



GEOPHYSICAL REPORT  
NORTHSTAR MINES LTD.

On A

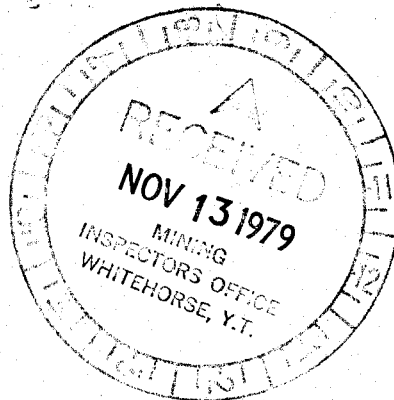
HORIZONTAL LOOP ELECTROMAGNETOMETER SURVEY

Leah mineral claims, Ortell Lake, Mayo M. D., Yukon  
Lat.  $64^{\circ}06'N$  Long.  $133^{\circ}W$  N.T.S. 106 C/2,3

AUTHOR: Glen E. White, B.Sc., P.Eng., Geophysicist

DATE OF WORK: August 14-25, 1979 090520

DATE OF REPORT; October 17, 1979



090520

Glen E. White

GEOPHYSICAL CONSULTING & SERVICES LTD.

This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner to be considered as representation work in the amount of \$ 11,700.00

J. A. Morin

Resident Geologist or  
Resident Mining Engineer

Considered as representation work under  
Section 53 (4) Yukon Quartz Mining Act.

B. F. Baxter  
Supervising Mining Recorder

Commissioner of Yukon Territory

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Figure 1 - Location and Claims Map

Figure 2 - Horizontal Loop Profiles

## INTRODUCTION

This report describes a reconnaissance horizontal loop electromagnetometer survey which was conducted over a number of strong zinc, silver and lead geochemical anomalies. The project was conducted on behalf of Northair Mines Ltd. during the period August 14-25, 1979 by Glen E. White Geophysical Consulting & Services Ltd.

## PROPERTY

The property surveyed consists approximately of Leah 93-112 and 165, 167, 169, 171, 173, 175, 175A, 179 and 181. The only posts noted during the survey were along the claim line between claims Leah 99 - 106. These claims are held under a joint venture agreement between Suneva Resources (previously Bow River Resources), Hecate Gold Corp., Newhawk Mines Ltd. (previously Highhawk Mines Ltd.), and ERL Resources Ltd. (previously Envoy Resources Ltd.).

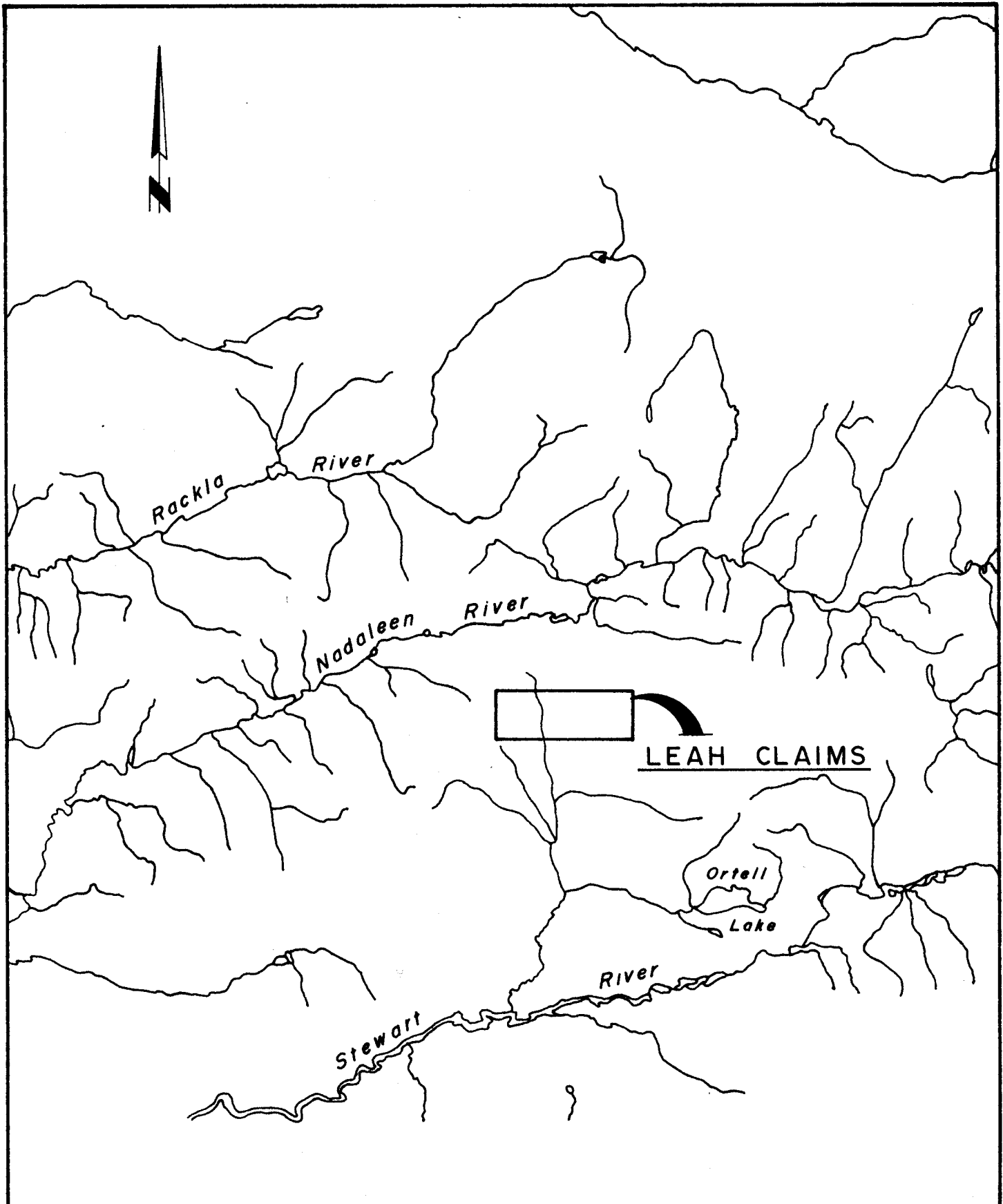
## LOCATION AND ACCESS

The property is situated between the Nadaleen and Stewart Rivers near Ortell Lake some 160 km east of Mayo Yukon, Mayo M. D. Latitude  $64^{\circ}06'N$ , Longitude  $133^{\circ}W$ , N.T.S. 106 C/2, 3.

The area is accessible by fixed wing from Mayo to Ortell Lake where base camp materials are stored. Helicopter support is then required to establish a camp on the survey area some 10 km to the northwest.

## GENERAL GEOLOGY

The general geochemical-geological data for the property is discussed in a report by J.W. Macleod, P. Eng. dated October 11, 1977. The regional geology is available from the G.S.C. open file 205.



NORTHAIR MINES LTD.  
— LEAH CLAIMS —  
LOCATION AND CLAIM MAP

*Geo. E. White*  
*geophysical consulting*  
*3*  
*1000 1st*

Scale: 1" = 4 Miles

OCT. 1979  
FIG. 1

Mr. Macleod reports that the Leah claims were positioned to cover a portion of the hanging wall of a major thrust fault which places a Hydroyanian grit unit over Ordovician shales and carbonates. The grit unit contains a dolomite horizon which hosts the known mineral occurrences on the McIntyre Mines ground to the west of the Leah group. Mississippian type lead-zinc mineral zones have been enriched by a second period evidenced by steel galena, minor grey copper, accompanied by significant silver values.

### SURVEY SPECIFICATIONS

#### Survey Grid

The grid used for this survey consisted of the reconnaissance geochemical grid with lines spaced at 200 m intervals. The lines were in a state of disrepair and were re-flagged and numbered. Approximately 24 km of line was re-flagged and surveyed.

#### Electromagnetometer Survey

The MAX-MIN horizontal loop system was used for this survey. The system was used in the MAX mode where the transmitter coil plane and receiver coil plane are horizontal. In-phase and quadrature voltage measurements induced in the receiver relative to like quantities induced in a reference coil. The reference voltage and the receiver voltage are compared in a bridge or ratiometer circuit and the output is calibrated to read in percent of normal field i.e. no conductors present.

## DISCUSSION OF RESULTS

Figure 2 outlines the area of anomalous zinc and lead geochemical anomalies with respect to the interpreted horizontal loop conductor trends. The Max-Min horizontal loop survey was completed with a separation of 100 m to try and limit topography and separation problems due to the uncut lines and difficult terrain, particularly in the northwest quadrant of the survey area.

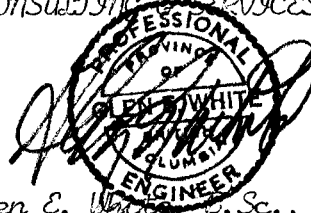
In general, the responses obtained show broad changes due to lithology and conductive surficial material in the valley bottom. A number of strong conductor trends were detected which correlate from line to line. The 100 m separation shows some of these as wide responses which would suggest conductive materials in a conductive lithology such as a graphite-bearing shale or argillite etc. However, a number of the trends do show good correlation to the anomalous geochemical areas such as the response between 5N - 6N on line 56E to 62E.

The northwest corner of the survey area between lines 28E and 38E may possibly have two parallel conductors. The general electromagnetic responses indicate an electromagnetic feature extending E-W across the survey area along 5N. This feature is likely a major fault or lithologic unit.

CONCLUSION AND RECOMMENDATION

A Max-Min horizontal loop survey was conducted over a portion of the Leah claims, Mayo M. D. on behalf of Northair Mines Ltd. The survey was conducted on a reconnaissance basis due to the uncut wide-spaced lines and difficult terrain. However, a number of interesting electromagnetic responses were obtained which would appear to correlate with known strong geochemical zinc-lead anomalies. Thus it is recommended that these electromagnetic conductor trends be covered by a well-cut survey grid and detailed with either the Max-Min or vector pulse electromagnetic methods.

Respectfully submitted,  
 GLEN E. WHITE GEOPHYSICAL  
 CONSULTING & SERVICES LTD.



Glen E. White, B.Sc., P. Eng.  
 Consulting Geophysicist

COST BREAKDOWN

<u>Personnel</u>	<u>Dates</u>	<u>Wages</u>	<u>Total</u>
B. Booth.....	Aug. 14-25/79.....	\$150/day.....	\$2400.00
J. Miller.....	"...".....	135/day.....	2160.00
J. Owens.....	"...".....	135/day.....	2160.00

Note: Dates 15-23 x 1.5 man days, therefore  
total 48 man days.

Meals and accomodations and travel expenses.....	1440.00
Instrument Lease.....	1280.00
Airfare.....	1236.00
Airfreight.....	238.00
Interpretation, drafting and reports.....	850.00
Total.....	<u>\$11,764.00</u>

STATEMENT OF QUALIFICATIONS

NAME: WHITE, Glen E., P. Eng.

PROFESSION: Geophysicist

EDUCATION: B.Sc. Geophysics - Geology  
University of British Columbia

PROFESSIONAL ASSOCIATIONS: Registered Professional Engineer,  
Province of British Columbia

Associate member of Society of Exploration Geophysicists.

Past President of B. C. Society of Mining Geophysicists.

EXPERIENCE: Pre-Graduate experience in Geology - Geochemistry - Geophysics with Anaconda American Brass.

Two years Mining Geophysicist with Sulmac Exploration Ltd. and Airborne Geophysics with Spartan Air Services Ltd.

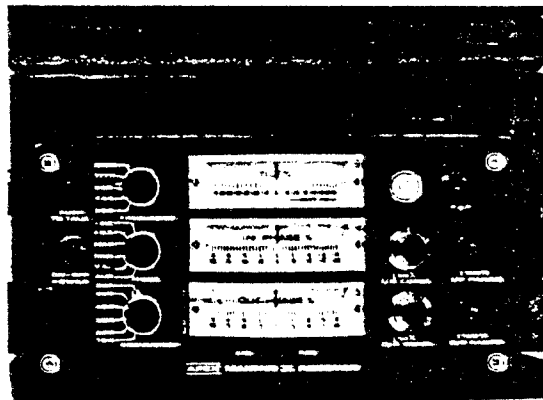
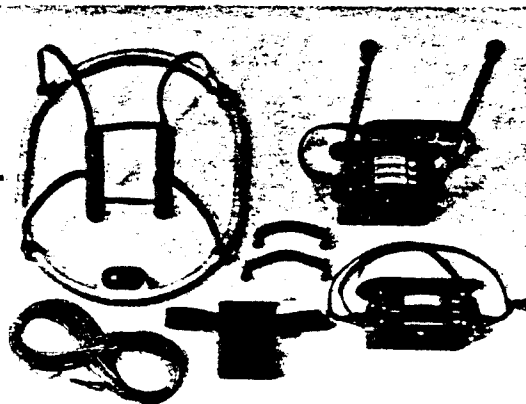
One year Mining Geophysicist and Technical Sales Manager in the Pacific north-west for W. P. McGill and Associates.

Two years Mining Geophysicist and supervisor Airborne and Ground Geophysical Divisions with Geo-X Surveys Ltd.

Two years Chief Geophysicist Tri-Con Exploration Surveys Ltd.

Eight years Consulting Geophysicist.

Active experience in all Geologic provinces of Canada.



### SPECIFICATIONS :

<b>Frequencies:</b>	222, 444, 888, 1777 and 3555 Hz.	<b>Repeatability:</b>	±0.25% to ±1% normally, depending on conditions, frequencies and coil separation used.
<b>Modes of Operation:</b>	<p><b>MAX:</b> Transmitter coil plane and receiver coil plane horizontal (Max-coupled; Horizontal-loop mode). Used with reference cable.</p> <p><b>MIN:</b> Transmitter coil plane horizontal and receiver coil plane vertical (Min-coupled mode). Used with reference cable.</p> <p><b>V.L.:</b> Transmitter coil plane vertical and receiver coil plane horizontal (Vertical-loop mode). Used without reference cable, in parallel lines.</p>	<b>Transmitter Output:</b>	<ul style="list-style-type: none"> <li>- 222Hz : 220 Acm<sup>2</sup></li> <li>- 444Hz : 200 Acm<sup>2</sup></li> <li>- 888Hz : 120 Acm<sup>2</sup></li> <li>- 1777Hz : 60 Acm<sup>2</sup></li> <li>- 3555Hz : 30 Acm<sup>2</sup></li> </ul>
<b>Coil Separations:</b>	<p>25, 50, 100, 150, 200 &amp; 250m (MMID) or 100, 200, 300, 400, 600 and 800 ft. (MMIFP).</p> <p>Coil separations in VL mode not restricted to fixed values.</p>	<b>Receiver Batteries:</b>	9V trans. radio type batteries (4). Life: approx. 35 hrs. continuous duty (alkaline, 0.5 Ah), less in cold weather.
<b>Parameters Read:</b>	<ul style="list-style-type: none"> <li>- In-Phase and Quadrature components of the secondary field in MAX and MIN modes.</li> <li>- Tilt-angle of the total field in VL mode.</li> </ul>	<b>Transmitter Batteries:</b>	12V 6Ah Gel-type rechargeable battery. (Charger supplied).
<b>Readouts:</b>	<ul style="list-style-type: none"> <li>- Automatic, direct readout on 90mm (3.5") edgewise meters in MAX and MIN modes. No nulling or compensation necessary.</li> <li>- Tilt angle and null in 90mm edgewise meters in VL mode.</li> </ul>	<b>Reference Cable:</b>	Light weight 2-conductor teflon cable for minimum friction. Unshielded. All reference cables optional at extra cost. Please specify.
<b>Scale Ranges:</b>	<p>In-Phase: ±20%, ±100% by push-button switch.</p> <p>Quadrature: ±20%, ±100% by push-button switch.</p> <p>Tilt: ±75% slope.</p> <p>Null (VL): Sensitivity adjustable by separation switch.</p>	<b>Voice Link:</b>	Built-in intercom system for voice communication between receiver and transmitter operators in MAX and MIN modes, via reference cable.
<b>Readability:</b>	In-Phase and Quadrature: 0.25% to 0.5% ; Tilt: 1% .	<b>Indicator Lights:</b>	Built-in signal and reference warning lights to indicate erroneous readings.
		<b>Temperature Range:</b>	-40°C to +60°C (-40°F to +140°F).
		<b>Receiver Weight:</b>	6kg (13 lbs.)
		<b>Transmitter Weight:</b>	13kg (29 lbs.)
		<b>Shipping Weight:</b>	Typically 60kg (135 lbs.), depending on quantities of reference cable and batteries included. Shipped in two field/shipping cases.

Specifications subject to change without notification.

## APEX PARAMETRICS LIMITED

200 STEELCASE RD. E., MARKHAM, ONT., CANADA, L3R 1G2

Phone: (416) 495-1812

Cables: APEXPARA TORONTO

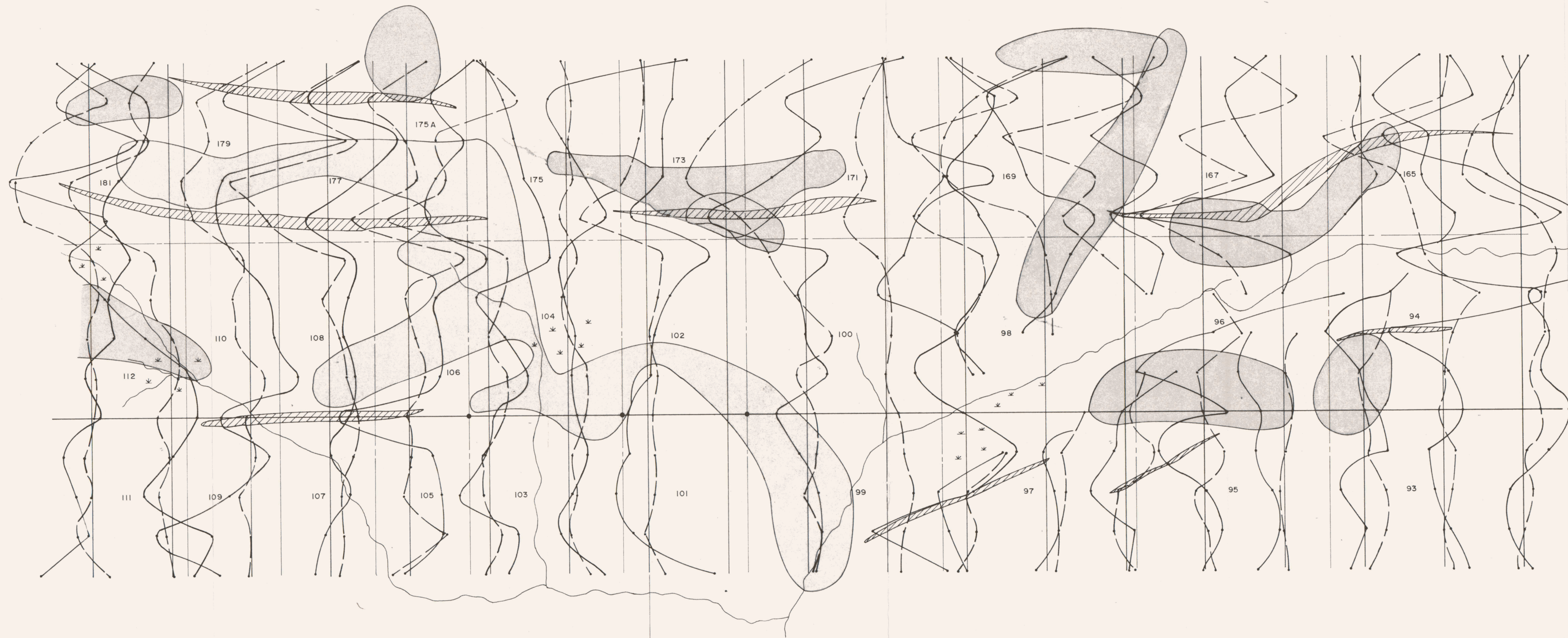
Telex: 06-966775 APEXPARA MKHM

*Glen C. White*

GEOPHYSICAL CONSULTING & SERVICES LTD.

28E 30E 32E 34E 36E 38E 40E 42E 44E 46E 48E 50E 52E 54E 56E 58E 60E 62E 64E

8+00N  
6+00N  
4+00N  
2+00N  
0+00—BASE LINE  
2+00S  
4+00S

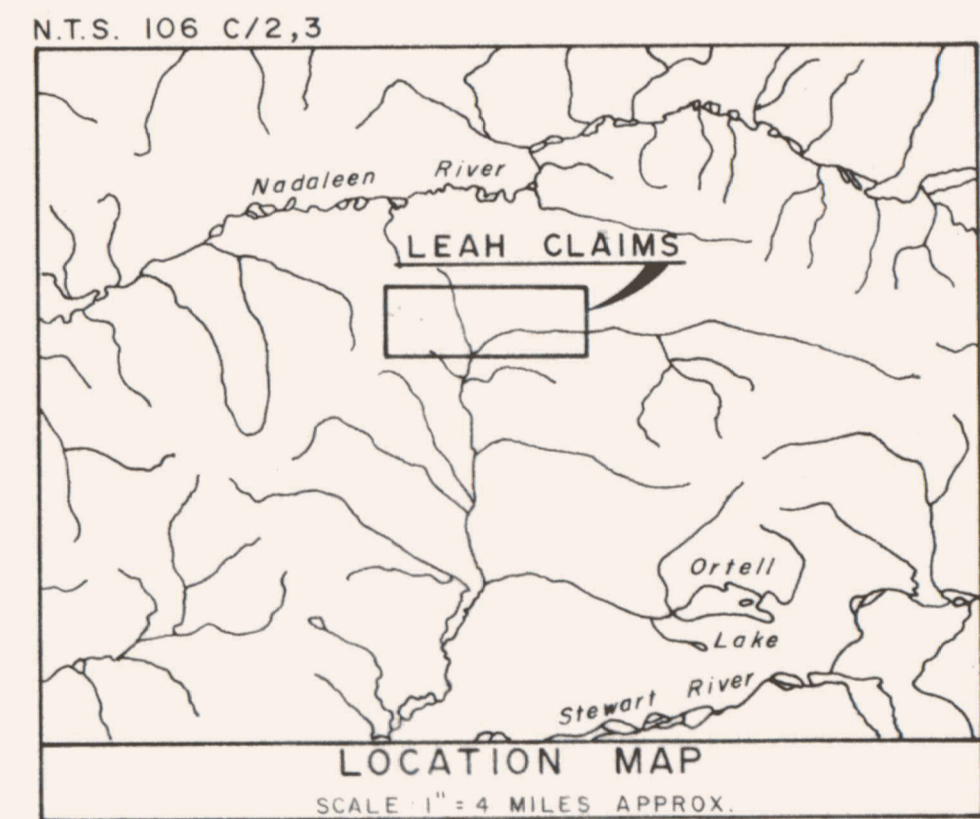


-20 -10 0 10 20  
Percent

LEGEND

- Out Phase
- In Phase
- Zinc & Lead Geo-Chem Anomaly
- ▨ Inferred Conductor

INSTRUMENT: APEX MAX-MIN. II  
HORIZONTAL LOOP



100 50 0 100 200 300  
Meters

<b>NORTHAIR MINES LTD.</b>	
<b>LEAH CLAIMS</b>	
MAYO MINING DIVISION - YUKON TERRITORY	
<b>MAX-MIN.</b>	
<b>ELECTROMAGNETOMETER SURVEY</b>	
— In Phase/Out Phase Profiles —	
<i>Glen E. White</i> geophysical consulting & services ltd.	INTERPRETED BY: G.E.W. DRAWN BY: T.M. CHECKED BY: DATE: OCT 1979 FIG. No.: 2

To Accompany Geophysical Report on  
THE LEAH CLAIMS  
Date *24.10.79*  
By GLEN E. WHITE - *G.E.W.* - GEOPHYSICIST