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GEOLOGICAL SURVEY

for

KEEFER LAKE RESOURCES INC.

on the

KEEFER-DENTON NORTH PROPERTY

in

KEEFER TOWNSHIP

and

DENTON TOWNSHIP

PORCUPINE MINING DIVISION

DISTRICT OF COCHRANE

ONTARIO

by

Kian A. Jensen
Consulting Geologist/Geophysicist

December, 1990

OMIP 90-008



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INTRODUCTION

During the summer of 1988 the author conducted prospecting on the property of Keefer Lake Resources Incorporated. The geological survey was conducted by the author from July 19 to September 8, 1990, on the 28 contiguous unpatented mining claims known as the Keefer-Denton North Property in the southeast central portion of Keefer Township and the southwest central portion of Denton Township.

A total of 29.96 miles of linecutting was completed. Of this total 17.258 miles were in Keefer Township and 12.705 miles were in Denton Township.

The project area is located approximately 12.5 miles (20 km) west of the junction of Highways 101 and 144. The claims cover the southeastern portion of Keefer Township north of Mosher Lake to Highway 101 then eastwards to within a quarter of a mile of Godon Lake in the southwestern portion of Denton Township, Porcupine Mining Division, District of Cochrane, Ontario.

The purpose of the survey was to identify the lithological units, location of structural features and to locate favorable areas for gold and/or base metal mineralization. In this area, gold mineralization is associated with narrow quartz or quartz carbonated veining in metavolcanic rocks, sulphide mineralization associated with zones of carbonization within structural features, such as faults, shear zones and fractures. Also, the identification of the source of the various magnetic and electromagnetic anomalies was an important objective.

LOCATION AND ACCESS

The 28 unpatented mining claims cover the area north of Mosher Lake to Highway 101 in the southeastern quadrant of Keefer Township and eastwards into Denton Township to 1/4 mile west of Godon Lake, Porcupine Mining Division, District of Cochrane, Ontario as shown in Figure 1.

The project area is located approximately 12.5 miles (20 km) west of the junction of Highways 101 and 144. On the east side of Warran Lake, a logging road leads south to southeasterly through Keefer Township to the southwest corner of Denton Township and the project area. A four wheel drive vehical would be required to travel the road for a short distance.

Additional access from Denton Township approximately 1 mile west of Cripple Creek. This road can be travelled by four wheel vehicle on the southern route to east of Godon Lake. From there, a short walk of 3600 feet to the most easterly boundary of the group.

PROPERTY

The portion of the Keefer Lake Resources Inc. holdings covered by this report consists of 28 unpatented mining claims as shown in Figure 2, and consists of the following mining claims and recording dates:

P-947868 to P-947880 inclusively	Keefer Twp.	Sept. 11, 1986
P-947885 to P-947889 inclusively	Keefer Twp.	Sept. 11, 1986
P-947837 to P-947845 inclusively	Denton Twp.	Sept. 11, 1986
P-947858	Denton Twp.	Sept. 11, 1986

TOPOGRAPHY and VEGETATION

The topography of the area consists of generally of low lying spruce and cedar swamps with mixed tag alders. The lowest area is occupied by a wide cedar and spruce cedar swamp north of the baseline in Keefer Township and approximately a 1/2 mile stretch north of the baseline in Denton Township.

In areas of moderate elevation, mature spruce, poplar and birch are the dominant vegetation. In the western area in Keefer Township extensive logging has been done.

Generally the soil conditions are a sandy gravel outwash plain material. In several areas large boulders were located, however, the usual size of the boulders do not exceed 2 feet.

The highest ground in the survey area is located near the township boundary in Keefer Township. The elevation of this hill is approximately 75 feet above the surrounding area.

The amount of bedrock exposure in areas does not exceed 2%.

PREVIOUS EXPLORATION ACTIVITIES

A detailed description of the exploration activities and the various properties up to 1938 is given in the O.D.M. Report Volume 47, Part 4, titled "Geology of the Keefer-Eldorado Area" by W.D. Harding and L.G. Berry.

From 1945 to 1947, A. Phillips trenched and diamond drilled a sericite-carbonate schist zone located about 1 mile southwest of Godon Lake.

In 1946, Nelson Hogg evaluated the Phillips property in Denton Township which covered 23 mining claims south and west of Godon Lake. It appears that in 1947, 2 diamond drill holes were completed on former mining claim P-29404 which is currently parts of P-949908 and P-949912. No assay results were reported from the drilling.

In 1961 Paymaster Consolidated Mines Limited conducted a ground magnetic and electromagnetic surveys in the area. Results of sampling of the trenches returned values up to 0.07 o.p.t. of gold. The old base line with a bearing of N 050 E, as noted on the enclosed geological map of the property, is believed to have been established by Paymaster.

During 1971, Texas Gulf Sulphur Company Inc. and Conwest Exploration Company Limited were joint venture partners on the Galata property. They conducted an airborne survey over portions

of Keefer and Denton Townships. During September, 1971, 3 diamond drill holes were completed on former mining claim P-325907 which is currently mining claim P-947888 in Keefer Township. A total of 933 feet were drilled, and no assays were reported.

In 1972, Falconbridge Nickel Mines Limited conducted a magnetic survey over 12 mining claims in Denton Township west of Godon Lake, without locating any significant anomalies.

In recent years, Frank Galata has trenched many areas of Keefer and Denton Townships. Most of the sites are quartz or quartz-carbonate veining located south and west of Mosher Lake in Keefer Township. No assay results have been reported.

The present exploration program of Keefer Lake Resources Incorporated is to define gold bearing target by means of geophysical surveys, geological mapping, trenching, and diamond drilling.

Keefer Lake Resources Incorporated has surveyed all the various grids with total field magnetic survey, VLF-EM survey and geological mapping. The 1990 exploration program consists of surveying the Keefer-Denton North Property with VLF-EM and geological mapping. Trenching was completed by Mr. Galata during 1986 on the main showing on the west side of Mosher Lake. A stripping program was completed on the shear zone near the west side of Godon Lake in 1987. During late October and early November, 1987, a 2129 foot diamond drill program was completed. The 9 drill holes are located on the west and south sides of Mosher Lake.

GENERAL GEOLOGY

The bedrock in the area consists of an early Precambrian metavolcanic-metasedimentary sequence and has been intruded by granitic rocks.

The rock units strike in a northeast to east direction. The oldest rocks appear to be pale colour ultramafic flows which are intercalated with metasediments. In isolated areas these rocks grade into a massive flow consisting of serpentinitized peridotitic komatite. These rock are overlain by basaltic komatite and/or Mg tholeiites. The above rocks are succeeded upwards by Fe tholeiite, calc-alkalic basalt, intermediate to felsic metavolcanics and clastic metasediments.

The intermediate to felsic metavolcanics consist of tuffs, breccia and foliated to massive flows. This unit grades into metasediments and clastic metasediments. Within isolated areas the metasediments contain a zone of chert and magnetite iron formation.

The above lithological units are intruded by gabbroic to dioritic rocks. The felsic intrusives appear to have three stages, being: quartz diorite to tonalite, porphyritic granodiorite and a medium grained hornblende syenite.

Metamorphism in the area is of the greenschist facies. Rocks near the late intrusive have been altered to a epidote amphibolite to amphibolite facies.

Intruding all the above lithological units are north to north-northwest trending diabase dikes.

The structure in the area appears to be dominated by north northwest trending transverse faults, several are filled by the later diabase dikes.

GEOLOGICAL SURVEY

INTRODUCTION:

The objectives of the geological mapping survey was to identify the local lithological units, location of major structural features and to identify favorable areas of gold and/or base metal mineralization.

In this area, gold and silver mineralization are associated with narrow quartz veining in metavolcanic rocks, sulphide mineralization associated with the carbonate zone within the Destor Porcupine Fault and in fractures or shear zones. Possible other sources of gold mineralization are felsic porphyries and sulphide facies of the iron formations. Base metal mineralization may be associated with gabbroic to dioritic intrusives.

Table 1 shows the general lithological units for the Keefer and Denton Townships. Not all of these units are located within the mapping area (Choudhry, A.G., 1982).

PLEISTOCENE GEOLOGY:

Approximately 98% of the mapping area is covered by glacial debris in the form of outwash plain and sandy gravel till. This is generally unsorted gravels with coarse grained sand and cobbles. Several areas have a large number of boulder erratics, usually granitic to felsic ranging up to 2 feet by 3 feet, with occasional small boulders and cobbles of gabbroic and mafic metavolcanics.

Table 1: Lithological Units for Keefer and Denton Townships

- 6 Mafic Intrusives
 - 6a Diabase dikes
 - 6b Quartz diabase
 - 6c Magnetite rich diabase dike

- 5 Felsic to Intermediate Intrusives
 - 5a Porphyritic granodiorite
 - 5b Syenite
 - 5c Quartz diorite, tonalite

- 4 Metamorphosed Mafic Intrusives
 - 4a Gabbro
 - 4b Quartz diorite

- 3 Metasediments
 - Clastic Metasediments
 - 3a Graywacke
 - Chemical Metasediments
 - 3b Banded magnetite-quartz iron formation
 - 3c Magnetite-epidote iron formation

- 2 Felsic to Intermediate Metavolcanics
 - 2a Massive flow
 - 2b Flow breccia
 - 2c Pillow flow
 - 2d Pillow breccia
 - 2e Tuff
 - 2f Pyroclastic tuff
 - 2g Carbonated
 - 2h Sheared
 - 2i Porphyritic

- 1 Mafic to Intermediate Metavolcanics
 - 1a Massive flow
 - 1b Flow breccia
 - 1c Pillow flow
 - 1d Pillow breccia
 - 1e Tuff
 - 1f Pyroclastic tuff
 - 1g Carbonated
 - 1h Sheared
 - 1i Porphyritic
 - 1j Chlorite schist
 - 1k Chlorite sericite schist

GEOLOGY OF THE KEEFER-DENTON NORTH GRID:

The geology of the Keefer-Denton North Grid area is shown in Figure 3 and 4 which are located in the back folder. The lithological units within the Keefer Lake Resources Inc. grid areas are described in detail below from the youngest to the oldest.

LITHOLOGICAL UNITS:

Diabase Dikes:

Within the mapping area only one age of diabase dikes were located, these being the younger north to west-northwest trending olivine diabase dikes.

The younger diabase dikes located are usually coarse to medium grained with aphaneritic black chilled margins and are moderately magnetic with visible quartz grains and magnetite in the coarse grained sections. The ground geophysical surveys indicated many possible northerly trending dikes and in areas, this information was used to map the extent of the dikes. The younger quartz diabase dikes trend from N 320 E to N 350 E.

Felsic to Intermediate Intrusives:

The location of these intrusives are restricted to the southern portion of Keefer Township and the eastern portion of the property in Denton Township and in isolated areas in the northwestern part of the Keefer-Denton North grid.

The syenite is medium to coarse grained, pinkish to reddish pink on the eroded and weathered surface, while the fresh surface appears reddish pink potash feldspars and mafic minerals usually hornblende and minor biotite with little or no quartz. Minor amount epidote alteration is present. No or very weak foliation is present.

The quartz diorite or tonalite to quartz monzodiorite is medium grained with a weathered surface ranging from white to greyish white. The fresh surface is medium grey with about 50% quartz and sodic feldspars, and mafic minerals usually biotite. Weak foliation is present.

The porphyritic granodiorite is usually greyish white to pinkish with white phenocrysts. The fresh surface is greyish white sodic feldspars and quartz in about equal amounts with about 50% to 60% mafics. Large phenocrysts of potassic feldspars are abundant and measures up to 1/2 inch by 1 inch in a fine to medium grained ground mass.

Metamorphosed Mafic to Intermediate Intrusives:

The mafic intrusives located within the property area are pyroxene gabbroic sills and possible plug. These intrusives are typically medium to coarse grained with a composition of pyroxenes with scattered plagioclase with an intergranular matrix of mafic minerals and visible magnetite.

The occurrence of the gabbro is a large plug forming a high hill in the northeastern portion of the mapping area. The gabbro is medium grained cut by coarse grained diabase dikes.

Only one intermediate intrusive was located in the mapping area. The carbonated quartz diorite was located north of the felsic pyroclastic tuff in the southeastern portion of the mapping area in Denton Township. It appears buff pale green to light greenish orange on the weathered surface and pale grey green to light medium green with chloritic clots. Quartz grains are visible in hand specimens. In this portion of the unit, numerous small 6 inch to large 6 foot wide quartz veins are located. Near the veining and in the central area fine grained pyrite and possibly chalcopyrite mineralization was located.

Metasediments:

No metasediments were located within the mapping area.

Felsic to Intermediate Metavolcanics:

The tuff to pyroclastic tuff are fine grained, light grey on the weathered surface to light buff grey to light greyish pale green on the fresh surface. Individual laminated bands contain very small greyish to whitish fragments parallel to the bedding. The massive tuff to pyroclastic tuff exhibits good bedding.

The majority of the intermediate metavolcanics with minor pyroclastic tuffs with felsic fragments are south of the mapping area in Denton Township.

Mafic to Intermediate Metavolcanics:

The majority of the outcrop exposure of the mapping area is comprised of mafic to intermediate tuff to pyroclastic tuff and massive flows. These are medium green to dark green, fine grained and weathers from a light green to a pale medium green. Generally the tuff and pyroclastic tuff exhibits good bedding while the massive flows exhibit poor to weak schistosity.

The degree of carbonization varies from weak to intense in the vicinity of shearing and suspected fault zones and usually confined to the tuffaceous units. Not all shear zones are carbonated. No pillow flows were located.

On Tie Line 51+00 North at 73+00 East, two outcrops were located which appears to be a flow breccia. The matrix is black, aphaneritic and has sub-rounded elongated fragments which weathers whitish buff and are mafic on fresh surfaces.

STRUCTURAL GEOLOGY:

Apart from the diabase dikes filling the north-northwest fault zones, the other structural features located are based upon geophysical survey information.

ECONOMIC GEOLOGY:

The amount of mineralization is in the form of scattered to less than 1% sulphides usually contained in the mafic metavolcanics.

Two old trenches were located near the township line, at Line 56+00 East at 40+00 North and 44+00 North. The massive and disseminated sulphides are generally pyrite with minor pyrrhotite and may be associated with an irregular shaped ultramafic to mafic unit.

CONCLUSIONS

The mapping area contains about 2% outcrop exposure. The limited exposure has put more emphasis on the geophysical surveys for identifying the contacts of lithological units, the identification of structural features and possible target areas for follow-up exploration activities.

Unlike other areas of the Keefer Lake Resources property, the Keefer-Denton North grid area did not have any quartz and/or carbonate veining. Also, carbonated metavolcanics associated with shearing was absent within this area.

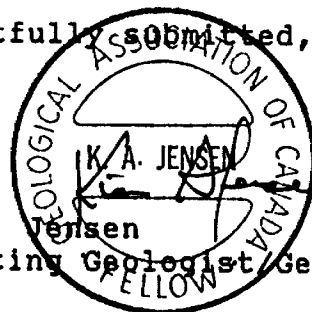
Sulphide mineralization is generally pyritization with isolated occurrences of pyrrhotite.

RECOMMENDATIONS

Based upon the results of the geological mapping minor trenching is warranted in the area of the geophysical anomalies with thin overburden cover. A limited diamond drilling program is recommended to test the stronger electromagnetic anomalies related to magnetic lows for gold mineralization, and moderate to high magnetics for base metal mineralization.

Dated at Timmins, Ontario
December 4, 1990

Respectfully submitted,



Kian A. Jensen
Consulting Geologist/Geophysicist

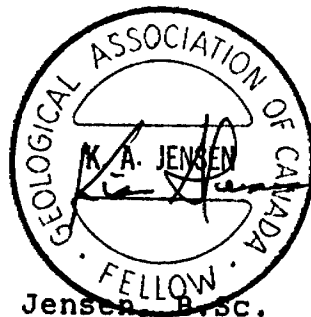
CERTIFICATE

With reference to my report on the Geological Survey on the Keefer-Denton North Property of Keefer Lake Resources Inc. Dated December 4, 1990.....

I, Kian A. Jensen, of the City of Timmins, Ontario, do hereby certify the following to be true and accurate to the best of my knowledge:

- 1) That I received an Honour B.Sc. degree in Earth Science, Geology Major, from the University of Waterloo,
- 2) That I have been employed as a geologist and/or geophysicist by various exploration companies and consulting companies since 1978,
- 3) That I have been and still am a member in good standing in the following associations:
 - a) Society of Exploration Geophysicists - Associate, 1981
 - b) Geological Association of Canada - Fellow, 1983
- 4) That I am the author of the corresponding report, and have been actively exploring and prospecting in the Timmins area since 1981,
- 5) That I have no interest directly or indirectly in the mining claims comprising the property described in this report or in the shares of any company or companies in this joint venture on this property or the surrounding properties, nor do I expect to receive any directly or indirectly.

Dated this 4th of December, 1990
Timmins, Ontario



Kian A. Jensen, B.Sc.
Consulting Geologist/Geophysicist



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ELECTROMAGNETIC SURVEY

for

KEEFER LAKE RESOURCES INC.

on the

KEEFER-DENTON NORTH PROPERTY

in

KEEFER TOWNSHIP

and

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PORCUPINE MINING DIVISION

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November, 1990



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INTRODUCTION

During November, 1990, a VLF electromagnetic survey was completed on the 28 contiguous unpatented mining claims known as the Keefer-Denton North Property in the southeast central portion of Keefer Township and the southwest central portion of Denton Township.

A total of 29.96 miles of the grid was established in 1989. A total of 25.852 miles on north-south lines was surveyed to establish 1365 electromagnetic readings in Keefer and Denton Townships. The survey was completed from November 5 to 16, 1990, by personnel of M.C. Exploration Services Inc. The data reductions were completed on Geopak, drafting, interpretation and report were completed by the author from November 16 to 22, 1990.

The project area is located approximately 12.5 miles (20 km) west of the junction of Highways 101 and 144. The claims cover the southeastern portion of Keefer Township north of Mosher Lake to Highway 101 then eastwards to within a quarter of a mile of Godon Lake in the southwestern portion of Denton Township, Porcupine Mining Division, District of Cochrane, Ontario.

The purpose of the survey was to identify structural features and favourable areas for gold mineralization.

LOCATION AND ACCESS

The 28 unpatented mining claims cover the area north of Mosher Lake to Highway 101 in the southeastern quadrant of Keefer Township and eastwards into Denton Township to 1/4 mile west of Godon Lake, Porcupine Mining Division, District of Cochrane, Ontario as shown in Figure 1.

The project area is located approximately 12.5 miles (20 km) west of the junction of Highways 101 and 144. On the east side of Warran Lake, a logging road leads south to southeasterly through Keefer Township to the southwest corner of Denton Township and the project area. A four wheel drive vehical would be required to travel the road for a short distance.

Additional access from Denton Township approximately 1 mile west of Cripple Creek. This road can be travelled by four whell vehicle on the southern route to east of Godon Lake. From there, a short walk of 3600 feet to the most easterly boundary of the group.

PROPERTY

The portion of the Keefer Lake Resources Inc. holdings covered by this report consists of 28 unpatented mining claims as shown in Figure 2, and consists of the following mining claims and recording dates:

P-947868 to P-947880 inclusively	Keefer Twp.	Sept. 11, 1986
P-947885 to P-947889 inclusively	Keefer Twp.	Sept. 11, 1986
P-947837 to P-947845 inclusively	Denton Twp.	Sept. 11, 1986
P-947858	Denton Twp.	Sept. 11, 1986

GENERAL GEOLOGY

The bedrock in the area consists of an early Precambrian metavolcanic-metasedimentary sequence and has been intruded by granitic rocks.

The rock units strike in a northeast to east direction. The oldest rocks appear to be pale colour ultramafic flows which are intercalated with metasediments. In isolated areas these rocks grade into a massive flow consisting of serpentinized peridotitic komatite. These rock are overlain by basaltic komatite and/or Mg tholeiites. The above rocks are succeeded upwards by Fe tholeiite, calc-alkalic basalt, intermediate to felsic metavolcanics and clastic metasediments.

The intermediate to felsic metavolcanics consist of tuffs, breccia and foliated to massive flows. This unit grades into metasediments and clastic metasediments. Within isolated areas the metasediments contain a zone of chert and magnetite iron formation.

The above lithological units are intruded by gabbroic to dioritic rocks. The felsic intrusives appear to have three stages, being: quartz diorite to tonalite, porphyritic granodiorite and a medium grained granodiorite.

Metamorphism in the area is of the greenschist facies. Rocks near the late intrusive have been altered to a epidote amphibolite to amphibolite facies.

Intruding all the above lithological units are north to northerly trending diabase dikes.

The structure in the area appears to be dominated by north northwest trending transverse faults, several are filled by the later diabase dikes. Several northeast trending shear zones are located in the southern portion of Godon Lake.

PREVIOUS EXPLORATION ACTIVITIES

A detailed description of the exploration activities and the various properties up to 1938 is given in the O.D.M. Report Volume 47, Part 4, titled "Geology of the Keefer-Eldorado Area" by W.D. Harding and L.G. Berry.

From 1945 to 1947, A. Phillips trenched and diamond drilled a sericite-carbonate schist zone located about 1 mile southwest of Godon Lake. In 1961 Paymaster Consolidated Mines Limited conducted a ground magnetic and electromagnetic surveys in the area. Results of sampling of the trenches returned values up to 0.07 o.p.t. of gold.

During 1971, Texas Gulf Sulphur Company Inc. and Conwest Exploration Company Limited were joint venture partners on the Galata property. They conducted an airborne survey over portions of Keefer and Denton Townships.

In 1972, Falconbridge Nickel Mines Limited conducted a magnetic survey without locating any significant anomalies.

In recent years, Frank Galata has trenched many areas of Keefer and Denton Townships. Most of the sites are quartz or quartz-carbonate veining.

The present exploration program of Keefer Lake Resources Inc. is to define gold bearing target by means of geophysical surveys, geological mapping, trenching, and diamond drilling.

GEOPHYSICAL SURVEY

INTRODUCTION:

The linecutting was conducted by Gord McIntosh Exploration Services of Timmins, Ontario, from August 2 to September 2, 1989. The tie line 32+00 North was extended from the Godon Lake group located on the west side of Godon Lake in Denton Township. Tie Line 36+00 North was extended from the township line at the iron bar westwards into Keefer Township to the west claim group boundary from 60+00 East to 16+00 West. North-south grid lines were established at 400 foot intervals and picketed every 100 feet. Both base lines established in Keefer and Denton Townships were tied into.

A total of 29.96 miles of linecutting was completed. Of this total 17.258 miles were in Keefer Township and 12.705 miles were in Denton Township. A total of 25.852 miles were surveyed to establish 1365 electromagnetic readings in Keefer and Denton Townships.

The survey was completed from November 5 to 16, 1990, by personnel of M.C. Exploration Services Inc. The data reductions were completed with Geopak computer program, and the drafting, interpretation and report were completed by the author from November 16 to 22, 1990.

ELECTROMAGNETIC VLF-EM SURVEY:

The survey was conducted with the Geonics EM-16 unit utilizing Cutler, Maine, 24.0 kHz as the transmitter station. All readings were collected facing north at 100 foot separations along the north-south grid lines. The instrument specifications are located in the Appendix.

The EM-16 unit measures the vertical in-phase component of the secondary electromagnetic field and the vertical out of phase or quadrature component of the secondary electromagnetic field.

The profile data for the in-phase and quadrature are plotted on a base map with a scale of 1:3200 as shown in Figure 3. Figure 4 illustrates the Fraser Filtering of the In Phase or Dip values on a base map with a scale of 1:3200.

INTERPRETATION

To assist in the interpretation of the electromagnetic survey, the dip values were subjected to a low pass filter known as Fraser Filtering. The results are plotted and contoured as shown in Figure 4. The anomalies are tabulated in Table 1.

The interpretation of some of the anomalies was hampered by the northerly trending diabase dikes, in such that the anomaly may be due to the edge effect of the dike and not the conductor.

Table 1: VLF-EM Anomalies

	Location	FF Value	Trend	Comments
1	L7200E - 5+00N L9600E - 5+00N	17 to 70	E-W	Possible sheared contact and sulphides
2	L6000E - 8+00N L9600E - 17+00N	4 to 34	NNE	Possible shear zone
3	L6000E - 21+00N L7200E - 28+00N	10 to 45	NE-SW	Possible contact zone
4	L6000E - 34+00N L9600E - 17+00N	12 to 22	NW-SE	Possible shear zone
5	L6000E - 43+00N L9200E - 45+00N	8 to 18	E-W	Lithogological unit cut by diabase dikes
6	L3200E - 42+00N L6000E - 58+00N	22 to 50	NE-SW	Shear zone cut by diabase
7	L1200W - 38+00N L 400E - 47+00N	50 to 70	NE-SW	Granite-metavolcanics possible contact - diabase interference
8	L2800E - 52+00N L4000E - 52+00N	34 to 48	E-W	Lithological unit, faulted
9	L2000E - 45+00N L3600E - 43+00N	16 to 60	E-W	Lithological unit, faulted
10	L1200W - 10+00N L2800E - 15+00N	18 to 44	NNE	Possible shear zone, may extend to No.2
11	L1200E - 5+00N L1600E - 5+00N	18 to 46	E-W	Possible contact or shear

The remainder of the anomalies may be related to either overburden conditions or contact zones of northerly trending diabase dikes.

CONCLUSIONS

The VLF-EM survey located several anomalies which are related to shear zones, lithological units suspected to contain sulphide mineralization, contact zones between lithological units, overburden conditions and diabase dikes.

The anomalies appear to be concentrated in the metavolcanics and at the granite-metavolcanic contact. Additional correlation between this survey and other geophysical surveys and the results of the geological mapping should be completed for a more refined interpretation of the survey results.

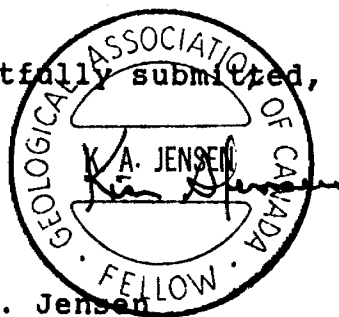
RECOMMENDATIONS

Based upon the results of the present survey and the available information, the author recommends geological mapping of the property. The areas of importance for gold mineralization is in the vicinity of the magnetic lows in areas of suspected shear zones and anomalous EM conductors of possible contact areas. A compilation of all available information should be completed to assist in a refined interpretation of the results.

Based upon the results of the recommended work, minor trenching may be warranted in areas of shallow overburden and a limited diamond drilling program to test anomalies with thicker overburden cover and suspected sulphide mineralization.

Dated at Timmins, Ontario
November 22, 1990

Respectfully submitted,



Kian A. Jensen
Consulting Geologist/Geophysicist

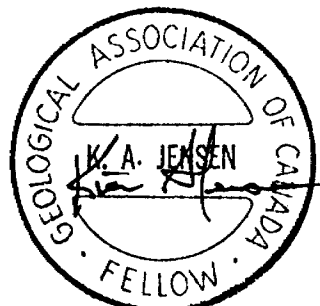
CERTIFICATE

With reference to my report on the Electromagnetic VLF Survey on the Keefer-Denton North Property of Keefer Lake Resources Inc. Dated November 22, 1990.....

I, Kian A. Jensen, of the City of Timmins, Ontario, do hereby certify the following to be true and accurate to the best of my knowledge:

- 1) That I received an Honour B.Sc. degree in Earth Science, Geology Major, from the University of Waterloo,
- 2) That I have been employed as a geologist and/or geophysicist by various exploration companies and consulting companies since 1978,
- 3) That I have been and still am a member in good standing in the following associations:
 - a) Society of Exploration Geophysicists - Associate, 1981
 - b) Geological Association of Canada - Fellow, 1983
- 4) That I am the author of the corresponding report, and have been actively exploring and prospecting in the Timmins area since 1981,
- 5) That I have no interest directly or indirectly in the mining claims comprising the property described in this report or in the shares of any company or companies in this joint venture on this property or the surrounding properties, nor do I expect to receive any directly or indirectly.

Dated this 22nd of November, 1990
Timmins, Ontario



Kian A. Jensen, B.Sc.
Consulting Geologist/Geophysicist

EM16

VLF Electromagnetic Unit

Pioneered and patented exclusively by Geonics Limited, the VLF method of electromagnetic surveying has been proven to be a major advance in exploration geophysical instrumentation.

Since the beginning of 1965 a large number of mining companies have found the EM16 system to meet the need for a simple, light and effective exploration tool for mining geophysics.

The VLF method uses the military and time standard VLF transmissions as primary field. Only a receiver is then used to measure the secondary fields radiating from the local conductive targets. This allows a very light, one-man instrument to do the job. Because of the almost uniform primary field, good response from deeper targets is obtained.

The EM16 system provides the *in-phase* and *quadrature* components of the secondary field *with the polarities indicated*.

Interpretation technique has been highly developed particularly to differentiate deeper targets from the many surface indications.

Principle of Operation

The VLF transmitters have vertical antennas. The magnetic signal component is then horizontal and concentric around the transmitter location.



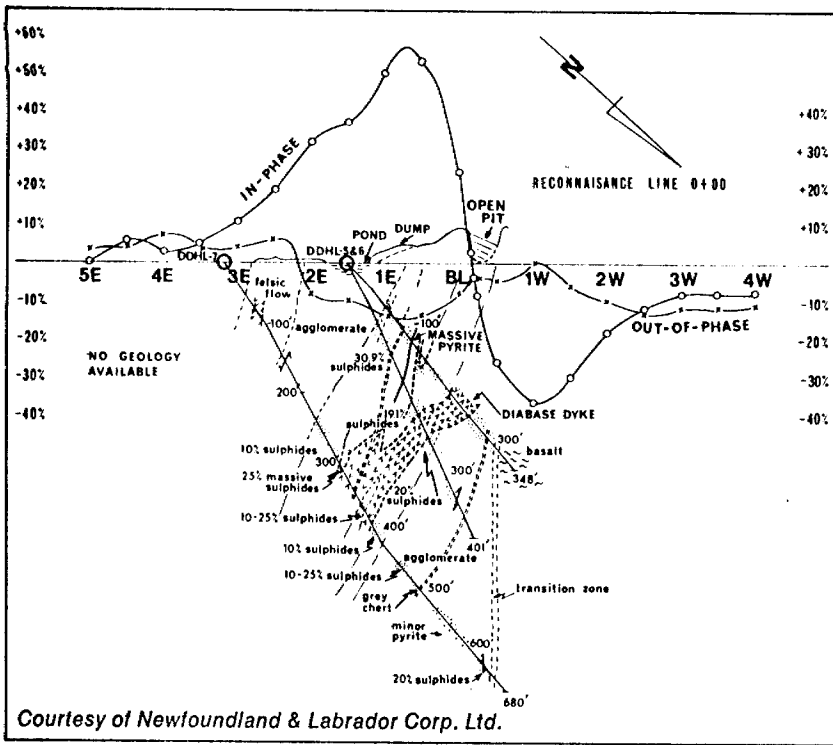
Specifications

Source of primary field	VLF transmitting stations.	Reading time	10-40 seconds depending on signal strength.
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 either station.	Operating temperature range	-40 to 50° C.
Operating frequency range	About 15-25 kHz.	Operating controls	ON-OFF switch, battery testing push button, station selector, switch, volume control, quadrature, dial $\pm 40\%$, inclinometer dial $\pm 150\%$.
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).	Power Supply	6 size AA (penlight) alkaline cells. Life about 200 hours.
Method of reading	In-phase from a mechanical inclinometer and quadrature from a calibrated dial. Nulling by audio tone.	Dimensions	42 x 14 x 9 cm (16 x 5.5 x 3.5 in.)
Scale range	In-phase $\pm 150\%$; quadrature $\pm 40\%$.	Weight	1.6 kg (3.5 lbs.)
Readability	$\pm 1\%$.	Instrument supplied with	Monotonic speaker, carrying case, manual of operation, 3 station selector plug-in tuning units (additional frequencies are optional), set of batteries.
		Shipping weight	4.5 kg (10 lbs.)

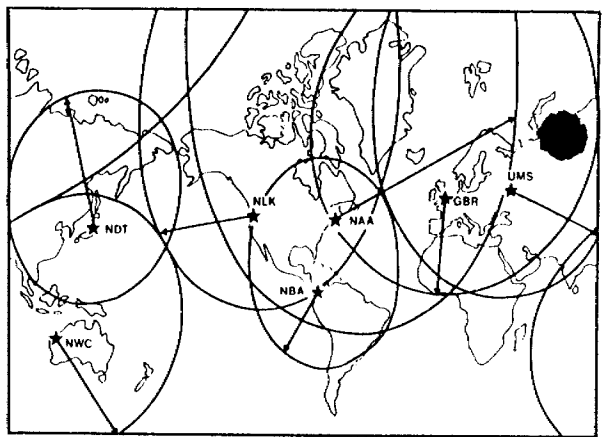


GEONICS LIMITED Designers & manufacturers of geophysical instruments

2 Thorncliffe Park Drive
Toronto/Ontario/Canada
M4H 1H2
Tel: (416) 425-1821
Cables: Geonic's



Courtesy of Newfoundland & Labrador Corp. Ltd.

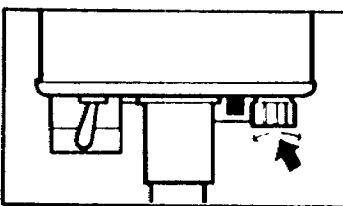


Areas of VLF Signals

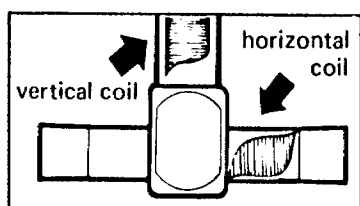
Coverage shown only for well-known stations. Other reliable, fully operational stations exist. For full information regarding VLF signals in your area consult Geonics Limited. Extensive field experience has proved that the circles of coverage shown are very conservative and are actually much larger in extent.

EM 16 Profile over Lockport Mine Property, Newfoundland

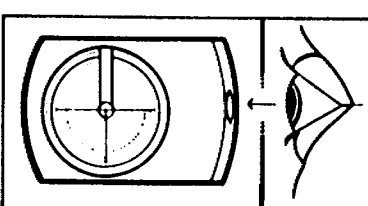
Additional case histories on request.



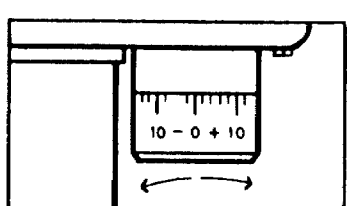
Station Selector
Two tuning units can be plugged in at one time. A switch selects either station.



Receiving Coils
Vertical receiving coil circuit in instrument picks up any vertical signal present. Horizontal receiving coil circuit, after automatic 90° signal phase shift, feeds signal into quadrature dial in series with the receiving coil.



In-Phase Dial
Shows the tilt-angle of the instrument for minimum signal. This angle is the measure of the vertical in-phase signal expressed in percentage when compared to the horizontal field.



Quadrature Dial
Is calibrated in percentage markings and nulls the vertical quadrature signal in the vertical coil circuit.

By selecting a suitable transmitter station as a source, the EM 16 user can survey with the most suitable primary field azimuth.

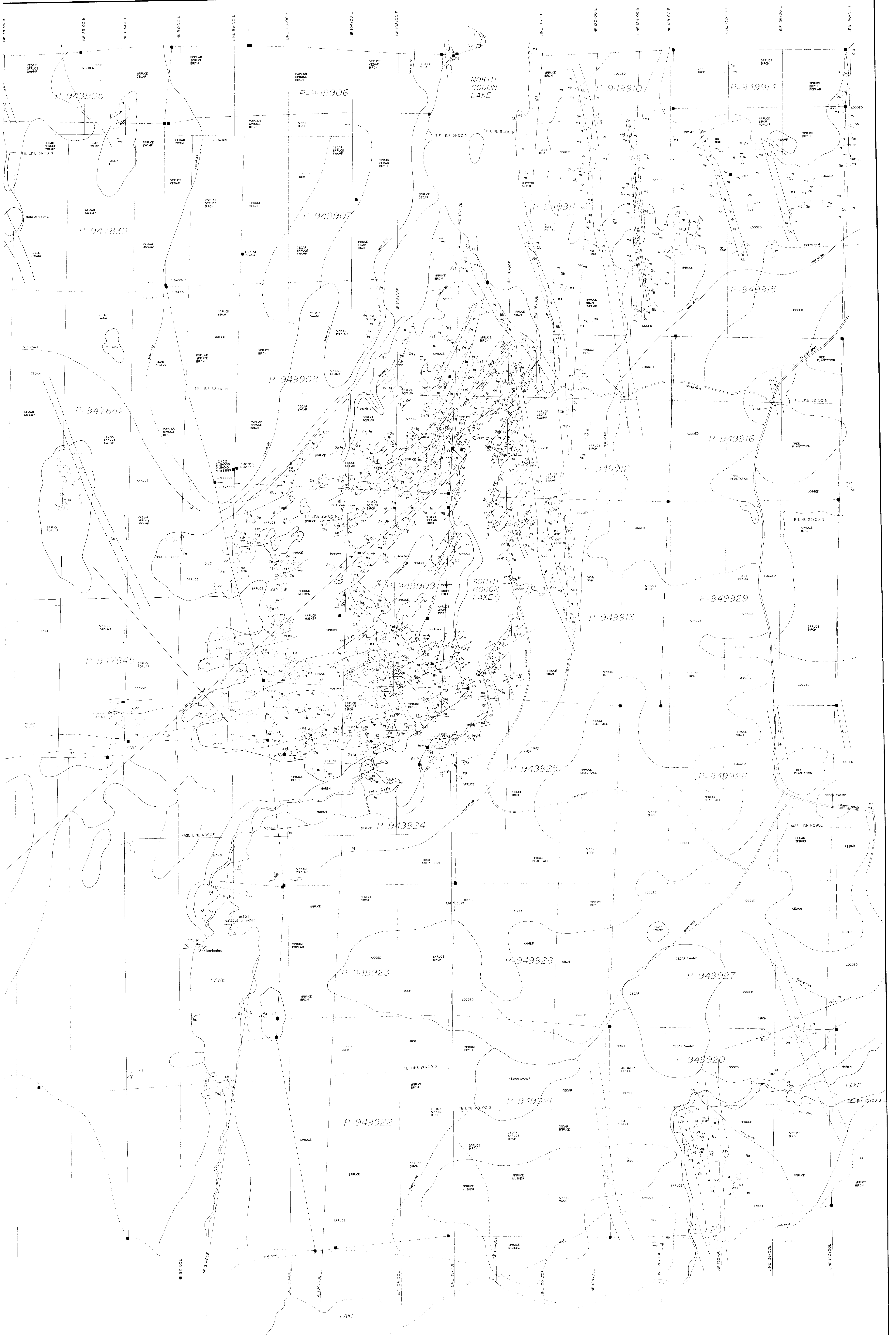
The EM 16 has two receiving coils, one for the pick-up of the horizontal (primary) field and the other for detecting any anomalous vertical secondary field. The coils are thus orthogonal, and are mounted inside the instrument "handle".

The actual measurement is done by first tilting the coil assembly to minimize the signal in the vertical (signal) coil and then further sharpening the null by using the reference signal to buck out the remaining signal. This is done by a calibrated "quadrature" dial.

The tangent of the tilt angle is the measure of the vertical in-phase component and the quadrature reading is the signal at right angles to the total field. All readings are obtained in per centages and do not depend on the absolute amplitude of the primary signals present.

The "null" condition of the measurement is detected by the drop in the audio signal emitted from the patented resonance loudspeaker. A jack is provided for those preferring the use of an earphone instead.

The power for the instrument is from 6 penlight cells. A battery tester is provided.



LEGEND

- FELSIC TO INTERMEDIATE METAVOLCANICS**
- a Massive
 - b Flow breccia
 - c Pillow flow
 - d Pillow breccia
 - e Tuff
 - f Pyroclastic Tuff
 - g Carbonated
 - h Sheared
 - i Porphyritic
- MAFIC TO INTERMEDIATE METAVOLCANICS**
- a Massive
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 - g Carbonated
 - h Sheared
 - i Porphyritic
 - j Chlorite Schist
 - k Chlorite sericite schist

SYMBOLS

- Grid lines
- Clam lines
- Clam post, located
- Diamond drill hole, located
- Trench
- Swamp or marsh
- Bedding, dip known, unknown
- Schistosity, dip known, unknown
- Juvenile, dip known, unknown
- Shearing, dip known, unknown
- Outcrop
- Geological contacts, definite, approximate, based on geophysical surveys
- Drag folds, plunge known, unknown
- Quartz veins
- Quartz carbonate veins
- Pyrite
- Chalcopyrite
- Pyrrhotite

KEEFER LAKE RESOURCES INCORPORATED

GEOLOGY SURVEY

DENTON TOWNSHIP
PORCUPINE MINING DIVISION, ONTARIO

SCALE 1:2400

200 400 600 800
FEET

SURVEY BY: KIAN A. JENSEN DATE: AUG. 25 - NOV. 3, 1989
DECEMBER, 1990

PROJECT: 89-012

63-606

63.6069

KEEPER LAKE RESOURCES INCORPORATED

VLF-EM SURVEY

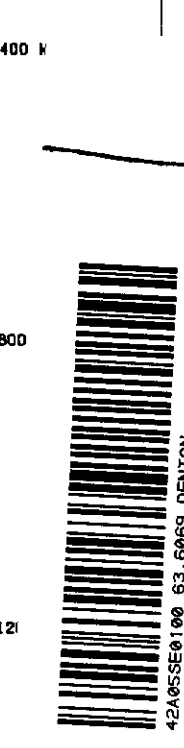
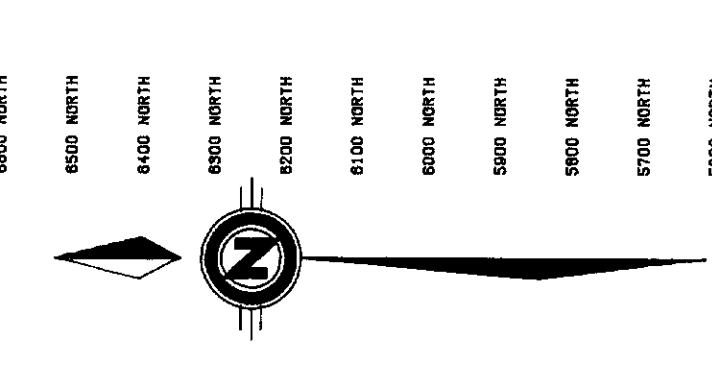
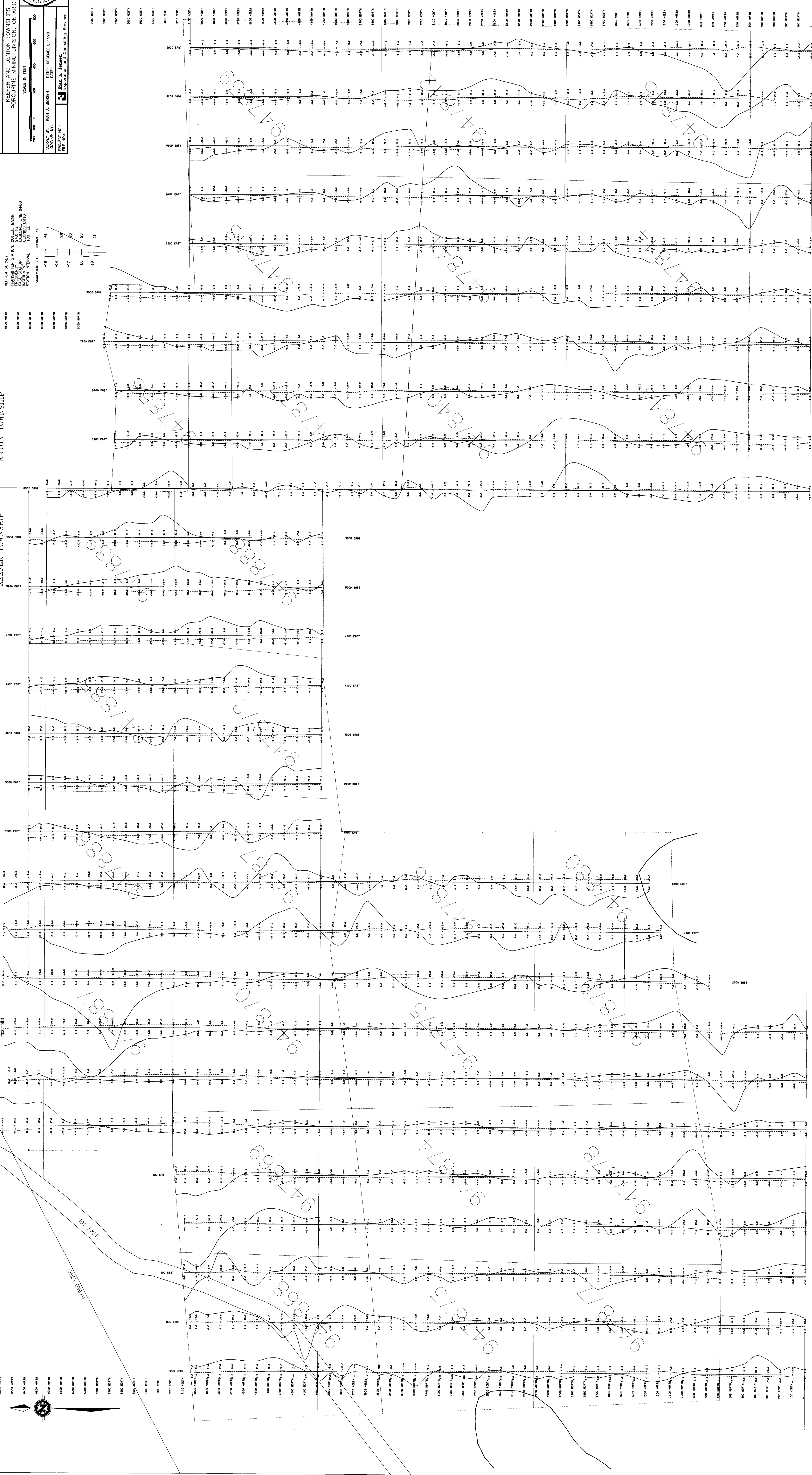
KEEPER AND DENTON TOWNSHIPS
PORCUPINE MINING DIVISION, ONTARIO

SURVEY BY: MAIA A. JENSEN DATE: DECEMBER, 1999
 PROJECT NO.: 947887
 CONSULTANT AND CONSULTING SERVICES

VLF-EM SURVEY
 TRANSFER STATION: COLLIER, MAINE
 BASELINE LINE: 01-00
 BASE STATION: 947887
 STATION INTERVAL: 100 FEET
 CHANNELS: 41
 INVERT: 0
 ANTENNA: 11
 ANTENNA HEIGHT: 20
 ANTENNA DIAMETER: 17
 ANTENNA LENGTH: 14
 ANTENNA WIDTH: 19

FENTON TOWNSHIP

KEEPER TOWNSHIP



947887

