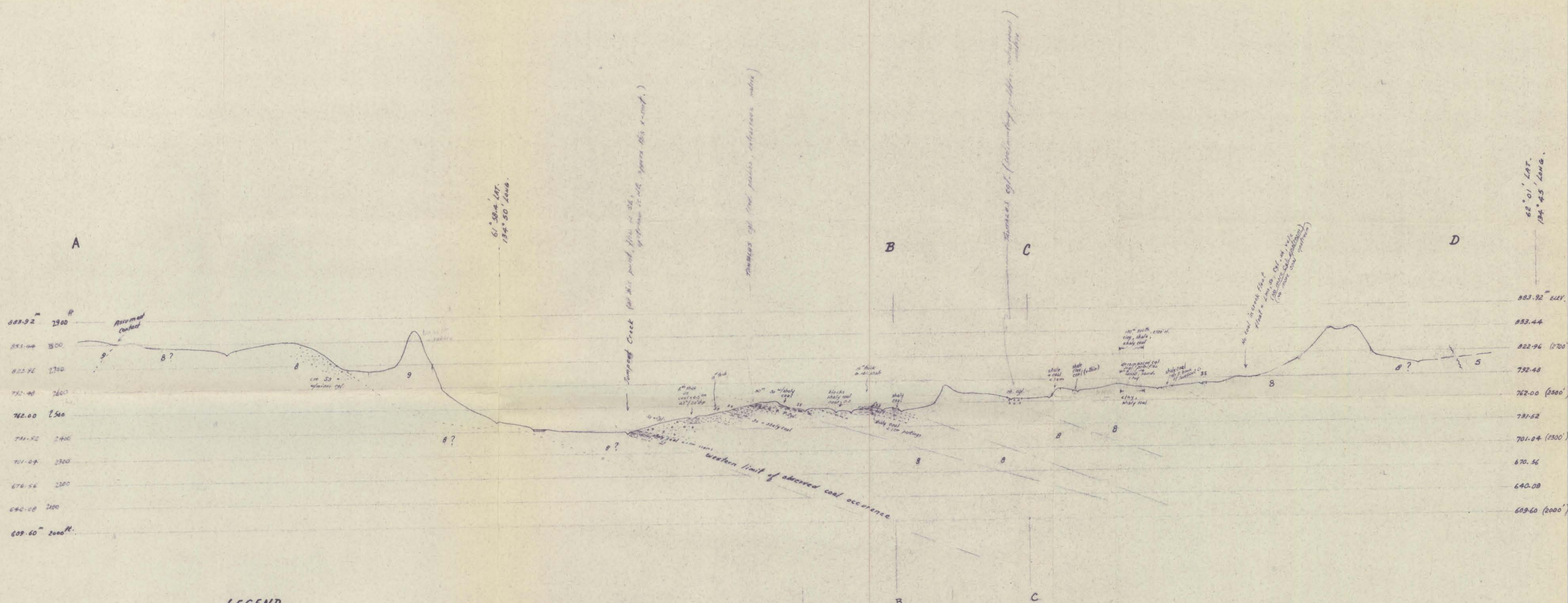
R. Mirko - 4790 Marine Drive, West Vancouver, B.C.  
Assistant Operator, J.E.M. Survey,  
Chain & Compass Survey.

No previous experience, high school student

SCHEDULE OF ACCOMPANYING MAPS

1. Location Map - Key Map
2. Location and Plan of Property
3. Plan showing Geological X-Section
4. Geological X-Section
5. Electromagnetic Survey - Line and Station Plan
6. Crone J.E.M. - High Frequency Contour Plan
7. Crone J.E.M. - Low Frequency Contour Plan
8. Crone J.E.M. - Profiles of Survey Data
9. E.M. 16 - Profiles of Survey Data





61° 58' 4" LAT.  
134° 50' LONG.

62° 01' LAT.  
134° 45' LONG.

**LEGEND**

- 5 Limestone, LEWIS RIVER SERIES
- 6 Conglomerate, sandstone, greywacke, argillite, coal seams; dacite, tuff, breccia. LABERGE SERIES
- 8 Conglomerate, sandstone, shale, coal seams. TANTALUS FORMATION
- 9 Andesite, basalt; lava, breccia, tuff. HUTSNI GROUP
- 7 Dacite, tuff, breccia, NORDENSKIÖLD Fm. (fm. incl. within unit 6)
- Sandstone
- Conglomerate
- Shale
- creek bed

CROWE J.E.M. RESPONSE

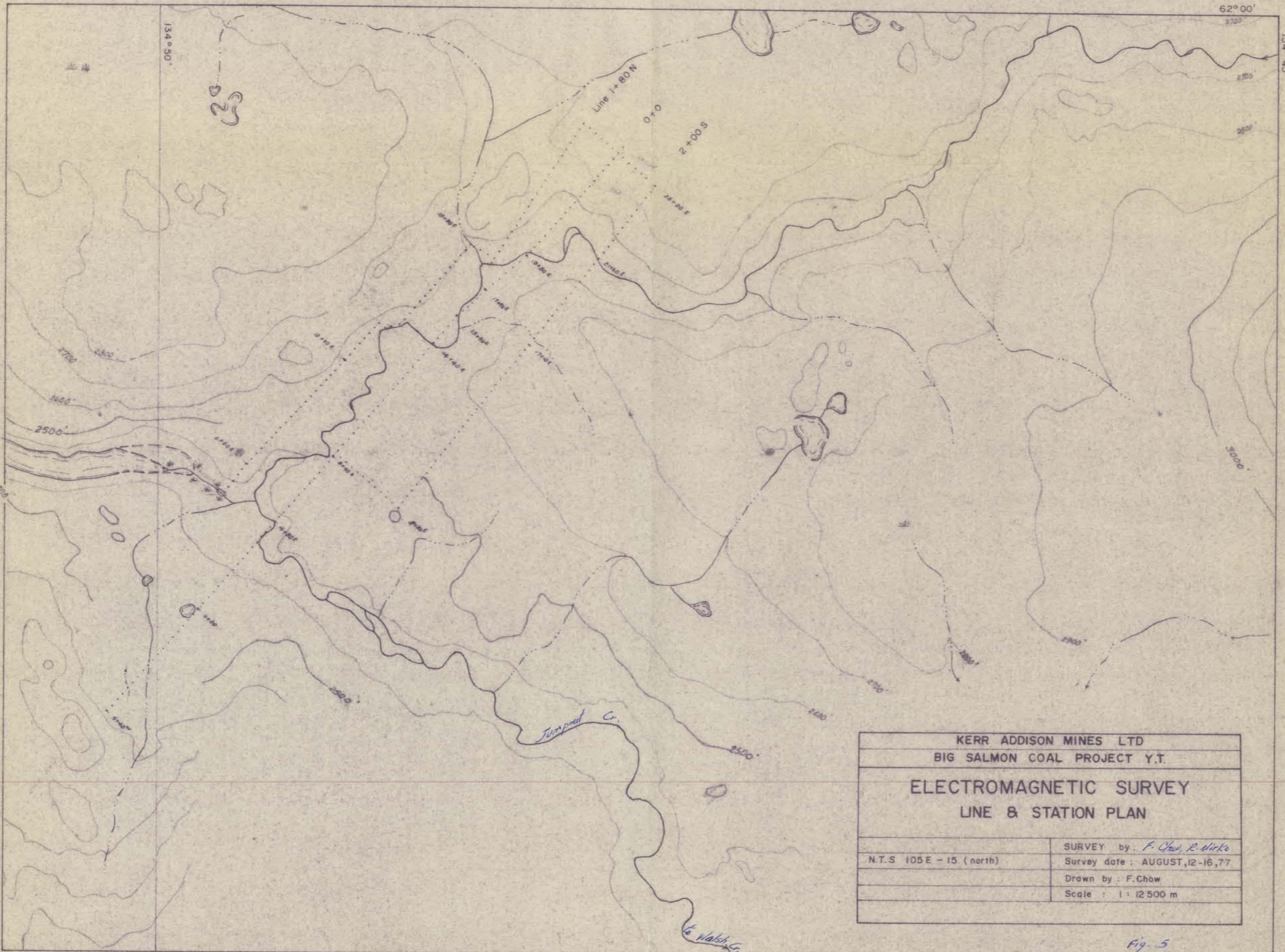
3600 ~	-12° to -35° readings
1800 ~	-4° to -12° readings
3600 ~	-4° to -35° readings

SECTION LOOKING NW (A-B) 41.5°  
 " " NE (B-C) 111.0°  
 " " NW (C-D) 58.5°

HERR ADDISON MINES LTD.  
**BIG SALMON COAL PROJECT**  
 BIG SALMON MAP AREA, Y.T.  
**GEOLOGICAL X-SECTION**

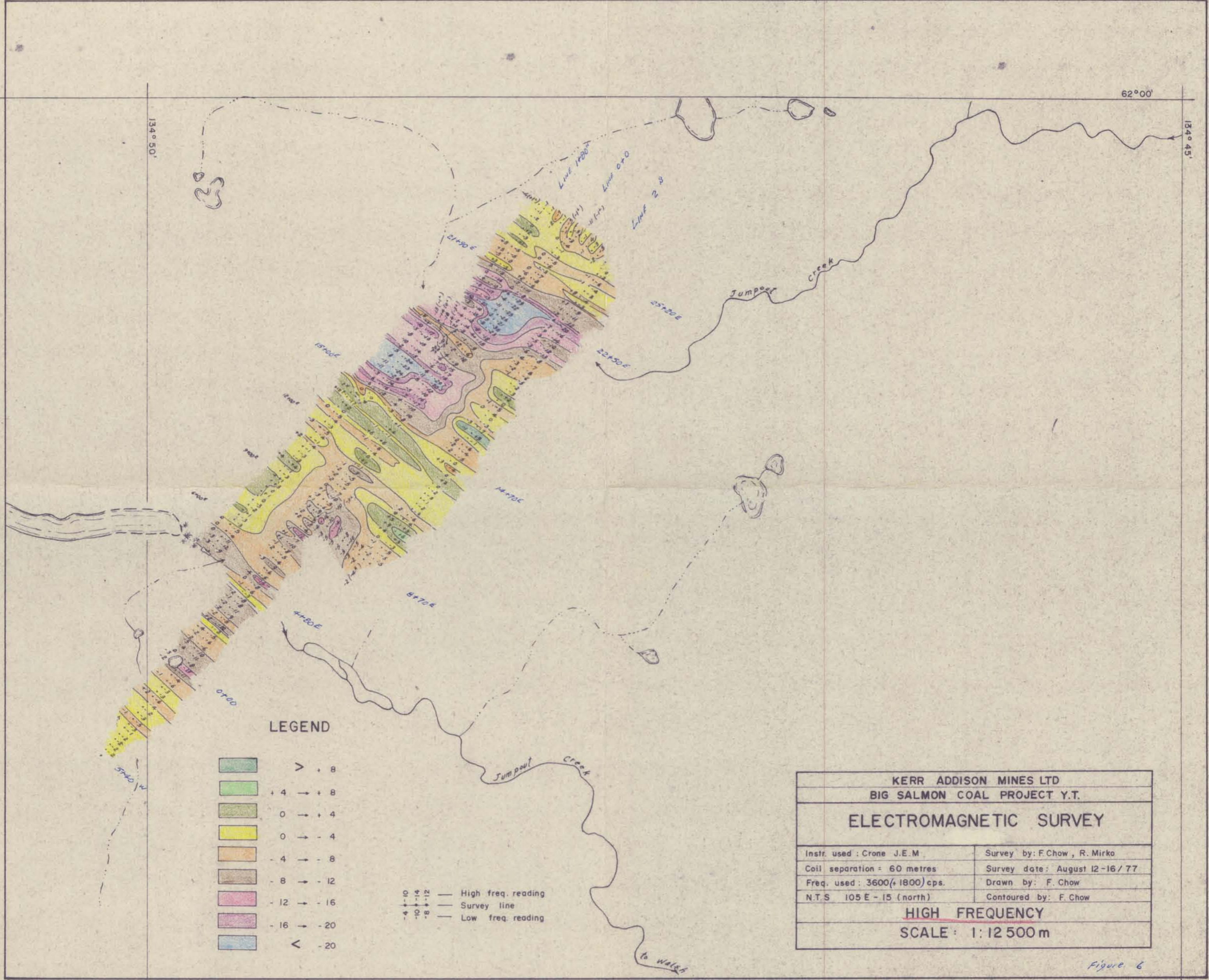
SCALE: Horiz. 1:12500 m  
 Vert. 1cm = 30-48m = 100ft  
 DRAWN BY: P.H. W.F.C.  
 DATE: Aug/77

NTS 105 E - 15 (north)  
 Geology by G. Noel, 1977  
 Interpretation by W.M.S. E.C.  
 Figure 4



KERR ADDISON MINES LTD	
BIG SALMON COAL PROJECT Y.T.	
ELECTROMAGNETIC SURVEY	
LINE & STATION PLAN	
N.T.S 105 E - 15 (north)	SURVEY by : <i>F. Chow, R. Mirko</i>
	Survey date : AUGUST, 12-16, 77
	Drawn by : F. Chow
	Scale : 1 : 12500 m

Fig. 5



**LEGEND**

	> + 8
	+ 4 → + 8
	0 → + 4
	0 → - 4
	- 4 → - 8
	- 8 → - 12
	- 12 → - 16
	- 16 → - 20
	< - 20

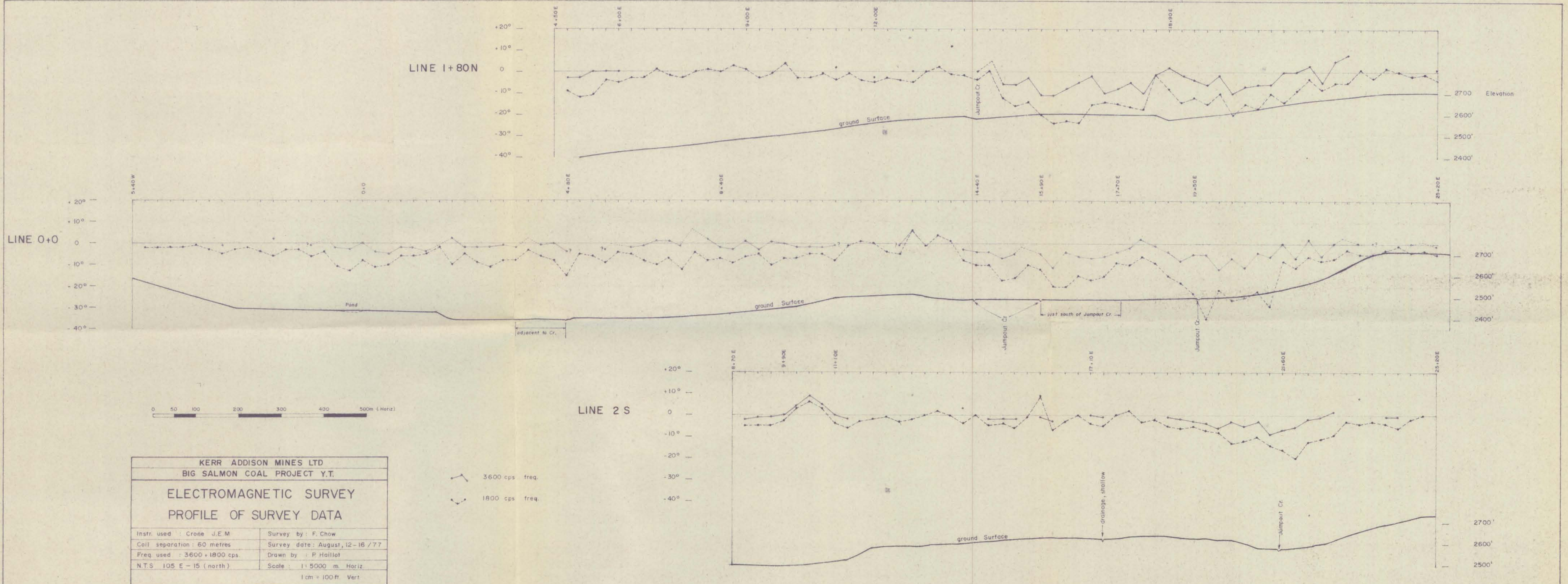
-4 -10  
 -10 -14  
 -8 -12

— High freq. reading  
 — Survey line  
 — Low freq. reading

<b>KERR ADDISON MINES LTD</b> <b>BIG SALMON COAL PROJECT Y.T.</b>	
<b>ELECTROMAGNETIC SURVEY</b>	
Instr. used : Crone J.E.M	Survey by: F.Chow , R. Mirko
Coil separation = 60 metres	Survey date: August 12-16 / 77
Freq. used : 3600(+1800) cps.	Drawn by: F. Chow
N.T.S 105 E - 15 (north)	Contoured by: F. Chow
<b>HIGH FREQUENCY</b> <b>SCALE : 1 : 12 500 m</b>	

Figure 6





LINE 1+80N

LINE 0+0

LINE 2 S



KERR ADDISON MINES LTD	
BIG SALMON COAL PROJECT Y.T.	
ELECTROMAGNETIC SURVEY	
PROFILE OF SURVEY DATA	
Instr. used : Crane J.E.M.	Survey by : F. Chow
Coil separation : 60 metres	Survey date : August, 12-16 /77
Freq. used : 3600 + 1800 cps.	Drawn by : P. Halliot
N.T.S. 105 E - 15 (north)	Scale : 1 : 5000 m Horiz.
	1 cm = 100 ft. Vert.

Figure 8

Elevation

2700'

2600'

2500'

2400'

2700'

2600'

2500'

