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GEOPHYSICAL REPORT,
FOR
PELANGIO EXPLORATION
ON THE
GOWAN PROP*ERTY*
GOWAN TOWNSHIP
PORCUPINE MINING DIVISION
NORTHEASTERN ONTARIO

JC Grant

Prepared by: J. C. Grant,
November 2021

TABLE OF CONTENTS

PROPERTY HISTORY

The following information provides a chronological history of the work conducted on the Gowan property prior to Pelangio Exploration's work. Full details on all historical work can be obtained in assessment reports located at the Ontario resident geologists office in Timmins Ontario and/or reports and survey map conducted by the Ontario Geological Survey. OGS maps and survey data are also available for detailed review at the Resident Geologist office in Timmins.

Alamo Petroleum, 1974 to 1975:

Alamo Petroleum conducted an induced polarization (IP) survey on cut one grid covering the majority of the current subject property. This work resulted in the detection of a series of IP anomalies. Alamo Petroleum in a follow up program completed 4 drill holes to test four specific anomalies. The highlight of a program was drill hole 2 which returned a significant low grade copper mineralization over a width of 36 feet. Hole 4 also intersected two short intervals of copper and zinc mineralization. Further testing of other IP anomalies and step out hole from the zones of mineralization were recommended.

Newmont Mining Corp of Canada Ltd., 1977:

Newmont conducted a drill program to follow up on work completed by Alamo. Newmont completed four drill holes. The highlight of the Newmont program was Newmont drill hole 1 which undercut Alamo Petroleum hole 2. The Newmont hole intersected the down dip semi massive sulphide zone found in the Alamo hole 2. The Newmont hole also returned a broad low grade copper intercept over 28.5 feet. No significant results were noted in the other Newmont holes and no further work was conducted.

Ontario Geological Survey Airborne, 1988 (Map 81064):

The OGS completed an airborne survey over Gowan Township in 1988. Over the Gowan property the survey outlined a number of airborne electromagnetic anomalies, a number of these anomalies were associated and/or proximal to a number of strong magnetic responses.

Amex Exploration Inc, 2018:

In 2018 Amex Exploration contracted Exsics Exploration to conduct a moving coil pulse electromagnetic survey over a portion of the Gowan Property to ground truth the OGS airborne electromagnetic anomalies defined in the 1988 survey. The survey failed to confirm the anomalies and the property was dropped.

INTRODUCTION:

The services of Exsics Exploration Limited were retained by Mr. Kevin Filo, on behalf of the Company, Pelangio Exploration Inc., to complete an Induced Polarization, IP survey on a portion of the claim holdings, The Gowan property, located in the eastern section of Gowan Township which is located within the Porcupine Mining Division in Northeastern Ontario.

The purpose of the program was to follow up on a recent airborne survey that outlined a large magnetic high structure at a depth estimate of 250+ meter depth.

PROPERTY LOCATION AND ACCESS:

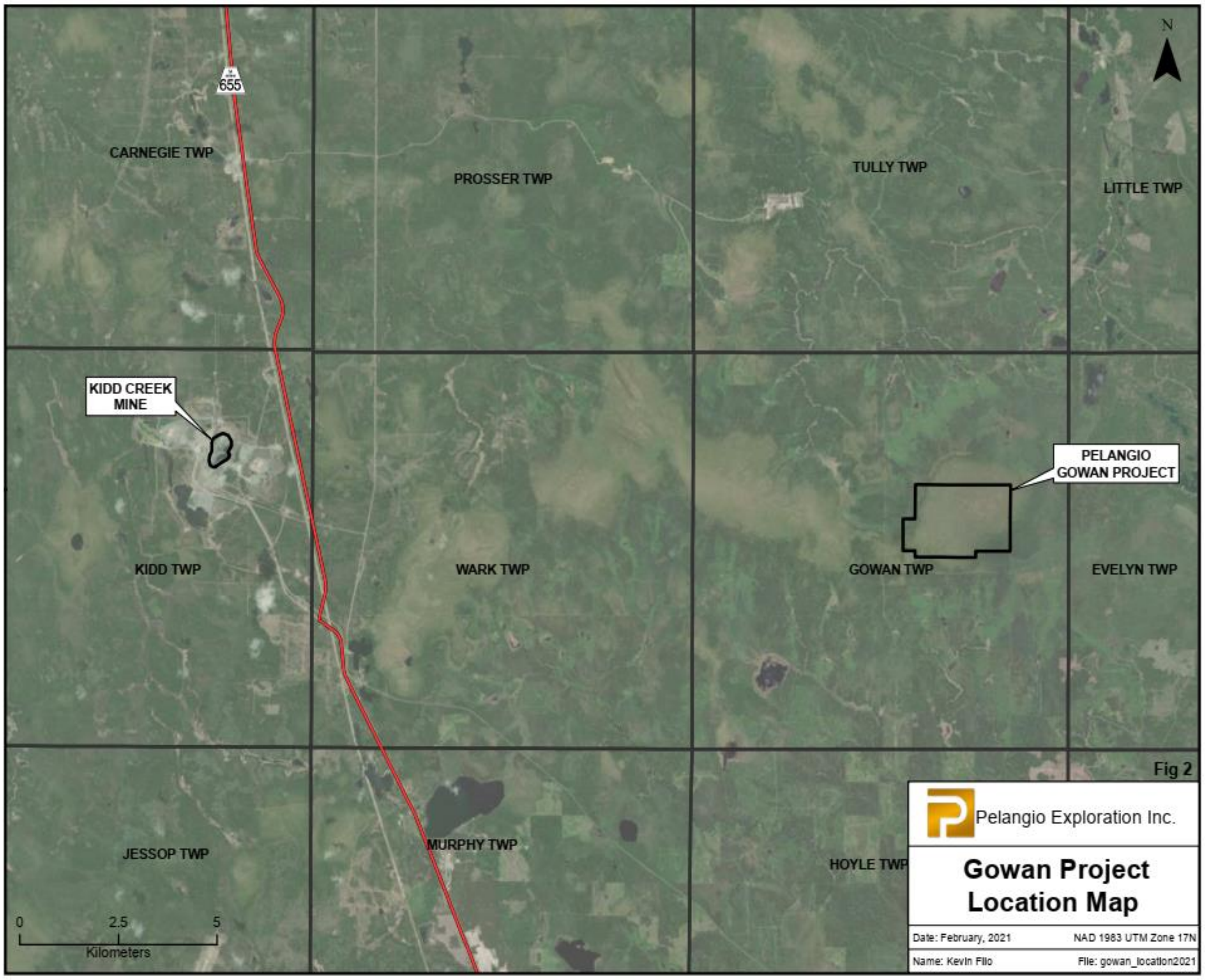
The Gowan Property is located in the central eastern section of Gowan Township. The entire claim block is situated approximately 27 kilometers northeast of the City of Timmins and about 5 kilometers west southwest of Ice Chest Lake. Figures 1 and 2.

Access to the grid during the survey period was by helicopter from a staging site approximately 40 kilometers to the northeast of Timmins just to the immediate east of Highway 655. The flying time to the grid was about 15 minutes. The line cutting crew prepared 3 helicopter pads on the northern central and southern edge of the grid.

Travelling time from the Timmins site was about 45 minutes which include driving and flying.

FIGURE 1 LOCATION MAP

FIGURE 2 PROPERTY LOCATION MAP



<u>CLAIM BLOCK:</u>

The claim numbers that represent the Pelangio Exploration Inc. holdings within Gowan Township are outlined on Figure 3. **The claim numbers that were covered by the 3 grid lines of the current IP survey, outlined in black**, were 246345, 137655, 246346, 137667, 206127, 272136, 344500 and 576332. Refer to Figure 3 for the claim numbers within the claim holdings.

<u>FIGURE 3, CLAIM BLOCK</u>:

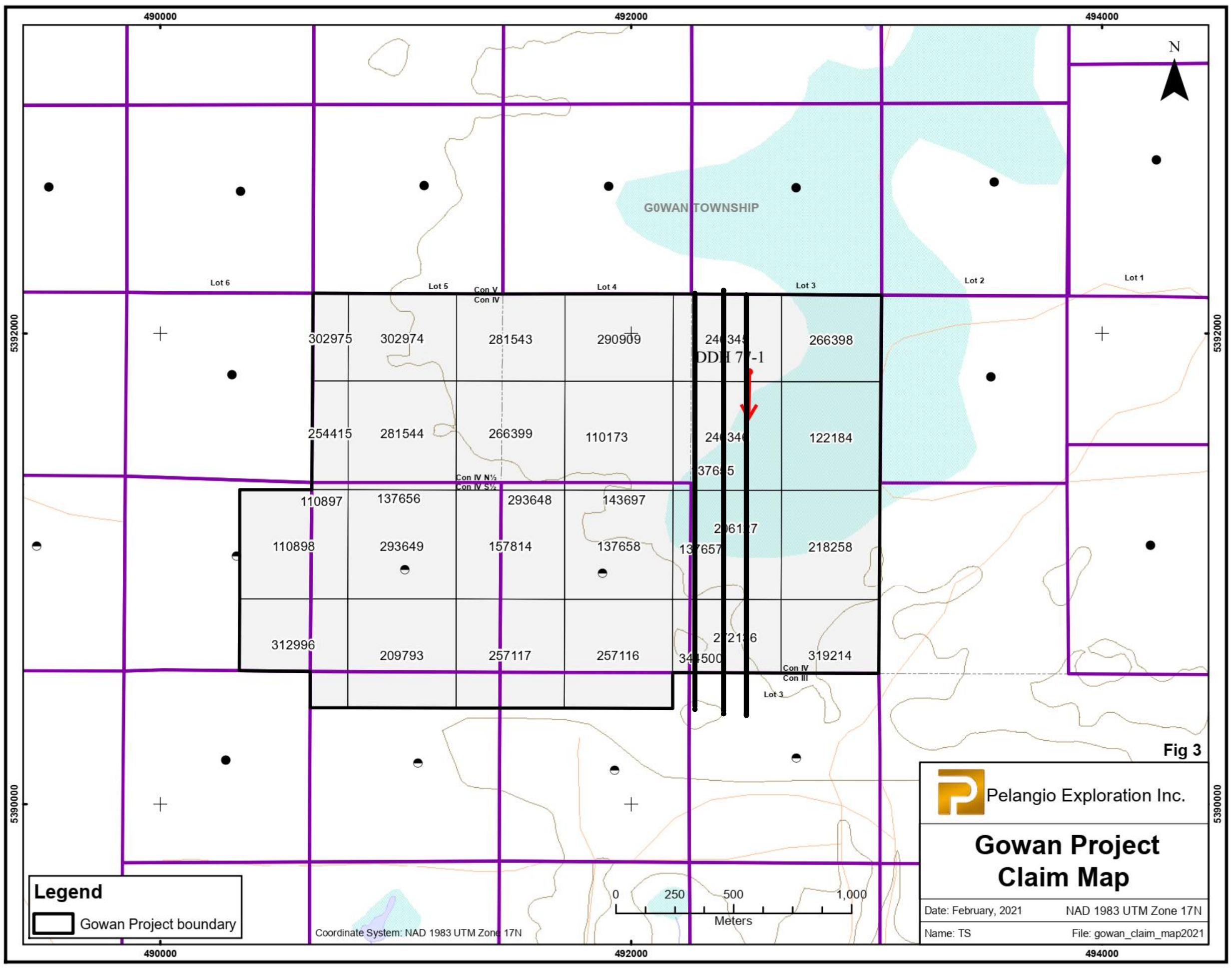
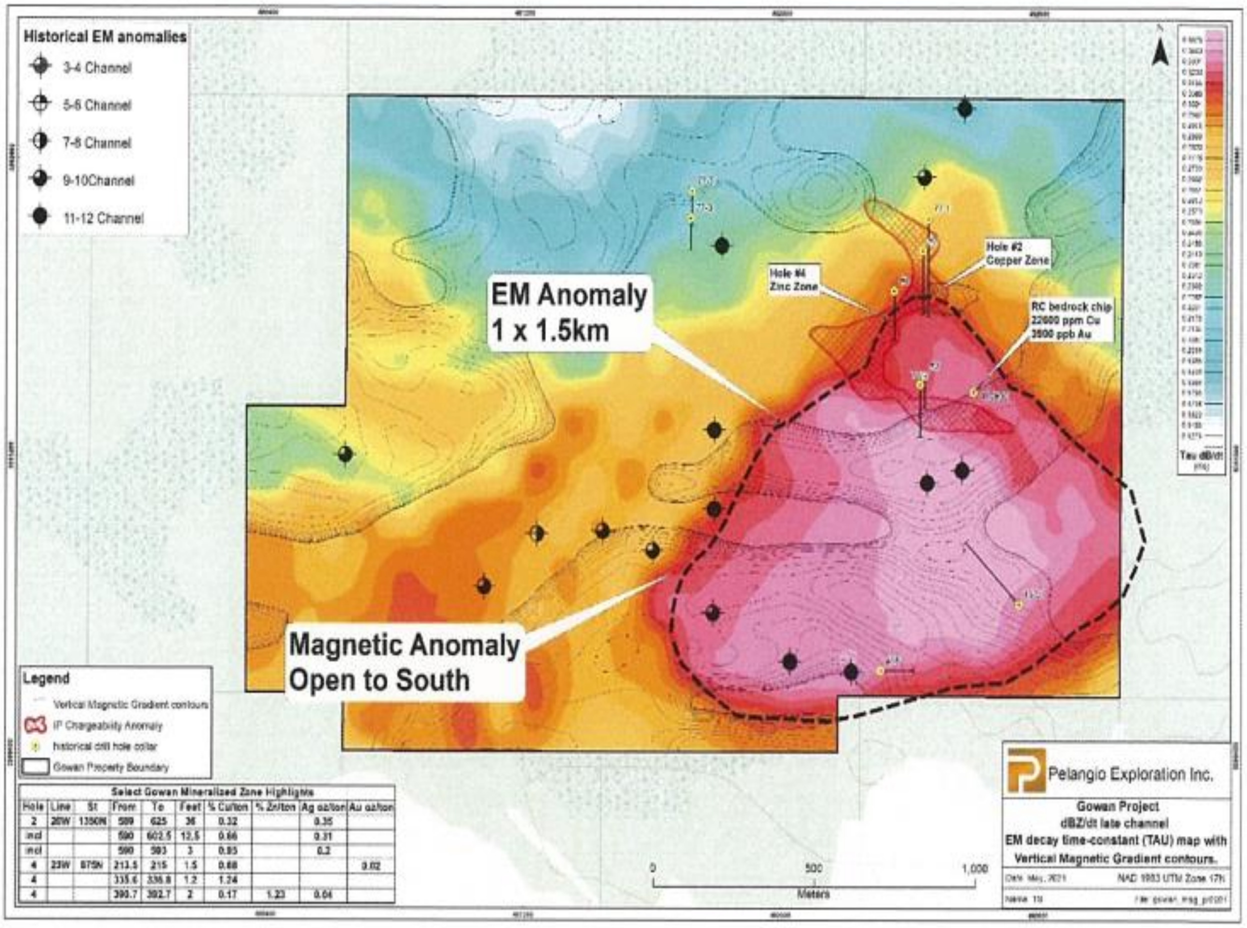


Figure 4 outlines the estimated location and size of the magnetic and EM anomaly. The current IP program was designed to test the anomaly at a depth range of -275 meters to -325 meters.

<u>FIGURE 4: GOWAN PROJECT COMPILATION MAP, REFERENCE, ALAMOS PETROLEUM, (1974-1975), NEWMONT MINING (1977) AND OGS MAP 81064, (1988) and Pelangio VTEM (2021)</u>



Select Gowan Mineralized Zone Highlights

Hole	Line	St	From	To	Feet	% Cu/ton	% Zn/ton	Ag oz/ton	Au oz/ton
2	20W	1350N	589	625	36	0.32		0.35	
incl			590	602.5	12.5	0.66		0.31	
incl			590	593	3	0.85		0.2	
4	23W	875N	213.5	215	1.5	0.88			0.02
4			335.6	336.8	1.2	1.24			
4			390.7	392.7	2	0.17	1.23	0.04	

<u>REGIONAL GEOLOGY, FIGURE 5</u>

B. Berger in OGS Report 229 on Hoyle and Gowna Townships provides excellent documentation of the geology in these townships. Both townships have extensive overburden cover and limited rock exposure. Berger’s interpretation in these townships relied heavily on available drill hole data and airborne magnetic surveys.

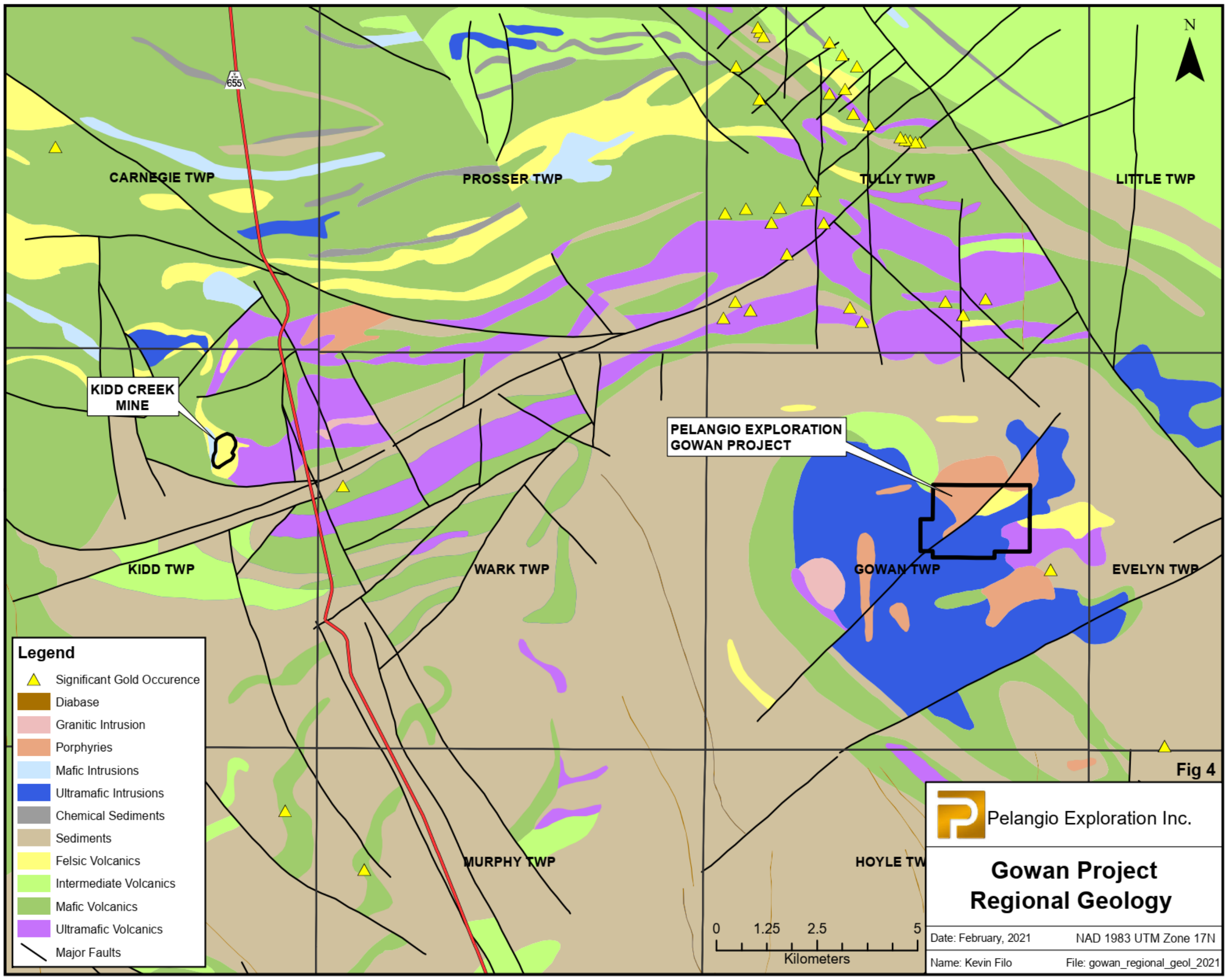
According to Berger both Hoyle and Gowan townships are underlain by NeoArchean Ultramafic, mafic, felsic and metasedimentary rocks; and ultramafic and felsic intrusive rocks. The supracrustal rocks with the tow townships are divided into three assemblages; these are the Tisdale, Hoyle and Kidd-Munro assemblages.

The Hoyle and Kidd Munro assemblages are present in Gowan Township. The Hoyle Assemblage is made up of clastic metasedimentary rocks and the Kidd Assemblage is made up of ultramafic, mafic to intermediate, and felsic metavolcanic rocks and related ultramafic and felsic intrusive rocks. All of these units are cut by NeoArchean to Paleoproterezoic diabase dykes which are generally northerly trending.

With regard to structure, Berger notes there is a foliation parallel to stratigraphy and a 2nd foliation oriented at 45-60 degrees. This 2nd foliation is particularly significant with respect to gold deposition in Hoyle Twp. Berger's mapping also outlined the presence of three major northeast trending faults which had previously gone unnoticed, one of these faults passes through the current subject property.

Metamorphism has affected all of the rock units in Hoyle and Gowan Townships; the metamorphic grade is lower greenschist. Berger also states that ultramafic rocks caused a thermal metamorphic aureole in central Gowan Twp. and the resulting meta-sedimentary rocks often contain porphyroblastic biotite and occasionally some garnet.

REGIONAL GEOLOGY MAP, FIGURE 5, REFERENCE, HOYLE AND GOWAN TOWNSHIPS OGS REPORT 229

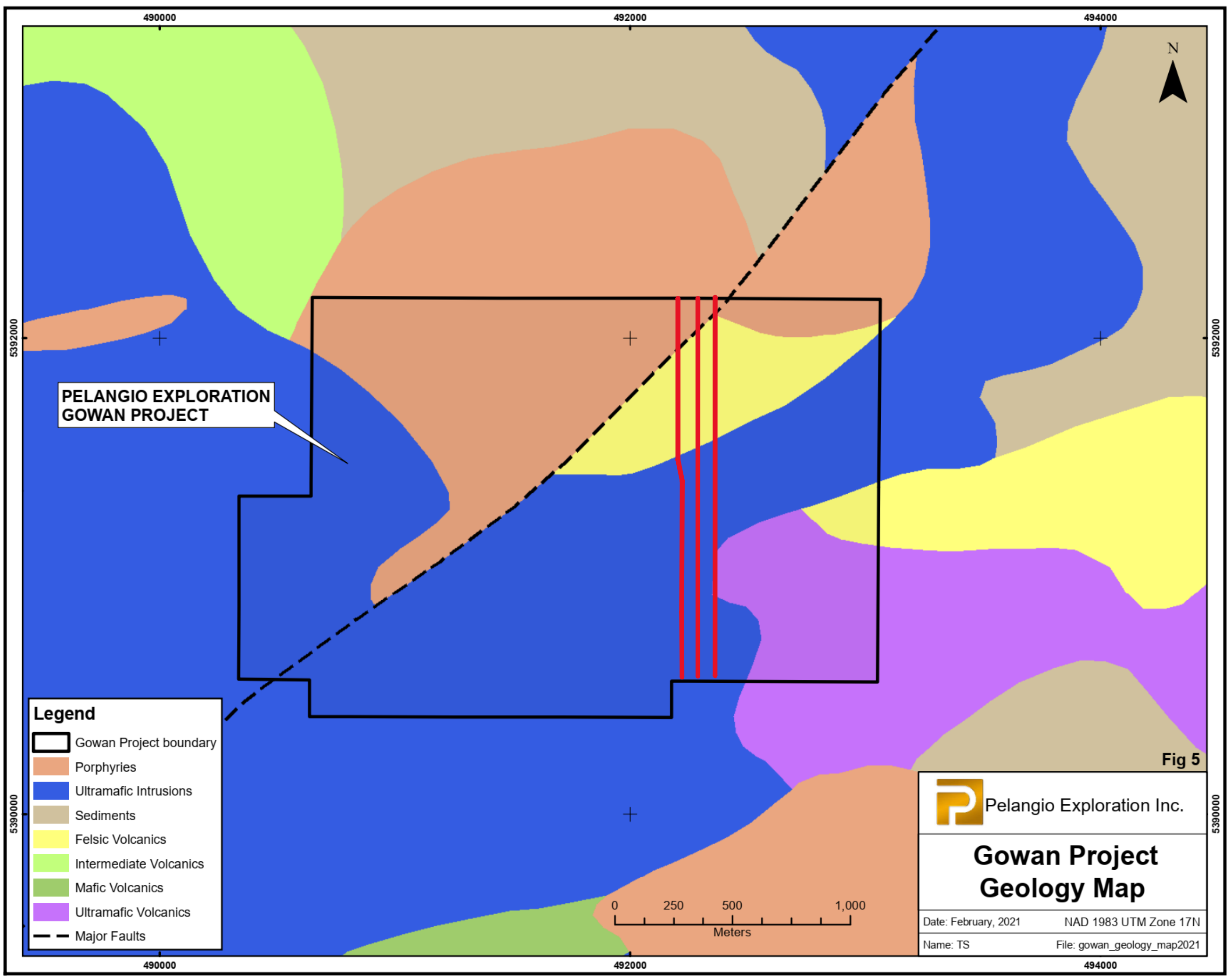


Some limited drill data and airborne geophysical surveys provide some information with respect to the heavily overburden covered Gowan property as interpreted by Burger in the accompanying figure 5. The north-northeastern portion of the property is interpreted to be underlain by a felsic volcanic package and large felsic intrusive body. The southern portion of the property in underlain by both ultamafic volcanics and ultramafic volcanics.

A distinct northeasterly trending fault is interpreted strike across the entire property. This fault is representative of the major structural feature on the property.

With respect to economic potential, historical drilling in the mid 1970's demonstrated the presence of some semi massive sulphide intercepts with associated copper and zinc mineralization associated with felsic volcanics. These intercepts suggest a possible good environment for the discovery of Cu-Zn volcanogenic massive sulphide, (VMS), deposits. The southern portion of the property contains substantial ultramafic volcanics and intrusives, a prospective environment for nickel copper sulphide deposits. It should be noted that the inordinately large VTEM target covers both of these distinct areas. Refer to Figure 6, Property geology with the three survey lines completed by the IP program outlined in red.

PROPERTY GEOLOGY, FIGURE 6, REFERENCE, HOYLE AND GOWAN TOWNSHIPS OGS REPORT 229.



PERSONNEL:

The IP field crew directly responsible for the collection of all the raw survey data were as follows:

J. Francoeur	Timmins, Ontario, Senior Operator
D. Porier	Timmins, Ontario, Senior Operator
G. Martin	Timmins, Ontario, Field Assistant
J. Hamelin	Timmins, Ontario, Senior, Operator
J. Harrold	Connaught, Ontario, Field Assistant
K. Wilson	Timmins, Ontario, Field Assistant
S. Duhan	Timmins, Ontario, Field Assistant
E. Guillmette	Timmins, Ontario, Field Assistant

All of the plotting, interpretation and report was completed by J. C. Grant of Exsics Exploration.

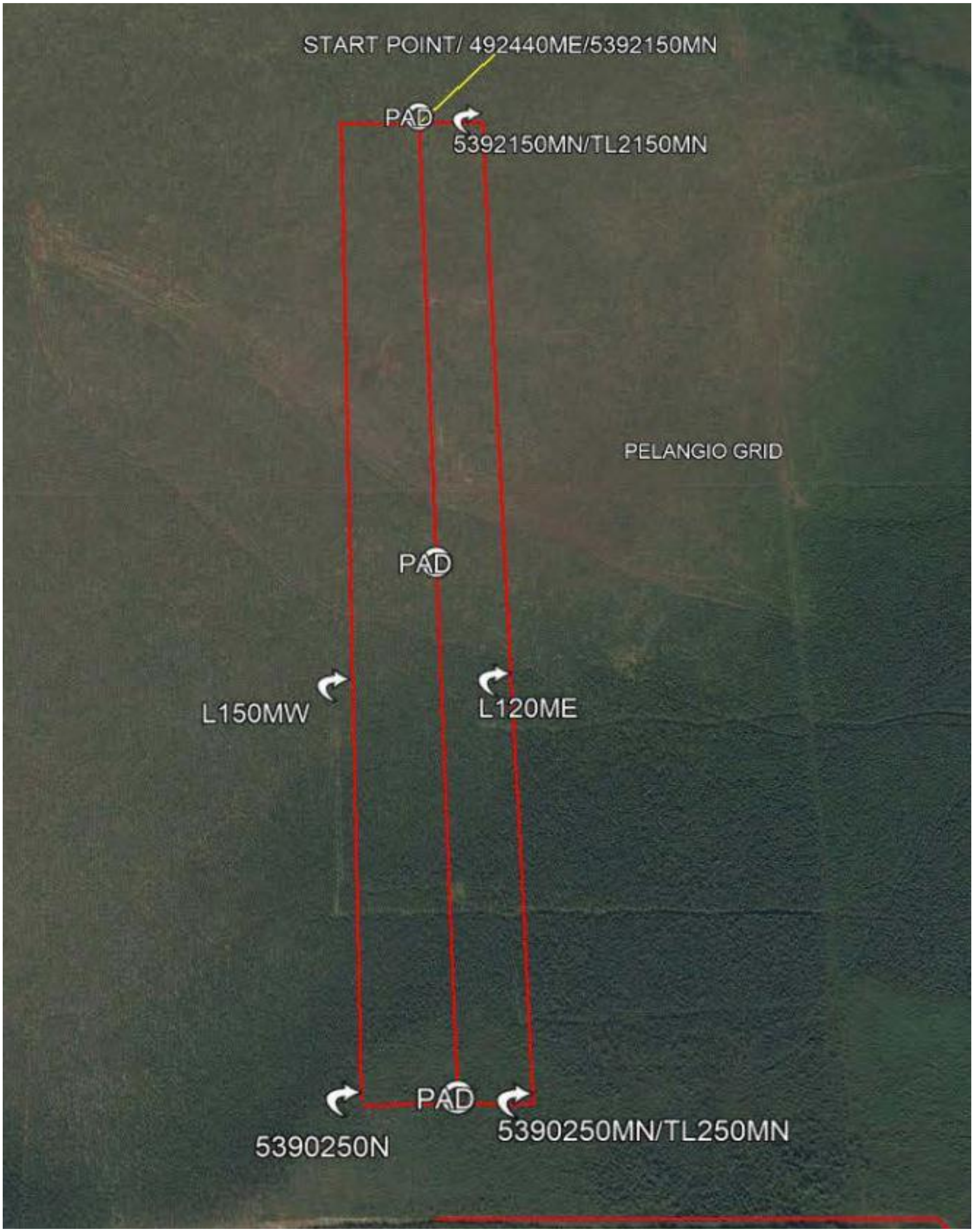
GROUND PROGRAM:

The ground program was completed in two phases. The first phase was to establish 3 grid lines across the VTEM target. The line cutting was flown into the top end of the center line which was labelled line 0/2150MN. A helicopter pad was completed here which was to be used for the IP survey crew. A tie line was cut 120 meters to the east and 150 meters to the west which represented line 120ME and line 150MW.

These three lines were then cut 1900 meters to the south for a distance of 1900 meters. Each line was chained with 25 meter station intervals from 2150MN to 250MN. Two additional pads were cut 850 meters south of the first pad on line 0 and at the southern end, 250 meters north. These pads speeded up the cutting and would be used for the access points for the IP surveys.

The grid was established in what is locally called the Gowan marsh and it was extremely wet so the pads would make for easy crew pick up spots at the end of the day. In all three helicopter pads and approximately 6.3 kilometers of grid lines and tie lines were established across the target area between September 17 and September 21st 2021. Refer to Figure 7, a Google map of the grid layout.

FIGURE 7, GOOGLE PLAN MAP OF THE GRID LAYOUT IN GOWAN TWP.



Once the line cutting was completed the 3 gird lines were covered by an Induced Polarization, (IP), survey using the Instrumentation G.D.D. transmitter and 2 5000 Kwatt transmitters. Two of the grid lines were covered by a total field magnetic survey, Lines 150MW and Line 0. The magnetic survey was completed using the OVERHAUSER GSM-19 proton magnetometer. Specifications for both of these units can be found as Appendix B of this report. The magnetic and IP surveys were completed between November 4th and 6th. The following parameters were kept constant throughout the survey.

IP SURVEY:

Method	Time Domain
IP array	Pole-Dipole array
Electrode spacing	50 meters
Number of electrodes	10 stainless steel
Delay time	240Ms
Transmitter cycle;	2 seconds on 2 seconds off
Line spacing	120 and 150 meters
Parameter measured	Apparent resistivity in ohms/meter
	Chargeability in MV/V
Parameters plotted	Chargeability, Resistivity, Calculated Meal factor

Once the three lines on IP were completed the lines were plotted in individual line pseudo-sections at a scale of 1:2500. The individual color sections are included in this report.

MAGNETIC SURVEY:

Two lines, line 150MW and 0+00 were covered by the magnetic survey during the final day of the program. Rain delays prevented the completion of line 120ME and the extra flying costs did not warrant the completion of the line.

Line spacing:	150 meters
Station spacing:	25 meters
Reading intervals:	12.5 meters
Reference field	56,000 NT
Datum subtracted	55,000NT
Contour intervals	25 gamma intervals

Once the magnetic survey was completed the collected raw data was then plotted onto a base map at scale of 1:2500 and the contoured and colored. A copy of this plan map is included in the report.

SURVEY RESULTS:

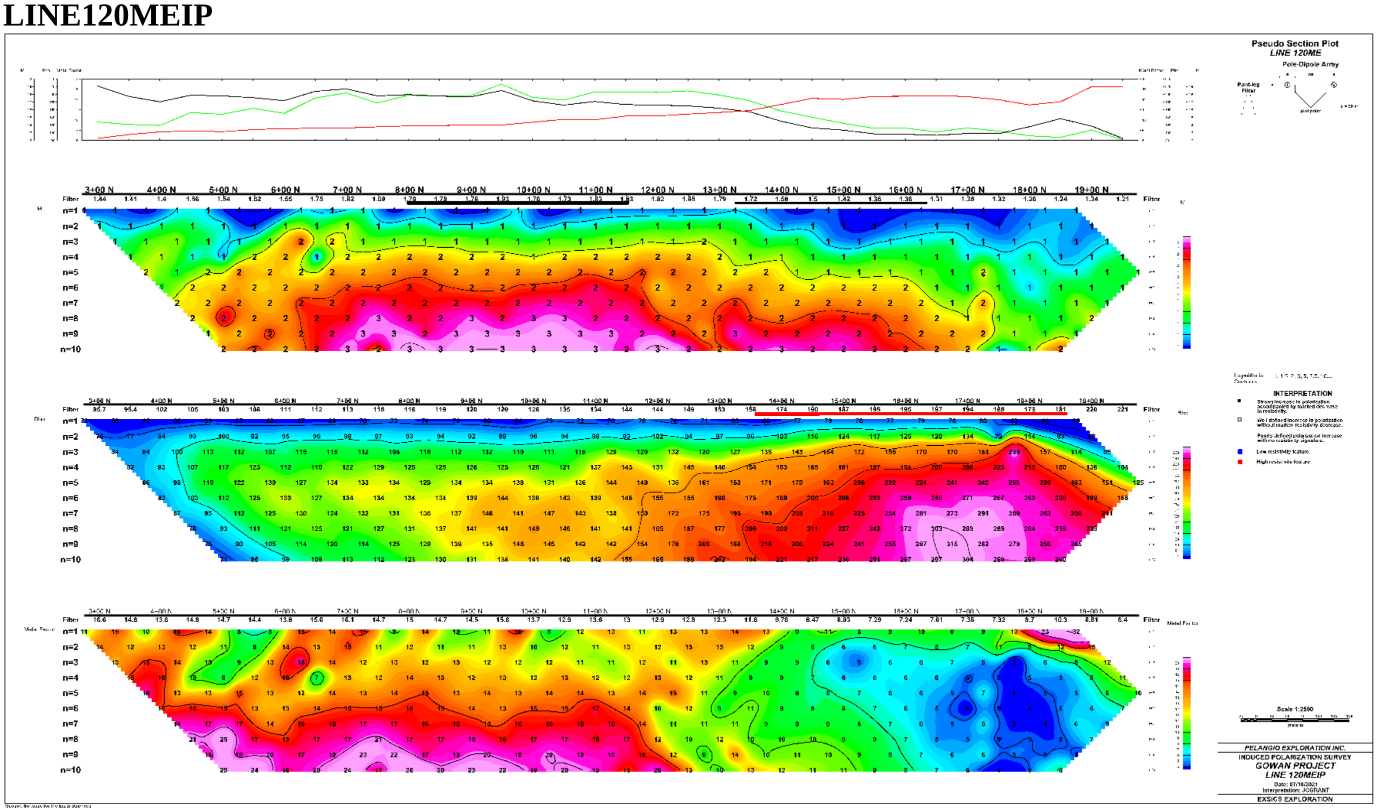
IP SURVEY RESULTS:

LINE 120MEIP:

This line outlined two very deep and weak zones that may represent the tops of the same source at depth or below the search depth range of the current IP program. The northern target lies between 1325MN and 1625MN and appears to be strengthening slightly at depth. This zone has a broad modest resistivity high with a high resistive core lying between 1600MN and 1850MN that continues at depth.

The southern zone lies between 800MN and 1150MN and appears to be slightly stronger than the northern zone. This zone lies on the extreme southern edge of the modest resistivity high to the north. From the magnetic map it would be safe to assume that this zone correlates to the central and northern section of magnetic core zone that is outlined on line 0.

LINE120MEIP

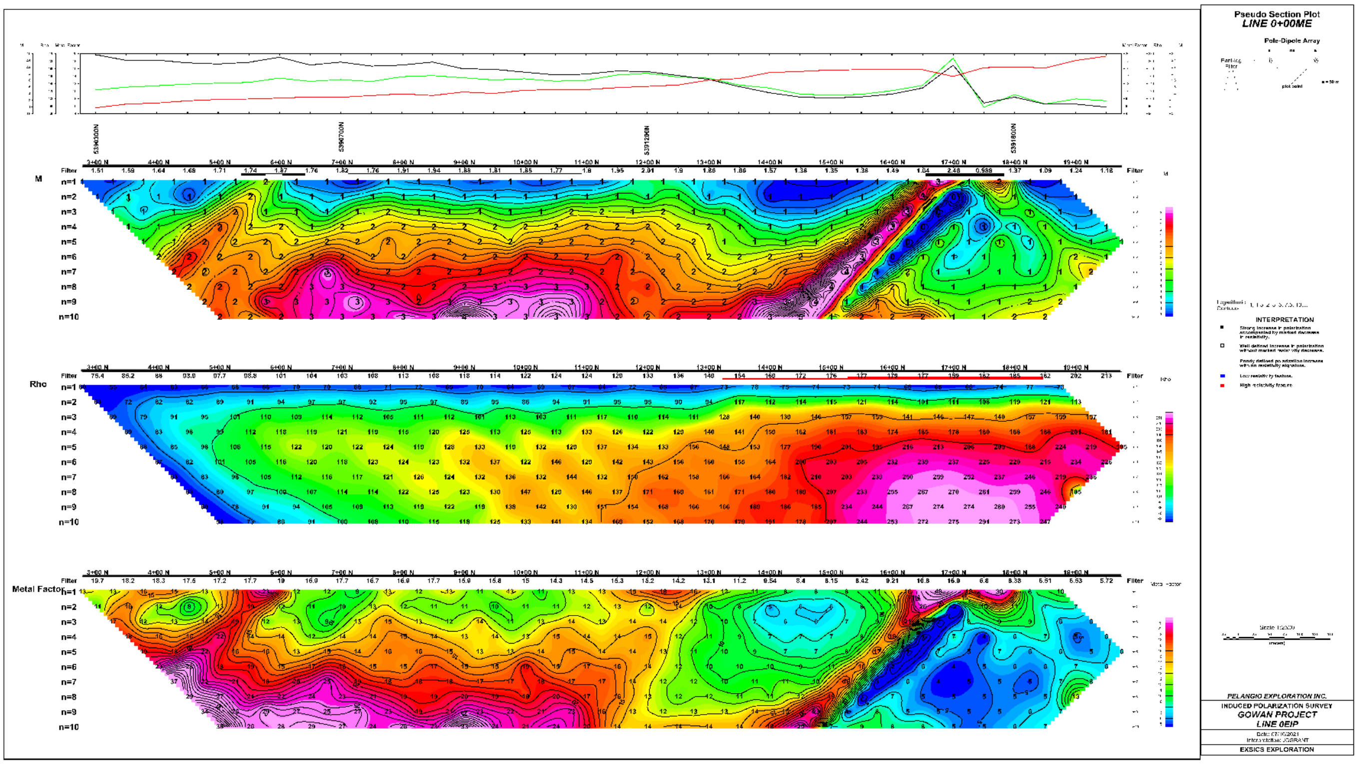


LINE 0MEIP:

The most predominant IP zone lying between 1660MN and 1775MN appears to correlate to the possible drill hole and collar that lies between 1750MN and 1775MN. Of interest is the modest weak IP zone that lies between 1600MN and 1725MN that was noted on the deeper portion of the survey. The zone appears to be strengthening with depth and the southern portion of this zone correlates to a modest magnetic high south of the collar location. The zone also correlates to the southern edge of the stronger portion of the resistivity high.

The area of interest outlined by the IP survey is the deep target situated between 700MN and 1100MN that generally correlates to the magnetic high core and the northern section of the broad magnetic high unit. The IP zone appears to be strengthening with depth. Again the zone lies on the southern flank of the broad resistivity high to the north.

LINE 0MEIP

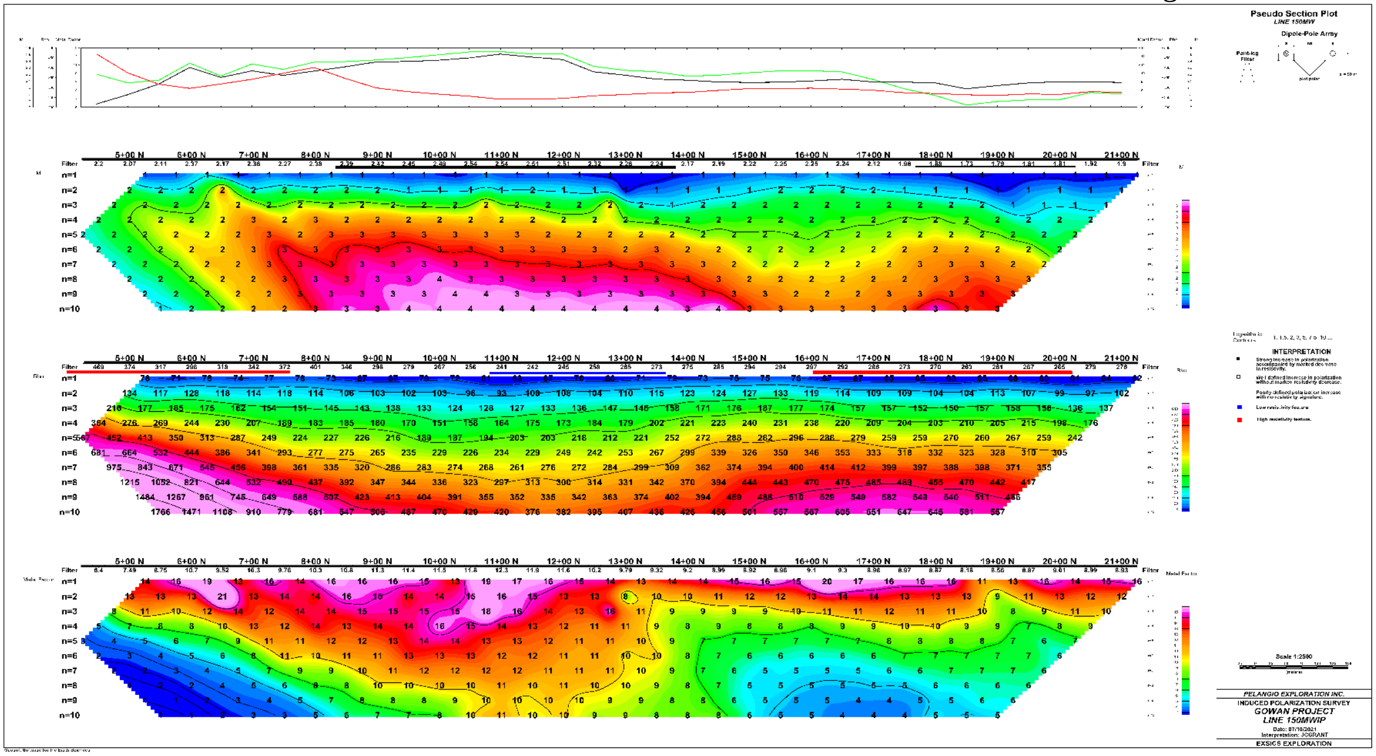


LINE 150MWIP:

This line outlined the main area of interest with the southern IP zone lying between 800MN and 1375MN. The zone correlates to a modest resistivity low situated between two flanking resistivity highs. This zone is the strongest response of the 3 lines and it is strengthening with depth. The zone also correlates to the broad magnetic high unit as well as a modest magnetic low lying between 1000MN and 1075MN.

A second somewhat weaker zone lies between 1775MN and 2025MN that represents a deep zone strengthening at depth. The zone also correlates to a resistivity high at depth. The zone also appears to lie at the extreme western edge of a modest magnetic high.

LINE 150MWIP

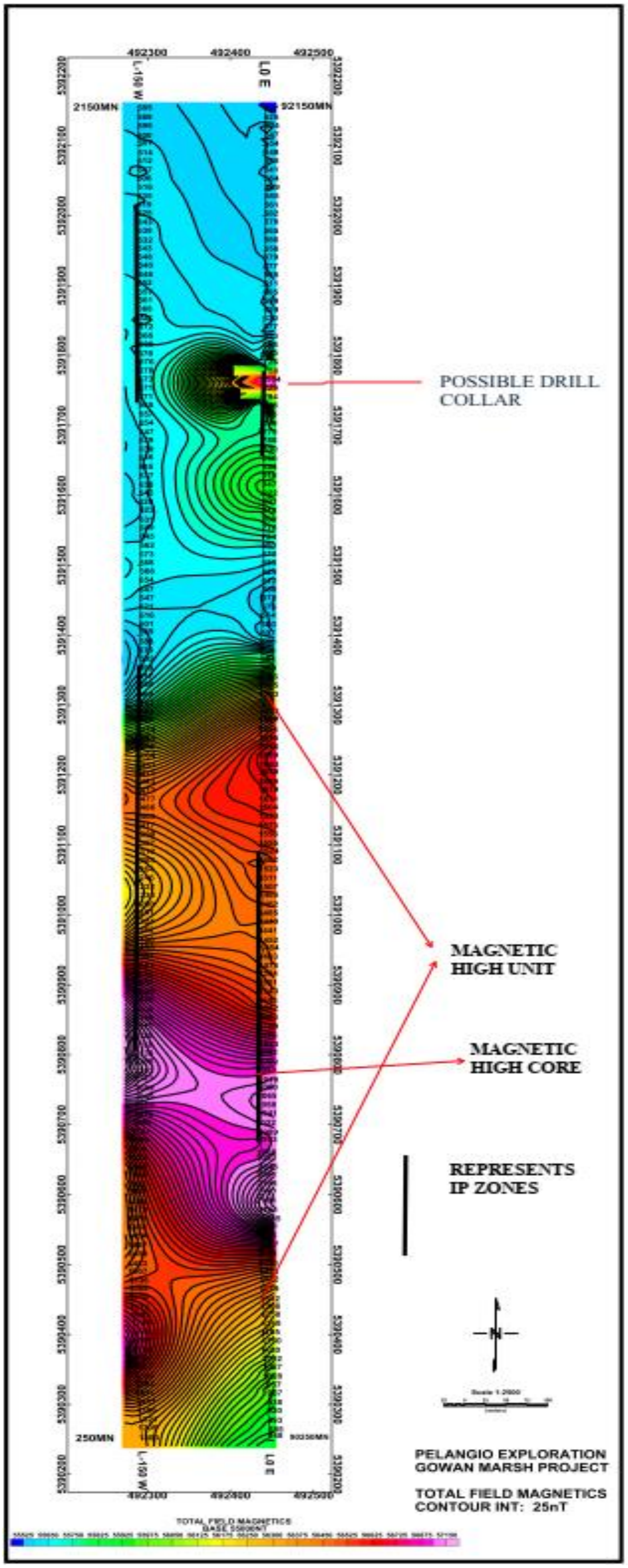


MAGNETIC SURVEY:

The magnetic survey, although somewhat limited, was able to outline the suspected magnetic high structure across both of the lines that were covered by the survey. This magnetic high lies between 5391300MN, (1300MN picket number), and 5390300MN, (300MN picket number). There is a distinctive core to this high that lies between 5390900MN and 5390550MN that is well defined as well on both lines. From the magnetics the suggested dip to the unit would be near vertical to slightly grid north.

The spot magnetic high noted on line 0 at 5391750MN, 1750MN picket number, appears to correlate to the suspected location of a historical drill collar.

MAGNETIC PLAN MAP WITH IP ZONES



CONCLUSIONS AND RECOMMENDATIONS:

The IP survey was successful in outlining a modest zone that generally correlates to the magnetic high unit. The zone is quite deep and appears to strengthen at depth. Lines 0 and 150MW appear to correlate to the magnetic high core within the broader magnetic high unit. At this writing it is recommended to drill the IP zone outlined on line 150MW lying between 800MN and 1375MN. The zone correlates to a modest resistivity low situated between two flanking resistivity highs. This zone is the strongest response of the 3 lines and it is strengthening with depth. The zone also correlates to the broad magnetic high unit as well as a modest magnetic low lying between 1000MN and 1075MN. Follow up drilling would be based on the results of this hole.

Line 0 should be look at closely especially to the north of the existing drill hole. The IP survey suggest that there may be a deep zone just to the north of the drill hole. If the drill logs for the historical hole are available it would advisable to check the logs at the bottom of the hole to see what was interpreted and possibly plan a hole to test this deep unit.

Respectfully submitted

JC Grant,

CET, FGAC, November, 2021

BIBLIOGRAPHY

-Berger, B.R., 1998; Pre-Cambrian Geology, Hoyle and Gowan Townships, Ontario Geological Report 229, Accompanied by Gowan Township Map 2522, Scale 1:20000.

-Middleton, RSM., 1974; Induced Polarization – Resistivity Survey for Alamo Petroleum, East Claim Group, Gowan Township Ontario; Ontario Government Assessment Report.

-Middleton, RSM., 1975; Diamond Drill Report for Alamo Petroleum, Gowan Township; Ontario Government Assessment Report.

-Newmont Mining Corp of Canada Ltd.1977; Diamond Drill Logs and Maps; Ontario Government Assessment Report.

-Ontario Geological Survey, 1988; Airborne Electromagnetic Survey, Timmins Area, Gowan Township, District of Cochrane and Timiskaming Ontario by Geoterrex Limited, for Ontario Geological Survey, Geophysical/Geochemical Series Map 81064. Scale 1:20000. Survey and Compilation from March 1987 to October 1987.

CERTIFICATION

I, John Charles Grant, of 108 Kay Crescent, in the City of Timmins, Province of Ontario, hereby certify that:

1). I am a graduate of Cambrian College of Applied Arts and Technology, 1975, Sudbury Ontario Campus, with a 3 year Honors Diploma in Geological and Geophysical Technology.

2). I have worked subsequently as an Exploration Geophysicist for Teck Exploration Limited, (5 years, 1975 to 1980), and currently as Exploration Manager and Chief Geophysicist for Exsics Exploration Limited, since May, 1980.

3). I am a member in good standing of the Certified Engineering Technologist Association, (CET), since 1984.

4). I am in good standing as a Fellow of the Geological Association of Canada, (FGAC), since 1986.

5). I have been actively engaged in my profession since the 15th day of May, 1975, in all aspects of ground exploration programs including the planning and execution of field programs, project supervision, data compilation, interpretations and reports.

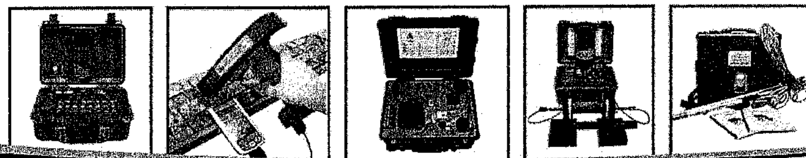
6). I have no specific or special interest nor do I expect to receive any such interest in the herein described property. I have been retained by the property holders and or their Agents as a Geological and Geophysical Consultant and Contract Manager.

John Charles Grant, CET., FGAC

GEOLOGICAL ASSOCIATION OF CANADA
JOHN GRANT
FELLOW

APPENDIX A

INSTRUMENTATION GDD INC.



Canadian Manufacturer of Geophysical Instrumentation since 1976
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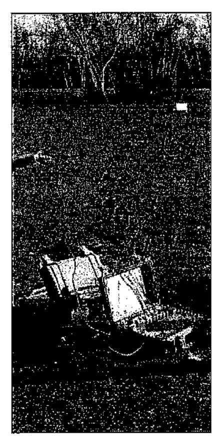
IP Receiver Model GRx8-32

«Field users have reported that the GDD IP Receiver provided more reliable readings than any other time domain IP receiver and it reads a few additional dipoles. »

FEATURES

- 8 channels expandable to 16, 24 or 32
- Reads up to 32 ch. simultaneously in poles or dipoles
- PDA menu-driven software / simple to use
- 32 channels configuration allows 3D Survey:
  4 lines X 8 channels - 2 lines X 16 channels
  1 line X 32 channels
- Link to a PDA by wireless communication or a serial cable
- Real-time data and automatic data stacking (Full Wave)
- Screen-graphics: decay curves, resistivity, chargeability
- Automatic SP compensation and gain setting
- 20 programmable chargeability windows
- Survey capabilities: Resistivity and Time domain IP
- One 24 bit A/D converter per channel
- Gain from 1 to 1,000,000,000 (10^9)
- Shock resistant, portable and environmentally sealed



GRx8-32: This new receiver is a compact and low consumption unit designed for high productivity Resistivity and Induced Polarization surveys. Its high ruggedness allows it to work under any field conditions.

User modes available: Arithmetic, logarithmic, semi-logarithmic, Cole-Cole, IPR-12 and user defined.

IP display: Chargeability values, Resistivity values and IP decay curves can be displayed in real time. The GRx8-32 can be used for monitoring the noise level and checking the primary voltage waveform.

Internal memory: A 4 Go (or more) Compact Flash memory card is used to store the readings. Each reading includes the full set of parameters characterizing the measurements for all channels; the full wave signal for post-treatment processing. The data is stored in flash type memory not requiring any battery power for safekeeping.

Manufactured in Canada by Instrumentation GDD Inc.

New IP Receiver Model GRx8-32 with PDA

GRX8-32: This new receiver is a compact and low consumption unit designed for high productivity Resistivity and Induced Polarization surveys. It features high ruggedness allowing to work in any field conditions

Reception poles/dipoles: 8 simultaneous channels expandable to 16, 24 or 32, for dipole-dipole, pole-dipole or pole-pole arrays.

Programmable windows: The GRX8-32 offers twenty fully programmable windows for a higher flexibility in the definition of the IP decay curve.

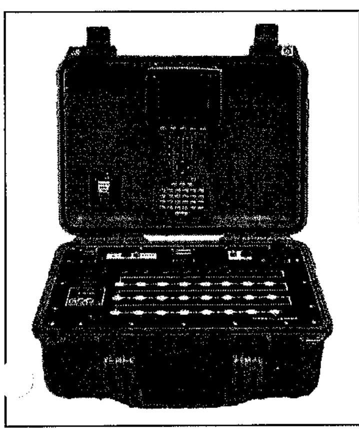
User modes available: Arithmetic, logarithmic, semi-logarithmic, Cole-Cole and user define.

IP display: Chargeability values, Resistivity values and IP decay curves can be displayed in real time. The GRX8-32 can be used for monitoring the noise level and checking the primary voltage waveform.

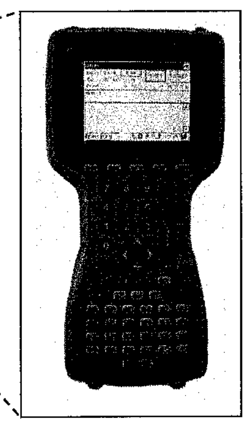
Internal memory: The memory of 64 megabytes can store 64,000 readings. Each reading totalizes one kilobyte and includes the full set of parameters characterizing the measurements on 8 channels. The data is stored in flash memories not requiring any lithium battery for safeguard. The memory can hold many days worth of data. It also stores fullwave form of the signal at each electrode for post-treatment.

Features:

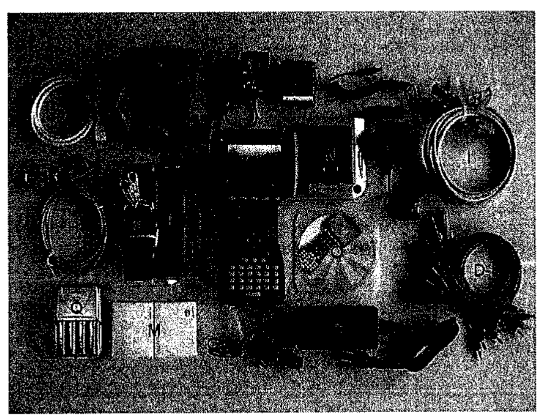
- 8 channels expandable to 16, 24 or 32
- Reads up to 32 ch. simultaneously in poles or dipoles configuration
- PDA menu-driven software / simple to use
- 32 channels configuration allows 3D Survey: 4 lines X 8 channels, 2 lines X 16 channels or 1 line X 32 channels
- Link to a PDA by Bluetooth or RS-232 port
- Real-time data and automatic data stacking
- Self-test diagnostic
- Screen-graphics: decay curves, resistivity, chargeability
- Automatic SP compensation and gain setting
- 20 programmable chargeability windows
- Survey capabilities: Resistivity and Time domain IP
- One 24 bit A/D converter per channel
- Gain from 1 to 1,000,000,000 (10^8)
- Shock resistant, portable and environmentally sealed



GDD IP Receiver model GRx8-32



PDA included with GRX8-32 Standard Juniper - Allegro CX mobile PDA

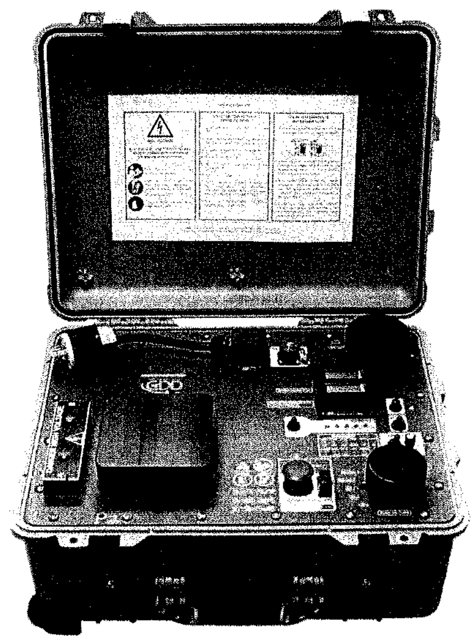


Components included with GDD IP Receiver GRx8-32

IP Transmitter

Model TxII
5000W-2400V-15A

Instruction Manual



INSTRUMENTATION GDD INC.

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Tel.: +1 (418) 877-4249
Fax: +1 (418) 877-4054
E-Mail: gdd@gdd.ca
Web site: www.gdd.ca

6. MASTER / SLAVE MODE

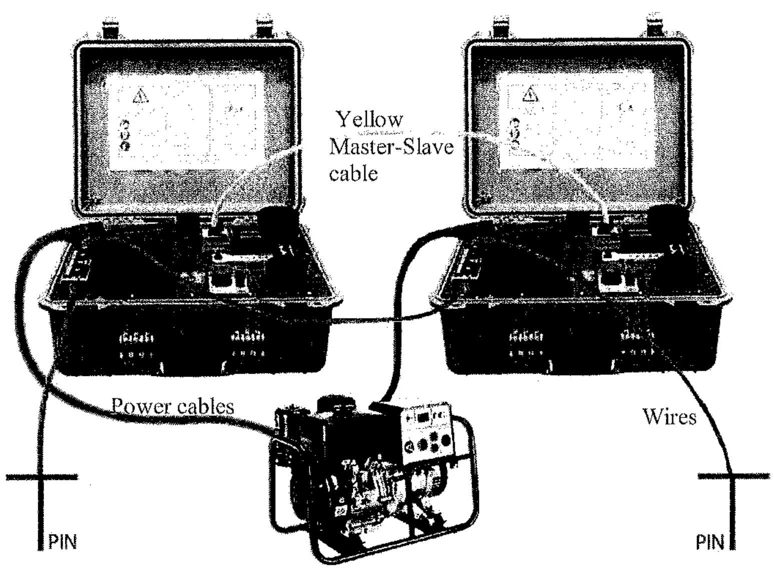
Here are the basic steps for a Master/Slave operation of the TxII:

1. Connect the yellow synchronization cable (Master/Slave) to the transmitters. The Master/Slave cable terminations are different: one is labeled *MASTER* and the other one *SLAVE*. The transmitter is *MASTER* or *SLAVE* according to the termination of the cable connected on its interface. The *MASTER* and *SLAVE* LEDs indicate the mode of each transmitter. (see figure 2, yellow line)

2. Connect an insulated wire between the terminal (A) of one transmitter and the terminal (B) of the other one. (see figure 2, blue line)

3. Connect the two power cables from the transmitters to the generator. (see figure 2, red lines)

4. Drive the electrodes into the ground and connect them to the unused terminals (A) and (B) by using insulated wires. (see figure 2, blue lines)



9. SPECIFICATIONS

Size :	TxII-5000W with a blue carrying case: 34 x 52 x 76 cm TxII-5000W only: 26 x 45 x 55 cm
Weight :	TxII-5000W with a blue carrying case: ~ 58 kg TxII-5000W only: ~ 40 kg
Operating Temperature :	-40°C to 65°C (-40°F to 150°F)
Time Base:	2 s ON+, 2 s OFF, 2 s ON- DC, 1, 2, 4, 8 or 16 s
Output current :	0.030A to 15A (normal operation) 0.0A to 15A (cancel open loop) Maximum of 7.5A in DC mode
Rated Output Voltage :	150V to 2400V Up to 4800V in a master/slave configuration
LCD Display :	Output current, 0.001A resolution Output power Ground resistance (when the transmitter is turned off)
Power source :	220-240V / 50-60Hz

APPENDIX B

v7.0

Overhauser

Magnetometer / Gradiometer / VLF (GSM-19 v7.0)

GEM's unique Overhauser system combines data quality, survey efficiency and options into an instrument that matches costlier optically pumped Caesium devices.

And the latest v7.0 technology upgrades provide even more value:

Data export in standard XYZ (i.e. line-oriented) format for easy use in standard commercial software programs

Programmable export format for full control over output

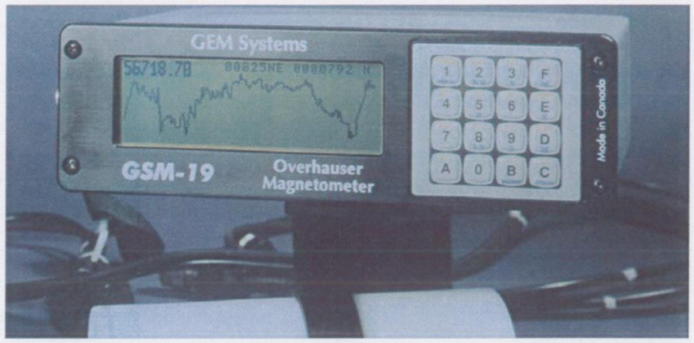
GPS elevation values provide input for geophysical modeling

Enhanced GPS positioning resolution
<1.5m standard GPS for high resolution surveying
<1.0m OmniStar GPS
<0.7m for newly introduced CDGPS

Multi-sensor capability for advanced surveys to resolve target geometry

Picket marketing / annotation for capturing related surveying information on-the-go

And all of these technologies come complete with the most attractive savings and warranty in the business!



Overhauser (GSM-19) console with sensor and cable. Can also be configured with additional sensor for gradiometer (simultaneous) readings.

The GSM-19 v7.0 Overhauser instrument is the total field magnetometer / gradiometer of choice in today's earth science environment -- representing a unique blend of physics, data quality, operational efficiency, system design and options that clearly differentiate it from other quantum magnetometers.

With data quality exceeding standard proton precession and comparable to costlier optically pumped cesium units, the GSM-19 is a standard (or emerging standard) in many fields, including:

- Mineral exploration (ground and airborne base station)
- Environmental and engineering
- Pipeline mapping
- Unexploded Ordnance Detection
- Archeology
- Magnetic observatory measurements
- Volcanology and earthquake prediction

Taking Advantage of the Overhauser Effect

Overhauser effect magnetometers are essentially proton precession devices -- except that they produce an order-of-magnitude greater sensitivity. These "supercharged" quantum magnetometers also deliver high absolute accuracy, rapid cycling (up to 5 readings / second), and exceptionally low power consumption.

The Overhauser effect occurs when a special liquid (with unpaired electrons) is combined with hydrogen atoms and then exposed to secondary polarization from a radio frequency (RF) magnetic field.

The unpaired electrons transfer their stronger polarization to hydrogen atoms, thereby generating a strong precession signal -- that is ideal for very high-sensitivity total field measurements.

In comparison with proton precession methods, RF signal generation also keeps power consumption to an absolute minimum and eliminates noise (i.e. generating RF frequencies are well out of the bandwidth of the precession signal).

In addition, polarization and signal measurement can occur simultaneously -- which enables faster, sequential measurements. This, in turn, facilitates advanced statistical averaging over the sampling period and/or increased cycling rates (i.e. sampling speeds).

Other advantages are described in the section called, "GEM's Commercial Overhauser System" that appears later in this brochure.

Key System Components

Key components that differentiate the GSM-19 from other systems on the market include the sensor and data acquisition console. Specifications for components are provided on the right side of this page.

Sensor Technology

GEM's sensors represent a proprietary innovation that combines advances in electronics design and quantum magnetometer chemistry.

Electronically, the detection assembly includes dual pick-up coils connected in series opposition to suppress far-source electrical interference, such as atmospheric noise. Chemically, the sensor head houses a proprietary hydrogen-rich liquid solvent with free electrons (free radicals) added to increase the signal intensity under RF polarization.

From a physical perspective, the sensor is a small size, light-weight assembly that houses the Overhauser detection system and fluid. A rugged plastic housing protects the internal components during operation and transport.

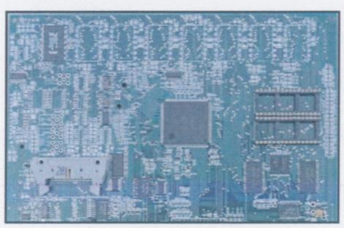
All sensor components are designed from carefully screened non-magnetic materials to assist in maximization of signal-to-noise. Heading errors are also minimized by ensuring that there are no magnetic inclusions or other defects that could result in variable readings for different orientations of the sensor.

Optional omni-directional sensors are available for operating in regions where the magnetic field is near-horizontal (i.e. equatorial regions). These sensors maximize signal strength regardless of field direction.

Data Acquisition Console Technology

Console technology comprises an external keypad / display interface with internal firmware for frequency counting, system control and data storage / retrieval. For operator convenience, the display provides both monochrome text as well as real-time profile data with an easy-to-use interactive menu for performing all survey functions.

The firmware provides the convenience of upgrades over the Internet via the GEMLinkW software. The benefit is that instrumentation can be enhanced with the latest technology without returning the system to GEM -- resulting in both timely implementation of updates and reduced shipping / servicing costs.



About GEM Advanced Magnetometers

GEM Systems, Inc. delivers the world's only magnetometers and gradiometers with built-in GPS for accurately-positioned ground, airborne and stationary data acquisition. The company serves customers in many fields including mineral exploration, hydrocarbon exploration, environmental and engineering, Unexploded Ordnance Detection, archeology, earthquake hazard prediction and observatory research.

Key products include the QuickTracker™ Proton Precession, Overhauser and SuperSenser™ Optically-Pumped Potassium instruments. Each system offers unique benefits in terms of sensitivity, sampling, and acquisition of high-quality data. These core benefits are complemented by GPS technologies that provide metre to sub-metre positioning.

With customers in more than 50 countries globally and more than 20 years of continuous technology R&D, GEM is known as the only geophysical instrument manufacturer that focuses exclusively on magnetic technology advancement.

"Our World is Magnetic"

Specifications

Performance

Sensitivity:	< 0.015 nT / √Hz @ 1 Hz
Resolution:	0.01 nT
Absolute Accuracy:	+/- 0.1 nT
Range:	10,000 to 120,000 nT
Gradient Tolerance:	> 10,000 nT/m
Samples at:	60+, 5, 3, 2, 1, 0.5, 0.2 sec
Operating Temperature:	-40C to +55C

Operating Modes

Manual: Coordinates, time, date and reading stored automatically at minimum 3 second interval.

Base Station: Time, date and reading stored at 3 to 60 second intervals.

Remote Control: Optional remote control using RS-232 interface.

Input / Output: RS-232 or analog (optional) output using 6-pin weatherproof connector.

Storage - 16 MB (# of Readings)

Mobile:	738,769
Base Station:	2,708,821
Gradiometer:	625,112
Walking Mag:	1,354,410

Dimensions

Console:	223 x 69 x 240 mm
Sensor:	175 x 75mm diameter cylinder

Weights

Console with Belt:	2.1 kg
Sensor and Staff Assembly:	1.0 kg

Standard Components

GSM-19 console, GEMLinkW software, batteries, harness, charger, sensor with cable, RS-232 cable, staff, instruction manual and shipping case.

Optional VLF

Frequency Range: Up to 3 stations between 15 to 30.0 kHz

Parameters: Vertical in-phase and out-of-phase components as % of total field. 2 components of horizontal field amplitude and total field strength in pT.

Resolution: 0.1% of total field

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