

Α

REPORT

0F

A VLF EM SURVEY
ON PART OF
THE TECK PROJECT
QUEENSTON GOLD MINES LIMITED

TECK TOWNSHIP, ONTARIO

INTRODUCTION

The property covered by this report is part of a large parcel held by Queenston Gold Mines Limited.

During the summer of 1977, line cutting, geological mapping and a VLF EM survey were completed to satisfy assessment requirements.

LOCATION AND DESCRIPTION

The claims are located in the southwest corner of Teck Township. They extend southerly to the south boundary of the township and westerly to within $1\frac{1}{2}$ miles of the west boundary of the township.

The Village of Swastika lies within the block which is crossed by Highway 66, the Ontario Northland Railway, the Northern Ontario & Central Gas pipe line, power lines of the Ontario Hydro, the Blanche River, the Amikougami Creek and an extensive network of secondary roads.

The following 15 claims are covered by this report for assessment credits:

- L. 476602
- L. 476198-99-200-201
- L. 476232-33
- L. 476313
- L. 476561-62-63
- L. 476566
- L. 476778-79
- L. 491177

HISTORY

Gold was discovered on the group in 1911. A 900' shaft, with extensive development to the 725' level, was sunk on claim L. 2696 from

which 88,887 tons of production grading 0.31 oz./ton were recovered. Surface drilling has been extensive with the last program being done in 1974-75. The shaft and immediate property are commonly known as the Golden Gate.

A second shaft, 75 feet deep known as the Trout Creek, was sunk in 1928 in the southwest corner of claim L. 16477 on a spectacular gold showing. Limited drilling and underground development found only low grade values.

The entire property has been extensively prospected with many pits and trenches now covered or full of debris. A short adit (caved) occurs on L. 476200.

0.D.M. publication, Vol. 57, Part 5, 1948 with map 1945-1 by J.E. Thomson describes the geology of Teck Township. No detailed mapping of the township has been published since that time.

However, in the last 10 years, R.H. Ridler, formerly of the Geological Survey of Canada and now with Newmont Mining Corp. has published a number of papers on the Kirkland Lake Area and has questioned the accepted versions of geology and ore genesis. More recently, L.S. Jensen of the Geological Branch of the Ontario Ministry of Natural Resources has been studying certain aspects of the geology of Teck Township.

GEOLOGY OF THE GROUP

The area covered by the mapping straddles the Temiskaming sediments/volcanic contact for a length of approximately 9,000 feet. This contact area is marked by highly deformed rocks and is commonly referred to as the Larder Lake "Break". Across the map area, the contact area has been apparently intruded (?) by a persistent syenite porphyry dike 400 to 500 feet in width. Carbonate rocks containing carbonate in varying amounts are common along the contact area and particularly in close proximity to the syenite porphyry. Whether this carbonate is of primary or secondary origin is still of continuing debate.

Immediately north of the contact area (i.e. near the top of the Temiskaming series) the sediments differ distinctly from the older underlying units to the north. All of the sediments face south and dip steeply south. While the older units are a monotonous interlayered sequence of conglomerate and greywacke, the upper units vary from east to west, being a uniform sized clastic rock with pronounced black graphite clasts within a grey arkosic matrix in the west and in the east a dense dark rock with deep red clasts in a fine grained dark matrix.

No tuffs were identified.

An irregular horizon of syenite porphyry within the sediments extends across the central part of the property. It has associated carbonate rocks and gold mineralization occurring with the Trout Creek structure.

In the north part of the property an extensive, uniform sill of mafic syenite 1,000 to 1,500 feet wide extends across the property.

Irregular bodies of mafic syenite occur with the volcanics.

The volcanics are predominantly Komatiitic basalts highly altered and deformed near the sedimentary contact area but to the east they show recognizable northerly strikes and interflow sedimentary horizons.

A narrow band of volcanic flow rocks paralleling the highway between Lines 16W and 8E of the north grid appear to be interbedded with the sediments.

Gold mineralization at the Golden Gate mine is associated with wide quartz veins which appear related to the syenitic rocks which intrude the mafic volcanics. At the Trout Creek, gold mineralization appears related to syenitic rocks within the sediments.

ECONOMIC GEOLOGY

Gold has been produced from the Golden Gate mine where quartz veins associated with felsic intrusives have been mined. This occurrence is illustrated in figures 2, 3 and 4.

At the Trout Creek property a spectacular but small surface exposure of gold (production 1 ton grading 81 oz./ton) was associated with a pyritized carbonatized quartz vein in syenite porphyry. A 78' shaft with about 200 feet of development at the bottom failed to locate

an extension of the values. (Figure 5.) Trenching and diamond drilling traced the structure for 800 feet to the southwest to yield low values both on surface and in drilling.

Graphitic shale has been found near the top of a grit rich in graphite-chert clasts and foliations of graphite. In addition, heavy graphite with massive pyrite had been found in the mine dump of the Golden Gate property and massive pyrite is mentioned in the old records of underground development. Graphitic shale was encountered in drill hole 74Λ -2, located near the south boundary of claim L. 476200. For these reasons it was decided to complete a VLF EM survey, hopefully to locate the graphite-pyrite horizons.

FIELD PROCEDURE

Utilizing the north/south grid lines, the property was traversed in a series of loops to the north and south of the base lines. Readings, (dip angle only) were taken every 100 feet.

A discussion of the VLF EM technique is attached as an appendix.

INTERPRETATION OF RESULTS

The conductive zones are marked in orange on the accompanying map.

Strong conductors are indicated along the railroad, the gas line and the powerlines. They require no discussion.

From north to south the other conductors are briefly described.

Conductors A, B, C. D. - Located north of the north base line, these conductors show a distinct correlation with the interface between outcrop and swamp.

<u>Conductors</u> E, F, G, H. - Located south of the north base line and north of Highway 66, these zones show a close relationship to swamp and/or the interface between swamp and outcrop.

Conductors J, K, L, M, N. - Located south of Highway 66, in the east part of the property, are interpreted as follows:

J & K - are the result of surficial conductive overburden found in the low ground near Amikougami Creek.

L - is located at the edge of a small area of mine tailings against a large outcrop.

 $\underline{\mathtt{M}}$ - is located at the edge of a swamp adjoining an extensive area of outcrop.

 \underline{N} - identifies the edge of a large swamp lying south of and parallel to the railway in claims L.476602 and L.491177.

CONCLUSIONS AND RECOMMENDATIONS

The VLF EM survey failed to identify any conductive zone which cannot reasonably be interpreted as due to conductive overburden. A magnetometer survey was completed over the same area in 1974. It was studied by the writer but did not add information that could be utilized in interpreting either this geophysical survey or the geology.

It is concluded that the graphite-pyrite zones are too small and discontinuous for detection.

Further VLF EM surveys are not recommended for property.

Signed

L.J. Cunningham, B.Sc., P.Hug.,

Mining Engineer.

Dated at

Kirkland Lake, Ontario

2nd October, 1978.



GEOLOGICAL REPORT

ON PART OF

THE TECK PROJECT AREA
QUEENSTON GOLD MINES LIMITED
TECK TOWNSHIP, ONTARIO

INTRODUCTION

The property covered by this report is part of a large parcel held by Queenston Gold Mines Limited.

During the survey of 1977 line cutting, geological mapping and a VIF EM survey were completed to satisfy assessment requirements.

Dr. R. G. Roberts, University of Materloo, Materloo, Ontario studied certain aspects of the subject area this summer on behalf of Queenston Gold Mines. He collaborated with the writer in identifying certain rock types. His professional assistance and ready co-operation were appreciated.

LOCATION AND DESCRIPTION

The claims are located in the southwest corner of Teck Township. They extend southerly to the south boundary of the township and westerly to within l_2^1 miles of the west boundary of the township.

The Village of Swastika lies within the block which is crossed by Highway 66, the Ontario Morthland Railway, the Northern Ontario & Central Gas pipe line, power lines of the Ontario Hydro, the Blanche Eiver, the Amikougami Creek and an extensive network of secondary roads.

The following 15 claims are covered by this report for assessment credits:

L. 476602

L. 476198-99-200-201

L. 476232-33

L. 476313

I.. 476561-62-63

L. 476566

L. 476778-79

L. 491177

Water Durand Red Co.

HISTORY

Gold was discovered on the group in 1911. A 900' shaft, with extensive development to the 725' level, was sunk on claim L.2696 from which 88,887 tons of production grading 0.31 oz./ton were recovered. Surface drilling has been extensive with the last program being done in 1974-75. The shaft and immediate property are commonly known as the Golden Gate.

A second shaft, 75 feet deep known as the Trout Creek, was sunk in 1928 in the southwest corner of claim L.16477 on a spectacular gold showing. Limited drilling and underground development found only low grade values.

The entire property has been extensively prospected with many pits and trenches now covered or full of debris. A short adit (caved) occurs on I.0476200.

O.D.M. publication, Vol. 57, Part 5, 1948 with map 1945-1 by J. E. Thomson describes the geology of Teck Township. No detailed mapping of the township has been published since that time.

However, in the last 10 years, R. H. Ridler, formerly of the Geological Survey of Canada and now with Newmont Mining Corp. has published a number of papers on the Kirkland Lake Area and has questioned the accepted versions of geology and ore genesis. More recently, L. S. Jensen of the Geological Branch of the Ontario Ministry of Natural Resources has been studying certain aspects of the geology of Teck Township.

GENERAL GROLOGY

From O.D.M. Vol. 57, Part 5, Pages 5 - 6:

The consolidated rocks of the area are Precambrian in age; the formations of economic interest belong to the earlier Precambrian era and consist of volcanies, sediments, and intrusives. Stratigraphical and structural studies show that the early Precambrian volcanic and sedimentary formations are greatly deformed by folding and faulting. They are separated by a great erosional and structural unconformity into

two main age groups. The older group consists of the volcanics that underlie the northern and southern parts of the area; these belong to the Keewatin period. The younger sedimentary-volcanic complex is classified as part of the Timiskaming series. It is predominantly sedimentary in character, but a number of horizons of volcanics and pyroclastics are interbedded with the sediments.

Throughout the Keewatin series there are bodies of gabbro and diorite. The larger masses are undoubtedly intrusive into the Keewatin series and appear to intrude the basal formations of the Timiskaming series. Some of the narrower bands assigned to this group may be coarse-grained phases of thick lava flows.

The above-mentioned formations are cut by irregular bodies and dikes of intrusives, which range from acid to basic in composition. These are classified as Algoran in age. A few post-Algoran diabase dikes are also found. Along certain zones of intense shearing in the volcanics and sediments there has been replacement by siliceous carbonate solutions, forming the so-called carbonated rocks or "dolomite"."

GEOLOGY OF THE GROUP

The area covered by the mapping straddles the Temiskaming sediments/volcanic contact for a length of approximately 9,000 feet. This contact area is marked by highly deformed rocks and is commonly referred to as the Larder Lake "Break". Across the map area, the contact area has been apparently intruded (?) by a persistent syenite porphyry dike 400 to 500 feet in width. Carbonate rocks containing carbonate in varying amounts are common along the contact area and particularly in close proximity to the syenite porphyry. Whether this carbonate is of primary or secondary origin is still of continuing debate.

Immediately north of the contact area (i.e. near the top of the Temiskaming series) the sediments differ distinctly from the older underlying units to the north. All of the sediments face south and dip steeply south. While the older units are a monotonous interlayered sequence of conglomerate and greywacke, the upper units vary from east clastic

to west, being a uniform sized/rock with pronounced black graphite clasts within a grey arkosic matrix in the west and in the east a dense dark rock with deep red clasts in a fine grained dark matrix.

No tuffs were identified.

An irregular horizon of syenite porphyry within the sediments extends across the central part of the property. It has associated carbonate rocks and gold mineralization occurring with the Trout Creek structure.

In the north part of the property an extensive, uniform sill of mafic syenite 1,000 to 1,500 feet wide extends across the property. Irregular bodies of mafic syenite occur with the volcanics.

The volcanics are predominantly Komatiitic basalts highly altered and deformed near the sedimentary contact area but to the east they show recognizable northerly strikes and interflow sedimentary horizons.

flow

A narrow band of volcanic vrocks paralleling the highway between Lines 16W and 8E of the north grid appear to be interbedded with the sediments.

Gold mineralization at the Golden Gate mine is associated with wide quartz veins which appear related to the syenitic rocks which intrude the mafic volcanics. At the Trout Creek, gold mineralization appears related to syenitic rocks within the sediments.

DESCRIPTION OF LOCK TYPES

1. Mafic Volcanies

Near the contact area, the volcanics are highly deformed and altered - often reduced to talc chlorite schist with prominent hard knobs or lumps which resemble stretched clasts. Away from the contact and particularly to the east and south the rock is dense, fine grained with a brown "elephant hide" weathered surface and a black-grey fresh appearance. Spinifex and polysuturing have been noted in numerous locations. The rock is often attracted to a magnet. Many of the outcrops are laced

by large and complex joints and sutures to a degree that crude pillow structures are suggested. These are not pillows but appear to be a development of the polygonal jointing. Toward the east boundary and particularly within 500 feet of the east boundary of claims 476199 and 476232, the flows become interbedded with narrow 1" -- 6" horizons of fine grained interflow greywacke-chert rich in pyrite and sometimes magnetite. These units have a consistent north strike over several thousands of feet with easterly dip varying from 60° to 85°. The writer was unable to determine the attitude of the volcanics near the contact because of their altered and disturbed nature.

The presence of a narrow band of mafic volcanics along the north side of Highway 66 from lines 167 to 28 is puzzling. A beautiful exposure of spinifex confirms the rock as a flow. The unit is exposed between the diabase on the south and the conglomerate grit to the north, and appears to occur within the sediments. Mafic volcanics are unknown within the Temiskaming sediments in Teck Township but do exist 2 miles to the west in Grenfell Township.

A small exposure of mafic volcanics can be seen at station 1N on Line 12W of the north grid. Located by the writer, it was confirmed by R. G. Roberts. It appears to be bedrock but an element of doubt remains with the writer.

2. Sediments

Thomson report on Teck Township, O.D.M. Vol. 57, Part 5, Page 7 states:

"In field mapping the Timiskaming series may be conveniently divided into two main lithological groups. These consist of (1) conglomerate and greywacke and (2) pyroclastics with small amount of trachytic volcanies. The conglomerate and greywacke are sometimes so intimately associated that they have to be mapped as a unit, but in other localities definite horizons of conglomerate may be distinguished. The pyroclastics consist of agglomerates and water-laid tuffs.

In Teck township the Timiskaming strata face south across the full

width of the belt, except for a local fold in a wedge-shaped fault block in the southeastern part of the township near Murdock creek. They rest unconformably on the Kecwatin volcanics to the north and are in faulted contact with the same volcanics to the south. The stratigraphical succession is made up of progressively younger formations to the south, but the complete sequence and the possible south limb of the fold has been removed by faulting."

Following in the steps of Thomson, the writer, due to the intimate association of greywacke and conglomerate, has mapped the two rock types as a single unit across most of the property. The conglomerate consists of a great assortment of rounded pebbles in a greywacke or grit matrix. Thomson points out that red jasper pebbles, which constitute 2 to 5% of the rock, are always present — in fact, it is the absence of jasper and the abundance of trachyte fragments which constitute a tuff in his opinion.

The greywacke is a massive rock - medium grained - grading from grit to argillite to a soft clay siltstone - the latter is rare.

"A feature of the Temiskaming series throughout the Kirkland Lake-Larder lake belt is the intermingling of numerous horizons of trachytic volcanics and associate pyroclastics with normal sediments."

Page 9, Thomson.

In Teck Township trachytic flows are absent and only the pyroclastic member is present as tuff.

"Surface exposures of typical tuff show a pinkish or reddish colour owing to the abundance of grains, crystals, and fragments of pink feldspar or pink trachyte in the rock. Much of it is bedded, and crude cross-bedding is often seen; but cross-bedding sufficiently developed to indicate the tops of beds is rarely found. Fragments of pink trachyte are almost invariably present. In certain places these trachytic inclusions are as large as pebbles or boulders and are as well rounded as the boulders in an ordinary conglomerate. This variety has been named tuffaceous conglomerate by A. MacLean and Mm. Gerrie. The bedding, sorting, and rounding of fragments provide evidence that the tuff and

CLAIM HOLDERS

Gateford Mines Limited Suite 1401 390 Bay Street Toronto, Ontario 476198 - 99 - 200 - 201 476232 - 33 476602 476778 - 79 491177

Jocelyn Kitson ⟨ R.R.#1 Tarzwell, Ontario

496313

L.J. Cunningham 1 McPhee Avenue Kirkland Lake, Ontario 496561 - 62 - 63 496566

ALL CLAIMS OWNED OR OPTIONED BY

QUEENSTON GOLD MINES LIMITED Suite 908 40 University Avenue Toronto, Ontario M5J 1T1 tuffaceous conglocerate are water-laid deposits.

Tuff and tuffaceous conglomerate are distinguished from the true sediments by the fact that the former contain no quartz grains and the fragments or publics in the conglomerate consist almost entirely of trachyte. In contrast, the true conglomerate always contains a great variety of public types and normal graywacke shows numerous grains of clastic quartz. Owing to the absence of quartz, the tuff and tuffaceous conglomerate is a softer rock and does not have a gritty feel when scratched with a steel pick or hobbail.

Despite the above-mentioned characteristics, it is not always easy to distinguish between the tuffaceous sediments and the true sediments." Page 9, Thomson.

The rock between Lines 20% and 8% south of the BL of the north grid (i.e. south of the central syenite porphyry and north of Highway 66) certainly fit this description. The writer has not called them tuffs but further examination may determine them to be pyroclastic.

Immediately overlying this unit is a thin sequence of sediments which grade upward into carbonate rock. Mapped in detail by Roberts (Figure 1) they consist of, from bottom to top:

Chert, massive	5
Breccia	I_{+}
Laminated Chert - Sericite	3
Conglomerate	2
Quartz-Carbonate Rock	1

Between Lines 76N and 56N in the southwest corner of the property - at the top of the Temiskaming series - a very distinctive sediment occurs. It is a grey arkosic grit with prominent black clasts and foliation of graphite and graphitic chert. Clast sizes are uniform 1/4" to 1/2" in diameter. Near the south boundary of the unit a narrow discontinuous horizon of graphitic shale is found. North of this distinctive unit lies a monotonous sequence of interbedded conglomerate and greywacke.

In the map area it would appear that, toward the end of the Temiskaming, conditions changed following a long period of deposition of

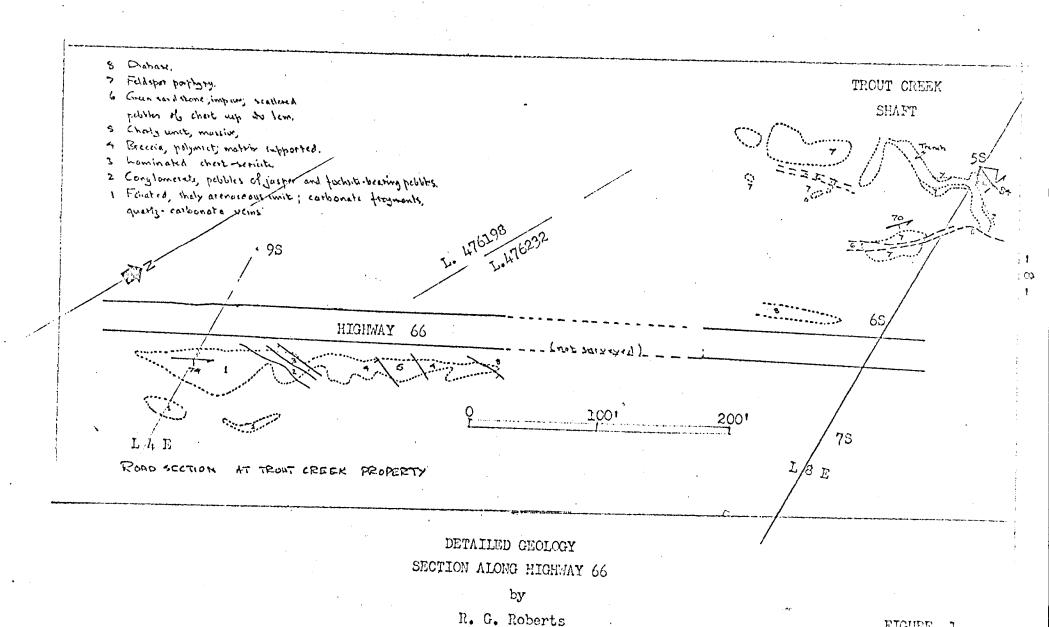


FIGURE 1

nermal conglowerate and greywacke. A graphite rich uniform sized grit or conglomerate was deposited in the western part of the property implying erosion of a graphitic bearing terrain - something that has not been recognized in older Temiskaming sediments. In the eastern part of the property a distinctive change took place by an accumulation of a uniformly sixed, closely packed, dark rock with prominent red clasts which is very different from the older underlying sediments. Thomson considered it a tuff.

This horizon of change appears to coincide with the horizon of felsic intrusion.

At the top of the Temiskaming sediments, adjacent to the syenite, carbonate rocks are common and consist of massive and foliated carbonate and carbonated conglemerates, located at intervals across the property. Similarly carbonate rocks are found associated with syenitic rocks at other locations on the property. These occurrences support Jensen's (1) observations: "In the Kirkland Lake Area, the main feature associated with the development of 'carbonate' is the proximity of felsic intructions. Faulting may or may not be present."

3. Intrusive Rocks

Felsic intrusives, (syenite-syenite porphyry), are common in both sediments and volcanics. The principal units are two apparent conformable bodies - the southerly is 400 to 500 feet in thickness which occupies the contact area across the entire property - fresher looking, generally porphyritic in the centre, the unit is intensely altered by sericitization, silicification and carbonatization along its boundaries; the second body extends conformably across the centre of the property and exhibits similar characteristics and has associated 'carbonate' particularly along its south boundary.

Within the volcanics felsic intrusives are irregular and extensive. Silicification and carbonatization are common and have been the site of much trenching and stripping.

⁽¹⁾ Jensen, L.S. (1976), O.D.M. Geologist, Kirkland Lake Field Tour Guide Pamphlet

Maffic intrusives occur both in sediments and volcanics. Within the acdiments a uniform, medium grained sill occupies the northern part of the property. It exhibits a fine grained, chilled south contact and contains sparse inclusions up to 10" in diameter of a fine grained. mafic rock near its centre. A number of irregular shaped basic syenite bodies are found in the volcanics.

ECONOMIC GEOLOGY

Gold has been produced from the Golden Gate mine where quartz veins associated with felsic intrusives have been mined. This occurrence is illustrated in figures 2, 3 and 4.

At the Trout Creek property a spectacular but small surface exposure of gold (production 1 ton grading 81 oz./ton) was associated with a pyritized carbonatized quartz vein in syenite porphyry. A 78' shaft with about 200 feet of development at the bottom failed to locate an extension of the values. Figure 5. Trenching and diamond drilling traced the structure for 800 feet to the southwest to yield low values both on surface and in drilling.

Signed,

L. J. Cunningham, B.Sc., P. Eng.,

Mining Engineer

Dated at Kirkland Lake, Ontario 2nd October, 1978



OFFICE USE ONLY

Ministry of Natı

GEOPHYSICAL – GEOLOG TECHNICAL DAT



2A01SE0038 2.2815 TECK

900

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

-	
Type of Survey(s) GEOLOGY & GEOPHYSICS	
Township or AreaTECK_TWP	- MINING CLAIMS TO AUTOCTO
Claim Holder(s) SEE ATTACHED	ー MINING CLAIMS TRAVERSED List numerically
Survey Company L.J. CUNNINGHAM & ASSOCIATES	(prefix) (number)
Author of ReportL.J. CUNNINGHAM	(prefix) (number) L 476778
Address of Author 1 McPhee Ave. Kirkland Lake, Ontario	/ L 476779 '
Covering Dates of Survey 3 ~ 27 July /78 (linecutting to office)	- √ L 476198 √
Total Miles of Line Cut 15.6	
	✓ L 476199 ✓
SPECIAL PROVISIONS CREDITS REQUESTED DAYS per claim	L 476200 V L 476201 V 1/2- L 476232
Geophysical	, L 476201 √
ENTER 40 days (includes VLFElectromagnetic 20	1/2- L 476232 1
line cutting) for first —Magnetometer	/ & L 4/6232
survey. —Radiometric	/ <u>L 476233 '</u>
ENTER 20 days for each —Other	√ L 476602 √
same grid	√ L 491177 √
Geochemical	Y431.177
AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)	
Magnetometer Electromagnetic Radiometric	L 496561
DATE: 5 00 18 SIGNATURE: Author of Report of Agent	<u> </u>
- Symbol of Report SQUIGERT)	L 496563 F
Pas Cool (3.1603)	
Res. Geol. Qualifications	
Previous Surveys	9963.13
File No. Type Date Claim Holder	¬
	·
l	.
	.
	·
	TOTAL CLAIMS

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS If more than one survey, specify data for each type of survey 877 877 ____Number of Readings ___ Number of Stations _____ 4001 Station interval 1001 ____Line spacing_____ l" = 20° (Dip Angle) Profile scale... Contour interval Instrument _ Accuracy - Scale constant ______ Diurnal correction method _____ Base Station check-in interval (hours)_____ Base Station location and value ___ Instrument V.L.F. EM Radem ELECTROMAGNETIC Coil configuration _____ Coil separation _ ____ Accuracy _ _ _ ☐ In line ☐ Parallel line x Fixed transmitter ☐ Shoot back Method: CUTLER MAIME (specify V.I., F. station) Frequency______ Dip Angle Parameters measured_____ Instrument _____ Scale constant ____ GRAVILY Corrections made____ Base station value and location _____ Elevation accuracy. Instrument _____ ☐ Frequency Domain Method [] | Time Domain Parameters - On time ______ Frequency _____ Off time _____ Range _____ RESISTIVIT Delay time Integration time_____ Power____ Electrode array

Electrode spacing -

Type of electrode _____

INDUCED POLARIZATION

