ENERGEX MINERALS LTD.

TOODOGGONE PROJECT

VOLUME 6

APPENDIX 'F'

GEOPHYSICAL REPORT BY
WHITE GEOPHYSICAL INC.
1986
ON THE AL PROPERTY

ENERGEX MINERALS LTD.

GEOPHYSICAL REPORT VOLUME 1

ON A

MULTIPOLE INDUCED POLARIZATION SURVEY,

PULSE ELCTROMAGNETOMETER TEST SURVEY,

EM-31 AND EM-16R TEST SURVEY,

PROTON PRECESSION MAGNETOMETER TEST SURVEY,

AND SELF POTENTIAL SURVEY,

ON THE

AL PROPERTY

OMINECA MINING DIVISION

LATITUDE: 57°28"N LONGITUDE: 129°27'W

NTS 92E/6

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DATE OF WORK: June 24 - July 24,1986

DATE OF REPORT: December 20,1986

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ILLUSTRATIONS

1.1 INTRODUCTION

A series of geophysical test surveys were undertaken by White Geophysical Inc. on the Al Property Thesis III Zone during July of 1986. The objective of these tests was to determine the utility of each of the techniques in detecting and delineating the geoelectric properties associated with the epithermal precious metal deposits. The multipole induced polarization technique proved useful in this regard, and more extensive surveys in the Thesis III Zone area, as well as the Thesis II, Bonanza and BV zone areas were carried out.

1.2 PROPERTY

The Toodoggone properties of Energex comprise 54 contiguous modified grid mineral claims for a total of 565 claim units and a single 10-unit, modified grid mineral claim, located approximately ten miles southeast of the main block of claims. Approximate area covered by the claims is 36,280 acres (14,675 hectares). The claims are located in the Omineca and Liard Mining Divisions.

The Al property with which this report is concerned, consists of 16 contiguous modified grid claims comprising 298 units and 6 fractions as follows:

Claim Name	Record #	Record Date	Mining Div.	# of Units	Current Group	Expiry Date
Al 1	789	12Jun79	Liard	20	Hump 84	1996
Al 2	790	12Jun79	Liard	20	Bull	1997
Al 3	791	12Jun79	Liard	20	Hump 84	1996
Al 4	792	12Jun79	Liard	20	Hyuk 84	1996
Al 5	1439	18Jul80	Liard	10	Hyuk 84	1996
Al 6	1440	18Jul80	Liard	10	Hyuk 84	1996
Al 7	1871	21Apr81	Liard	16	Hyuk 84	1996

Claim Name	Record #	Record Date	Mining Div.	# of Units	Current Group	Expiry Date
Al 8	1872	21Apr81	Liard	16	Hump84	1996
Bert	2012	13Aug81	Liard	20	Hump84	1996
Ernie	2011	13Aug81	Liard	20	Hump84	1996
Bull	2010	13Aug81	Liard	20	Bull	1996
Hyuk 1 (fr)	3026	11Jul83	Liard	1	Hyuk84	1996
Hyuk 2 (fr)	3027	11Jul83	Liard	1	Hyuk84	1996
Hyuk 3 (fr)	3028	11Jul83	Liard	1	Hyuk84	1996
JO (fr)	4272	08Sep81	Omineca	1	Bull	1996
RJ (fr)	4273	08Sep81	Omineca	1	Bull	1996
Winkle	4099	13Aug81	Omineca	20	Sesame 82	1991
Chute	4100	13Aug81	Omineca	18	Bull	1991
Surprise	4098	13Aug81	Omineca	20	A/L 82	1987
Gerome	4097	13Aug81	Omineca	15	A/L 82	1987
Wankle	4095	13Aug81	Omineca	3	A/L 82	1986
Tinkle (fr)	4093	13Aug81	Omineca	1	A/L 82	1987

1.3 LOCATION AND ACCESS

The Toodoggone River area is situated approximately 300 kilometres north of Smithers, British Columbia. It lies on the east margin of the Spatsizi Plateau, an open, gently rolling upland surface dissected by wide valleys. The Toodoggone area proper features more rugged relief, broken by broad alluvium-filled valleys. Steep-walled cirques, products of alpine glaciation, occur on north-facing slopes, while southerly slopes are more gentle and rounded. Elevations range from 1200 meters to 1900 meters above sea level.

Access is by air to a 1,600 meter gravel airstrip on the Sturdee River. A major mining company, backed by a Provincial Government loan, is currently considering

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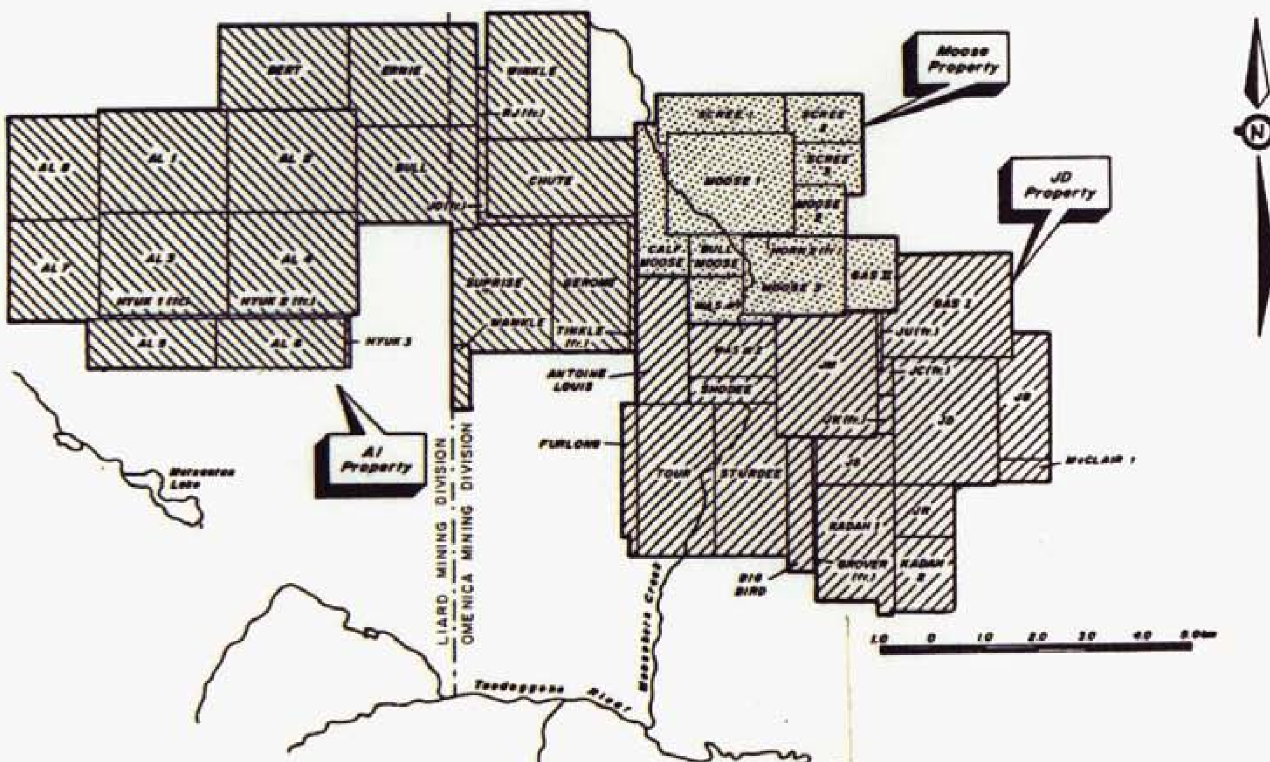


ENERGEX MINERALS LTD.
—AL, MOOSE & JD PROPERTIES—
LOCATION AND CLAIMS MAP

WHITE GEOPHYSICAL INC.

FIGURE 1

extending the Omineca Resource Road into the area from its present terminus at Moose Valley, 60 kilometers to the southwest. Completion of this road would provide a more economic mode of transport to and from the Toodoggone area, which is geographically one of the most isolated regions in the province.

The Al property covers a gently rolling, deeply dissected upland surface, which extends east from Albert's Hump, a prominent rounded peak, to Tuff Peak, and south from Tuff Peak to Metsantan Mountain. The upland area is bounded by the valleys of Metsantan, Moyez/Abesti and Moosehorn Creeks, and is drained by Antoine Louis Creek and a southwest flowing tributary of Metsantan Creek.

1.4 HISTORY AND PREVIOUS WORK

The history of recent exploration on the present claims is summarized in a report supplied by Energex as follows:

"1971 - The general area now covered by Energex's Moose and JD claims was first staked by Sullivan and Rogers for sumac Mines Ltd. (Sumitomo Metal Mining Ltd.) after a regional reconnaissance geochemical program.

1972 - Sumitomo undertook geological mapping,soil geochemistry, ground magnetic and induced polarization surveys on portions of the claims.

1973 - Sumitomo continued IP, magnetometer, rock, soil and geological surveys on portions of the claims. Newconex undertook a program of prospecting, hand trenching and rock sampling in search of porphyry-type Cu-Mo deposits in the area now covered by the AL 1-4,7 & 8 claims.

1974 - Sumitomo drilled 5 BQ diamond drill holes on the properties now known as the Moose and JD.

1977 - Claims lapsed (rental not paid).

1978 - Toodoggone claims restaked by Petra Gem Explorations of Canada Ltd. and T.C. Scott, prospector.

1979-80 - The Al 1-4 claims were staked by Energex Minerals Ltd. as part of the Petra Gem/Scott option and were optioned to Texasgulf Canada Ltd. in 1980, together with the Moose and JD properties. Texasgulf completed reconnaissance geochemical and geological surveys in that year, and staked the AL 5-6 claims to cover large alteration zones on the north flank of Metsantsan Mountain.

1981 thru 1984 - Kidd Creek Mines conducted major exploration programs totalling $3.3 million. In 1981, more extensive and detailed grid-controlled geochemical surveys were conducted. Additional work included trenching and VLF-EM/magnetometer orientation surveys. The work produced encouraging results; the claim block was further enlarged by the addition of the Al 7-8, Bet, Ernie, Bull and other claims.

The 1982 program consisted of geological mapping and rock geochemistry reconnaissance and detailed soil geochemistry, IP surveys, backhoe trenching, diamond drilling, and a legal survey of legal corner posts. Drilling and trenching were concentrated on the Bonanza-Ridge alteration zones; additional holes were drilled on the Furlong and Hump zones. The drilling was technically successful but the results were erratic and only moderately encouraging. It had become apparent that extensive surface work was needed before mineralized zones were tested by drilling (Clark and Sutherland, 1983).

Accordingly, 1983 was a season of detailed surface exploration which included very extensive backhoe trenching and limited geological mapping and soil sampling. This work resulted in the discovery of the high grade "Verrenass" zone in the Bonanza-Ridge area, and the "Thesis II" mineralization south of the present camp area.

In 1984, extensive backhoe trenching and diamond drilling were conducted on five mineralized zones, including the Verrenass, Ridge and Thesis II, and the newly discovered Thesis III and BV (Barite Vein) zones. The drilling results varied; encouraging high grade intersection were made on the BV and Thesis III zones and assays from the other zones were of moderate grade (von Fersen, 1984).

The Al property, together with the Moose and JD groups, was returned to Energex Minerals Ltd. in late December 1984. Kidd Creek Mines Limited (formerly Texasgulf Canada Ltd.) retained a 15% net profits interest in the properties.

1985 - Energex Minerals Ltd. undertook 8572 feet (2613 metres) of diamond drilling on the Moose and Al properties, together with geophysical surveys, detailed geological mapping, backhoe trenching and prospecting on select areas of the claims."

During the 1986 season, continued drilling, trenching and detailed mapping were carried out. As well, a mill was installed and surface mined ore processed.

1.5 REGIONAL GEOLOGY

The regional geology of the Toodoggone Camp is described in the above mentioned report:

"The Toodoggone River area is situated near the eastern margin of the Intermontane tectonic belt. The oldest rocks in the area are late Palezoic limestones in the vicinity of Baker Mine. These are in fault contact with late Triassic Takla Group volcanic rocks exposed at Baker Mine and east and North of the Moose property.

A volcanic assemblage of Lower Jurassic age, lithologically distinctive from the Hazelton or Takla groups, was first recognized by Carter in 1971, and informally named the "Toodoggone volcanics". These comprise a subaerial pyroclastic assemblage of predominantly andesitic composition (Panteleyev, 1983), which unconformably overlies, or is in fault contact with, older rocks. Toodoggone volcanic rocks are contained in a 100 x 25 kilometer northwest trending belt extending from Thutade Lake in the south to the Stikine River in the north. Mineral claims owned by Energex straddle the Toodoggone volcanic belt.

The Toodoggone rocks have been subdivided into eight units/formations (Panteleyev, 1982; Diakow, 1983) consisting of interlayered lava flows, ash flows and lapilli and crystal tuffs, with subvolcanic equivalents and associated volcaniclastic and epiclastic rocks. Radiometric ages indicate Toodoggone volcanic rocks were deposited over 1 20-million-year span, beginning in the earliest Jurassic (Panteleyev, 1983).

Toodoggone volcanics and older layered rocks are cut by Omineca granitic intrusive of Lower to Middle Jurassic age and by subvolcanic intrusions related to Toodoggone volcanism.

Clastic sedimentary rocks of the Cretaceous - Tertiary Sustut Group overlie older layered rocks near the Stikine

River and partly cover the southwestern exposed margin of the Toodoggone volcanic belt.

It has been noted, as one moves across the 25-kilometer wide belt of Toodoggone rocks from west to east (that is, from Albert's Hump towards the Moose claims) that the alteration patterns of the rocks reflect zonation caused by progressively deeper hydrothermal activity. This possibly indicated the down dropping of the western edge of the belt with respect to the eastern and central areas. Glaciers responsible for eroding the paleosurface have done so in varying degrees, removing less material from those areas which were downdropped to lower levels. Deeper level hydrothermal characteristics are displayed in areas towards the eastern side of the Toodoggone volcanic belt.

Structurally controlled, northwest trending lineaments believed responsible for the channelling of ore bearing fluids can be traced by landsat and air photo linears connecting many of the area's most significant precious metal deposits (Baker, Lawyers, Moosehorn Canyon, Metsantan, etc.). These lineaments can be followed for many kilometers. It is postulated that volcanic centres which erupted at points along the lineaments disrupted the geometry along strike by creating local spreading caused by the formation of radiating and arcuate fracture patterns. This theory is believed to be an explanation for the numerous, seemingly random deposits of gold on the **Al** property, all of which occur along the general trend of a major lineament."

2.1 MULTIPOLE INDUCED POLARIZATION SURVEY

The multipole induced polarization method is a technique which exploits the rapid signal acquisition and processing capabilities available with current micro computer technology. With this technique the potential field information is obtained through a multiconductor cable having 36 takeouts at 25 or 12.5 metre intervals. The cable is presently configured as up to six end and position interchangeable cables of 150 metre length. The takeouts are addressed by the 40 channel multiplexer assembly in a specially configured HP-3497A data acquisition system. The data acquisition system is driven by a HP-85 computer, allowing the data to be stacked in the computer for a number of cycles until a criteria is reached. Ten windows on the secondary voltage are compiled, as well as the primary voltage information. Time zero is sensed by direct reference to the transmitter timing circuitry. The cable is scanned simultaneously in groups of five dipoles and the decay curves presented graphically for acceptance and logging or rejection and rescan by the operator. The data is logged on digital tape cartridges and is readily accessed in the field in order to produce pseudo-sections. These tapes are read by a HP-9845 computer for further processing and production of final report ready sections.

The primary field power is provided by a Huntec MK IV 2.5 kw transmitter operated in time domain mode which is driven by a 400 H_z, 120 volt three phase motor generator. The transmitted signal is an alternate cycle reversing current pulse of two second on and two second off time. The current is introduced into the ground through two current electrodes for each scan of the potential cable.

The apparent resistivity is obtained from the ratio of the primary voltage measured on the potential dipole during the current on part of the cycle to the current flowing through the current electrodes. A geometric factor is computed from the electrode locations to arrive at the apparent resistivity, measured in ohm-metres.

The apparent chargeability is calculated from the ten secondary voltage windows as the area under the secondary decay curve and is measured in milliseconds.

The apparent resistivity data for the 25 metre dipole data is posted and contoured in ohm-metres on Figures 2A,2B,3 and 4A. The apparent resistivity data is posted in ohm-metres divided by a factor of 10 to allow display on pseudo section Figures 5-35.

2.2 PULSE ELECTROMAGNETOMETER SURVEY

The Crone pulse electromagnetometer system is a time domain E.M. system which can be used in the standard horizontal loop mode, fixed source mode or in a downhole mode.

The primary field for the standard horizontal loop method is produced by a portable transmitter loop of 6, 10 or 50 metres diameter. A depth of search of approximately 75% of separation is obtainable due to the high sensitivity of the receiver system. As measurements of the time derivative of the secondary field occur during primary field off time the method is relatively free from geometrical restrictions. Interpretation is accomplished with the aid of Slingram horizontal loop curves.

The primary field for the 2000 watt fixed source system is provided by a 500 by 1000 metre transmitter loop. A 150 by 150 metre loop is utilized with the 500 watt system. The time derivative of the secondary field resulting from the presence of a conductor is sampled at eight windows on the decay curve, during primary field off time. These eight channels of secondary field information are equivalent to a wide spectrum of frequencies from approximately 2 KHz to 16 Hz thus allowing conductor character and strength determination. The vertical and horizontal components are obtained at each station on the traverse, using the convention of vertical component positive upwards and horizontal component positive away from the transmitter loop. In areas of high surficial conductivity the primary field on time of 10.8 ms, and the receiver delay times may be doubled in order to obtain late time information. Time synchronization between transmitter and receiver is by radio or cable link.

The apparent primary field information is recorded at each occupied station. Normalization of the data with respect to instrument gain produces a constant gain plot. In this format a vertical plate-like conductor anomaly would be symmetric. Normalization with respect to the apparent primary field at each station provides a constant primary field plot that is useful in recognizing conductors present in the far primary field and in correlating anomaly amplitudes from line to line. The anomalies lose symmetry in this format but the condition of anomaly amplitude dependence on distance from the loop is relaxed.

2.3 EM-31 ELECTROMAGNETOMETER SURVEY

The EM-31 is a self-contained, single man operated induction technique which provides a direct reading of terrain conductivity. The instrumentation consists of an electronics console with boom mounted transmit and receive coils of approximately 3.6 metres separation. Terrain conductivity readings are obtained in units of millimhos per metre. These readings have been converted to ohm-metres for display in composite profile format on Figure 2C.

2.4 VLF-EM ELECTROMAGNETOMETER SURVEY

This survey was conducted using a Geonics EM-16 V.L.F. Electromagnetomter. This instrument acts as a receiver and utilizes the primary electromagnetic fields generated by VLF marine communication stations. These stations operate at a frequency between 15-25 KHZ, and have a vertical antenna-current resulting in a horizontal primary field. Thus, this VLF-EM measures the dip-angle of the secondary field induced in a conductor. For maximum coupling, a transmitter station located in the same direction as the geological strike is selected.

The EM-16R consists of an attachment to an EM-16 which, by means of a pair of electrodes, allows measurement of the electric component of the VLF field in addition to the magnetic field component. The ratio of these components is read as well as the phase angle between them. The electric magnetic field ratio is calibrated to allow direct reading of the ground apparent resistivity.

2.5 PROTON PRECESSION MAGNETOMETER SURVEY

The magnetometer survey was carried out utilizing two GSM-8 proton precession magnetometers. One of these was operated in conjunction with a CMG MR-10 base magnetometer recorder to allow diurnal and micropulsation variation removal. Operator precautions of demagnetization and consistency were observed and field clock to base magnetometer timing skew was maintained within one second per day. Corrected, unfiltered data are plotted on each of the base maps.

2.6 SELF POTENTIAL SURVEY

The self potential technique is a passive geophysical method which utilizes measurements of naturally occurring volages to provide geologic inferences. These voltages arise from electrochemical cell effects, if present, near massive sulphides, graphite, shear zones or from groundwater movement. The long wire method was used, with a common base reference for all lines run.

DISCUSSION OF RESULTS

3.1 THESIS ZONES, NORTH HALF (THESIS III)

3.1.1 MULTIPOLE INDUCED POLARIZATION SURVEY

The induced polarization data is displayed in plan on Figure 2A and in pseudo-section Figures 5-20. The general character of the Thesis III response is illustrated in pseudo-section line 1200SE, Figure 17. The A Zone resistivity anomaly is the dominant element in the data showing a clear vertical dyke-like anomalous response. The apparent fall off of resistivity with depth is the result of dilution of the response with the lower resistivity country rock with increasing dipole length. This indicates that the A Zone is depth extensive in this section. The B Zone, which was the dominant response on line 1150SE, Figure 16, is faded to a much weaker response on 1200SE. The rapid fall off of amplitude with depth suggests that this zone may be depth extent limited in this section. The pant legging of the A Zone response to depth near 950NE is a result of the influence of the B Zone contributing in the longer dipole lengths centred on 950NE. An identical effect of reciprocal nature is seen on line 1150SE where the B Zone is the dominant feature.

The general character of the chargeability response is also well illustrated on line 1200SE. The high apparent resistivity silicified zone , is flanked by a high chargeability response likely sourced in clay altered rock. This rock is also of low apparent resistivity, with respect to both the silica altered zone and the country rock, and often produces low apparent resistivity shoulders to the main zone.

In the Thesis III area and those of the subsequent surveys the 25 metre dipole is taken as a compromise between depth and resolution and although not a substitute for line to line scrutiny of the pseudo-sections is a useful plan contourable quantity that is quite rich in detail. Thus, the A and B zone are clearly manifested in plan on Figure 2A. The data suggests that a centre of increased apparent resistivity exists on line 1100SE near 1050NE on the C Zone. As well a subtle suggestion of an eastwest striking control is evident in the correlation of the C Zone from line 1150SE, 1038NE, to 1200SE, 1060NE. A flanking resistivity low to the north reinforces this strike correlation. A similar, but offset, effect is evident between 1050NE on line 1100SE and 975NE on line 1000NE.

The anomalous chargeability zones, indicated in plan on Figure 2A, are quite extensive in the Thesis III area. Probably sourced in clay altered rocks these anomalous zones occur as flanking effects on the A and B Zone, as discussed above. The C Zone response, is for the most part correlated with a chargeability high suggesting more complex character to the zone, such as less developed segregation of the clay and silica altered rocks.

The Thesis III zone appears as a strong high on an extensive high resistivity trend which extends as a weakly expressed double trend, echoing the A and B trends, south-southwesterly through 960NE and 875NE on to the Thesis II area, Figure 2B on line 1350SE.

To the northwest the C Zone appears to extend into a moderate apparent resistivity high near 1060NE on line 950SE, profile Figure 12. This high, labelled Zone 1 on Figure 2A shows the development of a more northwesterly strike. Zone 2, which gives the impression of a re-established element of the B Zone is embedded in this northwesterly strike which extends to include the strongly developed Zone 3.

An example of the strong depth extensive response of Zone 3 is shown on line 750SE, Figure 8. Here the separation of the silica altered zone and the clay altered effects in the geoelectric section is evident, particularly to the northeast of the zone. Zone 3 weakens, but remains open to the northwest.

Zones 4 and 5 are strong, narrow zones which retain the north-northwesterly strike of the Thesis III A and B Zones. the Zone 4 response on line 700SE, Figure 7, shows a difference in character, however, in the correlation of the apparent resistivity high with a distinct and local chargeability high. Here a third factor may be involved, such as a local enhancement of pyrite associated with the resistive zone. Zone 5 appears to be depth limited, appearing in shorter dipole length data only.

A number of other zones lie outside the main trend discussed above. These are, in general, weaker than the Thesis III and Zones 2-5 attaining apparent resistivities in the 300 ohm-metre range in the 25 metre dipole data. The Zone 6 response is illustrated in pseudo-section Figure 10 and weakly on Figure 11, lines 850SE and 900SE. As is the case with Zone 5, Zone 6 is likely depth extent limited.

Zone 7 is a broad amorphous effect occurring in the western corner of the survey area. This zone, illustrated on Figure 6, line 650SE, appears to be open to depth. Zone 8 appears to be influenced by two distinct controlling strikes. The well established east-west strike correlation between lines 850SE and 900SE coaleses with a trend more nearly parallel to the Thesis A and B zones on line 950SE, Figures 10-12. Zone 9 may be a resumption of the trend of the north-northwesterly striking arm of Zone 8.

3.1.2 EM-31 AND EM-16R TEST SURVEY

A test survey using the EM-31 and EM-16R electromagnetometers was run across the Thesis III zone. The data from these surveys are illustrated in composite profile form on Figure 2C.

The traverse lines across the Thesis III zone show a response in the EM-31 data as narrow peaks in apparent resistivity. The A and C Zones are clear as double peaks on line 1150SE in both the EM-31 and EM-16R data. The results from the two instruments are plotted at a vertical scale which provides approximately equal background response. It can be seen that at this scale the EM-31 provides the higher amplitude of response over background. The B Zone is not represented in the EM-16R data, apart from a minor peak, labeled 16R-3 on Figure 2C. Zone 9 of Figure 2A is not evident in either data set.

Lines 1100SE and 1050SE show evidence of a broad north-northwesterly trending zone labelled 16R-1 and 31-1 on Figure 2C. This correlates with a single point resistivity high at the south extreme of line 1050SE of Figure 2A and may represent another resistive zone to the southwest.

3.1.3 EM-16 AND PULSE EM TEST SURVEY

The EM-16 data is illustrated in plan on composite profile map Figure 2D. The pulse EM data is illustrated in profile Figures 60-71 in both constant gain and constant primary field normalized formats.

An example of the pulse EM response is seen in the inflection at 875NE on line 1050SE, Figure 68. The half width of the anomalous response is small and the anomaly decays rapidly, being evident only in the first four channels. This indicates that the conductors are of poor to moderate quality and are shallow sourced. It is therefore not surprising that several are correlated with VLF-EM conductors. For the most part the conductors such as PEM-3, VLF-3 on Figure 2D are flanking the resistive zones and may be correlated with chargeability highs. This suggests that the conductors may be sourced in conductive clays in the altered zones flanking the zones of interest.

3.1.4 MAGNETICS AND SELF POTENTIAL TEST SURVEY

The magnetics and self potential data is plotted in composite profile form on Figure 2E. The magnetic field and self potential data shows very little response correlated with the Thesis III Zone. The self potential information shows a background response over the area tested. A series of minor magnetics highs occur in the southern area of lines 1250SE to 1350SE. These do not appear to be correlated with anomalous areas defined by other techniques. The probable response in this situation might well have been a magnetic low indicating a destruction of background magnetic mineral content, but this does not appear to be the case.

The lack of a self potential response indicates that either the conductive structures or the oxidation reduction activity necessary to create the response, or both, are absent in the survey area.

3.2 THESIS ZONES, SOUTH HALF (THESIS II)

3.2.1 MULTIPOLE INDUCED POLARIZATION SURVEY

The induced polarization data is displayed in plan on Figure 2B and in pseudo section Figures 21-35. The general trend of apparent resistivity highs continues from the north map sheet, Figure 2A, through line 1400SE to the Thesis II Zone. This demonstrates that, although strike changes occur between the Thesis III and II Zones, the two zones occur on the same general trend.

As was the case with the Thesis III the Thesis II zone is well expressed in the apparent resistivity data, attaining 600 ohm-metres in the 25 metre dipole data, Figure 2B. A good illustration of the clear, depth extensive response is seen on line 1650SE, Figure 26. As was the case with Thesis III conductive zones flank the resistive feature although with a generally lower associated apparent chargeability high. The anomaly also occurs here in isolation, with far less flanking and multiple zone activity.

Along strike on the undulating trend on line 1850SE a single line intercept of a pronounced resistive zone occurs. Labelled Zone 10 on Figure 2B, this zone is illustrated in pseudo section Figure 30. This zone and the lesser flanking Zone 11 are overprinted with a strong chargeability anomaly that is unusual in that it gives strong indication of a local east west strike control. Zone 11 forms a weaker extension that appears to extinguish northwest of line 1650SE.

Zone 12 constitutes a broad and variable trend with its strongest manifestation on line 2000SE Figure 33. Here the zone has good depth extent, being well expressed in the larger dipoles. This zone occurs in a chargeability response background similar to the Thesis III zone of multiple chaotic, strong responses. Again an impressed east west control is apparent in the northwest extension the 400 ohmetre high and the flanking low to the northeast. The Zone 12 anomaly remains open to the southeast.

Flanking the main trend to the west is a moderate amplitude resistive trend which extends from 1150NE on line 1700SE off the extent of present coverage on line 2100SE.

3.3 BONANZA ZONE

3.3.1 Multipole Induced Polarization Survey

The induced polarization data is illustrated in plan on Figure 3 and on pseudo-section Figures 36-45. As was the case with the Thesis zones the 25 metre dipole apparent resistivity is taken as an aid to line to line correlation and contoured on Figure 3.

The most dominant apparent resistivity high observed in the data is a strong north trending Zone 1, which, between lines 4850NW and 5000NW correlates roughly with the Ghost Structure silicified zone. The resistivity anomaly broadens and bifurcates on line 4850NW with the northwesterly trending arm associated with the Verrenass Structure. The anomaly, illustrated, for instance, on line 4800NW Figure 37, is that of a vertical dyke-like zone with large depth extent, similar to those of the Thesis Zones. The Zone 1 anomaly is increasing in amplitude and open to the south. To the north, the zone continues of moderate intensity apparently deviating southwest of the surface mapped silica altered zone on line 5000NW. This may be due to variation in alteration with depth or the development of a narrow parallel zone not detected in the resistivity data. The zone is somewhat complex in this area as it coaleses with the northwesterly controlled Zone 2 anomaly. The Zone 1 anomaly continues to the north to line 5150NW where it remains open over a large area to the northeast.

The Zone 2 anomaly is of moderate intensity and is evident over approximately 150 metres strike length. At the northwestern extent of the zone a minor extension with apparent north-south strike is evident, labelled Zone 3 on Figure 3.

The northwesterly trending arm of Zone 1, which follows the Verrenass Structure, weakens near line 5050NW but may still be correlated line to line through Zone 4, and weakening further, off the northwestern extent of coverage.

Zone 5 constitutes a strong, narrow resistive feature paralleling the Zone 1 anomaly. Its presence in the shorter dipole data only however, raises the possibility of limited depth extent.

The chargeability high is found to overlap or correlate directly with Zones 1-5 in many areas. This is in contrast to the response on the Thesis Zones where the chargeability highs more often flanked the resistive effects.

Zone 6 is double trend existing between Zones 1 and 5. It is of moderate amplitude and may be related along strike to Zone 7 which is open to the south.

Zone 8 is a broad, strike limited feature to the southwest of the Verrenass Structure. The distorted shape of the zone indicates the influence of two strike controls, one of northwesterly nature and a more north-northwesterly trend. The multi-dipole response on line 5050NW, Figure 42 indicates good depth extent to the zone.

A number of other flanking and weakly developed trends are worthy of note. Zone 9 parallels Zone 1 to the east remaining open to the southeast. Zone 10, again to the east shows evidence of a more westerly strike control. The Zone 11,12,13 trend traverses the western extent of coverage.

3.4 B.V. ZONE

3.4.1 MULTIPOLE INDUCED POLARIZATION SURVEY

The induced polarization data for the B.V. Zone is illustrated in pseudo section Figures 46-59, and in plan on Figure 4A.

Zone 1 is a well defined apparent resistivity high which correlates well with the silica altered BV Zone between lines 2100SE and 2300SE. The resistivity anomaly remains open to the south. An example of the character of the anomaly is seen on pseudo section Figure 56. Although dip is a parameter that induced polarization techniques are not generally sensitive to, the response on this line is anomalous by comparison to those of the Thesis and Bonanza Zones in as much as the anomaly is a symmetric. This effect could occur for a number of reasons but a dip to the southwest is a possibility.

The chargeability response on the BV Zone grid departs from the behavior exhibited on the Thesis and Bonanza Zones. The overall background of activity is lower, tending toward isolated highs or short strike trends rather than continuous areas and broad bands. On lines 2150SE-2250SE a chargeability high flanks the resistivity anomaly, but the alignment of the responses suggest a strike control different from the apparent resistivity feature. Alternately, and less likely, these may represent three isolated highs, fortuitously intercepted by the three lines.

The resistivity anomaly bifurcates near line 2050E with Zone 2 correlated with the BV Zone. The northwest extension of Zone 1 continues, with a slight hiatus near line 3200E, to line 3050E. Zone 2 is flanked to the north by a weakly developed conductive zone. North of this, a system of resistive zones occur, labelled Zones 3-6. These are of limited strike length, with all but Zone 5 being closed within the survey area.

Zone 8 constitutes an irregularly shaped resistive area in the eastern area of coverage. The zone is quite strong attaining an apparent resistivity high of 500 ohm-metres.

3.4.2 EM-31 ELECTROMAGNETOMETER SURVEY

The EM-31 survey of the BV Zone is illustrated on Figure 4B. The coverage of the northeastern extension of the BV Zone detected a number of weak resistivity highs. Zone 4, Zone 3 and a single line intercept on the northwestern extension of the Zone 1 resistive highs are weakly manifested in the data.

4.0 SUMMARY AND CONCLUSIONS

A series of test surveys were undertaken on the Thesis III zone with the objective of determining the worth of the techniques in this geologic environment. the multipole induced polarization technique proved useful in identifying diagnostic geoelectric effects. The two principle useful anomalous effects are the low resistivity zones correlated with the silica altered rocks and to a lesser extent high chargeability effects likely correlated with clay altered rocks and/or disseminated pyrite.

The most useful of the other techniques tested was the EM-31 inductive resistivity measurement method, which detected the strongest resistive elements of the Thesis III Zone. The method was not sensitive to the more moderate resistive zones and thus did not provide the detail evident in the induced polarization data. As well, near surface, possible overburden, effects were evident in the data. The EM-16R technique provided similar results, but exhibited a higher background response and lower anomaly amplitude.

The pulse electromagnetometer and VLF electromagnetometer surveys were sensitive to a number of conductors, principally low order, shallow zones likely sourced in clay altered or shear zone conductive effects. In so far as mapping these zones is useful the VLF EM technique would be the most expedient. The power and bandwith of the PEM technique would be better suited to areas where deep penetration is the overriding consideration.

The magnetics and self potential surveys did not yield useful results in the Thesis III area covered in the tests.

The induced polarization apparent resistivity data clearly resolved the A,B, and C Zones of the Thesis III Zone and defined their location in a very strike extensive moderately resistive zone which includes the Thesis II Zone and remains open in present coverage. A number of enhanced resistivity zones are detected along strike in this general trend, as well as flanking it. The coverage shows the relationship to probable clay alteration sourced chargeability effects and suggests that a number of different strike directions are apparent as controls to the resistive zones.

The induced polarization data obtained in the Bonanza and BV Zones show good correlation between apparent resistivity highs and the known silicified zones and extend the zones beyond the current trenching and drilling. In one area of coverage on the BV Zone suggestion of a dip to the southwest to the main zone is inferred.

5.0 RECOMMENDATIONS

Coverage of the Thesis III and II Zones area detected a number of apparent resistivity highs along strike from and parallel to the III and II Zones. These should be trenched and/or drilled in a priority set by their location in the geologic understanding of the Thesis II and III area. The inference from the apparent resistivity data over the Thesis II and III zones property suggests the simple criterion for priority of testing the strongest zones first.

A zone of interest, although not strongly represented due to its presence at the extreme edge of the induced polarization coverage is the feature on lines 1100SE and 1050SE labelled 16R-1, 31-1 on Figure 2C. This zone is well represented in the slightly more extensive EM-31 and EM-16R coverage of these two lines.

The same criterion for follow up applies to the Bonanza and BV zone surveys which also detected extension and flanking anomalous apparent resistivity effects to the known silicified zones. An example of a flanking zone strongly wrothy of follow up is the well defined Zone 5 on the Bonanza Grid.

A large proportion of the anomalous trends remain open in current coverage. Contingent upon follow up success of the current induced polarization coverage additional coverage may be warranted.

Respectfully submitted,

Cliff Candy, B.Sc.,
Geophysicist

GLEN E. WHITE

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

6.0 INSTRUMENT SPECIFICATIONS

EM31 SPECIFICATIONS

MEASURED QUANTITY - Apparent conductivity of the ground in millimhos per meter.

PRIMARY FIELD SOURCE - Self-contained dipole transmitter

SENSOR - Self-contained dipole receiver

INTERCOIL SPACING - 3.66 meters

OPERATING FREQUENCY - 9.8 kHz

POWER SUPPLY - 8 disposable alkaline 'C' cells (approx. 20 hrs life continuous use)

CONDUCTIVITY RANGES - 3, 10, 30, 100, 300, 1000 mmhos/meter

MEASUREMENT PRECISION - ±2% of full scale

MEASUREMENT ACCURACY - ±5% at 20 millimhos per meter

NOISE LEVEL - <0.1 millimhos per meter

OPERATOR CONTROLS - Mode Switch
- Conductivity Range Switch
- Phasing Potentiometer
- Coarse Inphase Compensation
- Fine Inphase Compensation

DIMENSIONS - Boom: 4.0 meters extended
1.4 meters stored
Console: 24 x 20 x 18 cm
Shipping Crate: 155 x 42 x 28 cm

WEIGHT - Instrument Weight: 9 kgm
Shipping Weight: 23 kgm

EM 16 SPECIFICATIONS

Source of primary field - VLF transmitting stations

Transmitting stations used- Any desired station frequency can be supplied with the instrument in the form of plug-in tuning units. Two tuning units can be plugged in at one time. A switch selects units can be plugged in at one time. A switch selects either station.

Operating frequency range - 15-25 KHz.

Parameters measured - (1) The vertical in-phase component (tangent of the tilt angle of the polarization ellipsoid).

(2) The vertical out-of-phase (quadrature) component (the short axis of the polarization ellipsoid compared to the long axis).

Method of Reading - In-phase from a mechanical inclinometer and quadrature from a calibrated dial. Nulling by audio tone.

Scale Range - In-phase ± 150%; quadrature ± 40%.

Readability	- ± 1%.
Reading Time	- 10-40 seconds depending on signal strength.
Operating temperature range	- -40°to 50°C.
Operating Controls	-on-off switch, battery testing push button, station selector switch, volume control, quadrature, dial ± 40%, inclinometer dial ± 150%.
Power Supply	- 6 size AA (penlight) alkaline cells. Life about 200 hours.
Dimensions	- 42x14x9cm (16x5.5x3.5 in.)
Weight	- 1.6 kg. (3.5 lbs.)
Shipping weight	- 4.5 kg. (10 lbs.)

EM16R SPECIFICATIONS

MEASURED QUANTITY - Apparent Resistivity of the ground in ohm-metres

RESISTIVITY RANGES - 10 - 300 ohm-metres
- 100 - 3000 ohm-metres
- 1000 - 30000 ohm-metres

PHASE RNAGE - 0-9- degrees

RESOLUTION - Resistivity: ±2% full scale
- Phase: ±0.5°

OUTPUT - Null by audio tone. Resistivity and phase angle read from graduated dials.

OPERATING FREQUENCY - 15-25 kHz VLF Radio Band. Station selection by means of rotary switch.

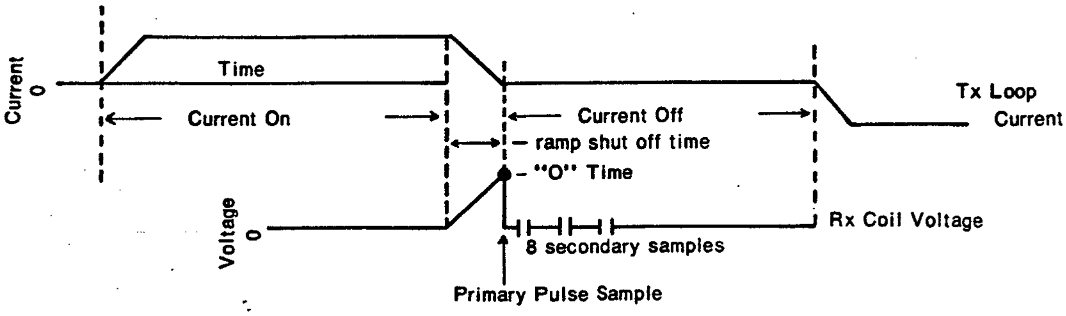
INTERPROBE SPACING - 10 metres

PROBE INPUT IMPEDANCE - 100 MΩ in parallel with 0.5 picofarads

DIMENSIONS - 19 x 11.5 x 10 cm (attached to side of EM16)

WEIGHT - 1.5 kg (including probes and cable)

PEM SPECIFICATIONS



Current Off time: 9.4 ms
Current on time: 10.8 ms
Current shut off (ramp) time: 1.4 ms
Sample times (zero to centre of sample): .15ms, .45ms, .85ms, 1.45ms, 2.45ms, 3.75ms, 5.85ms, 8.85ms.

Sample width: 100 μs
Zero time set at drop off point of primary pulse

TRANSMITTER – Transmitter power and loop size may be increased to obtain increased penetration. Weight, portability and power capabilities of the control instrument are the limiting factors. The standard transmitter is designed to be carried by two men.

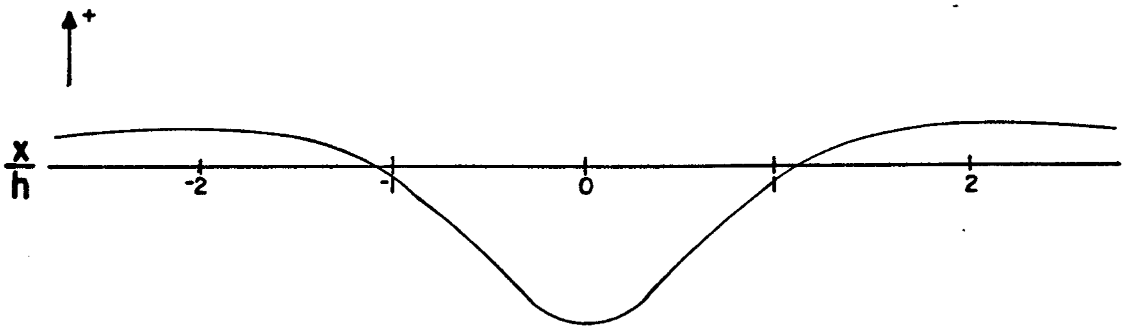
Loop diameter	– minimum 4 meters (13 feet)
Loop current	– 15 to 20 amps
Loop applied voltage	– 24 volts
Loop output	– minimum 4500 amps x meter ^{2}
Loop weight	– 11.8 kilos (26 lb)
Control unit weight	– 10 kilos (22 lb)
Control unit dimensions	– 20.5cm x 25.5cm x 36.5cm (8" x 10" x 14.5")
Battery supply weight	– 18.1 kilos (40 lb)
Battery supply	– 2 of 12 volt, 14 to 20 ampere hour

Timing control by radio synchronization

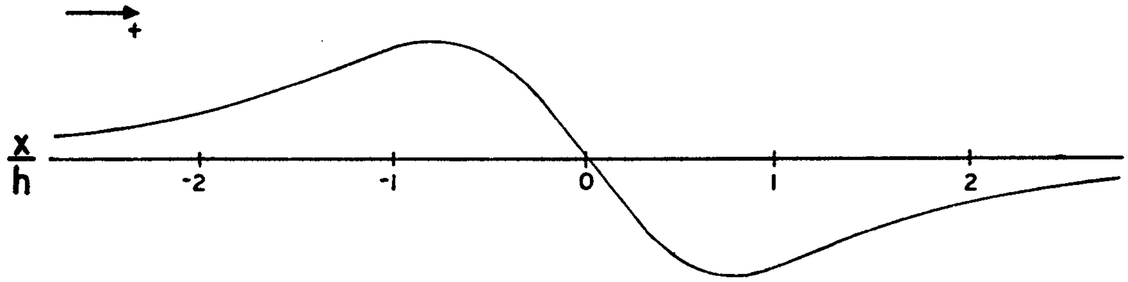
RECEIVER

- Receive coil dimensions: 55cm x 15cm (22" x 6")
- Receive coil weight: 4.5 kilos (10 lb)
- Preamplifier in coil
- Preamplifier batteries: 2 of 9 volt
- Receive coil tripod mounted
- Receiver measuring instrument dimensions: 28cm x 18cm x 21.5cm (11" x 7" x 9")
- Receiver measuring instrument weight: 6.3 kilos (14 lb)
- Timing control by radio synchronization
- Primary sample width: 100 μs
- Primary sample can be swept through primary pulse by means of a time calibrated pot
- Zero time set at primary pulse drop-off
- Secondary samples (eight of them) width: 100 μs
- Secondary samples time (zero to middle of sample): (1) .15ms (2) .45ms (3) .85ms (4) 1.45ms (5) 2.45ms (6) 3.75ms (7) 5.85ms (8) 8.85ms
- Automatic sampling for 5 seconds then all samples automatically stored
- Sample read out by means of meter
- Continuous sampling possible by switching function switch to "Continuous"
- Noise can be monitored by switching function switch to "Noise"
- Battery supply: 24 volt rechargeable, 2 of 12 volt Gel GC 12-15

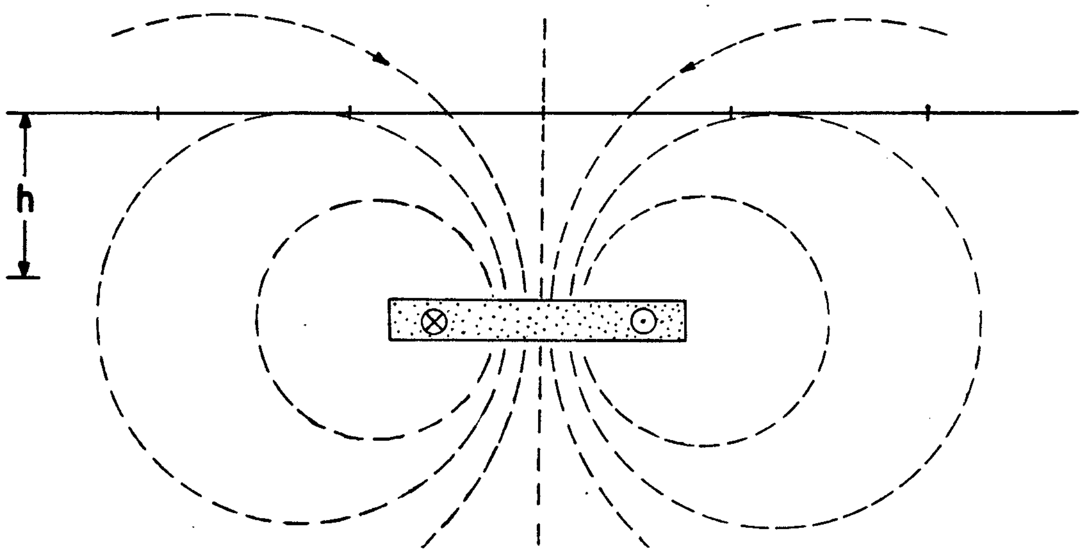
VERTICAL COMPONENT



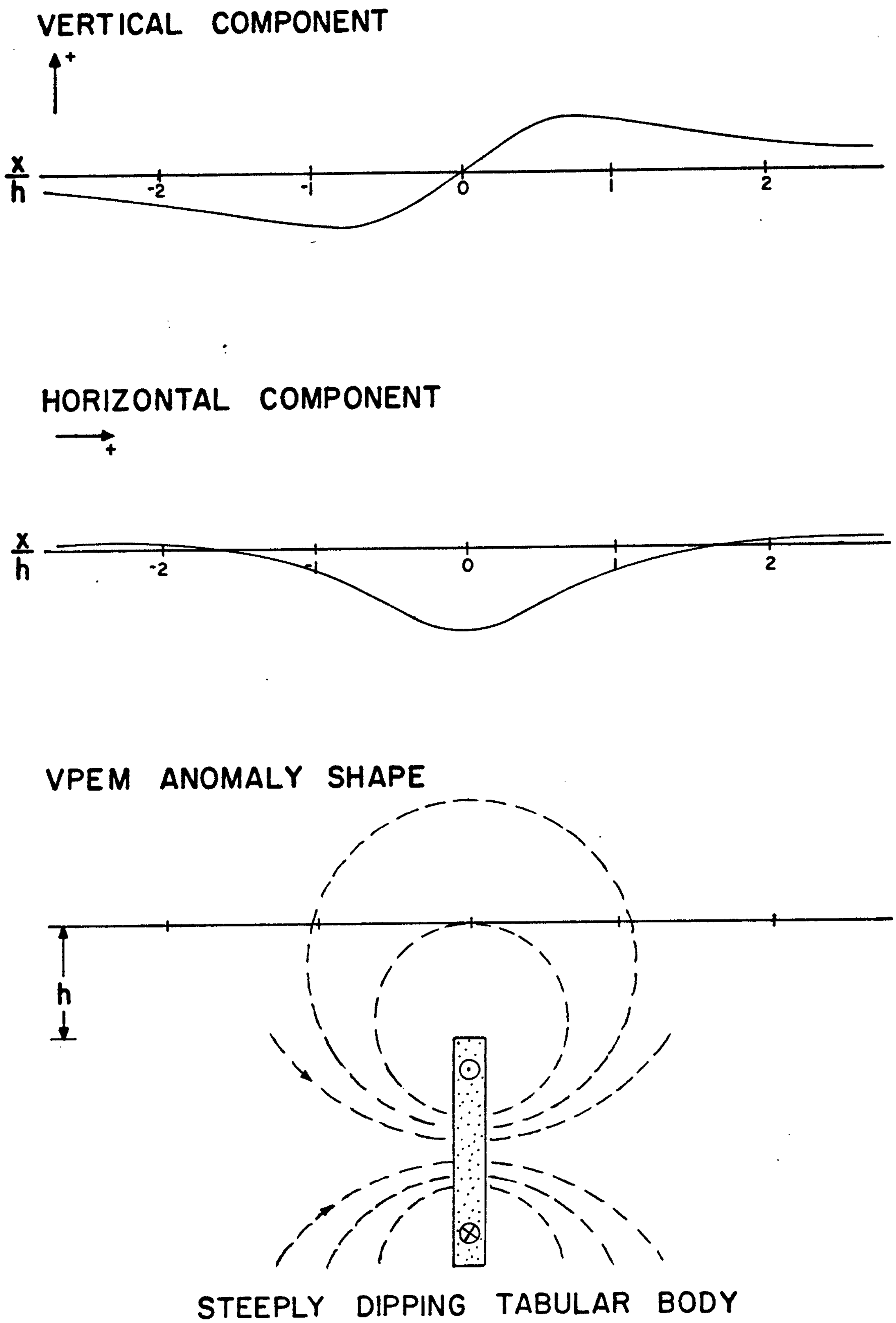
HORIZONTAL COMPONENT



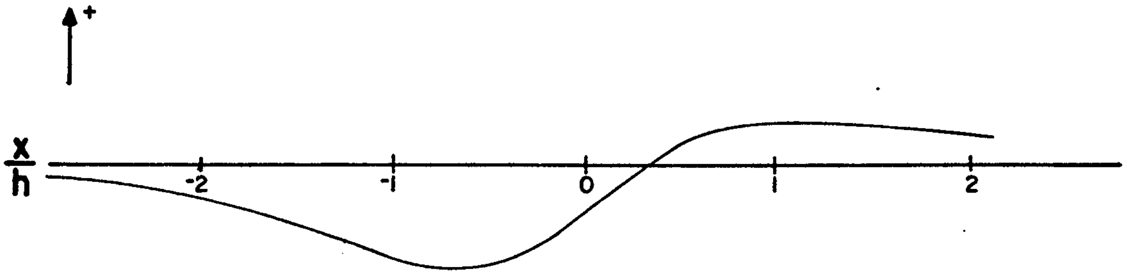
VPEM ANOMALY SHAPE



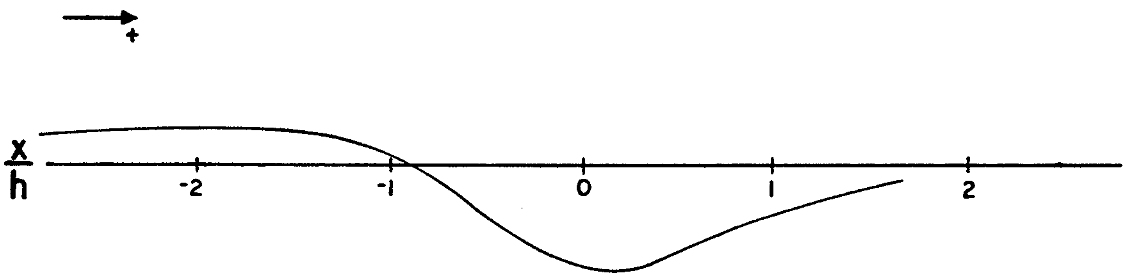
FLAT LYING TABULAR BODY


VERTICAL COMPONENT
+
x/h
-2
-1
0
1
2
HORIZONTAL COMPONENT
+
x/h
-2
-1
0
1
2
VPEM ANOMALY SHAPE
h
STEEPLY DIPPING TABULAR BODY

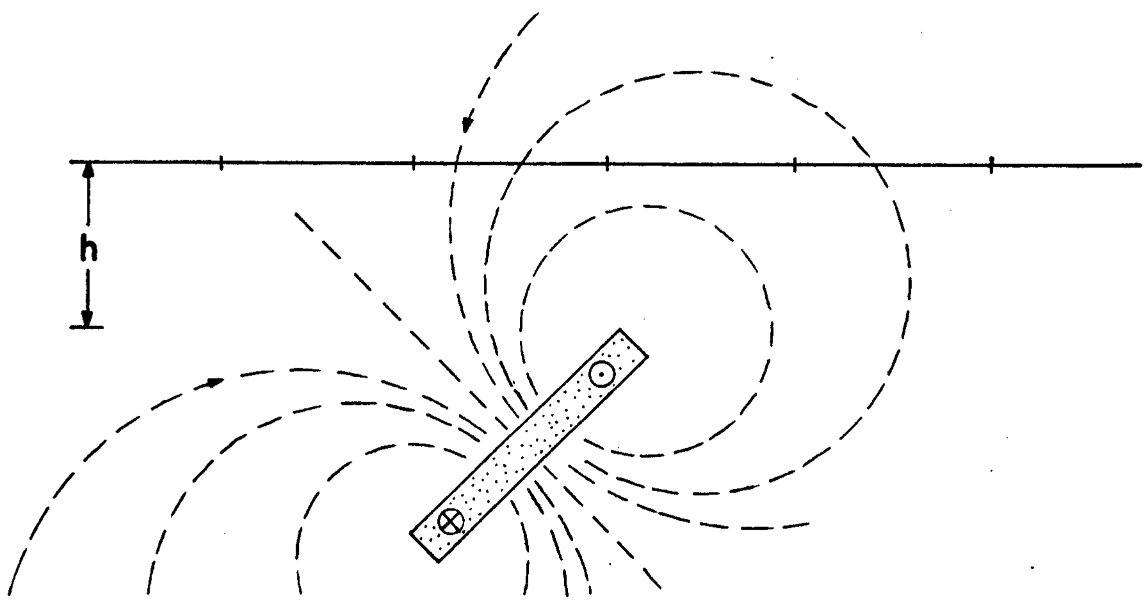
VERTICAL COMPONENT



HORIZONTAL COMPONENT



VPEM ANOMALY SHAPE



INCLINED TABULAR BODY

GSM-8 PROTON PRECESSION MAGNETOMETER

SPECIFICATIONS

Resolution:	1 gamma
Accuracy:	± 1 gamma over operating range
Range:	20,000-100,000 gamma in 23 overlapping steps.
Gradient Tolerance:	up to 5000 gamma/metre
Operating Modes:	manual pushbutton - new reading every 1.85 sec., display active between readings.
	cycling - pushbutton initiated, 1.85 sec. period.
	selftest - pushbutton controlled, 7 sec. period.
Output:	visual - 5 digit 1 cm (0.4") high liquid crystal display, visible in any ambient light.
	digital - multiplied precession frequency and gating pulse.
	analog - optional 0-99 or 0-999 gamma.
External Trigger:	permits externally triggered operation with periods longer than 1.85 sec. (optional minimum period 0.9 sec.)
Power Requirements:	12V 0.7A peak, 5mA standby.
Power Source:	internal - 12V 0.75Ah NiCd rechargeable battery 3,000 readings per full charge.
	external - 12-32V
Battery Charger:	input: 110/220V 50/.60Hz
	output: 14V 75mA DC.
Operating Temp.:	-35 to +55C

Dimensions:	console:	15x8x15cm. (6 x 3 1/4 x 6")
	sensor:	14x7cm dia (5 1/2 x 3" dia)
	staff:	175cm (70") extended, 53cm (21") collapsed.
Weight:	2.7kg (6 lb) per standard complete with batteries.	

7.0 STATEMENT OF QUALIFICATIONS

NAME:	CANDY, Clifford E.
PROFESSION:	Geophysicist
EDUCATION:	University of British Columbia B.Sc., Geophysics
PROFESSIONAL ASSOCIATIONS:	Society of Exploration Geophysicists British Columbia Geophysical Society.
EXPERIENCE:	Eight years Geophysicist with White Geophysical Inc., with work in British Columbia, Quebec, Saskatchewan, South-western U.S.A. and Ireland.

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. -Fourteen years Consulting Geophysicist. -Active experience in all Geologic provinces of Canada.

8.0 PERSONNEL

M.Seyward	June 24 - July 24,1986
J.Seyward	June 24 - July 24,1986
R.Acheson	June 24 - July 24,1986
D.Odenwald	June 24 - July 24,1986


'ZONE 5'
'ZONE 6'
'ZONE 4'
'ZONE 1'
'ZONE 2'
'C ZONE'
'ZONE 3'
'A ZONE'
'B ZONE'
'ZONE 8'
'ZONE 9'
'ZONE 7'
GEOLOGICAL BRANCH
ASSESSMENT REPORT
15,735
PART 6 OF 7
KEY
Apparent Resistivity (Ohm-m)
25 Metre Dipole
Silicified Zone:
N.T.S. 94 E/6 W
GRID LOCATION
57°28'N
LOCATION MAP
SCALE = 1 : 50,000
1 : 500
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
GLEN E. WHITE
WHITE GEOPHYSICAL INC.
INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.
ENERGEX MINERALS LTD.
THESIS ZONES
RESISTIVITY CONTOUR MAP
APPARENT RESISTIVITY (OHM-M)
DATE: JULY/86
FIG.: 2 A

'THESIS II ZONE'
'ZONE 10'
'ZONE 11'
'ZONE 12'
WHITE GEOPHYSICAL INC.
INSTRUMENT: 36 CHANNEL MULTIPOLE I.P.
To accompany Geophysical Report on the AL Property
GEOLOGICAL BRANCH
ASSESSMENT REPORT
15,735
PART 6 OF 7
KEY
Apparent Resistivity (Ohm-m)
25 Metre Dipole
Silicified Zone:
Chargeability Anomaly:
NTS 94 E/6 W
BERT
ERNIE
BULL
AL 2
AL 4
GRID LOCATION
AL 5
AL 6
LOCATION MAP
SCALE = 1 50,000
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
GLEN E. WHITE
1 500
ENERGEX MINERALS LTD.
THESIS ZONES
RESISTIVITY CONTOUR MAP
APPARENT RESISTIVITY (OHM-M)
DATE: JULY/86
FIG.: 2B

GEOLOGICAL BRANCH
ASSESSMENT REPORT

15,735

PART 6 OF 7

KEY

Apparent Resistivity (Ohm-m)

Geonics EM-31: ———•———

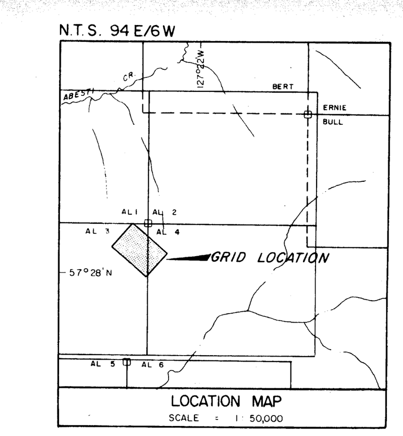
Geonics EM-16R: — — —•— — —

Vertical Scale EM-31: 200 Ohm-m/cm

Vertical Scale EM-16: 20 Ohm-m/cm

Silicified Zone:

N.T.S. 94E/6W



LOCATION MAP
SCALE = 1:50,000

PROVINCE OF BRITISH COLUMBIA
GLEN E. WHITE
PROFESSIONAL ENGINEER

10m 5m 0 5m 10m 15m
1:500

ENERGEX MINERALS LTD.
THESIS ZONES
EM-16,31 COMPOSITE PROFILE MAP
APPARENT RESISTIVITY (OHM-M)

DATE: JULY/86	FIG.: 2C


VLF-6
VLF-5
PEM 6
PEM-5
VLF-4
PEM-4
PEM 3
VLF-3
VLF-1
VLF-2
PEM-2
PEM 1
Silicified Zone:
GEOLOGICAL BRANCH
ASSESSMENT REPORT
15,735
PART 6 OF 7
KEY
Inphase Component (%):
Quadrature Component (%):
Station: NLK, Seattle, 24.8 kHz
Facing Direction: Southwest
VLF-EM Conductor Axis:
PEM Conductor Axis:
N.T.S. 94E/6W
GRID LOCATION
57°28'N
LOCATION MAP
SCALE = 1 : 50,000
1 : 500
WHITE GEOPHYSICAL INC.
INSTRUMENT: CRONE P.E.M.
INSTRUMENT: RONKA EM-16
To accompany Geophysical Report on the AL Property
ENERGEX MINERALS LTD.
THESIS ZONES
VLF-EM COMPOSITE PROFILE MAP
INPHASE AND QUADRATURE COMPONENT (PERCENT)
DATE: JULY/86
FIG.: 2D


600SE
650SE
700SE
750SE
800SE
850SE
900SE
950SE
1000SE
1050SE
1100SE
1150SE
1200SE
1250SE
1300SE
1350SE
GEOLOGICAL BRANCH
ASSESSMENT REPORT
15,735
PART 6 OF 7
KEY
Total Field Magnetics (nT)
Corrected for Diurnal Variation
Plotting Base: 58500 nT
Vertical Scale: 50 nT/cm
Self Potential (mV)
Vertical Scale: 10 mV/cm
Silicified Zone:
N.T.S. 94 E/6 W
127°22'W
ABESTI CR.
BERT
ERNIE
BULL
AL 1
AL 2
AL 3
AL 4
GRID LOCATION
57°28'N
AL 5
AL 6
LOCATION MAP
SCALE = 1 : 50,000
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
GLEN E. WHITE
10m 5m 0 5m 10m 15m
1 : 500
ENERGEX MINERALS LTD.
THESIS ZONES
COMPOSITE PROFILE MAP
MAGNETICS AND SELF POTENTIAL
DATE: JULY/86
FIG.: 2 E
WHITE GEOPHYSICAL INC.
INSTRUMENT: GSM-8 PROTON PRECESSION MAGNETOMETER
INSTRUMENT: SELF POTENTIAL
To accompany Geophysical Report on the AL Property