ONTARIO

PROSPECTORS ASSISTANCE PROGRAM
(OP 93-146)

REPORT ON THE SELF-POTENTIAL SURVEY AND

DIAMOND DRILLING WORK FOR THE

T-H PROPERTY

EXPLORATION PROGRAM

MONCRIEFF PROGRAM

MONCRIEFF TOWNSHIP

(G-4086)

1993

SUDBURY MINING DIVISION

ONTARIO

PREPARED BY:

Harold J. Tracanelli, G.E.T.N.

January 20, 1994

HAROLD J. TRACANELLI
582 Vermillion Lake Road
Box 167
Chelmsford, Ontario
POM 1LO

January 20, 1994

Mr. Edward R. Solonyka, Supervisor
Supervisor of Incentives
The Incentives Office
Mineral Development and Rehabilitation Branch
Ministry of Northern Development and Mines
933 Ramsey Lake Road
5th Floor
Sudbury, Ontario
P3E 6B5

Dear Mr. Solonyka:

Enclosed please find two copies of the "Report on the Self-Potential Survey and Diamond Drilling Work" for the T-H Property Exploration Program, Moncrieff Township (G-4086), File OP93-146. The property is situated approximately 45 miles northwest of Sudbury, Ontario.

The T-H property is situated over the northern sequences of the Benny Greenstone Belt, which is made up of a wide variety of metavolcanic rocks, some of which are believed to have the potential for hosting Zn-Pb-Ag type mineral deposits.

As I am sure you are aware, the T-H Exploration program was broken down and operated in two, more or less, separate parts.

The first part of the program which included backhoe trenching, geological mapping and rock and mineral assaying, is covered under an O.P.A.P. application by John George Huycke (OP93-145). The field supervision of the trenching operations and the carrying out of the various geological related duties was looked after by geologist Yves Clement.

Yves Clement was completely responsible for compiling all pertinent data and reporting on the findings of the above stated functions.

The second part of the program included the initiation of an orientative self-potential survey, followed by the drilling of a 604 foot diamond drill hole (C-93-1). This applicant was directly responsible for the initiation of the geophysical survey work, and the setting up of the diamond drill hole. All pertinent data was collected, evaluated, interpreted and reported on by this applicant (Harold J. Tracanelli) (OP93-146). Occasionally throughout the duration of the exploration program some consultations between Yves Clement and Harold Tracanelli were carried out in order to keep up to date with respect to progress and preliminary findings.

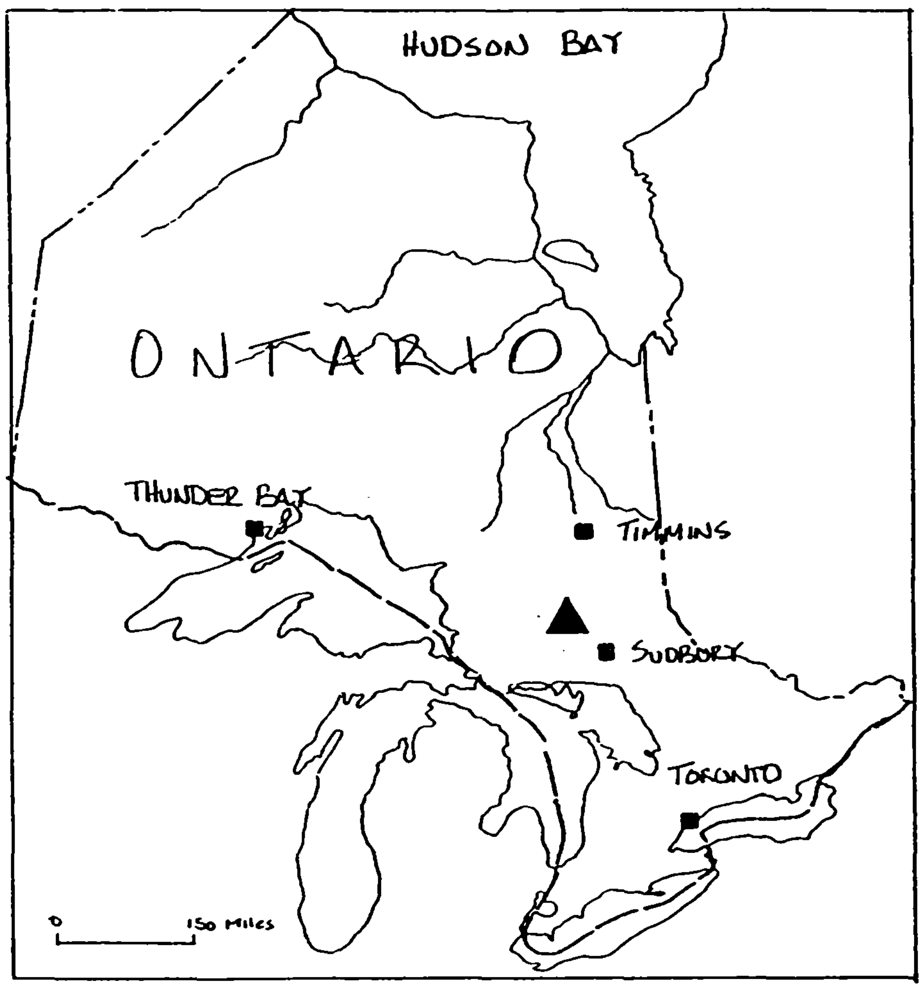
The T-H Exploration Program was designed to test the base metal potential at or near the contact between the felsic-metavolcanics and mafic metavolcanic sequences in the northern parts of the property in which previous preliminary geology, geochemical and geophysical studies over the past couple of years appears to indicate that the area has a strong potential for hosting base metal mineralization.

Generally the findings and the results of the self-potential diamond drilling work are thought to be somewhat mixed, although there are some interesting aspects which may be worthy of further, more detailed investigations in the near future. Recommendations for further, more detailed deeper diamond drilling and detailed chemical analysis work should be considered to test a few new geological ideas, which were generated as a result of the 1993 field work. Provided that the appropriate funding can be secured, work could begin in the 1994 field season.

I expect that you shall find the following report to be in good order and to your satisfaction.

Yours truly,

Harold J. Tracanelli



▲ T-H EXPLORATION PROGRAM.

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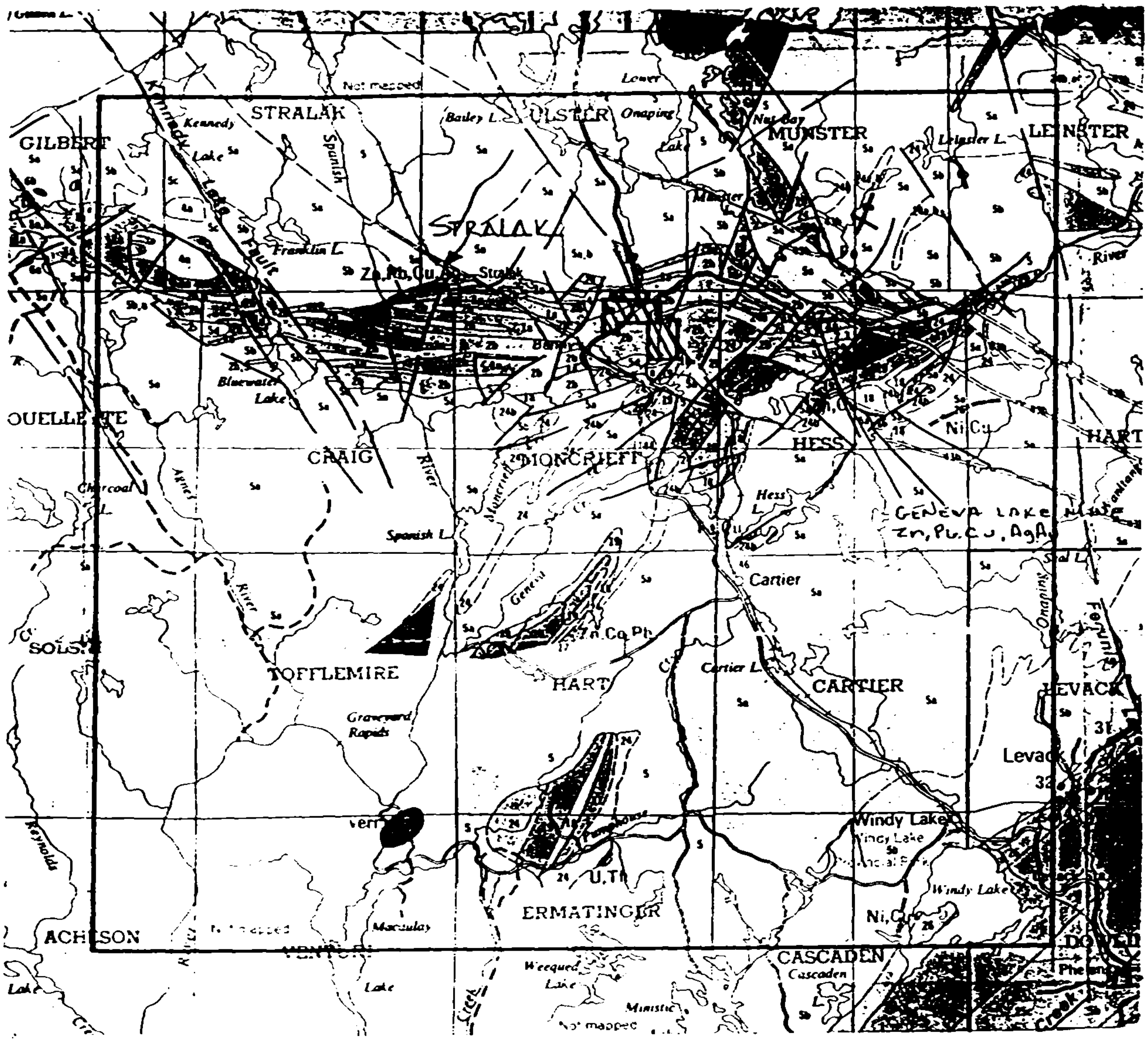
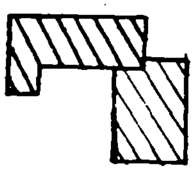
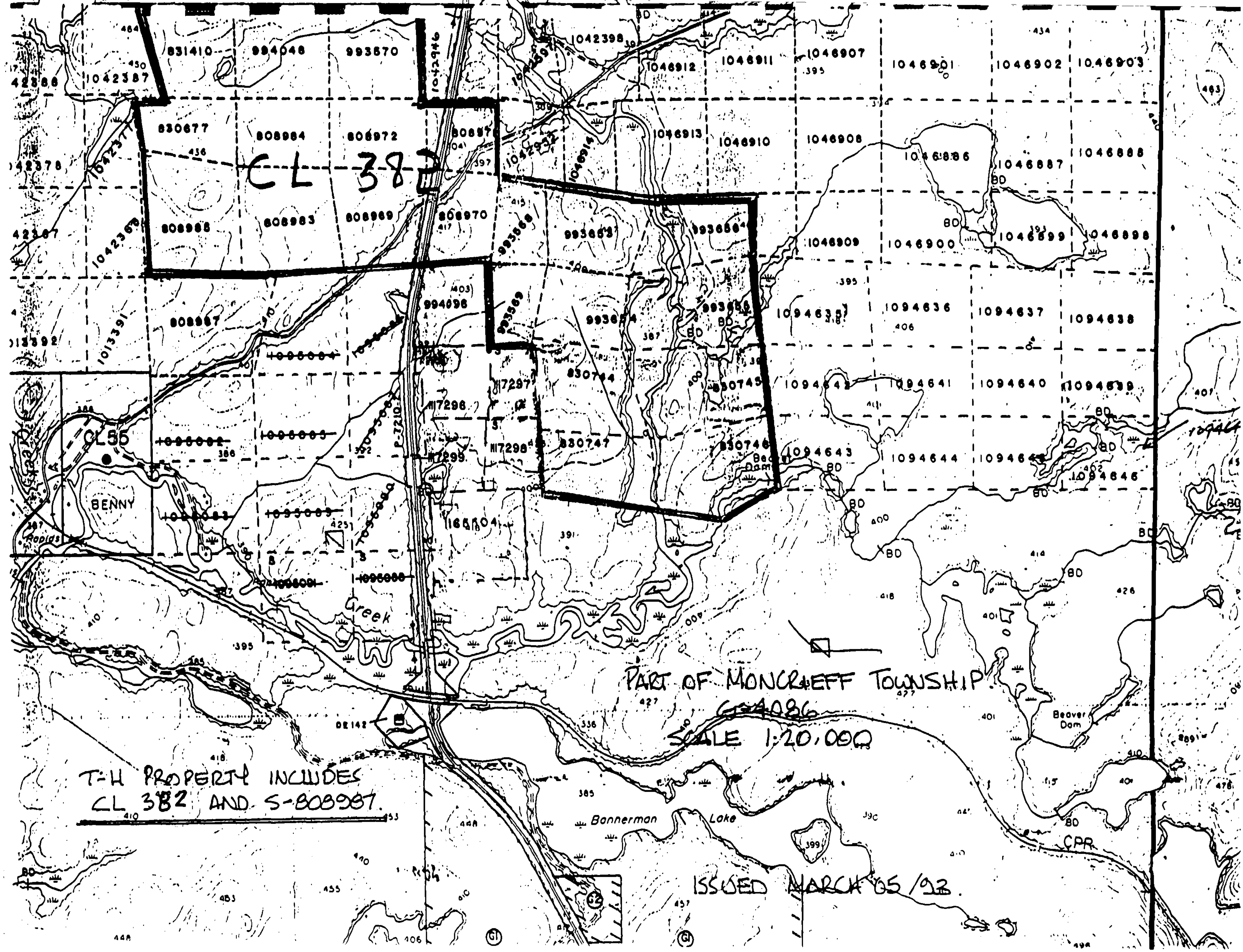


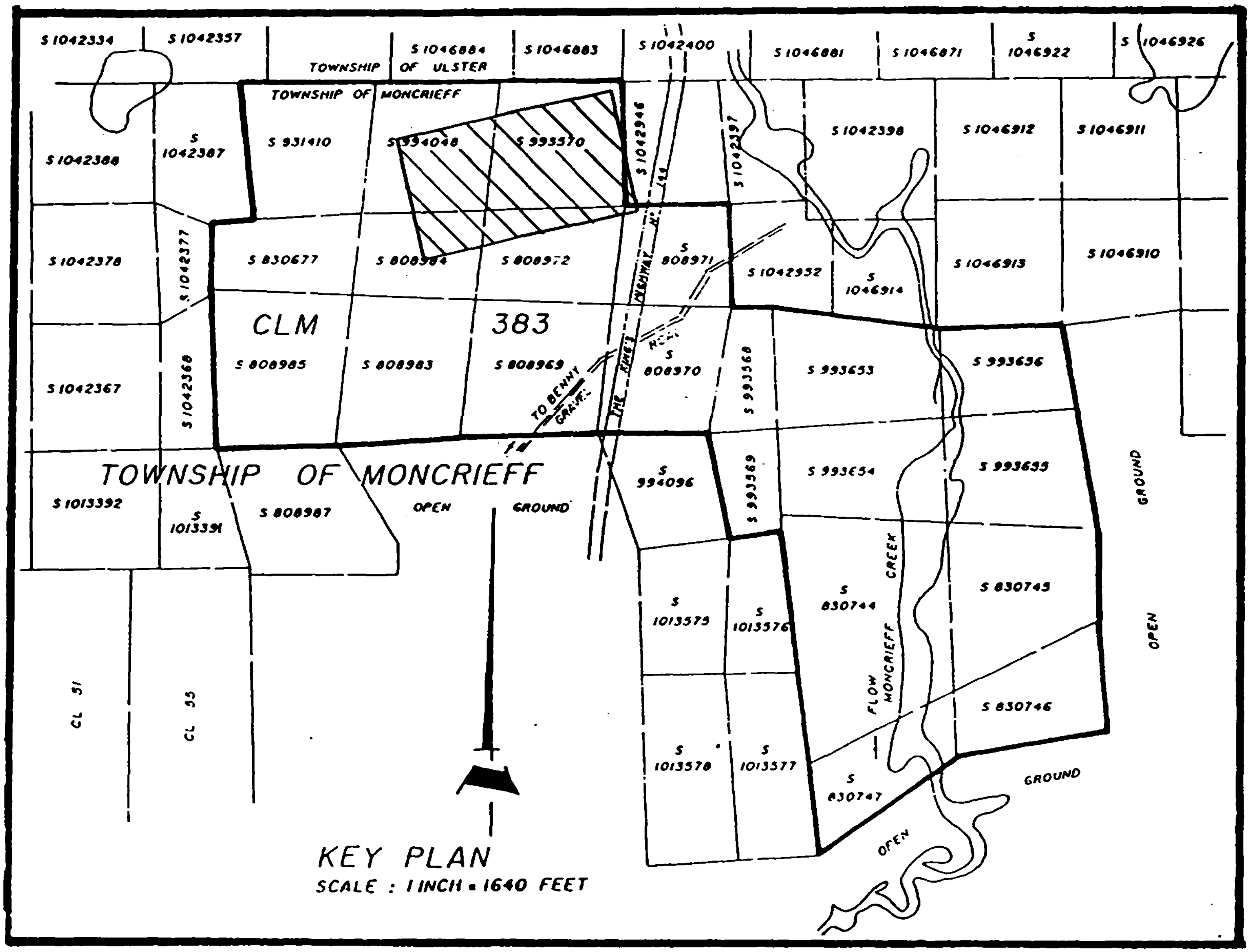


T-H PROPERTY.

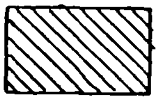
MONCRIEFF TOWNSHIP.

BENNY GREENSTONE BELT AREA.


CL 382
CL55
BENNY
Greek
Bannerman Lake
Beaver Dam
CPR
PART OF MONCRIEFF TOWNSHIP
G-4086
SCALE 1:20,000
T-H PROPERTY INCLUDES
CL 382 AND S-808987.
ISSUED MARCH 05/93.



T-H PROPERTY
MONCRIEFF TOWNSHIP, ONT.
(G-4086.)



EXPLORATION TARGET AREA.
WORKING AREA.

1.0 INTRODUCTION

The following is a detailed report which covers part of the initial T-H Property Exploration Program, Moncrieff Township. Part of the program included surface backhoe trenching, geological mapping and rock and mineral sampling which was looked after by John George Huycke (Op93-145); and geologist Yves Clement. The self-potential survey and the diamond drilling work which this report essentially describes was taken care of by this writer, the applicant, Harold J. Tracanelli. The findings and the results of the geophysics and drilling are generally mixed, although there are a few key aspects which will probably be subject to further, more detailed investigations.

Based on the findings of the fieldwork, additional work in the more promising and interesting looking areas in the northern parts of the T-H property is currently being evaluated and is under consideration for the 1994 field season.

The following is some detailed information pertaining to the area of interest, which is of interest when considering the various aspects of the exploration work findings.

The Tracanelli-Huycke property shortened to the T-H Property, is located in north central Moncrieff Township, within the Sudbury Mining Division, approximately 45 miles by road northwest of Sudbury, Ontario.

The 22 claim block overlies a number of east-west trending, southward dipping metavolcanic and metasedimentary volcangenetic sequences which makes up a part of what is known as the Benny Greenstone Belt.

The Benny Greenstone Belt is a 21 mile long by 3 - 4 mile thick sequence of east/west trending volcanic rocks which are thought to be the remnant portions of a much larger homoclinal pile that has probably been overturned and have since been deeply eroded. The rocks within this belt are known to dip towards the south but are believed to be overturned and actually young towards the north.

Generally the rocks of the belt consist of alternating sequences of flows with fine to very coarse grained pyroclastics, interrupted by cherty, micaceous-graphitic, metasediment rocks.

The composition of the rocks within the belt range from mafic to felsic. Felsic metavolcanic, metasedimentary and coarse grained pyroclastic rocks appear to be more prevalent in the eastern parts of the belt, while thicker sequences of mafic flows and other tuffaceous rocks with subordinate intercalated metasedimentary rocks predominate within the western areas.

Sulphide mineralization associated within the various metavolcanogenetic sequences is most evident with the cherty, micaceous and graphitic schistose rocks and probably represent former distal sea floor volcanoclastic sediments.

At a position near the central portion of the belt a thick sequence of volcanoclastic micaceous metasediments extending over considerable strike lengths is known to host large amounts of pyrite-pyrrhotite, graphite with only very minor amounts of base metal minerals. For the most part this sulphide bearing stratagraphic horizon is essentially base metal barren.

These mineral bearing rocks have been traced for considerable distances along strike by utilizing exploration methods such as trenching diamond drilling and a multitude of geophysics, over the last 40 years.

To the north of the barren sulphide horizon and stratagraphically above it, a felsic metavolcanic-metasedimentary horizon-zone occurs near the northern fringes of the belt, which is thought to host the Geneva Lake and Stralak base metal deposits. It was within this particular area in which trenching, self-potential and diamond drilling investigations were undertaken during 1993.

The base metal rich felsic volcanogenetic rocks in the Geneva Lake and Stralak areas host sulphide deposits at or near the contacts with the mafic metavolcanic rocks.

A detailed study of the geological mapping - geochemical - geophysical data generated over the years has clearly shown that the geological formations - stratigraphy which hosts the two known mineral deposits of the Benny Belt, appears to have been identified striking across the northern portion of the T-H property. This should be considered a very significant finding. The result of the 1993 work appears to indicate that a weak but identifable metal bearing horizon conformably occurs within felsic metavolcanis, thought to be part of the Ulster formation. The Ulster formation is thought to form a continuous stratagraphic horizon with the Geneva and Capper formations which host the Geneva Lake and Stralak base metal deposits.

On the T-H property, along this favourable, potential mineral bearing horizon, coincidental magnetic electromagnetic and I.P. anomalies with significantly high corresponding soil and lithogeochemical responses have been detected, and are traceable along strike over lengths of approximately 5,000 feet striking directly across the property.

High lithogeochemical metal values have been identified in the same general area where soil values as high as 3180 ppm zinc have been detected. Many of the significant looking geophysical-geochemical responses occur concordantly within the felsic metavolcanic units at or very near the mapped contact between the felsic and mafic metavolcanic rocks. The outcrop distribution in the area is somewhat limited due to the overburden cover, and therefore the geological mapping exercises of the past have been somewhat limited.

The massive sulphide deposits found within the Benny Belt are distinctively stataform and were probably generated as a result of volcanic vent-volcanogenetic massive sulphide processes within an aqueous environment.

The massive sulphide pyrite-pyrrhotite horizon identified in the central parts of T-H property have been traced along strike for some 4000 ft +/-, exhibits a number of similarities that have been observed in the geological assembledges at both the Geneva Lake and the Stralak properties, but for the most part are base metal poor.

The recently, partially tested northern part of the T-H property is thought to remain potentially favourable for hosting base metals, while it is believed that the rocks in the area are located along the same stratagraphic horizon as the Geneva Lake and Stralak deposits.

Over the years there has been a considerable amount of exploration work carried out throughout the Benny Greenstone Belt, particularly in those areas between Stralak and Geneva Lake.

The Stralak Zn-Pb-Ag mineral deposit was first discovered in the mid 1890's and although it was shown to contain sizable tonnages and grades, it was, for whatever reason, not brought into production.

The former Geneva Lake deposit was first discovered in 1924, while development and actual mining of the deposit took place in an intermittent fashion between the years 1928 and 1944.

For the most part a lot of the work that has been carried out in the belt has been concentrated around the massive pyrrhotite-pyrite-graphite zones which are easily detected using magnetic and electromagnetic geophysical techniques.

Much of the exploration work carried out over the pyrite-pyrrhotite horizons often included trenching, diamond drilling and testing with geophysics. For the most part the sulphide horizons often stuck out like a sore thumb. The results of much of the work showed generally poor results. Very interestingly, almost no one paid any attention to those areas to the north or stratagraphically above the barren sulphide horizons. At the Geneva Lake and Stralak deposits, barren massive pyrite and pyrrhotite are known to occur south of the ore zones. Many Archean base metal deposits are capped by a barren sulphide horizon.

Some of the work which was carried out on the T-H property north of the sulphide zone included soil geochemistry, ground geophysics and some very limited trenching. Most of the trenching on the property has been restricted to exposing portions of the pyrite-pyrrhotite horizon, including exposing of some minor areas of the lower sequences of the felsic metavolcanics.

Up until the summer of 1993, little or no surface trenching had ever been carried out along the upper most felsic metavolcanic sequences, (middle felsic-rhyolitic unit) contacting the mafic metavolcanics. This felsic-mafic contact area deserves a great deal more attention.

The results of the work carried out by Chevron in 1976, Noranda Explorations in 1985 and Falconbridge Ltd. in 1987 to 1990, has indicated that there are rather strong soil geochemical responses with corresponding weak but identifiable induced polarization, magnetic and electromagnetic anomalies, trending across parts of claims S-830677, S-808984, S-808972, S-994048 and S-993570. Most of the work in 1993 was carried out in the central parts of mining claim S-993570. The responses correlate with favourable geology consisting of felsic composition flows and pyroclastic rocks which overlay a sequence of mafic metavolcanics. The strength and characteristics of the geochemical-geophysical responses in conjunction with a favourable geological environment, would suggest that the areas should be further explored for base metals.

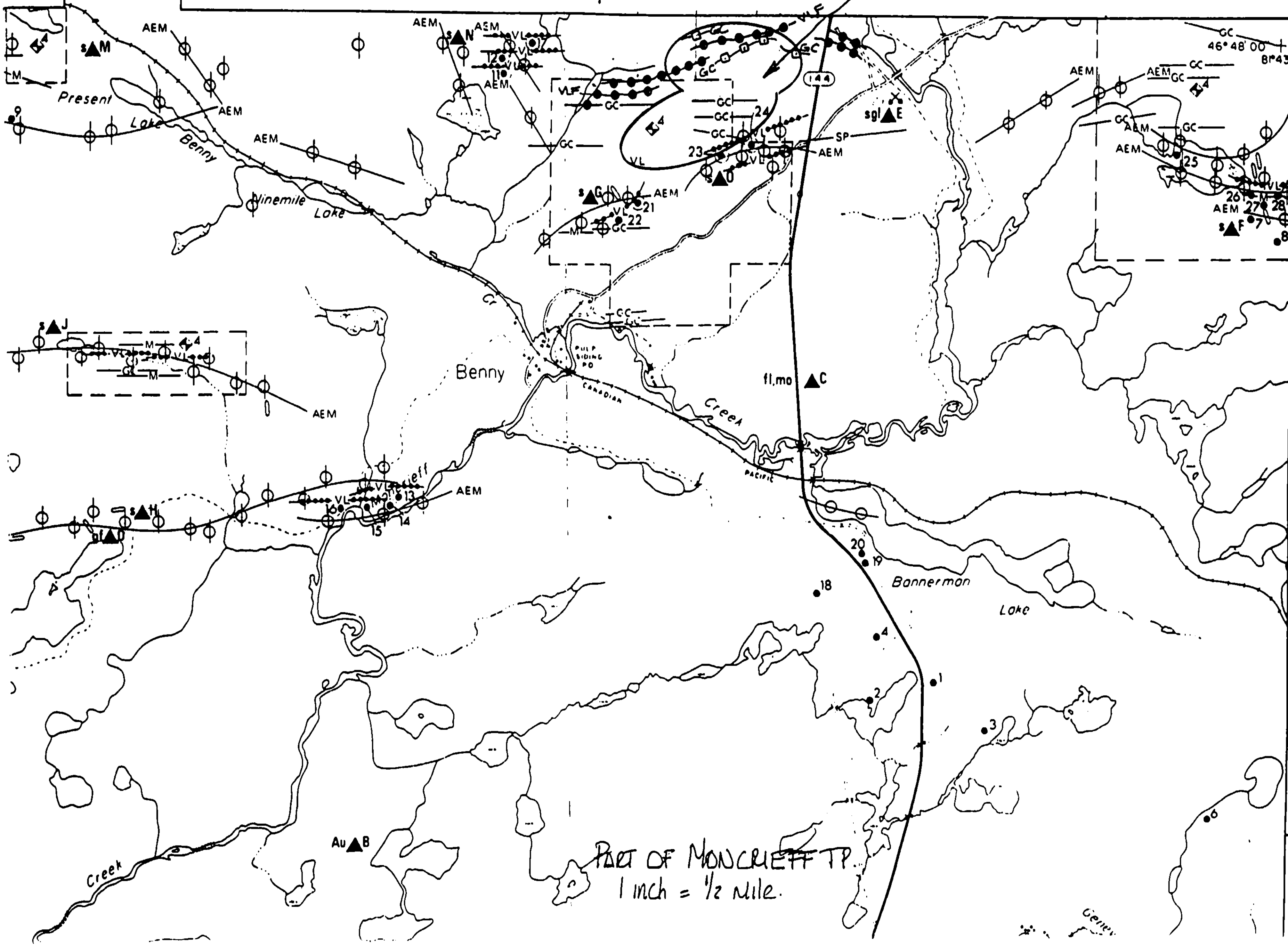
Peter S. LeBaron, P. Eng. of Noranda Exploration Company Ltd. concluded in his 1986 property report the following interpretation, much of which relates to the area of interest above described.

> "The geology appears favourable as a host for Stralak-type Zn-Pb-Ag mineralization. However, the only significant sulphide occurrence outlined by geophysical surveys is an iron sulphide formation which has been well-tested by diamond drilling over a strike length of about 1200 meters (North Cal Oils, 1959).
>
> One coincidental (actually several) Zn-Pb soil anomalies and a weak I.P. anomaly is of interest because orientation surveys over the stralak zone indicate that this type of sphalerite-rich sulphide zone is only weakly conductive but gives a strong Zn-Pb geochemical anomaly"

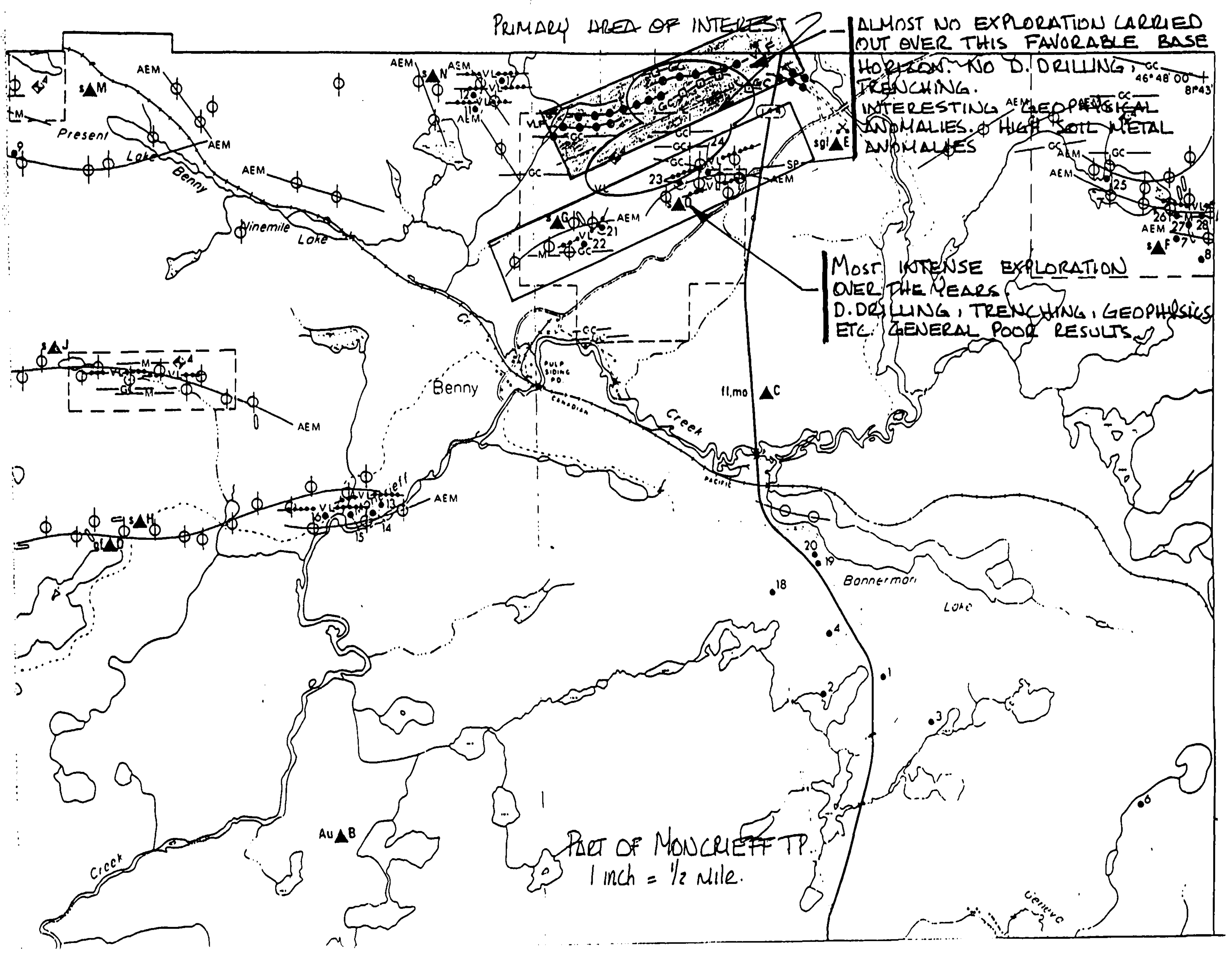
The T-H Property Exploration Program was designed to explore in some detail those areas described by Peter S. LeBaron and shown to have produced certain exploration results which may be indicative of potential base metal mineralization. Although some work was carried out, there are certain locations within the area of interest which warrant further, more detailed investigations.

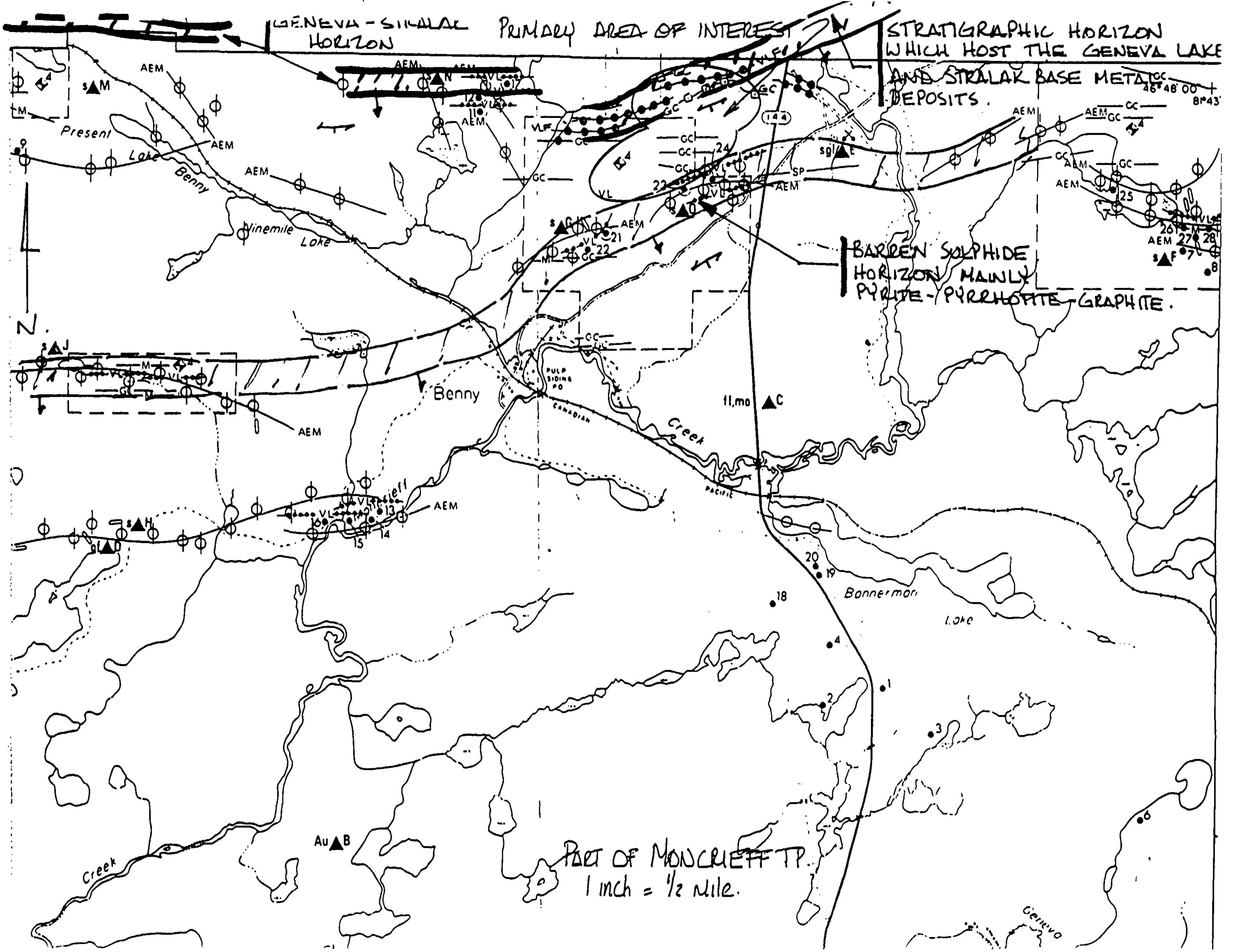
Please note that Bharti Laamanen Mining Inc. or its associated companies holds no interests or is expected to earn any interest rights in the T-H property. The mining property is strictly under the care and control of Harold J. Tracanelli and John George Huycke.

PRIMARY AREA OF INTEREST



PART OF MONCRIEFF TP.
1 inch = 1/2 Mile.


PRIMARY AREA OF INTEREST
ALMOST NO EXPLORATION CARRIED OUT OVER THIS FAVORABLE BASE HORIZON. NO D. DRILLING, TRENCHING.
INTERESTING GEOPHYSICAL ANOMALIES. HIGH SOIL METAL ANOMALIES
MOST INTENSE EXPLORATION OVER THE YEARS. D. DRILLING, TRENCHING, GEOPHYSICS ETC. GENERAL POOR RESULTS.
46°48'00"
81°43'
Present Lake Benny
Ninemile Lake
Benny
Creek
Bonnermon Lake
Pulp Siding P.O.
Canadian Pacific
AEM
GC
VL
SP
Au B
PART OF MONCRIEFF TP.
1 inch = 1/2 Mile.


GENEVA - STRALAK HORIZON
PRIMARY AREA OF INTEREST
STRATIGRAPHIC HORIZON WHICH HOST THE GENEVA LAKE AND STRALAK BASE METAL DEPOSITS.
BARREN SULPHIDE HORIZON MAINLY PYRITE - PYRRHOTITE - GRAPHITE.
46°48'00"
Present
Lake
Benny
Ninemile
Lake
Benny
Creek
Pulp Siding PO
Canadian
Pacific
Bannerman
Lake
Creek
Geneva
AEM
GC
VL
N.
PART OF MONCRIEFF TP.
1 inch = 1/2 mile.

2.0 PROPERTY LOCATION AND ACCESS

The T-H mining property is situated within north central Moncrieff Township, Sudbury Mining Division, Ontario, approximately 45 miles northwest of Sudbury, Ontario along highway 144 north. The highway passes directly through mining claims S-808970 and S-808971. Access to the surrounding points within the claim boundaries is afforded by means of an all weather road which leads west to the former E.B. Eddy pulp siding at Benny. A summer gravel road leads across the eastern portion of the claims and heads towards the former Geneva Lake Zn, Pb, Ag mine.

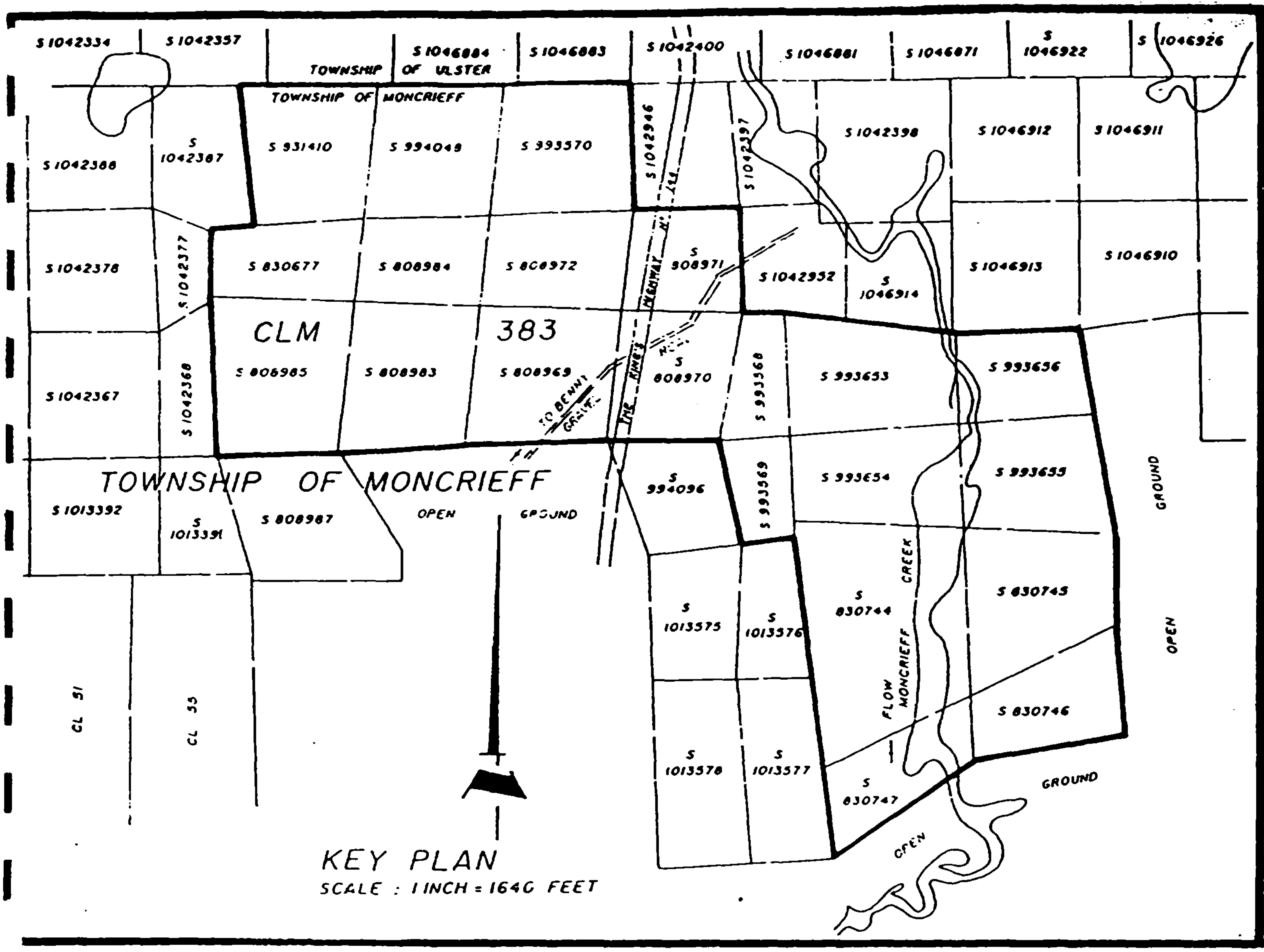
The base metal smelters in Timmins are located approximately 160 miles by road north from the T-H property.

3.0 PROPERTY DESCRIPTION

The T-H property consists of 21 surveyed claims and one unsurveyed mining claim, making up an estimated 850 acres +/-. The various mining claims are listed as follows:

S-831410	S-994048	S-993570
S-830677	S-808984	S-808972
S-808971	S-808985	S-808983
S-808969	S-808970	S-993568
S-993653	S-993656	S-993569
S-993654	S-993655	S-830744
S-830745	S-830747	S-830746
being part of surveyed claim 382, including unsurveyed mining claim S-808987.		

Although the claims have been surveyed, they have not been brought to lease



T-H PROPERTY
MONCRIEFF TOWNSHIP
ONTARIO
G-4036

4.0 PROPERTY OWNERSHIP

The above listed 22, surveyed but unleased mining claims, located in Moncrieff Township northwest of Sudbury, Ontario, known as the T-H property, and officially on record at the Sudbury mining Recorder's Office as being held in the names of:

John George Huycke, holding 50% and
Harold Joseph Tracanelli, holding 50%.

For the records, the listing of the interest holders is presented as follows:

1. Harold Joseph Tracanelli
582 Vermillion Lake Road
Box 167
Chelmsford, Ontario
POM 1LO (705) 855-5356
Lic. No. C-34300, CLN 202732
Holds 50% interest (O.P.A.P. Applicant)

2. John George Huycke
19 Emile Crescent
General Delivery
Dowling, Ontario
POM 1RO (705) 855-5415
Lic. No. C-30970, CLN 147219
Holds 50% interest (O.P.A.P. Applicant)

No other outside interests hold rights in the above stated mining property.

A perimeter survey was carried out by P.A. Blackburn, dated November 26th, 1990, at the request of Falconbridge Limited, and has been valuable in clearly defining the outer boundaries of 21 of the 22 T-H claim property.

No disputes, liens, orders, etc. have been filed against the mining claims of the official claim holders.

Ontario

Ministry of Northern Development and Mines

Ministère du Développement du Nord et des Mines

Mining Recorders Office
159 Cedar Street
2nd Floor
Sudbury, Ontario
P3E 6A5

Phone: (705) 670-7319
Fax: (705) 670-7323

July 15, 1992

Mr. Harold Tracanelli
582 Vermillion Lake Road
BOx 164
Chelmsford, Ontario
POM 1LO

Dear Sir:

RE: Mining Claims S. 808969-72 incl., S. 808983-85 incl., S. 830677; S. 830744-47 incl., S. 993568-70 incl., S. 993653-56 incl., S. 994048; S. 831410
Moncrieff Township

Mr. George Huycke who holds a 50% interest in the above-noted mining claims has advised this office recently that he has decided not to proceed to lease at this time on the said claims.

In order to discontinue the lease process I require written notification from yourself as well, stating that you also wish to not proceed to lease at this time.

It is important that you respond as soon as possible in order that this office may make the necessary adjustment to your file.

Yours truly,

Roy Denomme
Mining Recorder
Sudbury Mining Division

/kg

SCHEDULE "A"

S.808969	S.830746
S.808970	S.830747
S.808971	S.831410
S.808972	S.993568
S.808983	S.993569
S.808984	S.993570
S.808985	S.993653
S.808987	S.993654
S.830677	S.993655
S.830744	S.993656
S.830745	S.994048

5.0 DISCUSSION ON THE PRACTICES, PROCEDURES AND FIELD RESULTS OF THE SELF POTENTIAL SURVEY

As an integral part of O.P.A.P. project "OP93-146" an orientative self potential survey was proposed to be carried out over the northern part of the T-H property in Moncrieff Township. As a result of a very careful review of existing geological-geophysical and geochemical data, primarily originally generated from the former efforts of Noranda and Falconbridge, it was decided that the original extent of the survey should be reduced somewhat to reflect the findings of the latest evaluation.

Within the original proposal of March 10, 1993, plans called for an estimated four days of self-potential (S-P) surveying to be carried out over parts of mining claims numbered S-808972, S-808984, S-830677, S-831410, S-994048 and S-993570.

Part of the reasoning for reducing the survey area was due to the erratic distribution and complex nature of the volcanic stratigraphy west of mining claim S-993570, in addition a large amount of the stratigraphy that has been displaced by highly irregular shaped metagabbroic intrusions. It was felt that it would not be very worthwhile to carry out such survey work over areas made up mainly of metaintrusives, with highly jostled-reoriented blocks of original volcanic rocks, in which interpretation work would certainly prove to be very difficult.

As a result of the above evaluation, the self-potential orientation survey was carried out over mining claim S-993570, utilizing the former grid lines previously established by Falconbridge in 1988 and 1989.

The following is a discussion on the self-potential survey the equipment used, the procedures followed and the results which were obtained.

The self-potential unit utilized for the orientative work was carefully fabricated by the writer and is made up of the following integrated pieces of equipment:

1. Radio Shack Micronta LCD
   Digital Mutli Meter 22-191
   Please refer to the supporting documentation for further details in Appendix I.

2. Two white-glazed, raw bottom porous clay pots, each containing approximately 150 feet of heavy coper were wound tightly into a 4-1/2" to 5" +/- coil. Each of the copper coils was fully submerged within 6 cups +/- jellied supersaturated solution of copper sulphate and water. Each of the coils was suspended within the solution so that at no time were the coil electrodes allowed to touch the bottoms of pots which would cause the circuits to become grounded.

3. The conductor between each pot and to the readout meter, consisted of a standard gauge double conductor plastic insulated copper wire. Each end of the lead wires were connected to the extruding portion of the electrode coils by means of clip-like plugs. All of the contact areas were well secured and well taped to ensure good contact and limit the possibility of shorting or grounding out.

Prior to the commencement of the self potential survey, batteries and instrument checks were carried out. The pot differences were measured to determine the ultimate positive and negative survey pot positions. The pot differences in this case were determined to range from 1 to 5 milli-volts. Inverse pot differences were also taken to check the continuity of the instrumentation and the soundness of the leads and connections.

For the purpose of the orientative survey, the leap frog method was used with the positive-negative pot separation being approximately 50 feet +/- (15.25 meters +/-).

At each of the grid line stations a hole was dug down to the mineral soils, at which time a denim bag filled with damp cedar sawdust was placed and packed into the hole for maximum bag-ground contact.

The sawdust filled bag assists in providing a consistent pH media in which the pots make contact with and subsequently read the galvanic potential with little or minimal effects caused by pH differences.

The positive or forward pot was positioned at each of the advancing stations by the field assistant John George Huycke while the negative or rear position pot was worked by Harold Tracanelli.

The field measurements, geographic data was observed and recorded from the rear negative pot position of the configuration. Directions were issued to the forward pot position by the instrument man at such a time as it was felt that the appropriate data had been recorded.

The establishment of the 50 foot +/- pot separation, leap frog configuration would easily allow for the detection of narrow conductors if they were to occur perpendicular to the crosslines and were located below and between the positive and negative stations.

The grid arrangement was originally designed to cross perpendicular to the known regional geological trends, etc. On a regular basis, as well as upon completion of the day's surveying, the instrumentation pot hardware-pot differences etc. would be checked in an attempt to determine if any deviations had occurred.

No appreciable changes were found to have occurred on the day of surveying and it is therefore concluded that equipment consistencies should have lead to a significant reduction in systematic or random errors.

Background and anomalous millivolt (Mv) readings were determined based on an overall assessment of the readings compared against topographic-geographic characteristics in the grid area. It has been determined that the background values should range in the -25 to -30 Mv to +25 to +30 Mv range +/-.

For the purpose of the discussion on the self-potential geophysical survey a series of detailed 1.2500 scaled 11" x 17" drawings have been generated can be found in this report and include the following:

1. Contour plot of the uncorrected self-potential data superimposed onto the extrapolated geological formations.
2. Uncorrected self-potential field data, profile plot.
3. Corrected self-potential data, profile plot.
4. Cumulative self-potential data, profile plot.

Each of the above stated drawings would be useful for doing some interpretational work, in an attempt to identify sulphide bearing stratigraphy, structural elements, geological contacts, etc.

A complete set of tables showing the collected-corrected field data has also been provided, which at some point in time may be further manipulated.

For the most part the initiation of the survey in conjunction with the reduction and evaluation of the data has generally shown that for at least in this area the self-potential method provided a limited amount of usable data, some of which was shown to be quite cumbersome to work with.

The actual initiation of the self-potential survey was carried out on September 4, 1993. The survey was performed by the applicant (Harold J. Tracanelli) with assistance being provided by John George Huycke.

The survey was carried out over the former Falconbridge Limited precut grid lines of L1+00E, L0+00 and line L1+00W, for a total survey distance of some 4250 feet +/-, (1295 meters +/-).

The following distances were surveyed on the following lines:

L1+00E	2000 feet	(610 meters +/-)
L0+00	1250 feet	(381 meters +/-)
L1+00W	1000 feet	(305 meters +/-)

All survey readings were taken along each line at 50 foot (15.25 meter +/-) intervals. Various reference points along the metric grid lines were carefully noted, so as to facilitate the production of the appropriate drawings. Although the survey work was carried out in feet, the data representation was translated to metric (i.e. 1:2500) as to allow for effective compilation, superimposing and interpretation of data against the numerous Falconbridge maps already generated to date.

The results of the survey and its data representation shall be discussed as follows:

1. Corrected
2. Cumulative
3. Uncorrected

1. Corrected

The raw, uncorrected data, collected in the field was subject to some alterations and adjustments as prescribed by S.V. Burr, 1982, which is apparently necessary to correct for diurnal variations while employing the "Leap Frog Method", with a fixed length of wire between the electrodes.

Plotting of the results of the corrected field data has shown that many of the values appear to have become highly exaggerated.
On Lines 1+00E and 1+00W, where the surveying progressed from south to north, a large portion of the numbers are strongly negative, while on line 0+00 where surveying progressed from north to south, all of the corrected figures seem to show a moderate positive direction.

It is possible that the strongly opposite polarities on line 0+00 between the two adjacent lines may be in part a reflection of the survey direction. A similar effect can sometimes be observed when running fluxgate magnetometer surveys.

If the corrected values of line 0+00 were transposed to negative polarity, the vast majority of the corrected values of the survey would be strongly negative but unfortunately show little or no resemblance to responses that might be indicative of sulphide mineralization.

On line 1 + OOE at approximately 2 + 50 to 3 + 5ON, a small, poorly defined sine curve response sometimes typical of sulphides appears to occur over the northern contact of a metagabbro intrusive with the lower mafic and middle felsic unit. The sine curve response is far more clearly defined in the uncorrected profile data.

On the northern parts of the line starting at approximately 11 + 00 north the S.P. values change from weakly positive towards the trend of very strongly negative up to the end of the grid line. The change in polarity occurs over the extrapolated contact between the lower mafic unit and the middle felsic, rhyolitic unit. The character of the profiled data has been so strongly exaggerated that it is not possible at this time to make a useful interpretation.

It is important to note that it is the middle felsic unit which is believed to be the primary horizon for potential sulphide mineralization. The geological arrangement in the north part of the line consists of mafic metavolcanics and clastic metasedimentary rocks and are known to contain only very small amounts of sulphides, but show a very strong negative response in the corrected data. It is in part for this reason that interpreting the corrected data appears to be so difficult.

On line 0 + 00 regardless of polarity, if changes were to have been incorporated over an above the corrected data, no polarity crossovers would be indicated.

A moderately large spike of + 107 millivolts at station 6 + 00 south appears to correspond quite well with fairly well defined sine curve cross over observed in the uncorrected data. Little or no further interpretation of the corrected data from L0 + 00 is possible at this time.

On line 1 + OOW, fairly weak positive values form a crossover into very strong negative values in the area from approximately 2 + 00 North to 5 + 50 North. The actual polarity change - crossover was detected at 5 + 50 North. This crossover appears to correspond with a strong crossover shown in the uncorrected data.

The preliminary characteristics of the response would appear to indicate a steeply south dipping source of weak sulphide mineralization. Sulphides which are present may be strataform and could be associated with certain structural features.

In conclusion the corrected survey data appears to have been highly exaggerated and is quite abstract looking, making interpretation difficult at best. Because there is such exaggeration, effects due to landform, topography were very difficult to pick out.

2. Cumulative

The cumulative data is sometimes used by prospectors running the self-potential surveys as a means to more clearly define responses related to sulphide mineralization.

The accumulation of the positive and negative field data shows numerous sharp negative peaks and values which appear, for the most part, to reflect topographic effects.

On line 1 + 00E a very strong negative spike of -160 millivolts at 3 + 00N appears to correspond with the sine curves observed in both the corrected and uncorrected data profiles. All values on line 1 + 00E are of negative polarity.

In addition, on line 1 + 00E at 14 + 50N, a peak of -70 millivolts is paralleled by two nearly equal valleys of -34 and -36 millivolts. This particular response appears to correspond with a weak crossover as observed in the uncorrected data.

On line 0 + 00 a weak double crossover of -17 and -29 millivolts at 6 + 00 to 6 + 50 south appears to correspond with a moderately strong double crossover as is shown in the uncorrected data.

On the same grid line at 11 + 00S, the values go from quite strongly positive to deep negative, then back to positive, was detected in an area of poplar and jack pine flats and is considered unexplainable at this time.

The character of the profiles as depicted on line 1 + 00W is somewhat similar in nature to that of line 1 + 00E, with the exception of the values often changing polarity.

A small negative peak of -24 millivolts at 2 + 50 North appears to correspond with the extrapolated contact between the lower mafic unit and the middle felsic rhyolitic unit. At 5 + 00 North a crossover from + 25 millivolts to -46 millivolts corresponds with a strong crossover of -71 millivolts as depicted in the uncorrected data profiles.

Continuous negative values north of the crossover would appear to indicate the causative sources is dipping north as opposed to south as indicated in the corrected-uncorrected data profiles.

The north dipping source is contradictory with the idea of strataform sulphides associated with south dipping geological formations. A possible explanation for such a response may be the presence of a north dipping structure running parallel to, but cross cutting the local stratigraphy.

In conclusion the plotting of the cumulative data has not been overly helpful in identifying potential sulphide mineralization associated with the felsic-rhyolitic sequences. In some respects the various configurations of negative peaks correspond with characteristic corrected and uncorrected crossovers etc., but still do not show any definitive sulphide (sine curve) responses. It is quite possible that the detected responses are related to weak sulphide mineralization which are only putting out faint voltages.

3. Uncorrected

The uncorrected field data which has been profiled and in this instance most easily contoured, of the three types of data discussed, is most often used and interpreted during prospecting self-potential work.

The data profiles for each of the lines appear to be quite erratic looking and without other forms of data to compare to, the uncorrected data can also be difficult to interpret. By studying both the profile and contours, it is possible to identify certain patterns or characteristic features that may be related to sulphide mineralization. Due to the nature of the corrected and cumulative values, it was not possible to effectively draw contours and there is no additional benefit to try to make interpretations.

On line 1+00E, at 3+00N a very typical looking sine curve S-P response with a positive and negative crossover is clearly shown. The dip of the causative source appears to be steep towards the south, which is conformable with the metavolcanic stratigraphy. The sine curve response is thought to be due to possible sulphide mineralization related to the contact between the metagabbro intrusive and the metavolcanics. There are a couple of small occurrences of sulphides-arsenides located along the south contact of the above said intrusion, approximately 425 feet (130 meters +/-) to the southwest.

By contouring the negative values it was possible to identify a weakly to moderately strong lenticular response, trending northeast to southwest and is situated near the centre of the middle felsic-rhyolitic unit. The response which ranges from -34 millivolts at 14+50N on line 1+00E, -52 millivolts at 6+00S and -71 millivolts at 5+00N, appears to be conformable with the local stratigraphy. Due to the irregular nature of the data profiles it is not possible to predict a dip of the causative source. It is estimated that the thickness of the sources is probably in the range of 25 to 30 feet. Since the lenticular responses closely correlate with a weak VLF-EM anomaly detected by Falconbridge Ltd., with Induced polarization and geochemistry responses detected by Noranda Exploration, it is possible to speculate that the self-potential response is due to weak strataform sulphide mineralization.

The weak negative responses to the north and south parallel the main anomalous trend, are thought to be related to topographical effects. The parallel trend to the south can be seen on lines 1 + 00E and 1 + 00W, appear to occur only a short distance north of the contact between the lower mafic and the middle felsic matavolcanic rocks. There may be some contact relationship, but it is difficult to say for certain.

Based on a review of the interpreted geology-geophysics, the uncorrected and cumulative S.P. data, it would appear that the response on line 1 + 00W and possibly on line 0 + 00 may be related to weak sulphide mineralization within the middle felsic-rhyolitic unit. The response detected near the south end of line 1 + 00E is probably related to contact metamorphic-hydrothermal sulphides associated with metagabbro intrusive veins similar to the cobalt-bismuth veins observed near the south intrusive contact of the same metagabbro body.

In conclusion the orientative self-potential work carried out on mining claim S-993570 did not conclusively indicate the presence of conductive sulphide mineralization within those certain horizons suspected to be most favourable as potential hosts for mineralization.

With the exception of one response near the south end of line 1 + 00E, which shows what is though to be the typical response for sulphide mineralization there appears to be no additional areas surveyed which conclusively indicate the presence of significant concentrations of sulphide minerals, magnetite, etc.

Near the centre of the survey area, there appears to be a series of correlating responses which might be related to weak sulphide mineralization, possibly associated with certain structural features, which has yet to be proven and may warrant further, more detailed investigations.

For the most part the evaluation, interpretation and manipulation of the corrected, cumulative and uncorrected self-potential survey data proved to be difficult and cumbersome. Generally the results were found to be inconclusive and in part may be inaccurate. Whatever interpretations can be made, it is certain that there is now more data to add to the realm of pre-existing geological-geophysical-geochemical data gathered by various workers from the years gone by.

Self Potential Survey Results

Date: September 4, 1993
Grid Line 1 + 00E
Starting Point: Falco 1 + 10M North
Traverse-Survey Direction: North
Instrument Operators: Harold J. Tracanelli, John George Huycke

Survey Station	Pot.	Pot. Reading	Cumulative Value	Reading Plus Inverse Pot. Diff. P.D. = (-1)	Transposed Reading at Negative Pot	Tentative Value
0 N	(-)	0	0	0	- 0	0
50 N	(+)	-30	-30	-30 + (+1)	+(-29)	-29
100 N	(-)	-18	-48	-18 + (+1)	-(-17)	-12
150 N	(+)	-12	-60	-12 + (+1)	+(-11)	-23
200 N	(-)	-22	-82	-22 + (+1)	-(-22)	-1
250 N	(+)	-56	-138	-56 + (+1)	+(-55)	-56
300 N	(-)	-22	-160	-22 + (+1)	-(-21)	-35
350 N	(+)	+55	-105	+55 + (+1)	+(+56)	+21
400 N	(-)	+29	-76	+29 + (+1)	-(+30)	-9
450 N	(+)	+13	-63	+13 + (+1)	+(+14)	+5
500 N	(-)	-4	-67	-4 + (+1)	-(-3)	+8
550 N	(+)	-9	-76	-9 + (+1)	+(-8)	0
600 N	(-)	-8	-84	-8 + (+1)	-(-7)	7
650 N	(+)	+10	-74	+10 +(+1)	+(+11)	18
700 N	(-)	-5	-79	-5+(+1)	-(-4)	22
750 N	(+)	+18	-61	+18+(+1)	+(+19)	41
800 N	(-)	+14	-47	+14+(+1)	-(+15)	26
850 N	(+)	-31	-78	-31+(+1)	+(-30)	-4
900 N	(-)	-12	-90	-12+(+1)	-(-11)	7
950 N	(+)	+15	-75	+15+(+1)	+(+16)	23
1000 N	(-)	+7	-68	+7+(+1)	+(+8)	15
1050 N	(+)	+6	-62	+6+(+1)	+(+7)	22
1100 N	(-)	+25	-37	+25+(+1)	-(+26)	-4
1150 N	(+)	-46	-87	-46+(+1)	+(-45)	-49

Self Potential Survey Results

Date: September 4, 1993
Grid Line 1 + 00E
Starting Point: Falco 1 + 10M North
Traverse-Survey Direction: North
Instrument Operators: Harold J. Tracanelli, John George Huycke

Survey Station	Pot.	Pot. Reading	Cumulative Value	Reading Plus Inverse Pot. Diff. P.D. = (-1)	Transposed Reading at Negative Pot	Tentative Value
1200 N	(-)	+ 11	-72	+ 11 + (+ 1)	-(+ 12)	-61
1250 N	(+)	+ 1	-71	+ 1 + (+ 1)	+ (+ 2)	-59
1300 N	(-)	-17	-88	-17 + (+ 1)	-(-16)	-43
1350 N	(+)	+ 17	-17	+ 17 + (+ 1)	+ (18)	-25
1400 N	(-)	+ 35	-36	+ 35 + (+ 1)	-(+ 36)	-61
1450 N	(+)	-34	-70	-34 + (+ 1)	+ (-33)	-94
1500 N	(-)	+ 36	-34	+ 36 + (+ 1)	-(+ 37)	-131
1550 N	(+)	-31	-65	-31 + (+ 1)	+ (-30)	-161
1660 N	(-)	-1	-66	-1 + (+ 1)	-(0)	-161
1650 N	(+)	-7	-73	-7 + (+ 1)	+ (-6)	-167
1700 N	(-)	-5	-78	-5 + (+ 1)	-(-4)	-163
1750 N	(+)	-6	-84	-6 + (+ 1)	+ (-5)	-158
1800 N	(-)	+ 7	-77	+ 7 + (+ 1)	-(+ 8)	-166
1850 N	(+)	-6	-83	-6 + (+ 1)	+ (-5)	-171
1900 N	(-)	-1	-84	-1 + (+ 1)	-(0)	-171
1950 N	(+)	+ 16	-68	+ 16 + (+ 1)	+ (+ 17)	-154
2000 N	(-)					

Self Potential Survey Results

Date: September 4, 1993
Grid Line 0+00
Starting Point: Ulster/Moncrieff Township Line Falco 6+90M North
Traverse-Survey Direction: South
Instrument Operators: Harold J. Tracanelli, John George Huycke

Survey Station	Pot.	Pot. Reading	Cumulative Value	Reading Plus Inverse Pot. Diff. P.D. = (-1)	Transposed Reading at Negative Pot	Tentative Value
0 S	(-)	0	0	0	-0	0
50 S	(+)	+5	+5	+5+(+1)	+(+6)	+6
100 S	(-)	-20	-15	-20+(1)	-(-19)	+25
150 S	(+)	+30	+15	+30+(+1)	+(+31)	+56
200 S	(-)	-6	+9	-6+(+1)	-(-5)	+61
250 S	(+)	0	+9	0+(+1)	+(+1)	+62
300 S	(-)	0	+9	0+(+1)	-(+1)	+61
350 S	(+)	0	+9	0+(+1)	+(+1)	+62
400 S	(-)	+20	+29	+20+(+1)	-(+21)	+41
450 S	(+)	+10	+39	+10+(+1)	+(+11)	+52
500 S	(-)	-4	+35	-4+(+1)	-(-3)	+55
550 S	(+)	0	+35	0+(+1)	+(+1)	+56
600 S	(-)	-52	-17	-52+(+1)	-(-51)	+107
650 S	(+)	-12	-29	-12+(+1)	+(-11)	+96
700 S	(-)	+61	+32	+61+(+1)	-(+62)	+34
750 S	(+)	+13	+45	+14+(+1)	+(+14)	+48
800 S	(-)	+6	+51	+6+(+1)	-(+7)	+41
850 S	(+)	-1	+50	-1+(+1)	+(0)	+41
900 S	(-)	-9	+41	-9+(+1)	-(-8)	+49
950 S	(+)	+7	+48	+7+(+1)	+(+8)	+57
1000 S	(-)	+18	+66	+18+(+1)	-(+19)	+38
1050 S	(+)	+12	+78	+12+(+1)	+(+13)	+51
1100 S	(-)	-3	-75	+3+(+1)	-(-2)	+51
1150 S	(+)	-1	+74	-1+(+1)	+(0)	+53
1200 S	(-)	0	+74	0+(+1)	-(+1)	+52
1250 S	(+)	+6	+80	+6(+1)	+(+6)	+58

Self Potential Survey Results

Date: September 4, 1993
Grid Line 1+00W
Starting Point: Falco 3+50M North
Traverse-Survey Direction: North
Instrument Operators: Harold J. Tracanelli, John George Huycke

Survey Station	Pot.	Pot. Reading	Cumulative Value	Reading Plus Inverse Pot. Diff. P.D. = (-1)	Transposed Reading at Negative Pot	Tentative Value
0 N	(-)	0	0	0	- 0	0
50 N	(+)	-12	-12	-12+(+1)	+(-11)	-11
100 N	(-)	+19	+7	+19+(+1)	-(+20)	-31
150 N	(+)	-19	-12	-19+(+1)	+(-18)	-49
200 N	(-)	+19	+7	+19+(+1)	-(+20)	-69
250 N	(+)	-31	-24	-31+(+1)	+(-30)	-99
300 N	(-)	+50	+26	+50+(+1)	-(+51)	-150
350 N	(+)	+8	+34	+8+(+1)	+(+9)	-141
400 N	(-)	-10	+24	-10+(+1)	-(-9)	-132
450 N	(+)	+1	+25	+1+(+1)	+(+2)	-130
500 N	(-)	-71	-46	-71+(+1)	-(-70)	-60
550 N	(+)	+46	0	+46+(+1)	+(+47)	-13
600 N	(-)	-49	-49	-49+(+1)	-(-48)	+35
650 N	(+)	-5	-54	-5+(+1)	+(-4)	+31
700 N	(-)	+10	-44	+10+(+1)	-4(+11)	+20
750 N	(+)	+8	-36	+8+(+1)	+(+9)	+29
800 N	(-)	+15	-21	+15+(+1)	-(+16)	+13
850 N	(+)	-28	-49	-28+(+1)	+(-27)	-14
900 N	(-)	-3	-52	-3+(+1)	-(-2)	-12
950 N	(+)	+25	-27	+25+(+1)	+(+26)	+14
1000 N	(-)	-7	-34	-7+(+1)	-(-6)	+20

6.0 DISCUSSION ON DIAMOND DRILLING OF HOLE C-93-1

A major part of the T-H Property 1993 Exploration Program, OPAP File Number OP93-146, was to put down single diamond drill hole C-93-1, to evaluate and determine the depth extent of the potentially favourable mineral bearing stratigraphy, near or at the contacts between the middle felsic-rhyolitic metavolcanics and the upper mafic metavolcanic sequences. These lithological units have been previously established through geological mapping carried out by Falconbridge Ltd. in 1989 (M. Gray).

Based on a preliminary review of the trenching geological mapping and sampling work carried out by geologist Yves Clement, as part of the OP93-145 program, in conjunction with the available geological-geophysical and geochemical data previously generated by Falconbridge Ltd., Noranda Explorations and by this writer (self-potential survey), an appropriate drill hole collar location was chosen.

As a result of the review, the hole was drilled in the upper centre portion of mining claim S-993570, at the Falconbridge Ltd. co-ordinates of 5 + 16 meters north and 0 + 20 meters west. The drill hole was drilled towards the north-northwest at 331° Azimuth, at an inclination of -55°. The drill machine was set up directly on an outcropping, very near the south end of a large trench (See OP93-145), which is situated approximately 20 meters (65.0 ft. +/-) west of L0 + 00. No casing was required for Hole C-93-1, which helped to keep the costs down to a minimum. Upon completion of the drilling, the hole reached a final depth of 604 feet (184.09 meters +/-).

The diamond drilling contract was given out to Sparta Diamond Drilling, which is owned and operated by Larry J. Salo, out of Connaught, Ontario. For this drill hole the light weight BBS-2 drill machine was utilized and was easily mobilized into the collar area. The drill machine was equipped with a wireline system which was fitted to produce ADBGM (1.20 inch diameter) core. Core recovery for hole C-93-1 is estimated to be nearly 100%, and the core was laid out in the appropriate wooden boxes, which were easily shipped off to the core shack for logging, sampling, etc.

The total drilling costs for hole C-93-1 was set at $12.00/foot. A total of 604 feet of drilling was carried out, with the invoiced charges for this work being $7,200.00. A copy of the invoice can be found in Appendix V of this report.

Hole C-93-1 was spotted by John George Huycke, under the direction of this writer, on October 2, 1993 at the co-ordinates previously stated above. The drilling of the hole took place over a period of six days from October 2, to 7, 1993. On two occasions John George Huycke paid a visit to the drill site to check on progress and to take a look at some of the fresh core as it was made available. Upon completion of the hole all core boxes were tightly secured and then transported to 582 Vermillion Lake

Road, Chelmsford, Ontario, to be logged, sampled and placed in storage for future reference.

The formal drill core logging procedures were carried out on October 16th and November 13, 1993 by this writer, Harold J. Tracanelli, the OPAP applicant. All lengths of drill core were measured and logged in feet and inches as is clearly denoted within the attached drill logs. Complete descriptions of the rock type - lithological descriptions including colour, grain size, texture, alteration etc. were reported within the drill logs as carefully and effectively as possible.

At various locations throughout the hole core samples ranging in length from 1'-3" to a maximum of 7'-0" were marked out, with each given an identification number. The actual core splitting procedures were carried out on December 7, and 8, 1993. A total of 46 core samples were split, bagged, recorded and prepared for shipment off to Chemex Labs Ltd. in Toronto, Ontario. Each sample was subjected to ICP-32 and gold analysis. The complete results of the above analytical procedures can be found within Appendix III of this report.

The drill log information and the analytical data has been transposed onto a series of cross sections at a scale of 1 inch to 50 feet. The reasoning behind choosing an imperial scale for the sections over the metric scales as was used for the self-potential survey work was that it was found that the 1,2500 would probably prove to be too small to allow for sufficient space to plot some of the logs' useful details. Since there was no drill hole geological information projected vertically onto the horizontal projection of the hole, the "Diamond Drill Hole Location Plan" has been drafted at a scale of 1,2500, which can easily be overlaid onto the Falconbridge geological-geophysical plans, etc.

Within the report, cross sections depicting the Drill Hole Geology, Drill Hole Samplings and Trace Element Geochemistry have been provided. In addition, a 1,2500 scale plan depicting the position of the drill hole and the position of the drill hole showing the relationship of the extrapolated geological contacts with the positions of various geophysical and geochemical anomalies has also been provided. The complete drill hole log has also been provided within the report immediately following this particular section.

The results of drilling hole C-93-1 are considered to be somewhat mixed from a geological and metal bearing point of view. The geological sequences cut looked to be fairly interesting while, for the most part, metal values obtained for the Pb, Zn, Cu, Au and Ag were fairly low. In each instance it is possible to identify certain areas which could be of potential interest, but will require further, more detailed study.

For the most part the geology within the drill hole turned out to be pretty much what was expected. The various stratigraphy encountered generally consisted of felsic metavolcanics with intercalated mafic metavolcanics and metasediments, which have been intruded by gneissic-granitic rocks. Most of the rocks have been strongly altered due to vein infilling, quartz-carbonate-chlorite-biotite alterations and replacement, folding and faulting.

Within the upper parts of the drill hole the rocks are generally made up of a number of alternating sequences-intercalated predominantly felsic ash tuffs and felsic crystal tuffs, which are interrupted by narrow sequences of undifferentiated mafic to intermediate metavolcanic rocks.

Some of the undifferentiated rocks resemble fine grained gabbroic-diabasic intrusive rocks which have been distorted due to the effects of structural-chemical alterations.

In the upper felsic sequence (middle felsic-rhyolitic unit), narrow altered lamprophyre dykes cross cut the stratigraphy. Lamprophyre dykes are known to be fairly common within the central areas of the Benny Greenstone Belt.

From this setup, the drill hole cut approximately 250 feet of middle felsic-rhyolitic metavolcanic rocks. For the most part the rocks are not overly eventful looking, but have undergone some noticeable alterations due to the effects of faulting and subsequent vein infilling of quartz-carbonate-chlorite-epidote etc. These rocks were found to contain some minor pyrite. Most of the rocks do not contain more than 5 percent sulphide minerals. Numerous pseudotachylite veins and a fleshy red-pink discoloration due to potassium-sodium or hematite alterations is commonly observed within the felsic rocks. Jointing and fault fracturing with some mineral healings are visibly evident within this section and are probably related to young structural episodes.

The felsic-metavolcanics with the minor intercalated mafic-intermediate, etc. rocks, are thought to make up part of the Ulster Formation as classified by A.E. Guthrie, 1980. The Ulster Formation forms a continuous horizon with the Geneva and Copper formations which are known to host the Geneva Lake Mine and the Stralak base metal deposits. The Ulster Formation is thought to be the same rocks identified as the middle felsic-rhyolitic unit classified by Falconbridge Ltd., 1989.

Within the drill hole, the felsic sequences have been abruptly crosscut by a very strong, apparent south dipping mylonitic fault zone occurring from approximately 250 feet to 365 feet down the hole. The zone is made up of a wide variety of differentiated to undifferentiated altered - twisted and contoured rock fragments - xenoliths, ranging from felsic to mafic, intrusive to extrusive rock types. Some of the rock fragments appear to have been highly altered while others appear quite fresh looking. At a few locations within the zone, particularly near the upper contact areas, narrow 1" bands of massive pyrite-pyrrhotite, including inclusions of brown-sphalerite with lesser chalcopyrite-pyrite and galena were observed within, and appear to be associated with altered intermediate to felsic metavolcanic rock fragments. The very light coloured rock fragments found to contain sphalerite mineralization have been very strongly altered with quartz-carbonate and epidote minerals. The sphalerite is deep purple to brown in colour and occurs as irregular shaped inclusions, associated with minor chalcopyrite, pyrite and traces of galena. The most concentrated sphalerite-sulphide mineralization occurred over a distance of approximately 3 feet +/-, from 295'-9" to 293'-8" +/-.

The mylonite-fault zone matrix rocks are made up of a dark coloured aphanitic-nearly glassy recrystallized rock flour. In places small fragments of sulphides and minor secondary sulphide remobilization micro veining has been noted. Future investigations might be considered to determine the origin of such sulphides, the petrogenesis, etc.

It is quite possible to speculate that some of the incorporated rock fragments within the mylonite-fault zone were derived from the immediately adjacent formations. The sulphide bearing intermediate-felsic rocks could have been derived from the so-called Ulster Formation rocks, similar to those encountered in the upper parts of the drill hole. The Ulster Formation is though to form a continuous horizon with the Geneva Lake and Copper Formations which host two known base metal deposits.

The very strong structure feature is thought to mark the boundary between the middle felsic-rhyolitic unit (Ulster Formation, A.E. Guthrie, 1980) and the upper mafic metavolcanic unit as depicted on the Falconbridge Limited, Geology maps (Mike Grey, 1989). On surface, the fault zone is clearly marked by the presence of a deep, generally east-west trending gully which can be traced for a considerable distance along strike. This major structure could have acted an important metal bearing-fluid conduit system, allowing for metals to be introduced or mobilized and reconcentrated into rock formations most suitable for the precipitation of metals.

Immediately below the contact of the mylonite fault zone, the rocks are made up of predominantly mafic tuffaceous rocks with minor intercalated felsic ash tuffs. These particular rocks are probably part of the Falconbridge Ltd. Upper Mafic Unit (Munster Formation, A.E. Guthrie, 1980). The original contact between the middle felsic and the upper mafic rocks was obliterated as a result of the introduction of the mylonite fault zone. The visual change from predominantly felsic to predominantly mafic rocks in the down the hole direction would appear to signify the lithological change from felsic to mafic, as has been mapped on surface and which can be seen at depth.

Although it is suspected that sulphide mineralization will not likely be found directly on the felsic-mafic contact, it is important that attempts be made to try to approximate the position of the original prestructural contact. The sequences below the apparent south dipping fault structure consist of mafic rocks and clastic metasedimentary rocks.

The metavolcanic-metasedimentary rocks have been intruded by a fine to medium grained foliated-gneissic former felsic intrusive rock. These rocks appear to resemble the granite gneissic rocks north of the Benny Belt. Approximately 95 feet of the felsic intrusive rock was cut in Hole C-93-1, followed by the metasediments to the end of the hole.

Secondary alteration of the predominantly mafic rocks include fracturing and brecciation, followed by infilling of extensive carbonate veining with large inclusions of massive pyrite, magnetite and chlorite. The fracturing of the rocks followed by carbonate-sulphide fluids may have come about due to the establishment of the adjacent fault structure. It is not possible to determine at this time if the brecciation-veining predates or post dates the structure without conducting further detailed studies.

If veining were to post date the faulting, this could be good supporting evidence to suggest the fault may have acted as a fluid bearing conduit.

The metasedimentary rocks encountered in Hole C-93-1 appear to be made up of either Archean aged volcanogenetic or Huronian Supergroup metaclastic rocks ranging from siltstones -argillites, greywacke to conglomerates. Owing to the close special relationship of the granite gneiss and the metasediments to the north, and as can be clearly observed on surface, it is quite possible that the rocks are proterozoic in age (Gowgandan Formation).

Narrow mylonite fault rocks, identical looking to the structure rocks above, were found within the metasediments. The mylonitic-fault related rocks observed throughout approximately the lower half of the drill hole, clearly demonstrates the significant extensiveness of the fault structure.

In a generalized way it is possible to see that the felsic volcanic stratigraphy clearly overlies the mafic-metasedimentary stratigraphy. The large structure identified near the base of the middle felsic unit may represent a thrust fault allowing the older volcanic rocks to override the younger metasedimentary rocks. A thrust fault regime would clearly post date Huronian deposition. The thrust fault may have developed concordantly within the felsic sequences following the postulated overturning, (A.E. Guthrie, 1980), of the homoclinal volcanic pile. Over the past couple of years various workers have suggested the presence of such a thrust fault system occurring near the northern limits of the Benny Belt. There are those (K.D. Card, Bill Morris, et. al), who suggest that such deformation zones are related to the emplacement of the Sudbury structure.

If the proposed thrust fault was responsible for dragging mineralized rocks from below, it may be possible to speculate that there may be favourable, more richly mineralized rock formations to be found downdip along the fault. Deep drill probing would be required to test such a theory. Please refer to the attached diamond drill logs for further details.

With regards to the analytical work carried out, all samples collected from hole C-93-1 were subjected to an ICP-32 trace element determination which includes Ag, Pb, Zn, Cu, Ni, Co, including 26 various other elements. A 10 gram F.A. A.A. finish gold determination was also performed on all samples.

The results of the analytical work has shown that all metal values are generally in the low ranges.

No gold values greater than the detection limit of 5 ppb were reported. This would seem a bit unusual owing to the presence of a lot of quartz-carbonate-sulphide veining, etc. Unfortunately, a lot of the good looking, well mineralized rocks found in various locations throughout the Benny Belt often, for whatever reason, contain little or no gold. This has been demonstrated by a lot of other works over the years.

The silver values generally ranged from < 0.2 ppm (0.005 oz), to 0.60 ppm (0.175 oz). The majority of values are no greater than 0.2 ppm Ag.

The zinc values in most cases are quite low, which is not surprising since the amount of sphalerite encountered within the hole was quite minimal.

The values ranged from as low as 14 ppm to as high as 2090 ppm (0.209%). It is estimated the average values occur in the 50 to 200 ppm range. Two of the highest zinc metal values of 2090 ppm and 1170 ppm (0.209 and 0.117%) each occur over 5 foot core lengths, cut from the mylonite fault zone structure. Although quite limited, these metal values should probably be considered anomalous. There is some thought that the fault has tapped into mineralized strata or veins, etc. from the downdip direction.

It is interesting to note that in the areas that contain the high zinc values, large potassium value spikes were found to more or less correspond. The vast majority of the elevated potassium values were found within the mylonite-fault zone as well as within the mafic metavolcanic rocks adjacent to and below the identified structure.

The trace element geochemical work carried out by A.E. Guthrie, 1980, a part of his major Benny Belt investigations, has shown that both the Geneva Lake and Stralak base metal deposits are associated with increased potassium and a decrease in sodium. All samples from C-93-1 showed sodium values less than 0.10%. It must be kept in mind that only partial digestion of the potassium, sodium, calcium, titanium, etc. bearing minerals may be accomplished when utilizing the ICP analytical procedures.

It is believed that most of the ICP data can be effectively utilized to generalize, and to make broad interpretations. More highly sophisticated analytical work would have to be carried out in order to substantiate any of the preliminary interpretations.

The copper values showed quite erratic distribution ranging from as low as 4 ppm to a high of 301 ppm. For some reason the metal values do not correspond nor increase with increased zinc values. In a number of instances the copper values appear to drop in proportion to increasing zinc values.

With respect to the lead content, most of the values are quite low ranging from < 2 ppm to a high of 452 ppm (0.0452%). Interestingly the lead values for the most part correspond with the increased zinc values.

The arsenic values which range from < 2 ppm to 92 ppm are widely scattered through the hole and is probably associated with very weak arsenopyrite mineralization known to occur in the area.

The barium content reported for the hole appears to be quite low. It is strongly suspected that there has only been partial digestion. Previous whole rock litogeochemical work carried out by Falconbridge Limited (Harold Gibson; 1987, M. Gray 1988) has indicated Ba values up to about 2000 ppm.

Reported beryllium values are generally quite low at < 0.5 ppm. The exception to this is a few values of 1.0 ppm and a spike of 15.0 ppm Be. This high value was obtained from within the carbonate-sulphide veins which occur within the mafic metavolcanics immediately below the mylonite fault zone. In general there appears to be a weak Beryllium association corresponding to an increase in Calcium.

Bismuth values are quite low ranging from < 2 ppm to a maximum of 6 ppm. These values do not appear to be very significant, in light that a significant Bismuthinite BiS_3 vein showing is known to be located approximately 1/4 mile to the southeast.

Calcium values were found to range from less than 1.00% to over 15.00% and is in part due to carbonatization alteration and carbonate mineral vein emplacements.

Cadmium values were found to be higher than expectations. The metal values ranged from <0.5 ppm to a high of 17.5 ppm. Very interesting the cadmium values followed very closely with the increased zinc values. The Cd, Zn corresponding relationship may prove to be important in future investigations.

The elements Al, Co, Cr, Fe, Ga, Hg, La, Mg, Mo, Ni, Sb, Sc, Sr, Ti, Tl, U, V, W show quite low or scattered values, and may in the future require further, more detailed study to be undertaken.

Aside from the above, but probably no less complex is the phosphorous content, in which seemingly high values up to 2050 ppm (0.205%) has been reported. Most of the values were found to occur within the upper hundreds of ppms. These values may be indicative of the presence of the pervasive phosphorous alterations throughout the volcanic stratigraphy.

Manganese values throughout the hole were not exceptionally high, ranging from a low of 60 ppm to a high of 2010 ppm Mn. For the most part the Mn values appear to correlate with the zinc values within the lower ranges. In all but a few instances the Mn values ranged from about 4 or 5:1 in comparison with the zinc. In the cases where the zinc values were in excess of 0.1% the zinc values exceeded the Mn values by 2 or 3:1. It is unknown at this time if Mn would be a useful indicator for attempting to locate sphalerite mineralization, as has been suggested by other workers in the area (Peter Labaron, 1985, Noranda Exploration).

For all of the elements touched upon in this report, there is without doubt, room for further evaluations and interpretations. As was mentioned previously the ICP-32 trace element work is a suitable method to allow one to get some type of idea on the overall metal content in a fairly broad scale. In must be kept in mind that the ICP work has its limitations due to the partial digestion problems. Some interpretations can certainly be made which would give sufficient data to possibly allow for further, more detailed types of exploration work to be planned and carried out.

In conclusion the results of the diamond drilling and assaying procedures carried out by the applicant and a review of the pre-existing assay data obtained from Falconbridge Ltd., it would appear that there exists a conformable, weakly mineralized zinc bearing horizon within the middle felsic-rhyolitic unit (Ulster formation), which trends northeasterly across mining claim S-993570.

The presence of a strong fault structure which was found to host mineralized rock fragments may have tapped into richer zinc bearing strata somewhere in the downdip direction.

The presence of corresponding-nearly overlapping weak, visible VLF-EM, S.P., I.P., magnetic and geochemical anomalies appears to indicate the presence of a mineralized horizon within felsic rocks closely associated within known mafic metavolcanics contact.

An exploration program of deeper diamond drilling followed up with detailed geological and suitable geochemical analysis and may be warranted, and might be considered for the future.

If possible, a drill hole of 800 to 1000 feet at an inclination of 60° - 75° should be considered to be drilled along the east, north-south boundary of mining claim S-993570 to test the westend of a strong Falconbridge VLF-EM anomaly which trends across the company claim S-1042946 up to at least the T-H property boundary line. This particular anomaly is thought to correspond with the same middle felsic-rhyolitic unit (Ulster formation) as occurs on S-993570. The strong anomaly may carry higher concentrations of sulphide mineralization than the VLF-EM anomaly apparently cut by drill hole C-93-1. It is hoped that higher grade sulphides might be found in both areas as a result of potential future exploration.

THE T-H PROPERTY 1993 EXPLORATION PROGRAM

MONCRIEFF TOWNSHIP

Drill Hole No.	Date Logs Submitted:	Signature of Geologist:	No. of Pages in Log:
C-93-1	January 5, 1994		10

Company Name:	Property Name:	Township:	Claim Number:
Harold J. Tracanelli John George Huycke	T-H Property	Moncrieff Township	S 993570

41-1/13 Edition 2, Pogamasing, Ontario Core Size ADBGM	Drill core stored at: 582 Vermillion Lake Road, Box 167, Chelmsford, Ontario, POM 1LO

Project Supervisor:	Employer:
Harold J. Tracanelli	Not Applicable

Diamond Drilling Company:	Runner-Supervisor:	Helper:	Equipment Type:
Sparta Diamond Drilling	Larry Salo	Dennis Crites	BBS-2

Date Drill Hole Started:	Date Drill Hole Completed:	Azimuth of Drill Hole:	Total Length of Drill Hole:	Dip of Drill Hole,	Drillhole Co-Ordinates
October 2, 1993	October 7, 1993	331° Az	604 feet	Collar ° 0' - 55° 604' - 55°	5+16N, 0+20W Falco Grid.

Drill Core Logged by:	Drill Core Logging Completed:	Major Lithological Units:
Harold J. Tracanelli	November 13, 1993	Felsic metavolcanics with strong mylonite zone, some minor mafic metavolcanics.

Objectives of the diamond drilling type exploration:

To explore the depth extent of the mafic-felsic contacts for volcanogenetic massive sulphide type deposits (VMS)

Footage					Footage			C-93-01 Page 1
From	To	Rock Type	Description	Sample No.	From	To	Sample Length	Analytical Procedure
0'	18'-2"	Felsic Tuff	Light grey green to beige coloured, sub aphanitic, visibly well foliated ranging from about 45° T.C.A. 50° T.C.A. Some visible pervasive alteration of the felsic rock by very fine grained silvery-white sericite, also possible micro fine grained chlorite. The tuffaceous bands range in thickness from a mere fraction of an inch to about 1 inch +/-. This section of rock has been intruded by numerous unidirectional thin veins of calcite after pink iron carbonate, also, micro thin green chlorite stringers an also green chlorite inclusions. There are the occasional < 1/2" sharp contacting quartz-epidote veins. A lot of the possible related white-calcite, pink iron carbonate? follows somewhat along the core axis, while other less prominent looking veins appear to cross cut the foliation at 45° - 50° T.C.A. There would appear to have been 2 or 3 veining events *(probably secondary remobilization of siliceous-carbonate fluids)*. Locally the rock hosts from trace to 2% finely disseminated pyrite. Traces of finely disseminated sulphides noted within the intrusive veins @ 10'-5" - 13'-0" late, moderately broken "fault zone". Fracturing appears to have cross cut the carbonate veining, fractures evident at 25° T.C.A. Portions of the *rock appear to have been replaced by fine grained chlorite and carbonate, also* thin carbonate veins developed in some fractures. Locally the "fault zone" may host 5-6% finely diss. pyrite. The rock of the fault zone is distinctively greener in colour than the adjacent rocks but has a very similar texture-grain size, etc. For the most part the rocks are foliated tuffs altered with chlorite-carbonates and minor iron sulphides.					
18'-0"	37'-0"	Mafic Unit	Undifferentiated, possible flow? rock ranges from dark green to light grey green, subaphanitic to phaneritic, can be massive looking, weakly to well foliated @ 45°T.C.A., locally the mafic unit has been interrupted by thin intercalated bands of dark to light grey felsic tuff @ 27'-7" to 29'-5" complete with foliation @ 40° T.C.A. Trace diss. pyrite, also from 31'-5" to 32'-3-1/2" being the same as 27'-7" to 29'-5" except slightly darker due to some chlorite alteration - veining @ 33'-3" to 35'-5" "lampropyre dyke" mottled dark green to grey equigranular, phoneritic rock with visible black to black grey biotite and stubby pyroxene *phenocrysts, somewhat obscured contacts with adjacent mafic rocks* @ 59° T.C.A. The dyke host traces of fine diss. to inclusions of pyrite-chalcopyrite, minor thin < 1/8" anastomosing carbonate veins intrude the dyke. Much of the "mafic unit" has been subjected to visible alterations, most notably in the form of numerous, locally concentrated thin irregular anastomosing veins of carbonate, sometimes with minor epidote-chlorite traces of sulphides. Irregular shaped veins of chlorite with quartz and epidote have cross cut the carbonate veins. The minor areas of increased chlorite alteration are found to contain 3-5% diss. to inclusions of coarse grained pyrite, sometimes as crude cubes. The most concentrated sulphides can be found from about 19'-0" to 24'-0" - 5' (possible "chlorite-sulphide alteration zone").					

Footage					Footage			C-93-01 Page 2
From	To	Rock Type	Description	Sample No.	From	To	Sample Length	Analytical Procedure
			The most evident carbonate veining can be found in the mafic sections and less prominent in the intercalated felsic tuff bands and least evident in the lamprophyre dykes, suggesting that the veining alteration preceded the emplacement of the dykes. Some of the veins within the dykes including the adjacent mafic rocks, could be due to secondary remobilization during the initial emplacement and cooling down of the dykes.					
37'-0"	88'-0"	Felsic Tuff Felsic X-Stal Tuff	Light grey-grey green subaphanitic to phaneritic (grey quartz eyes), moderately to well foliated @ 45° - 55° T.C.A. Tuffaceous bands are generally only a fraction of an inch thick, and are quite regular looking. Some very minor kink bands were noted. The tuffs show fine grained disseminated silvery sericite and minor visible light coloured carbonate alteration. The coarser grained tuff sections showing quite visible quartz eyes are alternating with the finer grained tuffs which often have an increased, more concentrated sericite content, most notable along the foliation plains. Minor localized very thin micro anastomosing veins of quartz-carbonates with light green aphanitic epidote intruded the tuffs. Micro thin pseudotochylite? veins appear to cross cut quartz-carbonate veins. For the most part the tuffaceous unit may host traces of diss. pyrite. @ 61'-66" 3/4" white-grey quartz vein, moderately sharp contacts @ 27° T.C.A. @ 66'-0" 1/4" white-grey quartz vein, moderately sharp contacts @ 67° T.C.A., no sulphides observed in either of the veins. @ 69'-6" +/- to 80'-7" noticeable light pink to salmon pink coloration of the tuffs. The pink colour does not seem to be evenly distributed but looks to be somewhat patchy, very fine grained light yellow-green aphanitic pseudotachylite? veins and phaneritic epidote veins randomly occur within the pink altered parts of the tuff. Quartz with epidote and lesser carbonate minerals appear to occur together at some locations. The strongest, most evident quartz-epidote, pink (k-spar) minor carbonate alterations of the tuffs occur between the footages of 73'-3" to 76'-0" +/-. @ approximately 74' the quartz-epidote and pink mineral appears to have almost replaced the host tuffs. @ 80'-6" to 82'-3" dark to light green, aphanitic massive to weakly foliated undifferentiated mafic rock, possible "mafic dyke" contacts appear somewhat obscured. Possibly aligned to the foliation plain of about 45° T.C.A. Mafic rock has been intruded by a number of thin < 1/4" irregular shaped carbonate veins with possibly some epidote veins although irregular and somewhat discontinuous trend at approx. 20° T.C.A.					

Footage					Footage			C-93-01 Page 3
From	To	Rock Type	Description	Sample No.	From	To	Sample Length	Analytical Procedure
			@ 82'-3" to 88'-0" noticeable pink (K-spar?) alteration, the same as that noted from within section 69'-9" to 80'-7", most noteworthy within this section is the significant increase in the number of light green-yellow aphanitic pseudotachylite? veins, including some thin sharply contacting quartz epidote veins. These visibly altered rocks occur in between two thin mafic bands. The pseudotachylite? veins appear to have developed after the pink alteration. These veins do not appear to occur within the adjacent mafic rocks.					
88'-0"	89'-8"	Mafic Dyke	Dark green, almost subaphanitic, a few laths of pyroxenes can be observed in a generally fine grain green-black ground mass. The dyke appears to have intruded the felsic tuffs. There appear to be some thin < 1" chilled margins. The contacts are marked by a thin < 1/4" light yellow-green aphanitic, possible pseudotochylite materials. The dyke contains a few minor < 1/8" to 1/4" carbonate veins developed within fractures that extend across the contacts into the tuffs. Within the tuffs the carbonate fracture filling is noticeably narrower, likely due to the different strengths etc. of the two rock types. It is worthy to note that the dyke appears to have developed concordant with the foliation, former deposition of features of the tuffs. The mafic units (dykes) may have followed highly incompetent, easily penetrable tuff units. The tuff units would have also been most susceptible to alteration such as the quartz-carbonate-pink-epidote veining. Unfortunately no appreciable sulphides have been noted above the 88'-0" mark in this hole.					
89'-8"	100'-8"	Felsic Ash Tuff	Light grey to very light beige, with lesser pink (K-spar) discoloration, mainly fine grained aphanitic to minor subaphanitic, very weakly foliated to nearly massive looking in places. Rock appears to have been folded relative to the rocks in upper parts of the hole as evident by the foliation of 70°-80° T.C.A. Much of the section length has been subjected to visible alteration, the most prominent being numerous thin < 1/4" green-black chlorite stringers, a few minor carbonate-chlorite stringers and some localized brecciation of the tuffs with grey calcite healing and disseminated sulphides. The section can be broken down into the following subsections: 90'-2" to 91'-0" dark green massive altered mafic rock, possible dyke, with semi-gradational contacts. Rock shows some minor spotty-like pink discolorations, some replacement by fine grained green chlorite, rock intruded by thin < 1/4" irregular shaped grey carbonate veins.					

Footage					Footage			C-93-01 Page 4
From	To	Rock Type	Description	Sample No.	From	To	Sample Length	Analytical Procedure
		91'-0"-97'-6" Weak chlorite stringer zone	91'-0" to 94'-4" felsic ash tuff with thin but noticeable (5%) green-black chlorite stringers with trace pyrite, minor pink discoloration of rock. 94'-4" to 97'-6" felsic ash tuff with noticeably increased (up to 10%) irregular shaped-unidirectional green-black chlorite - with minor epidote veins with trace - 1% disseminated pyrite. Strong but localized brecciation and infilling with calcite with up to 5% fine grained pyrite occurs from 94'-4" to 95'-10" +/-. The strongest part of the breccia shows a grey-blue coloured fragment (either foreign or bleached). Some minor chlorite was noted with the calcite. In the strongest brecciated areas the rock shows significant pink discoloration - alteration. Minor microthin calcite veins are noted in the section, one microthin calcite vein carried a thin seam of chalcopyrite. 97'-6" to 98'-0" - same rock as 90'-2" to 91'-0" 98'-0" to 98'-2" alternating pink to grey, banded, phaneritic, 100% carbonate with trace diss. chalcopyrite, bands or foliation occur at 65° T.C.A. Contact with the altered mafic rock is quite sharp, while with the felsic tuff the contact appears more gradational, suggesting replacement of tuff by carbonate?	301701	94'-0"	98'-2"	4'-2"	ICP, Au
100'-8"	104'-11"	Mafic Dyke	Dark green, fine grained phaneritic, massive equigranular, generally fairly fresh looking, noticeable chilled margins of 4" to 6" upper contact of dyke sharp but slightly broken apart due to microfaulting in felsic tuff. Contact marked by thin band of grey carbonate-epidote, trace pyrite, lower contact is somewhat sharper @ 65° T.C.A. Two episodes of veining in the dyke, 1st thin quartz-feldspar veins @ 25° T.C.A., cross cut by 2nd calcite-iron carbonate veins < 1/4" @ 45° T.C.A.					
104'-11"	114'-0"	Felsic Ash Tuff	Light grey to dark grey aphanitic to subaphanitic, weakly to moderately well foliated @ 80° T.C.A. This tuffaceous unit is noticeably different from the previous tuffs, most noticeably there are only traces of quartz eyes within this section. These tuffs have been intruded by a couple of thin 2" to 6" +/- massive somewhat altered mafic dykes. The rock has a noticeable increase in sericite mica, and there are localized sections which appear to have been bleached. There are very few thin carbonate veins although micro stringers of yellow green pseudotachylites appear present. Some minor epidote with inclusions of chlorite, trace pyrite or a few micro thin chlorite veins were noted. 105'-7.5" to 106'-8" +/- dark green to red spotted, altered mafic dyke, which appears to have been subjected to some shearing-faulting with the fractures being infilled with carbonate and chlorite, minor epidote, no sulphides. Overall the tuffaceous section looks pretty much uneventful.					

Footage					Footage			C-93-01 Page 5
From	To	Rock Type	Description	Sample No.	From	To	Sample Length	Analytical Procedure
114'-0"	157'-1"	Felsic crystal to lesser ash tuff.	Light to dark grey with noticeable sections of pink (k-spar) discoloration. The unit appears to be made up of alternating bands of aphanitic to subaphanitic ash to phaneritic to aphaneritic quartz eye crystal tuff. The quartz eye crystal tuff predominates while the finer ash layers do not appear to exceed a couple of feet thick. For the most part the unit is only weakly foliated, while in places the rock almost looks massive. Observed foliation trends were noted @ about 80° T.C.A. At various locations the unit has been interrupted by thin dark green, massive fine grained mafic bands or dykes ranging from 3-1/2" to 1'-2" thick. *Several of these mafic rocks have been strongly altered with microfine grained* carbonate minerals. The most noteworthy mafic sections were noted from: 114'-0" to 114'-8" *strongly carbonate altered, trace 1% fine diss. pyrite*, some epidote at the contacts. Pervasive chlorite alteration. @ 124'-9" to 125'-0" moderately carbonate altered, secondary carb-chlorite veining at the contacts, 70° T.C.A. Trace pryite, pervasive chlorite alterations. @ 127'-1" to 127'-11" weakly carbonate altered, weak but noticeable chlorite alteration, secondary carbonate veins < 1/16" - 1/4" near contact areas, minor obscure quartz-pink feldspar veining, trace - 1/2% finely diss. pyrite. @ 130'-8" to 131'-10" weakly to moderately carbonate altered, very minor carb-epidote veining near contact as well as in mafic rock, pervasive chlorite alteration noted. Tr. diss. pyrite. @ 135'-2" to 135'-9" weakly carbonate altered, some chlorite alteration noted, *minor quartz, feldspar-carb veins noted, which host trace to 1/2% pyrite.*					
			For the most part the tuff unit does not carry a lot of quartz-carbonate-epidote veins as in the upper sections - most noticeable are at: 114'-6" 1/2" quartz-epidote-carbonate vein cut off by mafic dyke 119'-10" 1/8" quartz-carbonate vein 120'-5" 1/4 carbonate-epidote vein @ 85° T.C.A. 125'-2" 1/4" quartz vein 128'-6" 1" irregular carbonate-epidote vein 129'-1" 1/2" irregular carb.-epidote vein 131'-6"-1/2" 1/4" qtz vein right laterally separated 132-6" 1" white-grey quartz vein 134'-6" 1/4" qyartz epidote carbonate, 5% pyrite vein right laterally separated by microthin pseudotachylite veins @ 20° T.C.A. 147'-7-1/2" 1-1/2" quartz carbonate epidote spar vein, trace diss. pyrite 152-0" +/- to 155'-3" series of thin pink to white-grey carbonate-quartz-chl. *epidote feldspar veins ranging from 1/32" to 3/4" thick.* Most noticeable throughout the section is the randomly distributed microthin *anastomosing pseudotochylite veins which appear to be clearly secondary to* the other alteration elements.					

Footage					Footage			C-93-01 Page 6
From	To	Rock Type	Description	Sample No.	From	To	Sample Length	Analytical Procedure
157'-1"	166'-0"	Strongly oxidized fault-breccia zone	The rock colour ranges from quite dark green to salmon red, pink, hematite red to white grey. The altered rock is generally aphanitic to subaphanitic appearing to be made up of rocks ranging from mafic through to felsic. Most of the materials appear to be on the mafic side. The brecciated materials occur in between a prominent felsic tuff unit and a less prominent mafic unit. These strongly altered rocks may represent "flow top breccia". This section which is highly broken up carries a considerable amount of carbonate minerals, green epidote, lesser quartz and chlorite as irregular shaped inclusion, and vein infillings. Almost the entire section has been deeply oxidized which is clearly evident by the large amount of hematite-mud-sand and stainings.	310702 301703 301704	157'-1" 160'-1" 163'-1"	160'-1" 163'-1" 166'-1"	3'-0" 3'-0" 3'-0"	ICP, Au ICP, Au ICP, Au
166'-0"	176'-1"	Mafic flow?	Very dark green to black, being somewhat mottled 50/50 with fine grained equigranular light and dark minerals. The entire section has been moderately to strongly carbonate altered, with some chlorite alterations. Much of the section has been riddled by microthin, unidirectional anastomosing green-yellow to white carbonate-minor epidote veins. The rock host traces of pyrite inclusions, some minor altered carbonate-epidote-chlorite hematite oxidized veins < 1/2" wide noted at 170'-1" to 170'-6" +/-.	301726 301727	166'-1" 171'-1"	171'-1" 176'-1"	5'-0" 5'-0"	ICP, Au ICP, Au
176'-1"	214'-0"	Felsic crystal tuff <Fringes of major alteration zone>	Grey to light grey to reddish-brown (hematite-k-spar alteration). The rock is generally fine to medium grained, mainly phaneritic, but finer grained ashy matrix of the quartz eyes can be aphanitic. For the most part the rock unit is weakly foliated @ 80° - 90° T.C.A. The highly noticeable red-brown discoloration appears to increase with depth down the hole. The section has often been riddled by numerous thin unidirectional carbonate, iron, carbonate, quartz, epidote and microthin pseudotochylite veins. As a result of certain structural episodes, breccias were developed in which the fragments were sometimes infilled with carbonate minerals, chlorite-epidote etc. The section has been considerably broken in places with some of the fractures being coated with light green yellow talc. Generally all of the observed veins range from a fraction of an inch to less than one inch thick.	301728 301729	204'-0" 209'-0"	209'-0" 214'-0"	5'-0" 5'-0"	ICP, Au ICP, Au
214'-0"	217'-6"	Mafic unit, Mafic dyke?	Dark green-black, medium fine grained, massive, non-foliated, parts seem to have a light-dark green mottled appearance, rock hosts 3-4% diss. inclusions of pyrite-pyrrhotite, host rock intruded by several narrow secondary grey pink carbonate veins which host inclusions of chlorite and coarse grained anhedral pyrite crystals. Some iron carbonate may be present within the secondary veins. Similar veins also occur within the adjacent felsic tuffs. Some veining event cross cut two distinct rock types, probably fault related veining.	301730	214'-0"	217'-6"	3'-6"	ICP, Au
217'-6"	249'-4"	Felsic crystal tuff	Significantly altered, medium to fine grained, aphanitic-to subphaneritic, mainly light to dark grey but also brown-pink, due to some hematite alterations. Rock can range from nearly massive to moderately foliated, from 40° - 80° T.C.A., evidence of folding of rocks, more likely reorientation of foliation due to the effects of faulting. In places the rock shows quartz-eyes-porphyroblasts.	301731	217'-6"	218'-9"	1'-3"	ICP, Au

Footage					Footage			C-93-01 Page 7
From	To	Rock Type	Description	Sample No.	From	To	Sample Length	Analytical Procedure
			In a few places the host tuff has been intruded by narrow, irregular shaped less than 1/2" wide carbonate-quartz veins with large clusters or inclusions of pyrite crystals. The veins also host some minor chlorite-hematite. Locally the rock has been intruded by microthin pseudotachylite veins which in some instances form microbreccias. The rock is commonly highly fractured into many pieces, some of the fracture surfaces are coated with calcite-green talc-traces of fine grained sulphide films. Faulting is clearly the cause of such breakage. Brown-pink (Na?Fe?) altered felsic crystal tuff.	301732	242'-0"	246'-0"	4'-0"	ICP, Au
249'-4"	364'-0"	Mylonite Fault Zone	Extremely altered and contorted. Fault has arranged a wide variety of identifiable and undifferentiated rock types throughout the section. The colour of the mylonitic rock, with its fragments etc. range from green to grey-green, yellow green, dark green to lesser brown-pink. The outer fringes of the zone appear to have formed within a now brown to pink, barely foliated felsic crystal tuff. The more interior areas of the mylonitic fault zone appear to have developed within more mafic to intermediate type rocks, some of which appear to be massive to visibly foliated. Some of the rock chunks resemble mafic intrusives, while others more closely resemble foliated-bedded tuffs. Most of the rocks incorporated within the mylonite fault zone are so badly altered, contorted that it is nearly impossible to determine their origin, etc.	301733 301734 301735 301736 301737 301738 301739 301740 301741 301742	294'-04" 253'-0" 258'-9" 263'-0" 268'-0" 274'-0" 279'-0" 284'-0" 294-'0" 299'-0"	253'-0" 258'-0" 263'-0" 268'-0" 273'-0" 279'-0" 284'-0" 289'-0" 294'-0" 299'-0"	4'-7" 5'-0" 5'-0" 5'-0" 5'-0" 5'-0" 5'-0" 5'-0" 5'-0" 5'-0"	ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au
			The fragments range in size from a mere fraction of an inch to a couple of feet across although most of the fragments are probably only a couple of inches across. Some of the rock fragments carry various amounts of disseminated, bands or stringers of pyrite-pyrrhotite, with some minor sphalerite (brown) and galena-traces of chalcopyrite. Most notable sulphides are found at he following footages: 260'-0" - 263'-3" coarsely disseminated to bands of massive pyrite-pyrrhotite up to 1" thick, associated with some quartz-carbonate alteration. Sulphides appear to be associated with a foliated intermediate rock. 295'-9" - 298'-8" +/- - irregular inclusions of brown to deep purple sphalerite with lesser chalcopyrite, pyrite and traces of galena, associated with quartz, carbonate-epidote alteration, possible secondary sulphide remobilization?	301743 301744 301745 301746 301747 301748 301749 301750 4981 4982 4983 4984 4985	299'-0" 304'-0" 309'-0" 314'-0" 319'-0" 324'-0" 329'-0" 334'-0" 339'-0" 344'-0" 349'-0" 354'-0" 359'-0"	304'0" 309'-0" 314'-0" 319'-0" 324'-0" 329'-0" 334'-0" 339'-0" 344'-0" 349'-0" 354'-0" 359'-0" 364'-0"	5'-0 5'-0" 5'-0" 5'-0" 5'-0" 5'-0" 5'-0" 5'-0" 5'-0" 5'-0" 5'-0" 5'-0" 5'-0"	ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au

Footage					Footage			C-93-01 Page 8
From	To	Rock Type	Description	Sample No.	From	To	Sample Length	Analytical Procedure
			The rock fragments were found to have shapes ranging from highly rounded to highly angular. A lot of the fragments look to have been heated up and stretched out, bent around, twisted, etc. The matrix of the mylonite fault zone is made up of a grey-green aphanitic material, surrounding almost all fragments. Some of the matrix materials have worked into openings within the rock fragments. Within some sections of the matrix, the rocks appear to be aligned along a preferred orientation, possible plastic like flowing. The matrix materials may contain traces to minor micro seams of pyrite with lesser chalcopyrite. Almost everywhere throughout the section the rocks have been very intensely intruded by numerous multi-directional moderately thin epidote-pseudotachylite veins, sometimes forming distinct microbreccias, including carbonate-quartz veins with amphibole minerals and chlorite as vein inclusions. Some sections of the rock shows possible black biotite-chlorite alterations, most notably around 335'-0" +/- - 359'-0" +/-. The structure alteration within this section is incredibly strong. Very strong - randomly oriented secondary epidote-pseudotachylite, quartz-carbonate sulphide veins and inclusions, may be indicative of potential mineralized fluid conduits following or developing within an incompetent host rock. Primary sulphide mineralization predating the structural deformation observed within the fragments is also indicative that the structural feature appears to have tapped into a sulphide bearing strata above or below. This structure also appears to mark the boundary between felsic and mafic rocks. The large gully just north of the drill hole C-93-1 marks the surface contact between the two above mentioned rock types. This gully which is thought to be a fault zone is thought to dip south and has generally developed concordantly with the general trend and fabric of the surrounding geological formations. It is quite possible that this significantly thick structural feature encountered in C-1-93 represents a large trust fault, thought by other workers to have developed at the top of the Benny Belt volcanogenetic sequences.					
364'-0"	373'-0"	Mafic-Intermediate Unit	Mainly dark green to dark grey, poorly to very well foliated @ 55° T.C.A., fine grained, aphanitic-subaphanitic. The rock has undergone some visible alteration by minor carbonate, localized spotty inclusions of chlorite, possible spotty white luecoxene. There are a couple of distinct but narrow < 1/2 inch carbonate veins with traces of sulphides and chlorite in this section, trending at about 15° T.C.A. These minor veins are probably related to the large mylonitic structures (textures) encountered immediately above this section.					

Footage					Footage			C-93-01 Page 9
From	To	Rock Type	Description	Sample No.	From	To	Sample Length	Analytical Procedure
373'-0"	410'-2"	Mafic Metavolanic Unit <Alteration Zone>	Very strong veining, alteration zone within a rock predominantly made up of mafic metavolcanics, with some subordinate minor intercalated intermediate to felsic metavolcanic rocks. For the most part the bulk of the rocks appear to be made up of massive to visibly foliated rocks. Some of the rocks resemble massive igneous intrusives such as lamprophyres. The foliated rocks look to be laminated tuffs and are generally fine grained sub-aphanitic in character. The minor intercalated felsic-intermediate rocks appear to be quite aphanitic. They have been highly contorted and altered. All of the rocks throughout the section have undergone from meld to very strong alterations.	4986 4987 4988 4989 4990 4991 4992 4993	372'-9" 378'-0" 383'-0" 388'-7" 393'-0" 398'-0" 403'-0" 408'-0"	378'-0" 383'-0" 388'-7" 393'-0" 398'-0" 403'-0" 408'-0" 410'-10"	5'-0" 5'-0" 5'-7" 5'-0" 5'-0" 5'-0" 5'-0" 2'-10"	ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au ICP, Au
			In numerous places within the sequence, the rocks have undergone very strong carbonate veining associated with some quartz, fine grained sulphide inclusions, green clots and whisps of chlorite and epidote veining. In places the veining episode has resulted in the development of brecciation of the host rock being intruded. The strongest most evident carbonate veining with sulphides occurs from about 382'-0" +/- to 388'-8" +/-. The carbonate minerals making up the veins tends to be fine to medium grained to granular-sugar-like. With the exception of the above, most of the veins tend to be quite narrow < 1" +/-, but have developed within networks for clusters of veins throughout the section. In the lower part of the section from about 400' +/- to 410'-2" +/-.. The rocks appear to have undergone some shearing and appear to be made up of more competent rocks like the lamprophyre-mafic dykes, etc. Strong alteration of these rocks may be due to the contact metamorphic effects of the adjacent granitic rocks found a short distance further down the hole.					
410'-2"	429'-0"	Felsic Crystal Tuff	Generally grey to salmon pink coloured, quite massive, fine grained aphanitic, 10% +/- grey-blue quartz. Porpyroblasts present, weakly to strongly evident in places throughout the section. In the upper portion of the unit, the rocks have undergone some visible alteration of quartz-chlorite veining, followed by microfracturing and infilling with magnetite, trace - 1% diss. inclusions of pyrite. Some minor carbonate alteration-veining is present in the section. @ 426'-8" +/- 429'-0" altered fine grained mafic dyke, minor thin carbonate-magnetite veining, alteration of parts of the rock to talc-chlorite, trace - 1% inclusions of pyrite throughout. Rounded xenoliths of felsic crystal tuff evident in rock. Contacts with the adjacent tuff and the lower granite gneiss are fairly sharp, but appear to have been contorted somewhat.	4994 4995	410'-10" 415'-10"	415'-10" 418'-4"	5'-0" 2'-6"	ICP, Au ICP, Au

Footage					Footage			C-93-01 Page 10
From	To	Rock Type	Description	Sample No.	From	To	Sample Length	Analytical Procedure
429'-11"	523'-0"	Granite Gneiss	Fine grained, fleshy pink to grey phases of quartz feldspar-ferro magnesium mineral gneiss (granite gneiss). The light coloured gneiss is often alternating with darker phases, suggesting slight compositional changes. The light and dark phases grade into each other. The occasional thin 1/4" to 2" max. quartz vein with minor chlorite-carbonate, traces of sulphides occur within the section. These veins occur at about 50° T.C.A. For the most part the gneiss is uneventful looking except from 516'-523'.					
			@ 516'-0" - 523' - odd light pink coloured mottled 30% spotted alteration of the gneiss. Very fine grained pyrite noted on some of the fracture surfaces of the altered rock? In places the rock has been quite highly fractured. Tight jointing near contact with the metasediments.	4996	516'-0"	523'-0"	7'-0"	ICP, Au
523'-0"	604'-0"	Medasediment Sequence	Very dark green to nearly black to light green, fine grained, massive to plainer-foliated like, very sharp fractures developed along apparent depositional beds. In the upper part of the sequence the rocks appear to be made up of greywackes, argillites and lesser conglomerates with some visible granitic and other rounded rock fragments.					
			In the mid section of the sequence the rocks appear to be made up of very thin < 1/2" well developed beds @ about 60° T.C.A. Parts of the unit have been intruded and altered by faulting-mylonite development, followed by the intruding of a couple of narrow fine grained mafic dykes, narrow quartz-carbonate-epidote-pseudotachylite veins are common throughout the section.	4997 4998	549'-2" 554'-2"	554'-2" 559'-2"	5'-0" 5'-0"	ICP, Au ICP, Au
			@ 578'-0" - 580'-0" +/- dark orange-red (hematite altered) thin < 1/4" carbonate veins crosscut all other types of veins mentioned above.					
			In the lower sections from around 585'-0" +/- to 604'-0" the rocks are generally lighter green in colour, are bedded-foliated, and appear to be fairly well weathered. The rock fabric is about 60° - 65° T.C.A. Numerous quartz feldspar-minor carbonate inclusion partings occur within the lower section. In numerous places below the 585'-0" mark the rocks have been quite badly fractured, with some deep weathering to mud-clay. Everywhere throughout the metasedimentary sequence sulphides can be found usually less than 1%. For the most part the section of rocks below the granite gneiss is uneventful looking.					
	604'-0"	End of Hole C-93-1.						

7.0 CONCLUSIONS

The T-H Property 1993 Exploration Program was initiated on the Moncrieff Township mining property during the mid summer to fall of 1993. The work proposed included backhoe trenching, geological mapping - sampling, (John George Huycke OP93-145), followed by a self-potential geophysical survey and the diamond drilling of hole C-93-1, carried out under the application for Harold J. Tracanelli (OP93-146).

Most of the work carried out on the T-H property was concentrated in and around mining claim S-993570 which covers what is thought to be a favourable metal bearing geological contact area between the middle felsic-rhyolitic unit (Ulster Formation) and the upper mafic metavolcanic unit (Munster Formation). The Ulster Formation which was previously identified by A.E. Guthrie, 1980, is thought to form a continuous stratigraphic horizon with the Geneva Lake and Copper Formations. These two formations are known to host the former Geneva Lake mine base metal deposit and the Stralak prospect-deposit.

Previous geological-geophysical and geochemical work over the years carried out by Noranda Explorations, Falconbridge Limited and most recently by this applicant have shown there to be a close, clearly identifiable correlation between the expected, favourable geological formations (Ulster) and various geophysical-geochemical responses. Although, in some cases, the nature of the responses might be considered weak or negligible, various matters such as topography, overburden characteristics, conductivity, physical characteristics, geometry, depth to source, etc. need to be kept in mind throughout the evaluation process.

The work that was carried out for the exploration program was designed to test some of the theories that had been developed and to possibly determine if any further, more detailed work might be warranted.

Generally the results of the work showed that there is a well developed sequence of felsic metavolcnic rocks overlying mafic metavolcanic rocks which, at least in the near surface areas, show weak base metal horizons containing from 0.10 to 0.20% zinc. Importantly, the zinc mineralization occurs primarily within felsic metavolcanics in close proximity with the mafic metavolcanic contacts, which is conformable to the archean volcanogenetic VMS models.

The self-potential orientative survey work was carried out over three former pre-existing Falconbridge Limited grid lines in early September 1993. The results of this work showed the possible correlation with the previously identified VLF-EM and IP anomalies.

In part, the characteristics of the survey data appear to indicate a strataform, fairly narrow (25-30 foot) weakly mineralized sources within the felsic metavolcanics. Further, more detailed data manipulations-interpretations would have to be undertaken in order to make any further determinations. For the most part, in the early interpretation stages, the data evaluation proved quite cumbersome and may in part be inaccurate.

In early October of 1993, diamond drill hole C-93-1 was drilled to a depth of 604 feet near the north central part of mining claim S-993570. The drilling cut through a significant thickness of felsic metavolcanics followed by mafic metavolcanics and metasedimentary rocks. In between the felsic and mafic rocks, a very strong east-west trending mylonite fault zone developed, greatly altering and incorporating various rock fragments, some of which were shown to be well mineralized with sphalerite-chalcopyrite-galena, pyrite and pryyhotite. Some small bits of purely sulphide fragments were commonly observed within the fault zone. Because the majority of the rocks, mineralized or otherwise found, incorporated within the structural zone are probably fragments torn off of an adjacent geological formation, an important questions arises as to the former location and origin of the rock containing the richest sulphides. In this particular matter a thrust fault is postulated, in which it may be possible to speculate on the origin of the sulphides found within the rock fragments may have been brought up from lower stratigraphy down dip along the fault.

For the most part the rocks encountered throughout the length of the hole probably do not carry more than 5% of any one sulphide mineral. Various sections are quite visibly altered by sericite, biotite-chlorite, or injected by numerous quartz-carbonate-sulphide, pseudotachylite veins which have occupied fracture zones. Numerous samples were taken and trace element geochemistry work on the split core was undertaken. The results of the assaying were generally quite low, although there were a few exceptions, 0.2090% zinc over 5.0 feet.

Although the findings of the exploration work undertaken by this writer appear somewhat mixed, there are a few optimistic highlights within the data that might be worthy of future, more detailed investigations. It is quite possible that sulphide mineralization might exist at further depths. Sulphides observed in the mylonite fault zone may help to support such a theory. Sulphide bodies found at increasing depths will give weak or no conductivity-magnetic responses, etc, making exploration difficult.

8. RECOMMENDATIONS

The evaluation of the exploration data and conclusions would lead one to believe that further exploration work should be considered. The type of work that might be considered could be the drilling of a fairly steep 800 ft. - 1200 ft. diamond drill hole at the eastern boundary of mining claim S-993570 to test the western extension of the strong VLF-EM anomaly which trends across the adjacent Falconbridge Ltd. claim, S-1042946, up to the boundary of the T-H property. This strong anomaly may be associated with higher concentrations of sulphides, closer to surface than those anomalies exhibited on mining claim S-993570.

By utilizing Sparta Diamond Drilling, it is estimated that the cost of such a proposed drill hole would be $9,600 to $14,400 for an 800 ft. to 1200 ft. depth, at $12.00 per foot. Not included are mob-demob costs and the applicable taxes.

Any further analytical work considered should include processes which subject the samples to complete digestion. Thin sectioning and microscopic analysis should also be considered as part of a detailed investigation.

In order for the recommended work to be carried out, it will be necessary to obtain funding from private sources. It may also be possible that this work could be supported through the OPAP program, at which time the applicant, Harold J. Tracanelli and John George Huycke would once again collaborate, putting together two OPAP grants, in order to carry out a proposed exploration program.

APPENDIX I

The following is the supporting self-potential survey, instrumentation documentation for future reference.

Roger Barrlow
965-1687

Ontario Geological Survey
Miscellaneous Paper 99

A Guide to Prospecting by the Self-Potential Method

by
S.V. Burr

1982

Ontario

Ministry of Natural Resources

Hon. Alan W. Pope
Minister

W.T. Foster
Deputy Minister

ISSN 0704-2752
ISBN 0-7743-7531-0

Publications of the Ontario Ministry of Natural Resources
and price lists are available through the

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Parts of this publication may be quoted if credit is given. It is recommended that reference to this report be made in the following form:

Burr, S.V.
1982: A Guide to Prospecting by the Self-Potential Method; Ontario Geological Survey, Miscellaneous Paper 99, 15p.

1000-100-82-Maple Leaf

FOREWORD

A GUIDE TO PROSPECTING BY THE SELF-POTENTIAL METHOD

This guide to the self-potential method of geophysical prospecting represents part of continuing efforts by the Ontario Geological Survey to assist explorationists, and to support the development and implementation of sound mineral exploration technologies suited to Ontario conditions.

The self-potential method is small-scaled, versatile, and provides a simple, reliable and economical means of near-surface electrical prospecting for certain base metal sulphides and other mineral resources. In Canada, discoveries of important sulphide ore bodies by the SP method attest to its proven exploration value. Additionally, through research and development of the method, there should be further possible refinements and applications for SP.

E.G. Pye
Director
Ontario Geological Survey

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A Guide to Prospecting by the Self-Potential Method

by
S.V. Burr[1]

INTRODUCTION

The author has used the self-potential or spontaneous polarization (SP) prospecting method extensively for 35 years in surveying mining claims, and considers it the best of the electrical geophysical methods.

Recently, interest in the method has revived, probably due to renewed gold exploration. Most gold deposits are not good conductors, but do contain some sulphides which can be detected by the SP method.

The few available textbooks which mention the SP method are brief in their descriptions of field prospecting methods, and some prospectors, who have tried the method with insufficient understanding of the technique, have become discouraged and added to the misconceptions about it. Good practical descriptions of the SP method are contained in "Prospecting in Canada" by Lang (1970) and in "Mining Geophysics, Second Edition" by Parasnis (1975).

This guide incorporates and updates information from a previous paper by the author (Burr 1960) and is intended to instruct the layperson in the routine prospecting use of the method and to encourage more geophysical research of the SP phenomenon. Much of the material presented is unavailable elsewhere and was derived by experience through field applications.

IMPORTANT FACTS

Although the author has endeavoured to dispell some misconceptions, and to add some new facts on the SP method in the body of this guide, some isolated facts could be emphasized at the beginning:

1) Hydro and telephone lines, which plague some of the other electrical methods, do not affect SP

2) Iron formation, which acts as a "good conductor" with some of the other electrical methods, does not affect SP unless sulphides or graphite are associated with it. One major iron formation at the Sherman Iron Mine, Temagami, Ontario, contains graphite. The SP method begins to detect this anomaly at least two miles away. On the basis of one long north-south traverse conducted by the author, a peak of 4000 mv (4 volts) was obtained over or near this iron formation.

3) Buried or grounded metal objects can produce spurious SP "spot anomalies". A buried long metal pipe can produce a linear and sometimes genuine-looking (pseudo)anomaly. Graphite cathodes are used beside gas pipe lines to prevent corrosion and can produce an abnormally high negative SP anomaly. Similarly, it can be demonstrated that an axe, pick or knife driven into the ground beside the forward pot (an SP ground electrode) produces a high negative reading in the instrument.

4) Several years ago in Northern Quebec, the author discovered a graphite SP anomaly of 1 volt at a pot separation of 300 feet. An unsuccessful experiment was conducted to try and achieve a 6 volt potential and power a radio. An additional pot merely cut the potential to .05 volts. Apparently the current strength or "ground amperage" in a near-surface self-potential electrical field is not proportional to the number of pots used.

5) Natural SP anomalies of a few hundred to over a thousand millivolts, and of negative sign by convention, are caused by the iron sulphides pyrite and pyrrhotite, the copper sulphide chalcopyrite, and the native element graphite. Graphite gives the strongest SP reaction, followed by pyrrhotite, pyrite, and chalcopyrite. Strong negative anomalies have also been reported over chalcocite, covellite and anthracite (Sato and Mooney 1960). Because of the many other factors influencing the strength of an SP response, it is not possible to predict which type of sulphide is responsible for the anomaly. A magnetometer or dip needle survey may help to determine whether the magnetic

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Manuscript approved for publication (March 15, 1981) and published with the permission of E.G. Pye, Director, Ontario Geological Survey

iron sulphide pyrrhotite is present or not.

6) Magnetic storms, dealt with in the "Instructions" section of this guide, are a natural phenomenon which can be detected by the SP instrument. It has been suggested that approaching earthquakes, or an atomic explosion anywhere in the world could be detected by a monitoring SP instrument. In California, the method is used to locate water leaks in pipelines; in Australia, to detect salt springs; and it can also be used in geothermal exploration and in structural studies. Other applications are also possible but await further research of the SP method.

7) Manganese oxides (psilomelane and pyrolusite wads) have been observed to give positive SP anomalies. In Jamaica, the author detected high grade manganese "veins" or "dykes" which gave strong positive anomalies. The sedimentary Sibley Formation in the District of Thunder Bay, Ontario contains a manganese oxide unit which produces alternating high positive and high negative readings which the author interprets as a possible indication of the presence of graphite.

8) Finally, the peak of an SP anomaly is detected with the measuring pot positioned directly above the source. This is in contrast to other electrical methods which can be responsive to the dip of the anomalous source, and through misinterpretation have led to some drill holes that have overshot, or have been spotted too far from or too near the target.

BRIEF HISTORY

The SP method is the earliest electrical geophysical method to be discovered or invented. It was first applied in England by Robert Fox (1830) who conducted SP research around the tin mines of Cornwall, and later by Carl Barus (1882) who applied the method at the Comestock Lode in Nevada. The first sulphide orebody discovered by an electrical method was detected by SP at Nautenen, Lapland, Sweden in 1907 (Lundberg 1948).

BRIEF THEORY

Most explanations of the SP phenomenon propose that a "wet" sulphide (or graphite) body develops negative and positive electrical potentials at its top and bottom, resulting in a both metallically and electrolytically mediated "flow" of electrochemically generated current around and through the body as shown in Figure 1.

It is possible that sulphide and graphite bodies in contact with ground water electrolytes induce a "spontaneous" DC flow of current, but local ground currents are not solely related to potential differences arising from spontaneous polarization of a conducting body. The author considers that the natural telluric fields and currents encircling the earth provide a natural applied electrical

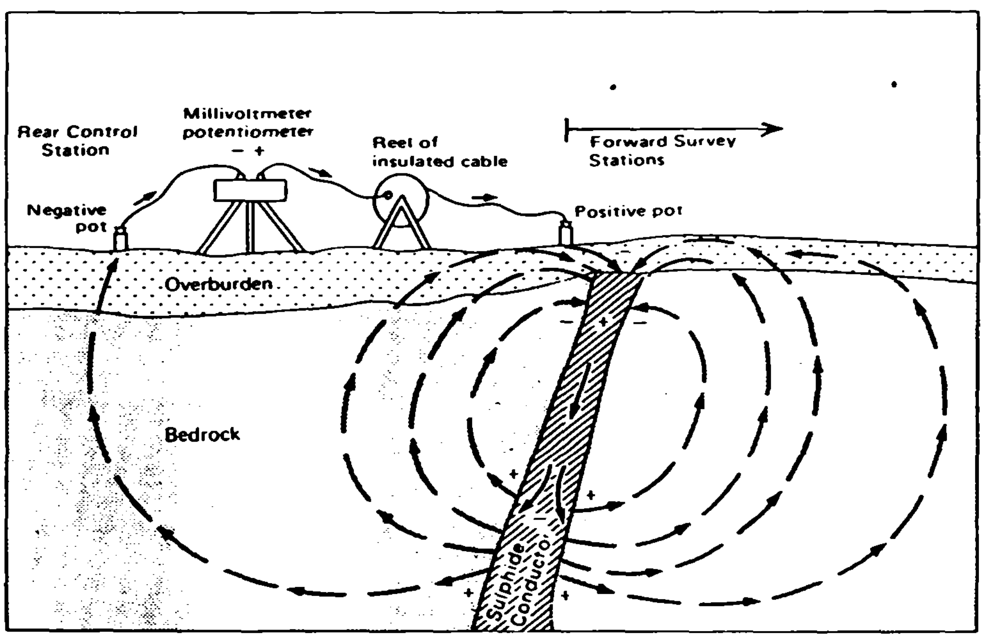

Figure 1—Schematic representation of spontaneously generated electric current flow near a sulphide body, showing current paths through the ground and the SP apparatus (after Lang 1970)

field which—close to an electrolyte-bathed SP body—can give rise to a "conductive" spontaneous polarization effect which distorts the local primary geosymmetry of natural electrical fields near the earth's surface.

For example, if these ground currents are flowing through an electrically isotropic and homogeneous rock type, they are like the parallel, equispaced strings of a harp, and a uniform potential difference field is developed (see A in Figure 2). If they are passing through different rock types with different conductivities, some of the nearby "harp strings" will converge slightly to take advantage of a better conducting rock unit, resulting in a "resistivity" map which differentiates between different conductivities of the rock types (see B in Figure 2). If the currents come upon sulphides or graphite they will be drawn towards such bodies in an attempt to flow through them, resulting in a high potential or anomaly (see C in Figure 2). Finally, in a strong magnetic storm, the harp strings will quiver as if they were being stroked (see D in Figure 2). The effect of a magnetic storm will be discussed at greater length in the "Instructions" section.

COMPARISON OF ELECTRICAL GEOPHYSICAL METHODS

Although the SP method was extensively and routinely used during the 1930's and 40's by many well-known professional geophysicists, currently, it is generally misunderstood or overlooked as a useful and economical geophysical prospecting method.

The first orebody found in Canada by electrical methods was surveyed by Hans Lundberg (1928) at the Buchan's Mine in Newfoundland, where conductive ore was detected using the SP method. At least one orebody was found in the Noranda area and Lundberg (1948, p.179) reports: "...a lead-zinc-copper orebody was found in the Eastern Townships of Quebec. This survey was carried out by A.R. Clark and H.G. Honeyman, and the results were well confirmed by subsequent drilling." He also states: "The outlining of the Flin Flon orebody in Manitoba is perhaps the best known example of his [Sherwin Kelly's] surveys."

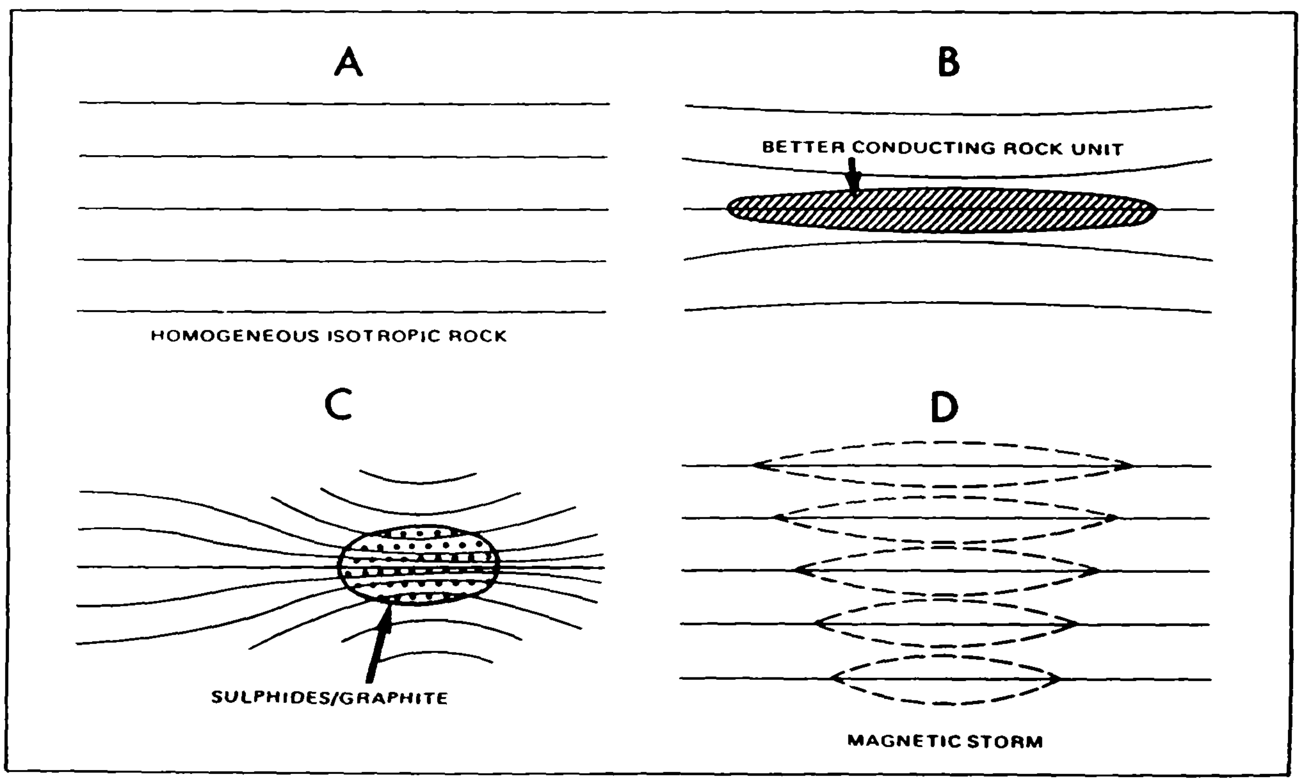

Figure 2—Schematic representation of various naturally occurring configurations of electrical equipotential fields.

The author was involved in early field surveying experiments with the resistivity method, using formulae developed by Dr Arthur Brant, University of Toronto. This method requires the "pushing" of alternating current into the ground and can provide an excellent interpretive model of the geological stratigraphy and structure Resistivity surveying can also detect conducting anomalies which may correlate with buried sulphides or graphite. However, the method was found to be cumbersome and slow, and soon gave way to the faster, more portable, but less informative electromagnetic (EM) methods More recently the induced polarization (IP) method has been developed and applied It also "pushes" current [as DC pulses which naturally decay] into the ground but is much more cumbersome than the resistivity method and much more expensive than most of the EM methods It is considered to be a composite of the resistivity and SP methods and is capable of detecting low resistivity "good" conductors and disseminated sulphides (including oxidized orebodies)

Unfortunately, the interpretation procedure is complicated and the method will equally well detect iron oxides and other semimetallic uneconomic minerals A drawback with the resistivity, EM and IP methods is that they measure secondary electrical fields which are sometimes difficult to interpret. They also respond to unmineralized wet shears, faults, and fissure zones. Perhaps the most common cause of "false" anomalies with these methods is the variable depth of overburden over the rock surface. If there is a subsurface valley buried by overburden, all the above methods will yield a "psuedoanomaly" similar to an anomaly observable over a massive sulphide zone.

Alternatively, the SP method does not determine secondary fields, so survey results are much easier to interpret It does not respond to subsurface valleys, wet clay, shears, or faults, and, in the author's experience, the SP method does not provide results which could lead to a false anomaly In over 500 SP anomalies which were stripped or drilled, the author always found the source of the SP anomaly to be sulphides and/or graphite in the underlying rock

The SP method responds to good conducting sulphides (both oxidized and unoxidized bodies), graphite, and nonconducting (disseminated) sulphides if these sulphides are oxidizing The author has encountered only two cases where disseminated sulphides were not detected by the SP method. In one case, an exposure of disseminated pyrite showed no oxidation "rust" (gossan) whatsoever, in another, sulphides of a pyrite-chalcopyrite-bearing copper orebody were also fresh, and the pH of the ground water was found to be 10.0, too basic to oxidize the pyrite According to Lundberg (1948, p.179): "The self-potential method must be used with some caution... and many orebodies may not cause any anomalies at all, owing to certain ground-water or overburden conditions." The proportion of nonoxidizing, nonconducting sulphide bodies is unknown, but the author expects that the number in Canada is probably very small It is this small percentage of nonconducting sulphide bodies which prevents one from saying the SP is a "Yes" or "No" method in geophysical prospecting for sulphide ores. It is a Yes or No method for the detection of good conductors only, but not necessarily for disseminated sulphides

Another feature of the SP method is its ability to differentiate between anomalies caused by sulphides and anomalies caused by graphite Sulphides produce a range of up to 350 millivolts between the most positive and most negative SP readings, graphite has a higher range. The SP method also has the ability to "smell" an anomaly some distance away and can smell graphite at a greater distance than sulphides

One of the popular misconceptions about the SP method is that it is limited to shallow depths as its detecting ability is dependent on the presence of oxidizing sulphides which usually occur close to surface of the earth. Lundberg (1948, p 179) states "The self-potential method is based on the fact that slowly proceeding weathering in the upper portion of a sulphide body is accompanied by electrical potential differences between the surficial oxidation zone and the deeper nonoxidized portions of the orebody" Lang (1970, p 162) contends this idea by noting that graphite is not oxidizing The author has located disseminated sulphides under 25 m of sand (including a quicksand layer), and a weak conductor under 36 m of overburden. Lang (1970, p.162) also states: "...reactions at the surface may become too weak to interpret when the overburden is more than about 300 feet [91 m] thick" The author has located "heavy" sulphides capped by 7.6 m of barren rock, with no apparent indications of oxidation

Another misconception is that one can derive a formula to determine the percentage of sulphides in an SP anomaly based on the strength of the readings Lang (1970, p 162) states "The strength of the potential generated depends largely on the concentration of sulphides" One cannot, however, determine any variations in the strength of anomalies as dependent on the concentration of sulphides For example, the strongest SP value along the strike of an anomaly does not occur where the sulphides are most highly concentrated, but where the source of the anomaly is closest to surface With a little practice, one can determine whether the source of the anomaly is close enough to the surface to be exposed by stripping Details are given in the section "Mineral Prospecting with the SP Method"

Although the author has stated that the SP method does not give false anomalies certain operator errors can produce them To help operators avoid such errors is one of the objectives of this guide

LIMITATIONS OF THE SELF-POTENTIAL METHOD

As no one geophysical method is all-embracing, the following limitations of the SP method should be borne in mind when planning surveys:

1) The SP method cannot be used over water How

ever, Lang (1970, p 162) states: "Where sulphide deposits lie beneath lake waters, the method is not usually applicable *except over the ice in the winter*". Further research is needed to refine this technique.

2) Winter surveys are now possible through snow cover using high impedance voltmeters, but dampness can short-circuit the instrument, extreme cold can weaken the batteries, and ice can encrust the pots and prevent ground contact. Preventive measures include addition of glycerine to the pots, and carefully planned quick checks over target areas, to maximize surveying before prolonged frigid temperatures can affect the equipment.

3) An SP anomaly does not indicate whether conducting sulphides are disseminated or massive. Accordingly, the anomaly could be tested by another electrical method such as VLF (very low frequency) to determine whether it is a good conductor. At the same time, the anomaly could be checked with a magnetometer to determine whether the magnetic iron sulphide pyrrhotite is present

4) As mentioned in the section "Important Facts", the SP method responds to pyrrhotite, pyrite, and chalcopyrite. It does not respond to zinc, lead, gold, or silver minerals. However, some iron or copper sulphides are generally present with these other metals and, if oxidizing, will result in an SP anomaly.

5) In the case of a strong and obvious graphite SP anomaly, the method cannot indicate the presence or absence of associated sulphides. Presently, only one instrument, the RONKA EM-15, can resolve associated sulphides, but only if the anomalous source is shallow, and if any associated sulphides are good conductors. For reasons not fully understood, this instrument only responds to good conducting sulphides, but not to graphite.

SELF-POTENTIAL EQUIPMENT

A millivoltmeter-potentiometer is used to take SP readings by a needle and scale, digital readout, or an adjustable dial which brings a needle or audio signal to a null position. The operator will likely make fewer mistakes in recording with a digital readout. Readings should be double-checked for precision, particularly at established control stations.

A basic requirement is a reel of wire. In most cases, more than 600 m of wire is desirable. Another useful and timesaving item in conjunction with the use of a long wire is a pair of walkie-talkies. Lastly, the most important items are the porous pots. If these do not function properly, the survey becomes a wasted endeavour. Occasionally the millivoltmeter may get wet and short-circuited. This condition is easy to detect if not to rectify. Also, the wire may develop a bare spot which may make contact with the wet ground and give a sudden strong negative reading. This is also easily identified though of infrequent occurrence. In some circumstances, an unmonitored pot may change its potential along a survey line and produce false anomalous readings. The pots are crucial to the successful operation of the SP equipment, and accordingly, will be discussed first in the "Instructions" section.

INSTRUCTIONS

(1) Operation of SP Equipment

The Pots

The two pots are generally made of porcelain ceramic in hollow cylindrical forms with porous bottoms. From the caps, copper electrodes are suspended down into the pots. A saturated copper sulphate solution is used as the medium to connect the porous pot contact with the ground, which establishes a mediated electrical contact with the copper electrodes suspended in solution. If two bare metal electrodes made contact with the ground, there would be an instantaneous surge in polarization between them which would then drop quickly to zero. With the copper sulphate solution as the mediator of the ground contact, no net polarization effect involving a discharge of current takes place and the relative potential difference between two survey stations can be measured with considerable accuracy.

Occasionally, the two pots will have, or may develop an inherent potential difference between them. If this is only a few millivolts, no harm is done in running survey lines with the reel and not correcting the individual readings. An error of a few millivolts will not result in false or obscured anomalies. However, a high pot potential difference can be very critical in some situations as discussed below.

The reason for an original pot difference is probably due to slight variations in construction making one pot more porous than the other, and thereby, of a slightly different conductive response. This is usually a fixed and unchanging condition which does not hamper the SP survey. However a sudden change in pot difference may be caused by a crack, by contact of the porous part of the pot with metal or sulphides, by the drying out of one pot, or by the solution in one or both pots becoming undersaturated in copper sulphate. The pot difference should be checked often; for example, at the start of the day, at noon, at the end of the day, and at each control station and tie-in point.

The filling of the pots must be carried out with care, the level of the solution checked often, and additional crystals or powder added frequently as required. Without ample copper sulphate solids in contact with the solution, a rise in temperature of one or both pots may result in undersaturation. This is because of the increased solubility of copper sulphate at higher temperatures. To make the saturated copper sulphate solution, it is advisable to heat the water as the crystals are being added, until the solution is hot and solid crystals are still present A pyrex bowl is recommended, as the solution is corrosive, and a wooden spoon or stick is useful for stirring

Jellying the Pots

If the pots are to be used for a week or more it is timesaving to make a jelly of the solution. Only enough jellied solution to fill the two pots is required The operation is similar to making any jelly, except it is advisable to add two or three times as much gelatin to the water to make a good set The hot water plus gelatin solution should be well stirred as the copper sulphate crystals are added After the solution has cooled, a few crystals should be added to each pot The jelly solution can then be poured into the pots, capped, and allowed to set One set of jellied pots should last an entire prospecting season of 3 or 4 months.

However, the pots should always be stored under moist conditions away from excessive heat to prevent evaporation and danger of drying out

Pot Difference

Once the pots have been filled and allowed to cool it is possible to determine by a simple procedure whether there is any inherent pot difference:

(1) The pots are placed on or in the ground, close together, with one pot connected to wire running from the positive ("far") connection of the millivoltmeter, and the other pot connected by wire to the negative ("near") connection A first reading is taken

(2) The pots are now reversed leaving the same wires attached to the positive and negative connections of the millivoltmeter, and a second reading is taken

(3) The formula for calculating the pot difference is: (1st Reading + 2nd Reading)/2.

For example, if the *1st Reading* is -8 millivolts and the *2nd Reading* is + 10 millivolts, the pot difference is ((-8) + (+10))/2 = +1 mv These relatively high readings indicate that the potential difference between the ground and each pot is 9 millivolts, suggesting that the pot difference was measured in an anomalous area However, as long as the correct procedure is followed, the true pot difference is obtainable anywhere. Once the magnitude of the pot difference is established, the positive and negative pots should not be interchanged during the course of SP survey readings. An alligator clamp on the "forward" positive pot is ample identification, and is useful for engaging and disengaging the end of the wire The pot difference should be regularly monitored and carefully measured at each control station and tie-in point

The Millivoltmeter-Potentiometer

Most voltmeters are accompanied by full operating instructions which describe how to read the instrument. It is important to emphasize that by convention the *forward* advancing pot should be linked to the positive or *far* instrument connection and the stationary or *rear* control station pot should linked to the negative *near* connection (Figure 1) With the positive pot moving "ahead", anomalies are negative after the traditional Carl Barus method which is the currently accepted convention If the negative pot is inadvertently sent ahead, strong positive readings would be anomalous

The Reel of Wire

Wire used in SP prospecting should be strong, thin, light, flexible, and well-insulated with a smooth surface Depending on the roughness of the terrain, thickness of underbush, and straightness of the traverse line, a 0 8 km length of wire can be pulled off a reel to its end Wire should be attached to the forward pot by a clove hitch knot, with a bared end connected to the copper electrode which protrudes above the pot cap The connection should be made with a short piece of insulated wire securely attached at one end to the pot electrode, and to an alligator clamp at the other end in order to make contact with the reel wire. With this arrangement, an SP surveyor can pull the wire and the forward pot with one hand without danger of disengagement of the pot connection

Theoretically, the potential difference due to the SP effect could be measured with the two pots several kilometers apart Although impracticable, a longer wire is preferable as more readings can be taken with the millivoltmeter and rear pot set up at a single control station, and fewer control stations are needed as discussed below

A reel with only 244 m (800 ft) of wire should not be spliced onto an extra length of wire. Regardless of how well the wire is spliced and insulated, it will come apart or become entangled under most field conditions The time gained from avoiding such survey delays will more than compensate for the cost of an appropriate length (e g 610 m (2000 ft) of wire

The positive wire from the millivoltmeter should have an alligator clamp to attach to the reel wire, as it is generally necessary to disengage the clamp before the reel unwinds

The Walkie-Talkies

Although the two SP operators can shout for a few hundred meters and then send messages by tugs on the taut wire, a faster and more reliable survey can result from use of walkie-talkies for voice communication The forward operator can describe the topography (e g swamps, creeks, up-hill, down-hill, etc) to the note-taker operating the millivoltmeter, and can notify when the forward pot is in ground contact and ready for a reading Often, the reel will stop, the instrument operator will attach the millivoltmeter at the rear control station wire, and then the reel will suddenly move forward resulting in possible damage The instrument operator can also inform the forward operator of the trend of the readings, and, if "smelling" an anomaly, to cut down the readings from, for example, 20 m intervals to 10 m or less for a preliminary detailed survey of the anomaly

The walkie-talkies should not be so powerful as to interfere with nearby citizens bands

(2) Conducting an SP Survey

After the pots have been prepared and the initial pot difference measured, they may be combined with the millivoltmeter, the reel of wire, the walkie-talkies, and weatherproof note-taking materials in preparation for an SP survey along a predetermined line grid. The starting procedure will depend on the size of the grid and the length of wire on the reel. For example, the grid shown in Figure 3 is oriented with a base line (BL) parallel to the structure or strike of rock units and cross lines at right angles.

With 610 m (2000 ft) of wire a survey moving from east to west could effectively cover the area as follows: (1) The first control station is established on the base line at cross line 4W. This station is given a *tentative value* of 0 mv. (2) The pot difference is recorded, and (3) SP survey measurements are recorded along with pot locations and other notes, north and south on lines 0, 4W and 8W, as well as readings along the base line between line 0 and line 8W. Readings should never be taken at forward pot spacing intervals of over 15 m (50 ft), except possibly along the base line. In exploration for narrow vein deposits, the intervals should be shortened to define the peak. Bends in the wire of 90 degrees or even 360-degree loops do not affect the readings.

After line 8W has been traversed, readings are taken along the base line to line 16W where a careful measurement is taken and added to the inverse of the pot difference. Next, the second control station at BL.16W is established. If the tentative value of the second control station is +5 mv, then all readings taken from the second control station set-up—along lines 12W, 16W, 20W, and

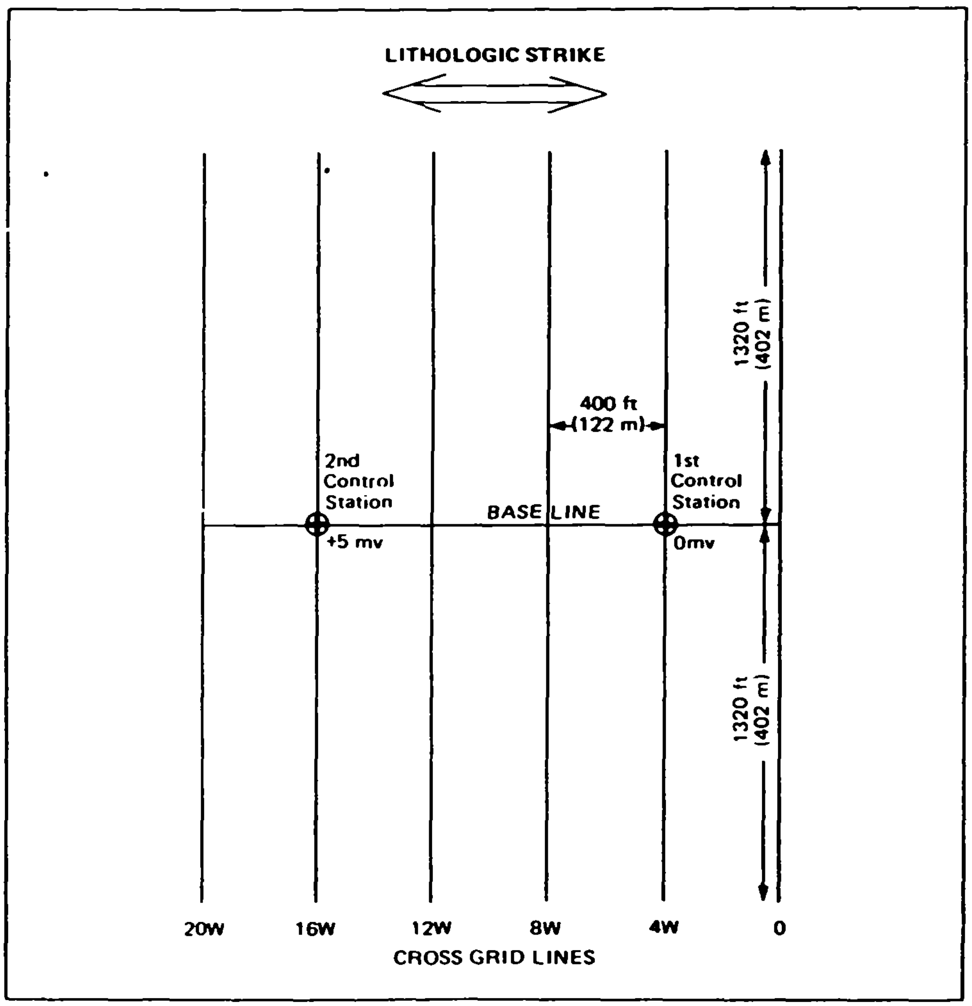

Figure 3—An example of logistical details for an SP survey conducted with 610 m (2000 ft) of wire (see also Table 1).

the rest of the base line—are relative to a value of +5 mv. For example, a reading of -25 mv gives a tentative value for that point, or survey station, of -20 mv. All readings or final adjusted values may be plotted on suitably scaled maps beside the appropriate survey stations.

With only 244 m (800 ft) of wire, an SP survey conducted over the same grid would require more set-ups, or control stations (Figure 4). In such a situation the first control station is set up at 7+00N on line 0 (tentative value 0 mv), and readings taken north, and south to the base line. Along the base line the pot positions should be carefully marked for tie-in with other control stations south of the base line. After the northern part of line 0 has been run, a reading is taken at 4W,7+00N and the inverse of pot difference is added. After this, the rear operator traverses over to 4W,7+00N where a second control station is established. The rest of the northern part of line 4W, including the base line, is surveyed and the procedure is repeated across the northern section of the grid to control station 20W, 7+00N. Next the pots, millivoltmeter, and reel of wire are moved to 20W,7+00S. The southern section of line 20W is traversed, tieing-in at the base line station. Assuming the value at BL.20W had been given as -23 mv from the control station at line 20W,7+00N; then, if the reading (including pot difference) from the new control station at 20W,7+00S is +10 mv, it follows that the new control station is 10 mv more negative than the base line at line 20W— thus -33 mv. The survey is continued eastward in the same fashion as the north section. It is unlikely that the rest of the base line tie-ins will check as the potential will have changed somewhat because of moisture and temperature variations. Any discrepancies should not produce or hide anomalies. Nevertheless, it is obvious from the above examples that a longer wire provides better control of background SP variations over a larger area (2 control stations versus 12 control stations and 6 tie-ins), and allows a faster and more efficient survey to be run.

When following the normal procedure of placing the pots on or in the ground, it is possible to obtain variations of up to 110 mv due to the varying acidity and bioelectric activity of soils. Wet swamps tend to give positive SP values, and dry hills negative ones. In areas where there is a more uniform type of soil cover, the background range is

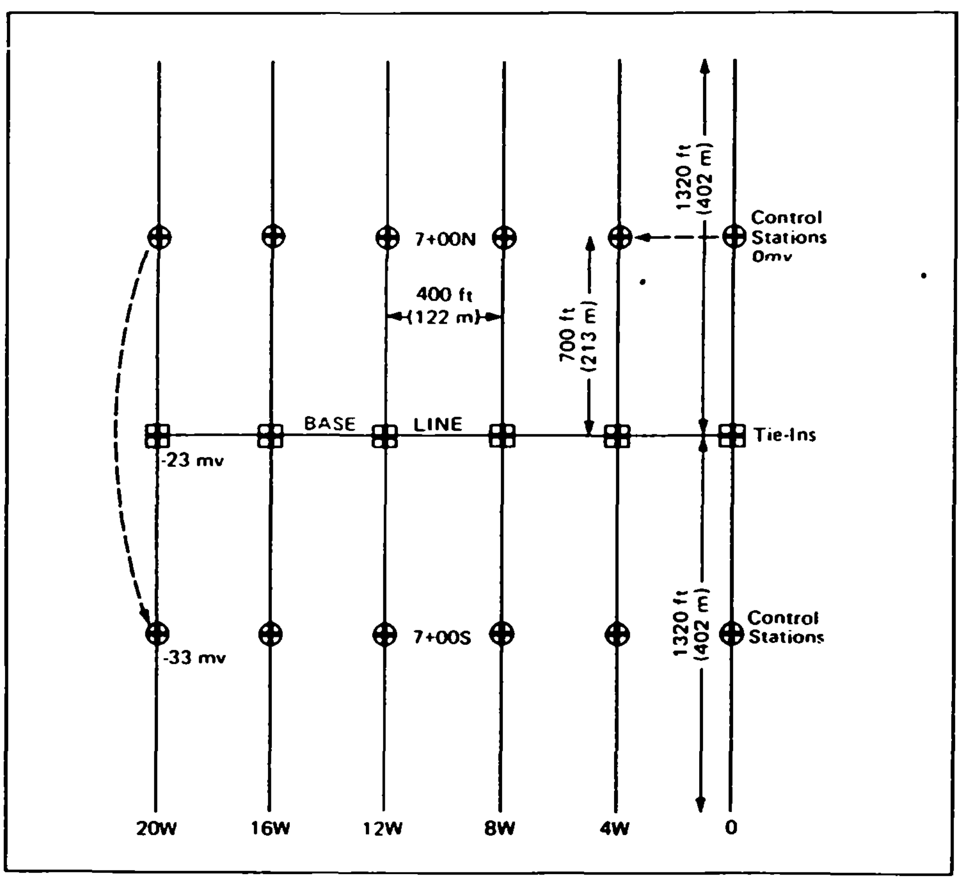

Figure 4—An example of logistical details for an SP survey conducted with 244 m (800 ft) of wire.

much less. As an extreme example of this, a detailed traverse across a 244 m (800 ft) wide tailings pond may give a range in readings from +1 to -1 mv, probably due to the uniform acidity of the tailings. The author observed similar small variations in the residual soils of Jamaica. Lang (1970, p.162) states: "Pronounced slopes... sometimes introduce a topographic effect." Fortunately, in Canada this potential variation of the background agrees with the topography, and, in nonanomalous areas of swamps and hills, the SP contours correlate to topographic features. This is one reason why the topography at each station should be noted. Another important reason is shown in Figure 5.

Figure 5 represents hypothetical SP values along one line. In example **A** SP measurements occur on a "flat" map showing no topography, such that the weak negatives opposite the ? would normally be ignored. Example **B** shows a small rise which would explain the negative readings in terms of normal background topographic variation. However, if there is a swamp, as in example **C**, these weak negatives would definitely be anomalous.

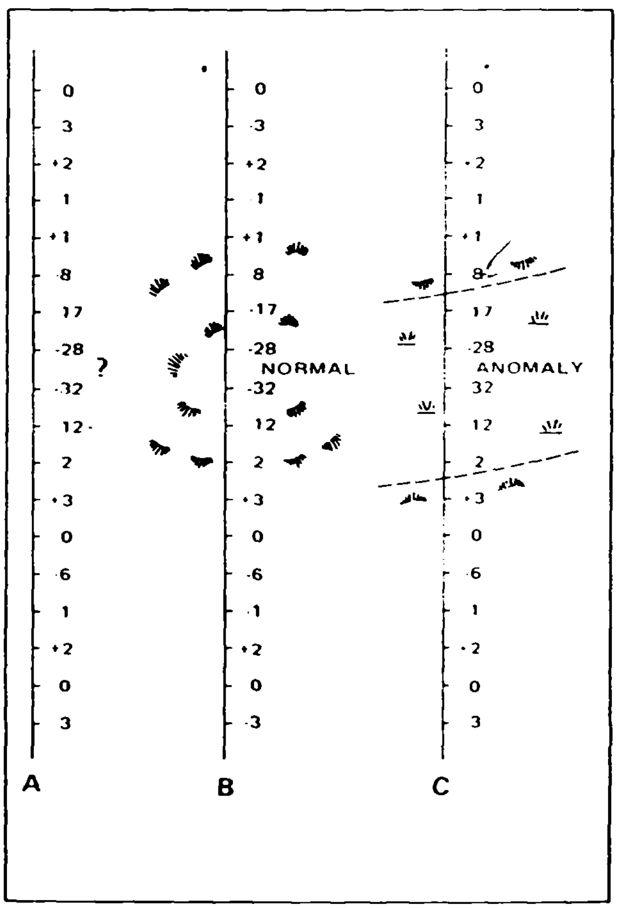

Figure 5—Theoretical SP readings showing the effects of topography

Under favourable conditions an SP survey such as that depicted by Figure 3 could cover the area with a few hundred readings in one or two days, traversing approximately 4 km of grid. If an SP survey detects strong anomalous negatives and has also covered a few swampy areas, it is likely that the greatest positive and negative values of the survey have been encountered. As an example, SP survey notes might read as shown in Table 1.

If the range of values is of the order of 250-300 mv or more, about one third of that range is probably background variation due to the varying acidity of the soils. In this case, if the most positive tentative value is near +100 mv, or near +10 mv, it should be given an adjusted value of +50 mv and the other tentative values adjusted accordingly. For example, if the most positive tentative value is +75 mv, it is adjusted to +50 mv, and it follows that a *normalizer* of -25 mv must be added to all the tentative values, as in Table 1, to yield the *final adjusted value*.

If the most positive tentative value is between +40 and +60 mv, no adjustment is necessary. In most cases the most positive value is over a swamp or low wet ground.

In some localized anomalous areas the range from most positive to most negative readings may be 150 mv, or less, and is probably due to a more uniform soil cover. In such a case, the most positive tentative value should be adjusted to about +25 mv. In most circumstances, one does not know at the time when the first control station is set-up, what anomalous conditions will occur. On more than one occasion, the author has unknowingly set-up a first control station over an anomaly and all the subsequent readings were positive to high positive.

The purpose of the adjustment is to attain a final balanced background range about the zero value, such that the anomalous signals are more readily recognized and interpreted. The background is the range of electrical self-potential which is due mostly to variations in topography or soil pH. For example, a final adjusted value of -50 mv on top of a hill would not necessarily be anomalous. A value of -70 mv, or more negative, would be. In the second case above, with a background range of 50 mv or less, an adjusted value of -25 mv on top of a hill would not necessarily be anomalous. A value of -40 mv would be. It should be stressed that over a swamp, as illustrated above, an anomaly due to buried sulphides might be much less negative, or in some cases, a low positive. SP anomalies under swamps and deep overburden are much weaker than on hills and shallow overburden. Thus, topographic information is needed in this type of electrical survey. Below, in the section on "Alternative Field Methods", a simple technique which minimizes the topographic effect is discussed.

Magnetic Storms

Solar flares produce geomagnetic disturbances which are related to the phenomenon of the aurora borealis and can cause magnetic storms of several days duration

TABLE 1 | AN EXAMPLE OF SP SURVEY NOTES FOR A SURVEY CONDUCTED WITH A REEL OF WIRE 610 METERS (2000 ft.) LONG ON A 400 ft. – SPACED GRID (see Figure 3).

Control Station	Survey Station	Reading	Tentative Value	+(-25) (Normalizer)	=	Final Adjusted Value
			(Millivolts)			
BL, 4W	–	–	0			-25
	BL,3W	+3	+3			-22
	BL,2W	-8	-8			-33
	BL,1W	-12	-12			-37
	BL,O	-7	-7			-32
	O+5ON	-2	-2			-27
	:					
	etc.		(a "quiet" area)			
	:					
	BL,16W	+5	+5			-20
BL,16W	–	–	+5			-20
	BL,15W	-25	-20			-45
	:					
	etc.		(probably anomalous)			
	:					
	BL,12W	-70	-65			-90
	O+50N	-44	-39			-64

The intensity and effects of magnetic storms in northern areas are enhanced near strongly magnetic iron formation. During a magnetic storm, SP readings fluctuate in an unpredictable and random fashion similar to fluctuations observable on a magnetometer under the same conditions. Generally, the magnetic storm has no effect on the SP readings until the two pots are more than about 100 metres apart; and increased pot separations increase the violence of the fluctuations. Magnetic storms may start suddenly and last only a few minutes, or they may last a few days. Except for short traverses, an SP survey with a reel of wire is not possible under storm conditions. Below, an alternative field method will be discussed which can avoid the effects of a magnetic storm.

(3) Alternative Field Methods

Topographic Problems

Although the influence of topography on SP readings may be interpreted and anomalies recognized, the problems can be confusing to the inexperienced operator. For several years, the author has used a technique which effectively inhibits the topographic effect and gives better ground contacts, even on rubble and bare outcrops.

First, two porous canvas sample bags are filled with material which will stay wet for several hours, such as black muck, loam, or sawdust. Second, a pot is inserted in each sample bag and tied on. Both pots are then in contact with a medium of constant pH, and the influence of varying acidity is strongly attenuated. As a result, readings become more uniform, the background displays a narrower range, anomalies in swamps are better defined, and anomalies on hills are less negative and less exaggerated. A final adjusted value of +10 mv for the most positive value is adequate, and a -25 mv value may be anomalous.

Magnetic Storm Problems

A magnetic storm can hamper or preclude an SP survey conducted with a reel of wire. However, by moving both pots at a constant separation along a survey line, it is possible to overcome the effects of a magnetic storm. Only on rare occasions such as in northern latitudes near strongly magnetic iron formation could there be any fluctuation with a pot separation of about 15 metres (50 ft) or so.

There are two alternative methods by which two operators can move aong a survey line without the reel, but linked together by about 20 m of wire, to allow for 15 metre-spaced (50 ft) readings in rugged topography. Both methods are much faster than a survey conducted with a reel since it is not necessary to walk back along a line and reel the wire in. From the base line the operators can survey along the longest lines, traverse across along a tie-line or through the bush to an adjoining line, and survey along it back to the base line, and over to the starting station to tie in—similar to magnetic surveying methods.

One method requires that the rear negative pot be moved up to the same ground contact location on which the forward positive pot was positioned. Under field survey conditions this method is impracticable due to the difficulty of placing the rear pot on the exact ground contact position of the forward pot, such that every station becomes an uncontrolled "control station".

A preferable alternative for SP surveying during magnetic storms is the "leapfrog method" shown in Figure 6.

This method solves the problem of uncontrolled control stations but adds to the arithmetic computations of the operator taking notes since each station has to be evaluated before the next station is "read". Both of the methods involve adding the inverse pot difference to each reading.

For example, the leapfrog pattern can be started from an established control station on the base line with an assigned tentative value of 0 mv. An example of typical survey notes is shown in Table 2.

The control station, with a tentative value of 0 mv, reads the positive pot at 0+50N. The reading is +5 mv; thus, with a pot difference (P.D.) of -1 mv, the corrected reading is -6 mv and the tentative value is 0+6 = +6 mv. Next, the negative pot is moved to 1+00N and reads station 0-50N. The corrected reading is -9 mv. Thus, 0+50N is 9 mv more negative than 1+00N; or 1+00N is 9 mv more positive than 0+50N. Thus 1+00N has a transposed reading of +9 mv (see Table 2), and the tentative value at 1+00N is (+6) + (+9) = +15 mv. The positive pot is then moved from 0+50N to 1+50N. Station 1+50N has a tentative value of +31 mv. The negative pot is then moved to 2+00N and reads 1+50N. If the corrected reading is +36 mv, then the transposed reading of -36 mv means that 2+00N is 36 mv more negative than 1+50N and thus has a tentative value of -5 mv.

To ensure that results are meaningful, it is important to keep a careful record of each reading and calculation for later rechecking. On returning to the base line, the readings should be tied-in to the control station from which the traverse started. An exact tie-in or equivalence of starting and finishing readings at the control station is unlikely, but depending on the number of stations read, one can treat the tie-in error as one would treat corrections for magnetic diurnal variation during a magnetic survey. For example if the tie-in reading is +50 mv after 50 readings, then working backwards one would distribute the discrepancy by adding -50 to the last reading, -49 to the second last, and so on. However, if the change in readings at the control station is several hundred milli-

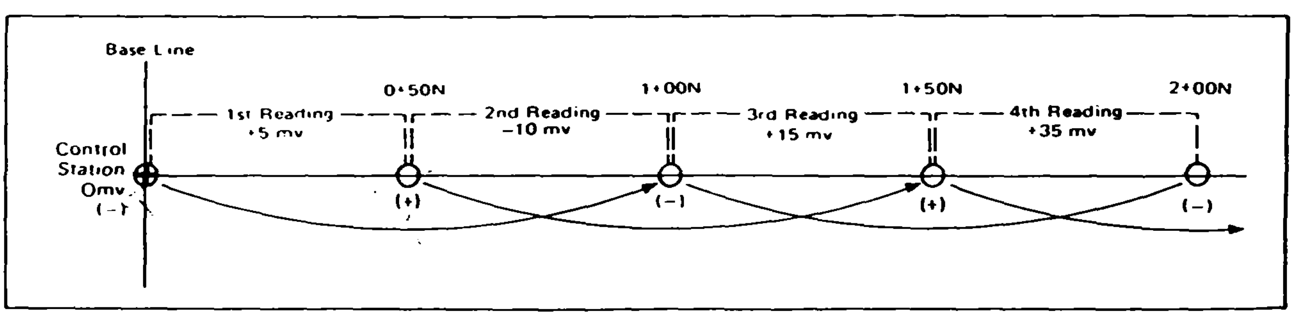

Figure 6 – An example of the "leapfrog" method of SP surveying with a fixed length of wire (see also Table 2).

TABLE 2 | AN EXAMPLE OF SP SURVEY NOTES FOR A SURVEY CONDUCTED USING THE "LEAPFROG" METHOD WITH A FIXED LENGTH OF WIRE (see Figure 6).

Control Station	Survey Station	Pot	Reading plus inverse Pot Difference P.D. = (−1)	Transposed Reading at Negative Pot	Tentative Value	Final Adjusted Value
				(Millivolts)		
BL,O	0+00	(-)	–	–	0	....
	0+50N	(+)	+5+(+1)=+6	+(+6)	+6	....
	1+00N	(-)	-10+(+1)=-9	-(-9)	+15	....
	1+50N	(+)	+15+(+1)=+16	+(+16)	+31	....
	2+00N	(-)	+35+(+1)=+36	-(+36)	-5	....

volts it is necessary to recheck calculations or resurvey the lines.

Although faster, this alternative method is somewhat complicated, requires careful arithmetic, and usually involves an adjustment to bring the relative values into reasonable perspective for interpretation. Despite savings in time, it is not recommended unless one is obliged to use it due to magnetic storms or a shortage of wire.

(4) Notes on the Interpretation of SP Survey Results

The results of an SP survey can be effectively represented and interpreted by using maps on which the final adjusted values are shown along with SP line profiles, or more preferably, SP contours of appropriate intervals. If a good background range is established, most anomalies are well delineated as more negative areas.

Anomalies of -450 mv, or more negative, are due to graphite, but anomalies of -350 to -400 mv can occur in a variety of lithologic or mineralized conditions Generally, detailed follow-up readings along the strike of the anomaly can resolve some of the possibilites.

Another situation sometimes encountered during an SP survey is a line of values which are more negative than the values along the adjacent lines on each side. This means that the anomalous SP contours run along the line at right angles to the base line and also to the regional strike. This condition may either be due to a loss of control, or the presence of a crosscutting conducting body which may contain sulphides. Loss of control may be due to a sudden change in pot difference, an erroneous reading (value) of the control station, or location of the control station over an anomaly. Similar to magnetic surveys, SP surveys are better controlled from nonanomalous control stations. If control stations are to be set up on the base line, it is preferable to first survey the base line, back and forth if necessary, to establish reliable values. Then, if some parts of the base line are anomalous, these should be avoided as control stations if possible. Since slight variations in moisture or temperature can change the electrical potential of any station, it is likely that in an anomalous area the change will be greater. To determine the cause of an anomalous line of values, the readings along it should be repeated. Repeated surveys of SP anomalies due to buried conductors are generally replicative; although, they may change in strength due mainly to variations in the level of the water table. A low water table produces stronger negatives than a high water table.

If duplicate readings should substantiate that an anomaly follows along a survey line, some follow-up cross traverses perpendicular to the line may be required in order to detail the anomaly as depicted in Figure 7.

In some cases the line profiles or contours of SP values may be used to approximately indicate the direction of dip of a conducting body (see Figure 8). This is particlarly so in level areas of no topographical effect or when using the canvas sample-bag method (see "Alternative Field Methods").

(5) Mineral Prospecting with the SP Method

The main procedures of the SP method are described under the heading "Conducting an SP Survey". SP prospecting may be conducted with a reel of wire; or, at a constant pot separation, depending on which is more

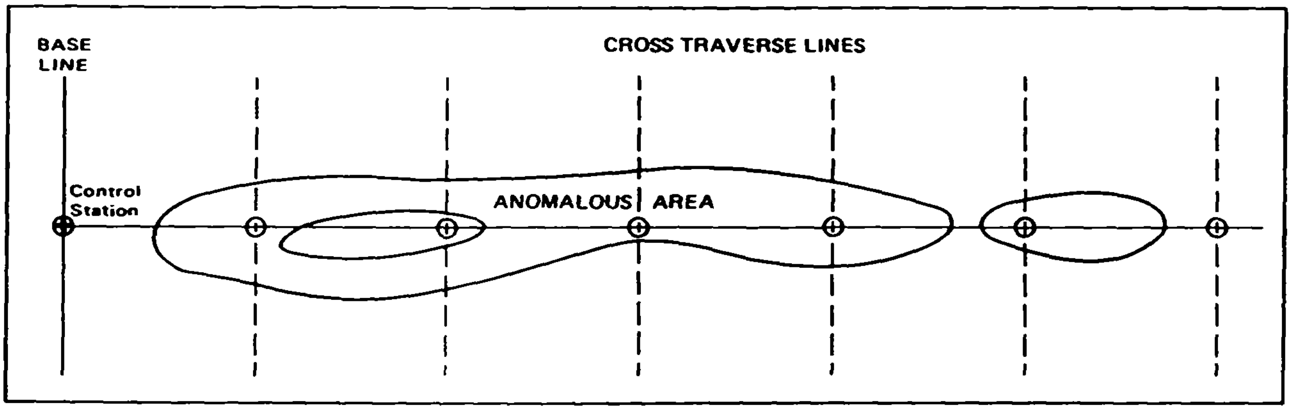

Figure 7—An example of an SP anomaly (arbitrary contour values) detailed by cross traverse lines.

convenient. Normally, it is not necessary to cut picketed grid lines for prospecting, as pace-and-compass traverses provide sufficient control over location of anomalies.

When an anomaly has been detected it should be "peaked up". This means that the forward pot is moved back along the survey line until the highest reading on that traverse line is accurately located. This may require moving the pot only a few centimetres along the line. Next, the rear pot and millivoltmeter are moved up close to the anomaly, preferably at or near a surveyed station so that the new control station can be tied-in to the rest of the survey values. As an example, the peak on the survey line in Figure 9 is -225 mv; since somewhere along strike the peak could rise to a "graphite" level, it is necessary to maintain some control over the relative magnitude of SP values. Assuming the new control station is found to be valued at -125 mv, it is possible to do a further check perpendicular to the traverse line to establish the location of the anomaly peak more accurately. If there is higher ground to the right and lower ground to the left, it is preferable to test the higher ground first by a detailed parallel traverse line some 5 to 10 m from the original survey line, as shown in Figure 9.

If a second peak of -285 mv is located to the right, this means that the best direction was chosen, and another detailed traverse line should be surveyed farther to the right. The third peak may be only -105 mv. Thus the strongest vaule is near -285 mv. Next, it is possible to pinpoint the SP target by "potting" along strike until the maxi-

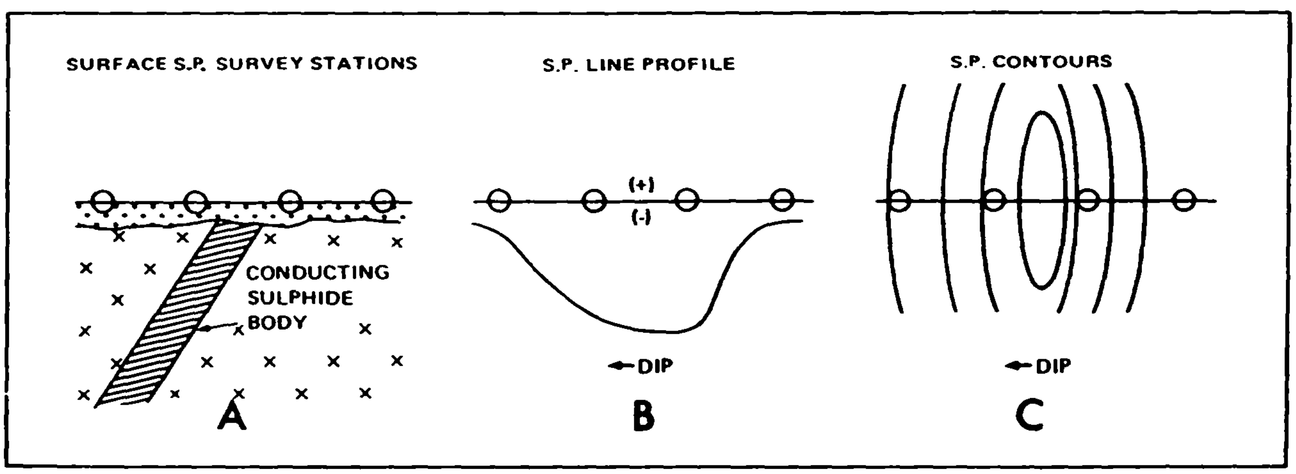

Figure 8—An example of dip determination using SP data.
(A)—cross-section of a dipping sulphide body.
(B)—line profile of SP readings over (A) showing smooth gentle slope on the down-dip side and steep abrupt slope on the up-dip side.
(C)—contours of SP readings over (A) showing wider spacing interval down-dip and a closer interval up-dip.

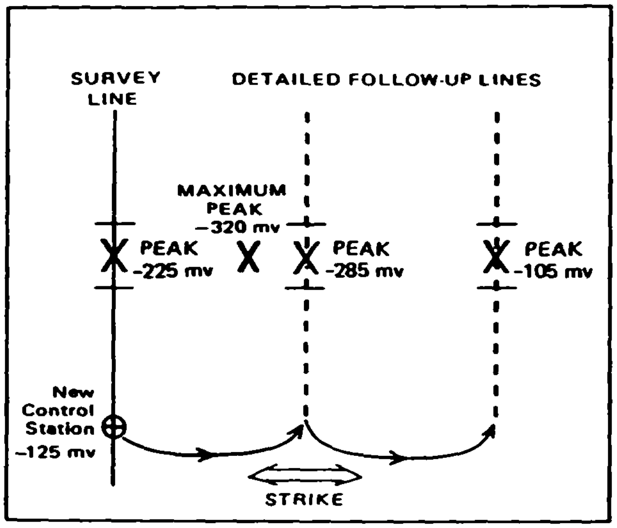

Figure 9—An example of detailed follow-up surveying used to locate a maximum SP peak.

mum peak is located, probably between the original traverse line and the -285 mv value for the above example. Assuming the highest peak value is -320 mv, this is where the source of the anomaly is closest to surface. To evaluate whether the anomaly can be exposed by stripping, it is necessary to "pot" around the highest peak by taking a dozen or so readings over an area of about 30x30 cm^2 (1 ft^2).

If the readings around the peak vary by only 1 to 5 mv within the square area, then the source of the anomaly is probably below the water table and inaccessible by ordinary overburden stripping. If the readings vary by 5 to 15 mv or more, the anomaly is above the water table and probably may be exposed by stripping off the overburden with a shovel and pick. If the peak area varies by 25 to 50 mv or more, the source of the anomaly is probably graphite which may, or may not, be above the water table.

An alternative to the grid prospecting method for surveying well-staked contiguous claims is the "spiderweb" technique illustrated in Figure 10.

Four claims can be covered from a single control station. This method is recommended for base metal prospecting in areas where only large sulphide bodies are of interest. It is not recommended for gold prospecting.

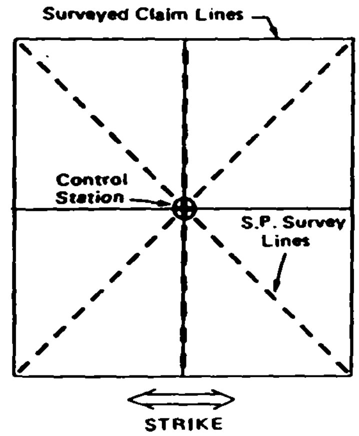

Figure 10—The "spiderweb" method of SP surveying.

CONCLUSIONS

Lang (1970, p.162) states: "Of all the geophysical methods applicable to the search for sulphides, the spontaneous polarization technique provides the quickest field procedure and also furnishes highly definite information as to the occurrence or absence of sulphide mineralization...With the exception of graphite there are but few insignificant factors to lead the geophysicist astray when interpreting the spontaneous polarization results."

Nevertheless, because varying concentrations of iron sulphide are common near the surface of the earth's crust, and are readily detected by the SP method, there may be a considerable number of SP anomalies which are due to uneconomic mineralization. Thus SP should be combined with other prospecting methods when the nature of mineralization is in doubt. Also, laboratory and field research into several important aspects of the SP method are lacking. For example, the feasibility and effectiveness of SP surveys over ice are not well established. Other areas of possible investigation include the effects of magnetic storms, the extra intensity of these storms near major iron formations, the effect of hydrothermal alteration on SP anomalies, improvement of the canvas sample-bag technique (see "Alternative Field Methods") to eliminate potentials due to varying soil acidity, derivation and refinement of topographic correction techniques, and use of the SP method to monitor earthquakes or atomic explosions.

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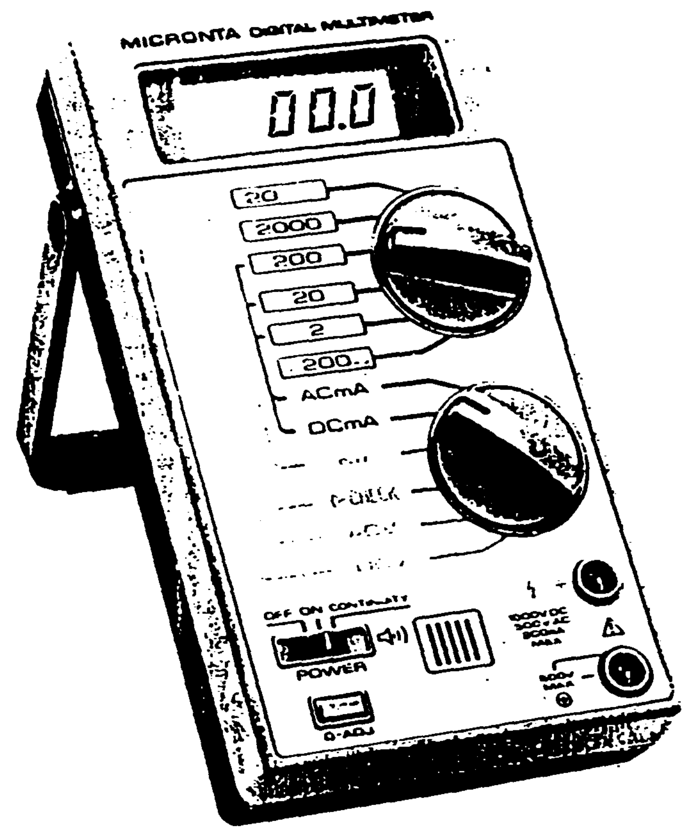
MICRONTA®*

LCD Digital Multimeter



OWNER'S MANUAL

22-191

The MICRONTA LCD Digital Multimeter is a portable 3½-digit, compact-sized Multimeter ideally suited for field, lab, shop, bench and home applications. Here's a review *of some of the features that qualify your new Digital Multimeter as a real "pro."*

The latest IC and display technology is used to achieve the lowest possible component count. This, in turn, ensures reliability, accuracy, stability and a really rugged, easy-to-handle instrument.

Low battery voltage automatically detected and displayed.

No pointers to bend. No parallax and no mechanical zero-adjust to worry about. Just a high contrast, easy-to-read, 3½-digit, liquid crystal display.

Effective overload and transient protection on all ranges.

Over-range indication on each range.

Full auto-polarity operation.

Dual-slope integration to ensure fast, accurate, noise-free measurements.

Built-in Buzzer function for quick continuity check (sounds when circuit continuity is approximately 300 ohms or less).

Special Diode Check function lets you safely check semiconductor junctions (for open, short or normal).

Switchable electronic Zero-adjust suppresses two least significant digits to assure *precise low-range readings.*

SPECIFICATIONS

Display	3½-Digit, LCD	
Accuracy		
DC VOLTS 200mV–2–20–200–2000V (Maximum measurement = 1000 Volts)	±0.8% of reading and ±0.2% of full scale, ±1 in last digit	
AC VOLTS 2–20–200–2000V (Maximum measurement = 500 Volts RMS)	±1% of reading and ±0.5% of full scale, ±1 in last digit	at 50/60 Hz

[illegible] to [illegible]	±1.5% [illegible]ding ±0.5% of full scale, ±1 in last digit	at 20 Volt R[illegible]
1 kHz to 10 kHz	±6% of reading and ±0.5% of full scale, ±1 in last digit	at 20 Volt R[illegible]
DC-CURRENT 2–20–200mA	±1.5% of reading and ±0.2% of full scale, ±1 in last digit	
AC-CURRENT 2–20–200mA	±1.5% of reading and ±0.5% of full scale, ±1 in last digit	
RESISTANCE 200Ω–2–20–200–2000KOHM	±1.5% of reading and ±0.2% of full scale, ±1 in last digit +18 digit maximum at 200Ω	
20MΩ	±3.0% of reading and ±0.3% of full scale, ±1 in last digit	
Continuity Function	Continuity buzzer sounds at less than 300 oh[illegible] input resistance.	
Diode Check Function	For checking if diodes are open, shorted or n[illegible]	
Input Impedance	10 MEG OHM (DCV/ACV) more than 100 MEG OHM on 200mV DC	
Range Selection	Manual ranging	
Power Source	Two "AA" size 1.5V batteries	
Power Consumption	5mW	
Low Battery Indication	"BATT" on the left of display Below 1.2 – 1.3V	
Polarity	Automatic polarity	
Over-range Indication	1000 with blinking "1"	
Operating Temperature	0°C to 50°C (32°F to 122°F)	
Storage Temperature	–20°C to 60°C (–4°F to 140°F)	
Weight	300g Approx. (11 oz.)	
Size	196mm x 90mm x 36mm (7-9/16" x 3-1/2" x	
Accessories	Fuse: 0.315A 250V Banana Type Test Leads (Radio Shack Cat. No. 278-704)	

ITEM NO.	NAME	FUNCTION
1	Display	A 3½ digit display (1999 max) with decimal point and minus polarity indication. Indicates measured input values and over-range and low battery condition plus 0-ADJ and mV/Ω functions.
2	POWER Switch	Turns the instrument ON and OFF. Set to CONTINUITY for continuity check. Set to ON when Buzzer function is not desired.
3	ZERO ADJUST Switch	Push to suppress the two least significant digits. Push again (or change Range/Function switch position) to cancel 0-ADJ.
4	Input (+) Jack	Connect (+) red lead for all voltage, current and resistance measurements.
5	Input (–) Jack	Connect (–) black lead for all measurements.
6	Function Switch	For selecting functions: DC V, AC V, ⟶⊢ CHECK, K Ω, DC mA, AC mA
7	Range Switch	For selecting ranges: Voltage: DCV 200mV, 2V, 20V, 200V, 1000V ACV 2V, 20V, 200V, 500V Current: 2mA, 20mA, 200mA Resistance: 200Ω, 2K, 20K, 200K, 2000K, 20MΩ ⟶⊢ CHECK:
8	Battery/Fuse Compartment	Open to install/replace fuse and/or batteries.

EXPLANATION OF SPECIAL PANEL MARKINGS

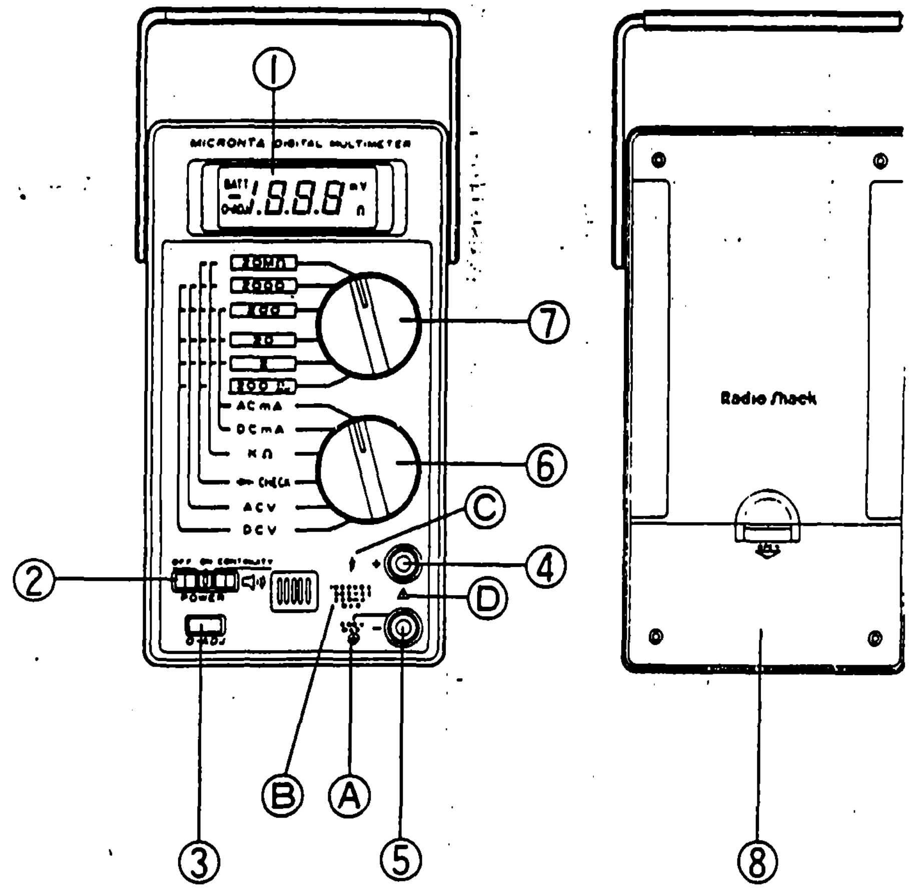
Special marking has been added to the panel to remind you of the measurement limitations and safety.

A. 500V MAX ⊕ To avoid electrical shock and/or instrument damage do not connect the common input terminal (–jack) to any source of more than 500 volts with respect to earth/ground.

B. 1000V DC 500V AC 200mA MAX The maximum voltage or current that can be measured is 1000 V [500 V AC, or 200mA.

C. ϟ Be extra careful when making measurements for high voltage; do r touch terminals or probe ends.

D. ⚠ Refer to complete operating instructions.



Preparing for Operation

All you need to do is load two 1.5 Volt "AA" batteries. We recommend that you use the Alkaline type – such as Radio Shack's 23-552.

Be sure POWER is OFF and test leads are disconnected.

Open the Battery/Fuse Compartment cover on the rear by pressing in the direction of the arrow. Snap the two 1.5 volt batteries in place and press the Battery/Fuse Compartment cover back on.

When the batteries become weak "BATT" will be displayed on the left side of the display. Replace batteries. NEVER LEAVE A WEAK OR DEAD BATTERY IN YOUR UNIT. Even "leak-proof" types can leak and cause damage to the circuitry. When you are not going to use your unit for a few weeks, remove batteries.

Use only the same type of test leads as are supplied with your unit. These test leads are rated for 1200 volts; replacements are available from your local Radio Shack store (Radio Shack Cat. No. 278-704).

Check Before Operation

1. Plug the red test lead into the (+) jack, and the black test lead into the (–) jack.
2. Turn POWER ON.
3. Turn the Function Switch to K Ω.
4. With no resistance connected across the test leads, the over-range indication should occur, and display will show "1000" (with blinking "1"). Short the test leads; the display now should be three zeroes.
5. Touch the red probe tip to the black probe tip, and rotate the Range Switch, starting at the top (20MΩ). The decimal point in the display should be positioned as follows:

20 MΩ	0.00
2000 K OHM	000
200 K OHM	00.0
20 K OHM	0.00
2 K OHM	.000
200 Ω	00.0Ω

MAKING MEASUREMENTS

DC Voltage Measurements/AC Voltage Measurements

IMPORTANT: The maximum input limit for voltage measurements is 1,000V DC and 500V RMS AC. You cannot measure above these limits even with the Range Switch set to "2000". If you attempt to measure DC voltages above 1000 volts or AC voltages above 500 volts RMS, your unit may be damaged.

1. Set Function Switch to DCV or ACV.
2. Set Range Switch as required for the voltage level to be measured. If you don't know the voltage level, start out with the Range Switch set to the highest position and reduce the setting as required to obtain a satisfactory reading.

3. Co the is to ircui e tes n DC minu will ir voltage is negative (with respect to black lead).
4. If the voltage exceeds the maximum on the range selected, the display will indicat an over-range "1000" (with blinking "1"). Select a higher range.

NOTE:

When the Function Switch shifts from "KΩ" or " ⇥ CHECK" to DC 200mV rang the digital counter displays over indication for a while because the input impedance i too high.

The counter indicates zero by short-circuiting the plus and minus terminals of test lead:

Resistance Measurements

NOTE: The resistance measuring circuit applies a known value of constant curren through the unknown resistance and then measures the voltage developed across it Thus, when checking "in-circuit" resistance, be sure the circuit under test has al power removed (are all capacitors fully discharged?).

1. Set the Function Switch to the K Ω position.
2. Set the Range Switch to the desired position.
3. Connect the probes across the circuit to be measured.
4. If the resistance value being measured exceeds the maximum value of the rang selected, an over-range indication will be displayed "1000" (with blinking "1") Select a higher range. For resistances of approximately 1 Megohm and above, th Meter may take a few seconds to stabilize. This is normal for high resistanc readings.

NOTE 1

Your unit has a circuit to protect the resistance ranges from over-voltage. Wher measuring on the 200Ω range, the resistance of this circuit may affect the reading. To determine the error, short the test leads: the reading is the resistance of the circuit Subtract this figure from the measured reading. (Typically the circuit resistance is 1.8 ohms at its maximum). Or you can use 0-ADJ function. Press 0-ADJ to suppress the two least significant digits, and the display will be all zeroes. Mesure the resistance and you will get the correct reading. Press 0-ADJ again or change the position of Function or Range Switch to release 0-ADJust Function.

NOTE 2

Some devices may be damaged by the current applied during resistance measurements The following table lists the voltage and current available on each range.

RANGE	A	B	C
200Ω	1.5V	150mV	650μA
2KΩ	0.65V	180mV	100μA
20KΩ	0.65V	300mV	23μA
200KΩ	0.65V	350mV	3μA
2000KΩ	0.65V	360mV	0.3μA
20MΩ	0.65V	360mV	0.03μA

A is open circuit voltage at th jacks in volts.
B is voltage in volts across a resistance equal to full scal value.
C is current in microamps thro a short circuit at the input jacks.

All values are typical.

NOTE 3

Your unit has a circuit to protect the resistance ranges from over-voltage (500V AC 1 minute). But never connect a source of voltage when function switch is in KΩ/ ⊣◄ CHECK position.

DIODE CHECK

Since open-circuit voltage between input jacks is maintained at 1.5 Volts (when in the ⊣◄ CHECK function), you can check continuity of most diodes, transistors, etc.

1. Set the Function Switch to the ⊣◄ CHECK position. The range is automatically set to 200Ω.
2. Remove power from the circuit under test.
3. Connect probes to the semi-conductor device you want to check.
4. If the device is good, the display will show some value. If over-range occurs, try reversing polarity: if over-range still occurs, the device is open. If reading is very small or zero, the device is shorted.

NOTE: This multimeter cannot measure forward resistance of LED because this measurement needs more than about 2.1 volts.

DC Current Measurement/AC Current Measurements

To measure current, you must break the circuit and connect the leads to two circuit connection points. **Never connect the leads across a voltage source;** doing so will blow the Tester's fuse or, even worse, may damage the circuit under test.

The maximum input limit for DC current/AC current measurement is 200mA.

1. Place the Function Switch in the DCmA or ACmA position.
2. Set the Range Switch to the desired position. Always set the Range Switch to the highest position if you don't know the amount of current to be measured.
3. Remove power from the circuit under test and then break the circuit at the appropriate point.
4. Connect probes to the circuit.
5. Apply power and read current.
6. In DCmA if the polarity of the current being measured is negative, the value displayed will be preceded by a minus (–) sign.
7. If the magnitude of the current being measured exceeds the selected Range, the over-range circuitry will operate, displaying "1000" (with blinking "1"). When this occurs, immediately remove power from the circuit under test and select a higher current range.

NOTE:

The current ranges are fuse-protected. If inoperative, check the fuse.

WARNING
DON'T APPLY VOLTAGE TO INPUT TERMINALS WHILE FUNCTION SWITCH IS IN DCmA OR ACmA POSITION.

Buzzer (continuity test)

This tester has a built-in audible continuity function. Select the KΩ function. The range is automatically set to 20K OHM. Set the Power switch to CONTINUITY position.

Connect probes to the circuit you want to check. If the circuit continuity is 300 ohms or less, the buzzer will sound.

The CONTINUITY position will also result in sounds with function settings other than KΩ (that is, DCV/ACV/DCmA/ACmA):

1. When function or range switch setting is changed (one short tone).
2. When over-range takes place (two short tones).

NOTE: Buzzer does not sound in the 0-ADJ mode.

Replacement of Battery/Fuse

WARNING: TO AVOID ELECTRIC SHOCK, DISCONNECT MEASURING TERMINALS BEFORE REMOVING BATTERIES OR FUSE. REPLACE ONLY WITH SAME TYPE BATTERIES OR FUSE.
THIS INSTRUMENT CONTAINS NO USER SERVICEABLE PARTS.
SCREW REMOVAL BY QUALIFIED PERSONS ONLY.
CAUTION: FOR CONTINUED PROTECTION AGAINST FIRE, REPLACE ONLY WITH 0.315A, 250V FUSE.

NOTE:

The fuse used in your Digital Multimeter is a special size and type. It can only be ordered from Radio Shack's National Parts Department. Contact your local Radio Shack store to place such a special order.

1. Be sure POWER is OFF and test leads are disconnected.
2. Open the Battery/Fuse Compartment Cover.
3. Pull the red ribbon in the Fuse Compartment; the fuse will pop out.
4. Insert a new fuse on the ribbon ring. Use only a fuse of the same type/rating (0.315A, 250V, 5ϕ x 20mm Miniature fuse).
5. Install fuse with ribbon in the Fuse Compartment.
6. Close the Battery/Fuse Compartment Cover.

WARNING: DO NOT OPERATE YOUR UNIT UNTIL THE BATTERY/FUSE COVER IS IN PLACE AND FULLY CLOSED.

MAINTENANCE

Your Digital Multimeter is a precision electronic device. Do not touch any of the circuitry inside the Case. Do not expose to extreme temperatures [below −4°F (−20°C) or above 140°F (60°C)]; protect from extremely humid areas.

To avoid damage:

A. Never connect more than 1000 Volts DC or 500 Volts RMS AC.
B. Never connect a source of voltage when Function Switch is in K Ω position.
C. Never operate the DMM unless the Battery Cover is in place and fully closed.
D. Battery and/or Fuse replacement should only be done after the test leads have been disconnected and POWER is OFF.

The Micronta DMM comes to you fully calibrated and tested. Under normal use, no further adjustment should be necessary. In case meter should require repair, do NOT try to adjust by yourself; bring it to your nearest Radio Shack store. SERVICE OF THE DMM BY UNAUTHORIZED PERSONNEL WILL VOID THE WARRANTY.

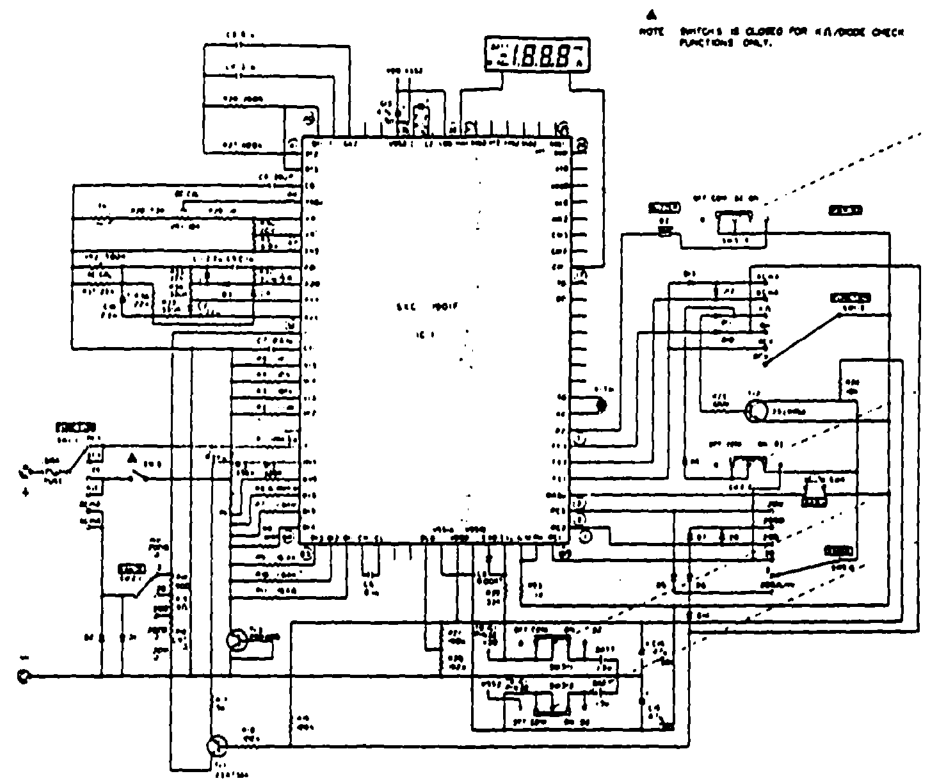
A Word About Safety

Every precaution has been taken in the design of your meter to insure that it is as safe as we can make it.

However, **safe operation depends on you, the operator.** We recommend that you follow these simple safety rules:

1. Never apply voltages to the DMM that exceed the limits given in the Specifications section. Never apply more than 1000 Volts DC or 500 Volts RMS AC between input jacks and/or ground.
2. Use extreme caution when working with voltages above 100V. Always disconnect power from the circuit being measured before connecting test leads to high-voltage points.
3. Always discharge filter capacitors before attaching test leads to a power supply.
4. Get into the habit of keeping one hand in your pocket when trouble-shooting any equipment containing high voltages.
5. Since many AC-DC sets have a potentially "hot" chassis, be sure that the top of your workbench and the floor underneath it is dry and is made of non-conductive material.

SCHEMATIC DIAGRAM



NOTE:
(1) ALL RESISTANCE VALUES ARE INDICATED IN "OHM" (K = 10^3 OHM, M = 10^6 OHM)
(2) ALL CAPACITANCE VALUES ARE INDICATED IN "μF" (P = 10^{-6} μF)

Schematic subject to change without notice. For most accurate Schematic (and parts) contact Radio Shack, National Parts Dept., Barrie, Ontario, L4M 4W5

■ SAMPLE PREPARATION

ROCK CHIPS, DRILL CUTTINGS AND CORE

Crushing, splitting and drying charges

Procedure code	Sample weight	Specifications	Crushing/Splitting Price	Drying Price
226	0 - 5 lbs	For small exploration type rock chip samples packed in porous bags only	$ 2.05	n/a
274	0 - 15 lbs	Crush the entire sample	3.05	$ 1.50
276	16 - 25 lbs	to better than 60 percent -10 mesh; split sample	5.25	2.50

Drying charges apply only when overnight drying or sample transfer is required

Final pulverization

Procedure code	Sample weight	Specifications	Price
205/208	200 grams	Cr-steel ring to -150 mesh (>90%)	$ 2.10
248	100 grams	Zirconia ring to -150 mesh (>90%)	3.50
212/207	400 grams	Carbon steel plate pulverization to 100 percent -150 mesh (screened)	3.45

SOIL, SEDIMENT, HUMUS AND VEGETATION SAMPLES

Procedure code	Description	Price
201	Dry; sieve to -80 mesh (-10, -35 or -150 mesh also available)	$ 1.10
202	Save reject from any plus size fraction	0.55
220	Transferring charge for wet soil or sediment samples submitted in non-porous bags or containers	0.55
205	Ring any fraction to -150 mesh [illegible] steel ring mills	2.10
217	Dry and pulverize entire sample (up to [illegible] grams) to -150 mesh (>90%)	2.10
210	Dry, macerate and blend vegetation [illegible]	4.25
237	Dry, macerate and blend vegetation samples, press into a pellet and shrink wrap. (Required for analysis by NAA.)	6.35

HIGH GRADE SAMPLES AND CONCENTRATES

235	Pan concentrates. Dry and ring pulverize the sample (200 gram maximum) to better than 90% -150 mesh using Cr-steel ring sets	$ 5.30
209	Concentrates or high grade samples [illegible] pulverize entire sample (200 gram maximum) [illegible] 150 mesh using Cr-steel ring sets	[illegible]
1364	Large high grade samples. Crush [illegible] sample followed by ring pulverization as per code 209	16.00
1327	Manual or mechanical homogenization [illegible]	3.00

MISCELLANEOUS PROCEDURES

261	Compositing charge (per weighed sub sample)	$ 1.30
227	Manual or mechanical homogenization [illegible]	1.05
214/225	Handling charge for pulps not prepared in house (Includes relabeling and verification that pulps meet minimum Chemex pulp QC criteria (>90% -150 mesh).	0.30
244	Pulps previously prepared by Chemex [illegible] submitted for analysis	n/c

■ Clearly mark all international sample shipments as "GEOLOGICAL MATERIALS - NO COMMERCIAL VALUE". Preaddressed shipping labels are available at no cost on request. We offer advice on shipping samples to our lab by surface carrier, air cargo courier and air cargo.

■ GOLD AND OTHER PRECIOUS METALS

GOLD ANALYSIS – FIRE ASSAY PROCEDURES

	Procedure code	Sample weight	Fire Assay finish procedure	Detection limit	Upper limit	Price per sample
Trace Level	Suitable for the analysis of gold in exploration rock chip, soil or sediment samples. Since fire assay reagents will typically introduce a blank value of 1 to 2 ppb Au, lower detection limits than 1 ppb are not meaningful.					
	100	10 grams	A.A.	5 ppb	10 ppm	$ 7.95
	983	30 grams	A.A.	5 ppb	10 ppm	9.50
	101	10 grams	N.A.A.	1 ppb	10 ppm	8.50
	993	30 grams	N.A.A.	1 ppb	10 ppm	10.00
Low Grade	Suitable for the analysis of lower grade ore deposits where more than 95 percent of the samples will have a gold content of less than 0.35 oz/t. Any 'overlimits' are automatically re-assayed and charged out as per procedure 996 (see below).					
	877	1 AT	A.A.	0.0005 oz/t	0.35 oz/t	9.50
Intermediate Grade	Suitable for the analysis of ores averaging from 0.15 to 0.5 oz/t. Any samples which assay over 0.4 oz/t are automatically re-assayed using a gravimetric fire assay procedure at no extra charge. The gravimetrically determined gold content is substituted into the certificate of analysis.					
	398	1/2 AT	A.A.	0.002 oz/t	5 oz/t	9.50
	998	1 AT	A.A.	0.001 oz/t	5 oz/t	10.50
High Grade	Suitable for ores which assay routinely over 0.35 oz/t.					
	396	1/2 AT	Gravimetric	0.003 oz/t	20 oz/t	10.00
	996	1 AT	Gravimetric	0.002 oz/t	20 oz/t	11.00
	1296	2 AT	Gravimetric	0.001 oz/t	20 oz/t	18.00
	1596	5 AT	Gravimetric	0.001 oz/t	20 oz/t	30.00
Special	Metallics or 'screen' assay. The plus 150 mesh fraction screened from the pulp is assayed in its entirety by fire assay and averaged in with a 30 gram assay of the minus 150 mesh fraction. (Requires a code 207 sample preparation scheme.)					
	G180	1 AT	Gravimetric/A.A.	0.001 oz/t	5 oz/t	23.50
	Combination of coarse gold extraction by cyanide leach (24 hour bottle roll) followed by fire assay of a representative 30 gram sample of the residue. Results are reported for both the cyanide extractable gold and the fire assay of the residue. Total gold is also reported by summing these two values.					
	G380	500 grams	A.A.	0.001 oz/t	2 oz/t	29.50

SILVER ANALYSIS

	Procedure code	Sample weight	Method	Detection limit	Upper limit	Price per sample
Trace Level	**6**	1 gram	Aqua-regia, A.A.	0.2 ppm	100 ppm	$ 2.90
Ore grade	**385**	2 grams	Aqua-regia, A.A.	0.01 oz/t	20 oz/t	3.70
	383	15 grams	Fire assay, grav	0.1 oz/t	20 oz/t	3.70*

*Fire assay silver price applies to samples which are also being analyzed for Gold by a FA-Gravimetric method. Pricing for 'silver only' assays is $ 10.00 per sample.

■ TRADITIONAL ICP PACKAGES

Traditional ICP packages offer an economic alternative to single element determinations. Aqua-Regia digestions will not completely digest some of the elements which are normally reported as part of a multi-element scan (especially those shaded in grey below). Tri-acid digestions such as the nitric-perchloric-hydrofluoric acid digestions used for the ICP-24 and ROCK-20 packages will be essentially quantitative for all elements. Only extremely mineralized material will not be totally dissolved in this type of acid matrix.

Package		ICP-32	ICP-9b	ICP-9g	ICP-24	ROCK-20	
Digestion used		Aqua-Regia digestion	Aqua-Regia digestion	Aqua-Regia digestion	HF-nitric-perchlor. digestion	HF-nitric-perchlor. digestion	Upper limits for all
		Detection limits					
Al	Aluminum	**0.01 %**			0.01 %	0.01 %(*)	15 %
Sb	Antimony	2 ppm		2 ppm			1 %
As	Arsenic	2 ppm		2 ppm			1 %
Ba	Barium	**10 ppm**			10 ppm	10 ppm	1 %
Be	Beryllium	**0.5 ppm**			0.5 ppm		0.01 %
Bi	Bismuth	2 ppm		2 ppm	2 ppm		1 %
Cd	Cadmium	0.5 ppm			0.5 ppm		0.05 %
Ca	Calcium	**0.01 %**			0.01 %	0.01 %(*)	15 %
Cr	Chromium	**1 ppm**			1 ppm	1 ppm	1 %
Co	Cobalt	1 ppm	1 ppm		1 ppm	1 ppm	1 %
Cu	Copper	1 ppm	1 ppm	1 ppm	1 ppm	1 ppm	1 %
Ga	Gallium	**10 ppm**					1 %
Fe	Iron	0.01 %	0.01 %		0.01 %	0.01 %(*)	15 %
La	Lanthanum	**10 ppm**					1 %
Pb	Lead	2 ppm	2 ppm	2 ppm	2 ppm	2 ppm	1 %
Mg	Magnesium	**0.01 %**			0.01 %	0.01 %(*)	15 %
Mn	Manganese	5 ppm	5 ppm		5 ppm	5 ppm	1 %
Hg	Mercury	1 ppm		1 ppm			1 %
Mo	Molybdenum	1 ppm	1 ppm	1 ppm	1 ppm	1 ppm	1 %
Ni	Nickel	1 ppm	1 ppm		1 ppm	1 ppm	1 %
P	Phosphorus	10 ppm			10 ppm	10 ppm	1 %
K	Potassium	**0.01 %**			0.01 %	0.01 %(*)	10 %
Sc	Scandium	**1 ppm**					1 %
Ag	Silver	0.2 ppm	0.2 ppm	0.2 ppm	0.5 ppm	0.5 ppm	0.02 %
Na	Sodium	**0.01 %**			0.01 %	0.01 %(*)	10 %
Sr	Strontium	**1 ppm**			1 ppm	1 ppm	1 %
Tl	Thallium	**10 ppm**					1 %
Ti	Titanium	**0.01 %**			0.01 %	0.01 %(*)	10 %
W	Tungsten	**10 ppm**			10 ppm		1 %
U	Uranium	10 ppm					1 %
V	Vanadium	1 ppm			1 ppm	1 ppm	1 %
Zn	Zinc	2 ppm	2 ppm	2 ppm	2 ppm	2 ppm	1 %
Price per sample		$ 6.25	$ 5.25	$ 5.50	$ 9.95	$ 9.95	

For the ICP-32 package those elements **shaded in grey** will only be partially dissolved.

(*) These elements are reported as oxides in the ROCK-20 package

APPENDIX III

DRILL CORE SAMPLES, ANALYTICAL RESULTS

Please refer to the attached "Certificates of Analysis" for the C-93-1 diamond drill hole core sample assay results.

Chemex Labs Ltd.

Analytical Chemists * Geochemists * Registered Assayers
5175 Timberlea Blvd., Mississauga,
Ontario, Canada L4W 2S3
PHONE: 416-624-2806

To: BHARTI LAAMANEN MINING INC.

131 FIELDING RD., P.O. BOX 700
LIVELY, ON
P0M 2E0

Project : T-H PROPERTY
Comments: ATN: H. TRACONELLI CC: H. TRACONELLI

Certificate Date: 20-DEC-93
Invoice No. : I9326205
P.O. Number : 67656
Account : KDU

CERTIFICATE OF ANALYSIS A9326205

SAMPLE	PREP CODE		Au ppb FA+AA	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm
4981	205	226	< 5	0.2	2.95	10	10	0.5	< 2	2.16	< 0.5	45	124	41	5.01	< 10	< 1	0.26	< 10	2.56	795
4982	205	226	< 5	0.2	2.86	24	40	< 0.5	< 2	3.29	< 0.5	32	151	96	4.18	< 10	< 1	0.83	10	2.45	775
4983	205	226	< 5	< 0.2	3.02	14	20	0.5	< 2	1.84	< 0.5	29	113	71	4.35	< 10	< 1	0.49	10	2.58	780
4984	205	226	< 5	< 0.2	0.87	6	< 10	< 0.5	< 2	2.44	< 0.5	15	73	103	1.43	< 10	< 1	0.04	10	0.60	285
4985	205	226	< 5	< 0.2	3.16	4	30	< 0.5	< 2	1.91	< 0.5	31	133	24	4.63	< 10	< 1	0.74	10	2.74	770
4986	205	226	< 5	< 0.2	2.32	50	10	< 0.5	< 2	2.45	< 0.5	71	131	14	4.43	< 10	< 1	0.17	< 10	1.92	595
4987	205	226	< 5	< 0.2	3.03	74	10	0.5	< 2	4.77	< 0.5	54	352	9	5.18	< 10	< 1	0.11	< 10	2.70	905
4988	205	226	5	0.6	1.30	74	< 10	10.5	< 2	>15.00	2.0	67	65	130	3.56	< 10	< 1	0.09	10	1.06	2010
4989	205	226	< 5	< 0.2	2.37	36	20	0.5	< 2	3.48	< 0.5	32	104	12	4.15	< 10	< 1	0.34	< 10	1.91	760
4990	205	226	< 5	< 0.2	2.44	< 2	30	0.5	< 2	6.34	0.5	19	236	51	3.81	< 10	< 1	0.36	20	2.26	885
4991	205	226	< 5	< 0.2	2.87	6	40	0.5	< 2	2.87	< 0.5	29	193	22	4.26	< 10	< 1	0.70	30	2.83	730
4992	205	226	< 5	< 0.2	3.07	16	60	1.0	< 2	2.50	< 0.5	35	330	41	4.44	< 10	< 1	1.06	20	3.14	665
4993	205	226	< 5	< 0.2	2.55	14	80	1.0	< 2	2.91	< 0.5	31	422	118	4.21	< 10	< 1	1.00	20	2.79	575
4994	205	226	< 5	< 0.2	0.43	< 2	20	< 0.5	< 2	0.09	< 0.5	13	91	6	0.67	< 10	< 1	0.18	10	0.23	60
4995	205	226	5	< 0.2	1.31	22	30	< 0.5	< 2	0.12	< 0.5	20	137	9	3.63	< 10	< 1	0.30	30	0.94	245
4996	205	226	< 5	< 0.2	0.71	< 2	10	< 0.5	< 2	0.22	< 0.5	12	143	4	1.95	< 10	< 1	0.12	< 10	0.54	100
4997	205	226	< 5	< 0.2	2.26	12	50	< 0.5	4	1.10	< 0.5	21	121	32	3.78	< 10	< 1	0.61	10	1.81	420
4998	205	226	< 5	< 0.2	3.05	4	100	0.5	< 2	1.29	< 0.5	30	124	26	5.13	< 10	< 1	1.25	10	2.47	775
301701	205	226	< 5	0.2	1.33	34	10	< 0.5	4	2.03	< 0.5	18	117	30	2.30	< 10	< 1	0.13	20	1.11	450
301702	205	226	< 5	< 0.2	4.63	2	20	1.0	< 2	0.43	< 0.5	34	153	23	8.57	< 10	< 1	0.34	< 10	3.81	1170
301703	205	226	< 5	< 0.2	2.70	< 2	< 10	1.0	< 2	2.36	0.5	19	125	17	4.48	< 10	< 1	0.15	20	2.05	675
301704	205	226	< 5	< 0.2	1.96	< 2	< 10	< 0.5	4	4.55	0.5	12	134	21	3.20	< 10	< 1	0.16	20	1.78	840
301726	205	226	< 5	< 0.2	3.01	14	80	0.5	< 2	1.49	< 0.5	24	33	28	5.67	< 10	< 1	0.78	10	2.08	945
301727	205	226	< 5	< 0.2	3.00	< 2	100	0.5	2	1.55	< 0.5	30	42	26	5.60	< 10	< 1	0.75	20	1.90	935
301728	205	226	< 5	< 0.2	0.78	< 2	30	< 0.5	4	2.41	< 0.5	4	93	7	1.56	< 10	< 1	0.17	30	0.36	265
301729	205	226	< 5	< 0.2	1.03	< 2	10	< 0.5	2	0.90	< 0.5	8	85	7	1.86	< 10	< 1	0.08	20	0.62	210
301730	205	226	< 5	< 0.2	3.31	16	10	0.5	< 2	3.39	< 0.5	46	66	17	5.78	< 10	< 1	0.17	30	3.01	855
301731	205	226	< 5	0.2	0.78	92	10	< 0.5	4	4.49	< 0.5	69	90	182	3.00	< 10	< 1	0.05	10	0.53	380
301732	205	226	< 5	< 0.2	0.48	4	< 10	< 0.5	< 2	1.33	< 0.5	6	50	2	0.80	< 10	< 1	0.04	20	0.31	150
301733	205	226	< 5	0.2	0.95	< 2	< 10	< 0.5	4	1.10	< 0.5	5	87	6	1.50	< 10	< 1	0.06	10	0.61	225
301734	205	226	< 5	< 0.2	1.43	< 2	< 10	< 0.5	< 2	0.93	< 0.5	8	77	4	2.20	< 10	< 1	0.03	20	0.91	305
301735	205	226	< 5	0.2	2.27	16	< 10	< 0.5	< 2	1.99	2.0	25	149	301	4.43	< 10	< 1	0.01	10	2.01	605
301736	205	226	< 5	< 0.2	2.29	34	< 10	< 0.5	< 2	1.67	17.5	31	84	82	4.86	< 10	< 1	0.11	10	2.07	635
301737	205	226	< 5	< 0.2	3.69	< 2	20	1.0	< 2	1.98	7.5	34	65	139	6.47	< 10	< 1	0.53	< 10	3.04	1100
301738	205	226	< 5	0.2	3.26	30	80	0.5	< 2	2.42	1.0	46	96	130	6.09	< 10	< 1	1.36	< 10	2.43	925
301739	205	226	< 5	< 0.2	3.02	12	40	< 0.5	< 2	1.40	1.5	30	57	49	4.99	< 10	< 1	0.57	10	2.43	850
301740	205	226	< 5	< 0.2	2.15	14	20	< 0.5	< 2	2.77	1.0	28	85	66	3.41	< 10	< 1	0.27	< 10	1.65	695
301741	205	226	< 5	< 0.2	2.11	< 2	20	< 0.5	< 2	1.32	1.0	26	95	53	3.28	< 10	< 1	0.31	10	1.66	655
301742	205	226	< 5	< 0.2	1.56	54	< 10	< 0.5	< 2	1.54	12.5	46	75	37	2.20	< 10	< 1	0.10	< 10	1.09	470
301743	205	226	< 5	0.2	1.71	24	10	< 0.5	< 2	1.10	3.5	31	88	65	2.56	< 10	< 1	0.21	< 10	1.32	565

CERTIFICATION: [signature]

Chemex Labs Ltd.

Analytical Chemists * Geochemists * Registered Assayers
5175 Timberlea Blvd., Mississauga,
Ontario, Canada L4W 2S3
PHONE: 416-624-2806

To: BHARTI LAAMANEN MINING INC.
131 FIELDING RD., P.O. BOX 700
LIVELY, ON
P0M 2E0

Project : T-H PROPERTY
Comments: ATN: H. TRACONELLI CC: H. TRACONELLI

Certificate Date: 20-DEC-93
Invoice No. : I9326205
P.O. Number : 67656
Account : KDU

CERTIFICATE OF ANALYSIS A9326205

SAMPLE	PREP CODE		Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sr ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
4981	205	226	< 1	0.02	96	720	62	< 2	10	22	0.20	< 10	< 10	133	< 10	200
4982	205	226	< 1	0.02	78	770	16	< 2	6	43	0.30	< 10	< 10	102	10	130
4983	205	226	1	0.02	57	910	12	< 2	6	50	0.31	< 10	< 10	96	10	162
4984	205	226	< 1	0.04	15	210	20	< 2	3	38	0.08	< 10	< 10	20	< 10	64
4985	205	226	1	0.02	61	680	2	2	8	33	0.31	< 10	< 10	103	10	140
4986	205	226	< 1	0.03	30	900	12	< 2	13	13	0.13	< 10	< 10	149	< 10	88
4987	205	226	< 1	0.01	43	2050	6	2	18	29	0.08	< 10	< 10	145	10	106
4988	205	226	2	0.01	26	350	22	< 2	10	75	0.03	< 10	< 10	63	20	304
4989	205	226	< 1	0.03	37	740	2	< 2	12	27	0.11	< 10	< 10	101	< 10	98
4990	205	226	1	0.03	43	1180	< 2	< 2	12	54	0.14	< 10	< 10	88	10	94
4991	205	226	1	0.02	61	1070	2	2	10	44	0.16	< 10	< 10	85	10	116
4992	205	226	1	0.01	160	670	14	< 2	6	46	0.49	< 10	< 10	95	10	126
4993	205	226	< 1	0.01	197	770	6	2	3	36	0.62	< 10	< 10	100	10	102
4994	205	226	1	0.03	8	30	6	< 2	1	6	0.01	< 10	< 10	4	< 10	14
4995	205	226	2	0.02	18	110	4	< 2	3	6	0.02	< 10	< 10	21	< 10	38
4996	205	226	< 1	0.04	24	280	< 2	< 2	2	4	0.04	< 10	< 10	24	< 10	16
4997	205	226	< 1	0.03	40	620	8	< 2	7	20	0.21	< 10	< 10	67	< 10	52
4998	205	226	< 1	0.04	51	1190	< 2	4	6	57	0.27	< 10	< 10	111	< 10	98
301701	205	226	7	0.03	26	400	12	2	4	18	0.10	< 10	< 10	33	< 10	64
301702	205	226	< 1	0.01	41	820	< 2	2	16	12	0.07	< 10	< 10	192	< 10	210
301703	205	226	< 1	0.01	26	980	< 2	2	11	41	0.07	< 10	< 10	130	10	108
301704	205	226	< 1	0.01	25	560	2	2	7	31	0.08	< 10	< 10	82	< 10	88
301726	205	226	< 1	0.03	13	940	2	6	8	24	0.28	< 10	< 10	160	< 10	174
301727	205	226	< 1	0.02	9	950	6	< 2	6	25	0.24	< 10	< 10	132	< 10	156
301728	205	226	< 1	0.04	5	290	6	< 2	2	13	0.04	< 10	< 10	22	< 10	28
301729	205	226	< 1	0.04	8	430	2	< 2	3	21	0.03	< 10	< 10	29	< 10	36
301730	205	226	< 1	0.02	30	1730	12	< 2	15	24	0.14	< 10	< 10	144	20	126
301731	205	226	< 1	0.03	26	250	4	< 2	5	26	0.05	< 10	< 10	27	< 10	30
301732	205	226	< 1	0.06	3	350	< 2	< 2	4	9	0.08	< 10	< 10	25	< 10	14
301733	205	226	< 1	0.05	9	460	4	< 2	6	21	0.13	< 10	< 10	56	< 10	28
301734	205	226	< 1	0.04	14	550	6	< 2	6	38	0.15	< 10	< 10	60	< 10	40
301735	205	226	1	0.03	50	960	60	< 2	8	15	0.17	< 10	< 10	97	< 10	332
301736	205	226	1	0.04	56	710	194	2	6	18	0.20	< 10	< 10	86	10	2090
301737	205	226	< 1	0.01	33	650	36	2	8	28	0.41	< 10	< 10	165	10	920
301738	205	226	3	0.03	49	810	54	< 2	6	31	0.43	< 10	< 10	160	10	278
301739	205	226	< 1	0.06	34	1020	78	2	7	28	0.31	< 10	< 10	146	< 10	334
301740	205	226	< 1	0.03	43	630	66	2	6	41	0.27	< 10	< 10	103	< 10	228
301741	205	226	1	0.06	74	720	92	4	4	34	0.24	< 10	< 10	78	< 10	186
301742	205	226	< 1	0.06	88	630	452	2	4	54	0.22	< 10	< 10	54	< 10	1170
301743	205	226	< 1	0.04	67	660	104	2	3	27	0.22	< 10	< 10	71	< 10	396

CERTIFICATION:

Chemex Labs Ltd.

Analytical Chemists * Geochemists * Registered Assayers
5175 Timberlea Blvd., Mississauga,
Ontario, Canada L4W 2S3
PHONE: 416-624-2806

To: BHARTI LAAMANEN MINING INC.

131 FIELDING RD., P.O. BOX 700
LIVELY, ON
P0M 2E0

Project : T-H PROPERTY
Comments: ATN: H. TRACONELLI CC: H. TRACONELLI

Certificate Date: 20-DEC-93
Invoice No. : I9326205
P.O. Number :67656
Account :KDU

CERTIFICATE OF ANALYSIS A9326205

SAMPLE	PREP CODE		Au ppb FA+AA	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm
301744	205	226	< 5	0.2	2.34	22	10	< 0.5	4	2.09	3.5	36	95	124	3.42	< 10	< 1	0.38	< 10	1.81	755
301745	205	226	< 5	0.4	2.19	8	20	< 0.5	6	1.11	1.5	22	55	117	3.23	< 10	< 1	0.33	10	1.66	630
301746	205	226	< 5	< 0.2	2.51	14	20	< 0.5	2	0.96	< 0.5	31	108	99	3.81	< 10	< 1	0.41	< 10	2.24	695
301747	205	226	< 5	< 0.2	2.20	6	10	< 0.5	< 2	2.10	< 0.5	20	144	38	3.16	< 10	< 1	0.29	10	1.90	635
301748	205	226	< 5	< 0.2	4.22	< 2	20	0.5	< 2	2.08	< 0.5	29	157	47	6.26	< 10	< 1	0.28	10	3.72	1090
301749	205	226	< 5	< 0.2	3.94	6	20	0.5	< 2	2.10	< 0.5	32	163	71	5.92	< 10	< 1	0.29	< 10	3.56	975
301750	205	226	< 5	< 0.2	3.58	4	10	< 0.5	< 2	2.24	< 0.5	35	153	38	5.48	< 10	< 1	0.25	10	3.14	880

CERTIFICATION: [signature]

Chemex Labs Ltd.

Analytical Chemists * Geochemists * Registered Assayers
5175 Timberlea Blvd., Mississauga,
Ontario, Canada L4W 2S3
PHONE: 416-624-2806

To: BHARTI LAAMANEN MINING INC.

131 FIELDING RD., P.O. BOX 700
LIVELY, ON
P0M 2E0

Project : T-H PROPERTY
Comments: ATN: H. TRACONELLI CC: H. TRACONELLI

Certificate Date: 20-DEC-93
Invoice No. : I9326205
P.O. Number :67656
Account :KDU

CERTIFICATE OF ANALYSIS A9326205

SAMPLE	PREP CODE		Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sr ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
301744	205	226	< 1	0.04	79	720	152	2	5	38	0.32	< 10	< 10	101	< 10	436
301745	205	226	< 1	0.04	29	940	92	2	4	41	0.25	< 10	< 10	84	< 10	270
301746	205	226	1	0.04	67	730	8	< 2	6	26	0.27	< 10	< 10	105	< 10	104
301747	205	226	< 1	0.02	53	750	< 2	< 2	5	30	0.19	< 10	< 10	81	< 10	98
301748	205	226	< 1	0.01	66	840	4	< 2	8	22	0.25	< 10	< 10	140	10	210
301749	205	226	< 1	0.01	70	660	6	2	10	17	0.27	< 10	< 10	148	20	190
301750	205	226	1	0.02	63	770	18	< 2	11	25	0.26	< 10	< 10	143	10	178

CERTIFICATION: ____________

APPENDIX IV

ANALYTICAL EXPENDITURES

The following is a listing of the assaying and assaying related expenditures that are a result of the samplings taken from drill hole C-93-1 on the T-H Property in Moncrieff Township.

Laboratory Work Order Number	Cost
I9326205	$830.53
Shipping of Samples to Lab	$49.22
Total Cost of Assaying Related Expenses	$879.75

The total of the assaying expenditures remains to be paid. Awaiting remainder of O.P.A.P. funds to settle the account.

Chemex Labs Ltd.
Analytical Chemists * Geochemists * Registered Assayers
212 Brooksbank Ave., North Vancouver
British Columbia, Canada V7J 2C1
PHONE: 604-984-0221

To: **BHARTI LAAMANEN MINING INC.** *

131 FIELDING RD., P.O. BOX 700
LIVELY, ON
P0M 2E0

INVOICE NUMBER	**I 9 3 2 6 2 0 5**

BILLING INFORMATION

Date: 20-DEC-93
Project: T-H PROPERTY
P.O. No.: 67656
Account: KDU

Comments: AA147KDU.93Q

Billing: For analysis performed on Certificate A9326205

Terms: Payment due on receipt of invoice 1.25% per month (15% per annum) charged on overdue accounts

Please Remit Payments to:

CHEMEX LABS LTD.
212 Brooksbank Ave.,
North Vancouver, B.C.
Canada V7J 2C1

# OF SAMPLES	ANALYSED FOR CODE - DESCRIPTION	UNIT PRICE	SAMPLE PRICE	AMOUNT
47	205 - Geochem ring to approx 150 mesh	2.10		
	226 - 0-5 lb crush and split	2.05		
	ICP-32	6.25		
	100 - Au ppb FA+AA	7.95	18.35	862.45
			Total Cost $	862.45
			Client Discount (10%) $	-86.25
			Net Cost $	776.20
		(Reg# R100938885)	GST $	54.33
			TOTAL PAYABLE (CDN) $	**830.53**

Chemex Labs Ltd.

Analytical Chemists * Geochemists * Registered Assayers
212 Brooksbank Ave., North Vancouver
British Columbia, Canada V7J 2C1
PHONE: 604-984-0221

To: BHARTI LAAMANEN MINING INC. *

131 FIELDING RD., P.O. BOX 700
LIVELY, ON
P0M 2E0

INVOICE NUMBER I9326205

BILLING INFORMATION

Date: 20-DEC-93
Project: T-H PROPERTY
P.O. No.: 67656
Account: KDU

Comments: AA147KDU.93Q

Billing: For analysis performed on Certificate A9326205

Terms: Payment due on receipt of invoice 1.25% per month (15% per annum) charged on overdue accounts

Please Remit Payments to:

CHEMEX LABS LTD.
212 Brooksbank Ave.,
North Vancouver, B.C.
Canada V7J 2C1

# OF SAMPLES	ANALYSED FOR CODE - DESCRIPTION	UNIT PRICE	SAMPLE PRICE	AMOUNT
47	205 - Geochem ring to approx 150 mesh	2.10		
	226 - 0-5 lb crush and split	2.05		
	ICP-32	6.25		
	100 - Au ppb FA+AA	7.95	18.35	862.45
			Total Cost $	862.45
			Client Discount (10%) $	-86.25
			Net Cost $	776.20
	(Reg# R100938885)		GST $	54.33
			TOTAL PAYABLE (CDN) $	**830.53**

APPENDIX V

DIAMOND DRILLING EXPENDITURES

Diamond drilling of hole C-93-1 was carried out from October 2, to October 7, 1993 on mining claim S-993570 of the T-H Property by Sparta Diamond Drilling.

The invoice for the above described work has been included within this appendix.

L.J. SALO
General Delivery,
Connaught, Ontario
PON-1AO (705)363-2108

MR. HAROLD TRACANELLI
582 Nickel Basin Road
Chelmsford, Ontario

INVOICE; OP930907

RE; DRILLING Benny Road Area

C-93-1

600 feet of ADBGM core drilling at $12.00 per foot	$7,200.00
MOB to Benny Road	$	n/c
DEMOB	$	n/c
CORE TRAYS	$	n/c
SUB-TOTAL		$7,200.00
TOTAL DUE		$7,200.00

THANK YOU FOR YOUR WORK. IT WAS A PLEASURE TO SERVE YOU.

J.G. Salo

Oct 07 1993

Sec

APPENDIX VI

SELF-POTENTIAL FIELDWORK MANPOWER INFORMATION

On September 4, 1993 the applicant (OP93-146) Harold J. Tracanelli was assisted by John George Huycke (OP93-145), performed a self-potential survey over lines 1 + 00E, 0 + 00 and 1 + 00W, primarily being located on mining claim S-993570, Moncrieff Township.

Date Worked	Duty Performed	Daily Allowance
September 4, 1993	Self-Potential Survey	$100.00

APPENDIX VII

Transportation, Drill Core Logging and Sampling, Report Preparation and Reproduction, Word Processing Expenditures and Expenditure Summary Statement

TRANSPORTATION EXPENSES

1. Return trip to project site for backhoe orientation.
   Harold Tracanelli, Yves Clement, Gordon Salo.

2. Spotting of Drill Hole C-93-1 by John George Huycke, October 2, 1993.

3. John George Huycke visited the diamond drill site to check on drilling progress on October 4, 1994

4. John George Huycke visited the diamond drill site to check on drilling progress on October 6, 1993.

   4 trips of 120 km per trip from residences were made = 480 km +/-

   480 x 40.30/km = $144.00

DRILL CORE LOGGING EXPENSES

On the following dates diamond drill core logging endeavours were carried out by the applicant on hole C-93-1.

Date	Function	Hours Worked
October 16, 1993	Drill Core Logging	8.0
November 13, 1993	Drill Core Logging	8.0
Total		16.0 hours
16 hours / 8 hrs. = 2 days x $100.00/day = $200.00		

DRILL CORE SAMPLING EXPENSES

Date	Function	Hours Worked
December 7, 1993	Split Samples 301743-301750 4981-4998	4.0
December 8, 1993	Split Samples 801701-301742	4.0
Total		8.0 hours
8 hours / 8 hrs. = 1 day x $100.00/day = $100.00		

REPORT PREPARATION EXPENSES

The following dates and hours were spent in preparing, proof reading the draft copy of the report. All report preparation work was carried out by the applicant, Harold J. Tracanelli, at a rate of $100.00/day.

Date	Function, Daily Logs	Hours Worked
December 20, 1993	Drafting drill hole C-93-1 cross section geology	4.0
December 21, 1993	Drafting drill hole C-93-1 cross section assay data	4.0
December 23, 1993	Reducing, correcting, reducing S-P survey data	4.0
December 27, 1993	Drafting of corrected S-P data	2.0
December 29, 1993	Drafting of S.P. data, geological compilation, superimposed onto S.P. survey data	2.0
December 30, 1993	Drafting S.P. data	1.0
January 1, 1994	Drafting of remaining S-P data, geological-geophysical compilation, began to finalize all drawings, S-P, drill sections, etc.	5.0
January 2, 1994	Telephone consultation with geologist Yves Clement regarding findings of trenching work (OP93-145). completed finalized drafting of 11" x 17" drawings	3.0
January 4, 1994	Report writing, self-potential survey	5.5
January 5, 1994	Report writing, diamond drilling	3.0
January 6, 1994	Report writing, diamond drilling, assaying, began compiling information for appendices	7.0
January 7, 1994	Report writing, completed compiling appendix data, put together introduction, location, access data, etc.	6.0
January 9, 1994	Began proof reading parts of the draft report.	5.0
January 10, 1994	Completed compiling all data for report for word processing for final draft.	5.0
January 14, 1994	Final proofing of draft copy of report, minor corrects to be made prior to printing.	4.0
TOTAL		58.50 hrs.
58.50 hrs / 8 hrs = 7.31 days X $100.00/day = $731.25		

REPORT REPRODUCTION

The cost of supplies required to produce two copies of the report to the OPAP offices has been estimated at $30.00

The copies of the report shall be generated by the applicant.

3 hours work will be required to complete the process.

3 hrs / 8 hrs = 0.375 x $100.00/day = $37.50

Total Costs $67.50

WORD PROCESSING

The exploration work report word processing work was carried out by Bharti Engineering Staff secretary Maryann Foy over the following dates and hours. The company uses a chargeout rate for such services at $27.00/hour.

Date	Hours Worked
December 7, 1993	2.5
December 8, 1993	4.25
December 9, 1993	3.0
December 13, 1993	1.5
December 30, 1993	2.0
January 3, 1994	1.5
January 4, 1994	2.0
January 5, 1994	1.5
January 6, 1994	5.0
January 7, 1994	3.75
January 11, 1994	1.5
January 12, 1994	3.0
January 13, 1994	3.0
January 14, 1994	2.0
Total Hours	36.5
Total of 36.5 hrs x $27.00/hr = $ 985.50	

EXPENDITURE SUMMARY STATEMENT

Item	Total Cost of Item	Amount Paid out to Date of Report	Amount Outstanding to Date of Report
Diamond Drilling	$7,200.00	$4,900.00	$2,300.00
Assaying	$830.53	0	$830.53
Sample Shipping	$49.22	0	$49.22
Self-Potential Survey*	$100.00	$100.00	0
Drill Core Logging*	$200.00	0	$200.00
Drill Core Sampling*	$100.00	0	$100.00
Report Preparation*	$731.25	0	$731.25
Report Reproduction*	$67.50	0	$67.50
Word Processing**	$985.50	0	$985.50
Transportation	$144.00	0	$144.00
Totals	$10,408.00	$5,000.00	$5,408.00

* work carried out by the applicant (OP93-146) designated rate of $100.00/day based on an 8 hour work day.

** work carried out by M. Foy

APPENDIX VIII

O.P.A.P. Certificate and Supporting Documentation

Ontario

Ministry of Northern Development and Mines

Ministère du Développement du Nord et des Mines

February 24, 1993

ONTARIO PROSPECTORS ASSISTANCE PROGRAM 1993-94

INFORMATION CIRCULAR 93-1

For 1993-1994, a booklet containing information on the OPAP program, the OPAP Regulations and OPAP application forms, has been prepared. These booklets are being mailed to past OPAP applicants as well as anyone else who has been placed on the Incentives mailing list. The booklets will also be available at all Ministry regional offices.

The official starting date for this year's program is **April 1, 1993.** All applications received prior to this date will be considered for assistance under the OPAP program. All applications received after this date will be considered only if there are unallocated funds.

As the competition for OPAP assistance is very strong, it is important that each applicant submits a **complete application form and proposal.** Failure to do so will likely result in the application being rejected. Please read the OPAP booklet thoroughly prior to completing the application form.

As a result of several fatal accidents last year, we have included some safety literature. (French versions may be obtained from the Incentives Office)

For further information on OPAP, please contact the staff at your local Resident's office or

The Incentives Office
Mineral Development and Rehabilitation Branch
Ministry of Northern Development and Mines
5th Floor, 933 Ramsey Lake Road,
Sudbury, Ontario
P3E 6B5

Telephone (705) 670-5824
1-800-265-0834
Fax (705) 670-5803

le 24 février 1993

PROGRAMME D'AIDE AUX PROSPECTEURS DE L'ONTARIO 1993-1994

CIRCULAIRE D'INFORMATION 93-1

On a préparé pour l'année 1993-1994 une brochure qui contient des renseignements sur le PAPO, ses règlements afférents et le formulaire de demande. Elle sera envoyée aux personnes ayant déjà fait demande auprès du PAPO ainsi qu'a celles dont le nom figure sur la liste d'envoi du Bureau des subventions d'encouragement. Ces brochures seront également disponibles aux bureaux régionaux du Ministère.

Le programme de cette année sera en vigueur officiellement à partir du **1er avril 1993.** Les demandes reçues avant cette date seront considérées. Toutes celles reçues après cette date seront considérées seulement s'il reste des fonds.

Les demandes étant très nombreuses, il importe de remplir **au complet le formulaire de demande ainsi que le plan proposé.** Sinon, la demande risque d'être rejetée. On vous encourage à lire la brochure attentivement avant de remplir le formulaire.

Puisqu'il est arrivé plusieurs accidents mortels l'année dernière, nous incluons du matériel sur la sécurité. (La version française est disponible au Bureau des subventions d'encouragement.)

Pour de plus amples renseignements sur le PAPO, communiquez avec le personnel du bureau local du géologue résident ou de la géologue résidente, ou encore :

Le Bureau de subventions d'encouragement
Direction de l'exploitation des minéraux et de la réhabilitation
Ministère du Développement du Nord et des Mines
933, chemin du lac Ramsey, 5e étage
Sudbury (Ontario)
P3E 6B5

Téléphone (705) 670-5824
1-800-265-0834
Télécopieur (705) 670-5803

Ontario

Ministry of Northern Development and Mines

Ministère du Développement du Nord et des Mines

Mineral Development Section
933 Ramsey Lake Rd., 5th Floor
Sudbury, Ontario
P3E 6B5

Tel. 1-800-265-0834
(705) 670-5824
Fax (705) 670-5803

May 13, 1993

HAROLD J. TRACANELLI
582 VERMILLION LK RD., BOX 167
CHELMSFORD, ONTARIO
POM 1L0

Dear Mr. TRACANELLI:

Re: OPAP File Number OP93-146

I am pleased to inform you that your application for financial assistance under the Ontario Prospectors Assistance Program (OPAP) has been reviewed and approved in the amount of $10,000.

Please quote the above file number in any future correspondence with the Incentives Office.

A cheque for one half of this amount, $5,000, in accordance with the regulations, will be forwarded to you directly. The balance of your OPAP grant will follow when your final submission form and supporting documentation have been submitted to the ministry and approved.

Please find enclosed one copy of the following documentation:

- Certificate of Initial Grant Approval
- Ontario Prospectors Assistance Program 1993, Information Circular 93-2, "Guidelines for the Preparation of the Summary Technical Report and Additional Reporting Requirements for Prospecting, Stripping and Trenching".
- Ontario Prospectors Assistance Program 1993, Information Circular 93-3, "Guidelines for the Reporting of Financial Expenditures."

PLEASE BE ADVISED THAT THE EVALUATIÓN OF THE FINAL SUBMISSION FORM AND SUPPORTING DOCUMENTATION WILL BE BASED ON THE DOCUMENTATION SUBMITTED BY THE DEADLINE OF JANUARY 31, 1993. Supporting documentation submitted after this date may not be considered. Thus, applicants must file a complete submission by that date to avoid any cut-backs in their final grant amounts. Failure to submit the required documentation by the deadline would require the reimbursement of the full amount of the initial grant payment.

This past year, the majority of OPAP recipients submitted their final submissions in January, thus causing a large backlog and delays in final grant payments. To avoid the reoccurrence of this problem, applicants are strongly encouraged to forward their completed final submissions immediately upon completion of their projects.

Please note that according to the Regulations, if exploration work on a designated project is discontinued before the project is completed, you must notify this office in writing within thirty days of discontinuing the work. This provision is to allow any unused funds to be passed on to applicants who were initially unable to receive a grant as a result of the program's budget being fully allocated. Failure to notify this office would make you ineligible to apply for further incentives for a period of three years from the expiry of the designation of the project.

Also, please note that the reporting requirements for OPAP and assessment work may differ for some exploration activities. Therefore, reports submitted to OPAP may not be accepted for assessment credits and vice versa. Please ensure that reports submitted for OPAP meet OPAP requirements. Please forward Report of Work Forms directly to the appropriate Mining Recording Office. Geotechnical reports must still be forwarded to the Mining Lands Section to ensure timely approval of your assessment work.

If you have any questions about these or other aspects of OPAP, I will be pleased to discuss them with you.

I wish you every success with your project and look forward to reviewing your prospecting report at the conclusion of your field work.

Yours truly,

Edward R. Solonyka
Supervisor
Incentives

Attachments

Ontario

Ministry of Northern Development and Mines

Ministère du Développement du Nord et des Mines

May 15, 1993

ONTARIO PROSPECTORS ASSISTANCE PROGRAM 1993

INFORMATION CIRCULAR 93-3

GUIDELINES FOR THE REPORTING OF FINANCIAL EXPENDITURES

Expenses being claimed for the OPAP project must be detailed on the form in Section III of the OPAP Final Submission Form. These expenses are then summarized in Section II of the form.

Please note that the cost of supplies or services provided by a company in which the applicant holds an interest, rental costs of equipment owned by the applicant, staking and land maintenance costs and expenses for non-consumable items are **NOT** eligible.

Examples of non-consumable items are given below:

- Camping equipment: tents, stoves, cots, mattresses, lanterns, etc.
- Prospecting equipment: packsacks, compasses, hand lenses, etc.
- Clothing: boots, jackets, pants, shirts, rain gear, etc.
- Others: chain saws, water pumps and hoses, generators, geophysical equipment, major repairs and parts and insurance, etc.

Ontario

Ministry of Northern Development and Mines

Ministère du Développement du Nord et des Mines

May 15, 1993

ONTARIO PROSPECTORS ASSISTANCE PROGRAM 1993

INFORMATION CIRCULAR 93-2

GUIDELINES FOR THE PREPARATION OF THE SUMMARY TECHNICAL REPORT AND ADDITIONAL REPORTING REQUIREMENTS FOR PROSPECTING, STRIPPING AND TRENCHING

Although the OPAP Regulations, included in the OPAP booklet, state the reporting requirements for the program, a **SUMMARY TECHNICAL REPORT** is also required for each OPAP project.

In the preparation of the reports, information must be provided under the headings outlined in the attached guidelines.

In addition to the SUMMARY TECHNICAL REPORT, further information is required for the reporting of prospecting, stripping and trenching results.

The applicant must identify, in detail, the location of the area that the prospecting, sampling, stripping and trenching has taken place, both in the daily log and on sketches. A description of the samples and their assay results must also be included. Examples are attached.

The quality and content of the overall submission including the report and accompanying maps will be used to judge your performance as an OPAP recipient. This performance will be taken into consideration when reviewing any future OPAP applicants.

FINAL SUBMISSION - SUMMARY TECHNICAL REPORT GUIDELINES

DATE:

NAME:

LIST OF INDIVIDUALS WHO APPLIED FOR ASSISTANCE FOR THIS PROJECT:

LOCATION AND ACCESS: Mining Division, Township or Area name, with a claim location map and prospecting traverse map.

CHANGES TO PROPOSED PROJECT: if any

GEOLOGY: Similar to the information given in the proposal, but is based on the applicants' field work.

WORK DONE: State work that was accomplished during the designated period, how, and why.
e.g. Line cutting - miles/km <u>and</u> what survey(s) were run on the grid
- Geological Surveys - scale of mapping, sampling locations
- Geophysical Surveys - type, miles/km
- Geochemical Surveys - type, no. of samples
- Drilling - type, footage
- Stripping/trenching - method
- Other - type, explanation, description

Maps for each survey should be submitted, showing sample sites (location, width and grade), grids, drill hole locations, trenches etc. Also state if the proposed work was completed or not.

RESULTS AND RECOMMENDATIONS: Any significant results from assays, (include assay/certificate of analysis) new showings, anomalies, etc. State if there were any claims staked during the designated period, or if an option agreement will result from the work completed. State if more work is necessary or not, recommend follow up work based on the work completed in this project.

DAILY LOG: There is a page allocated on the application for this purpose. If more space is required, feel free to attach a separate sheet.

DETAILED LIST OF EXPENDITURES: There is a page allocated for this purpose on the final submission form, additional sheets may be used if necessary.

NOTE: Total expenditures for the project should be submitted in case some of the subitted expenses are ineligible and have to be deducted.

Prospecting Daily Log

Project Area	Date	Work Performed
	July 3	Prospected along north claim line of claim no. 1078892 (3 samples taken)
	July 4	Prospected along east claim line of claim no. 1078892 (1 sample taken)
	July 4	Prospected along EW line across centre of claim no. 1078892 (2 samples taken)

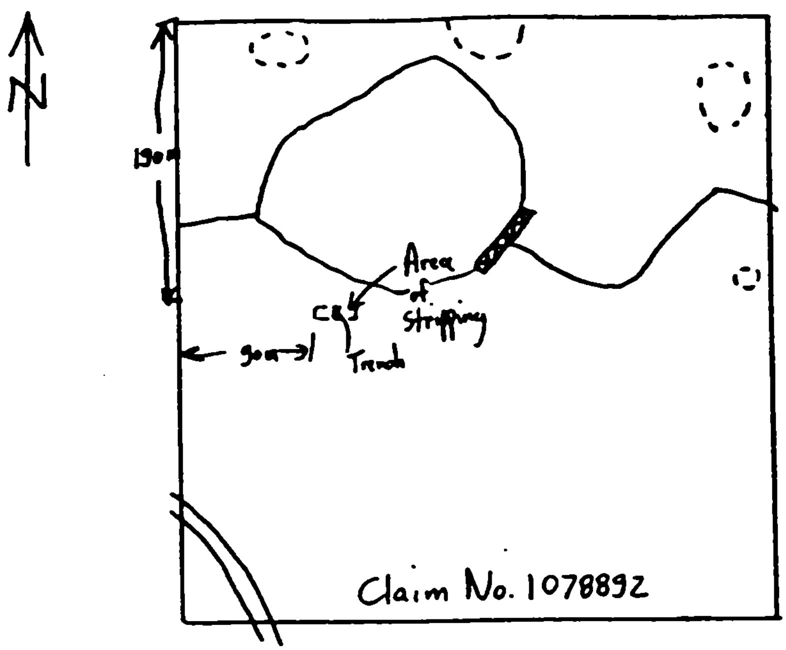
Location of Prospecting

- area outlined on previously submitted claim map
- detailed sketch attached

Description of Samples

Sample No.	Type of Sample	Rock Type	Mineralization	Assay Results (certificates attached)
1	Grab	Altered Basalt	Minor sulphides	50 ppm Au
2	Grab	Altered Basalt	Minor sulphides	75 ppm Au
3	Grab	Altered Basalt	Minor sulphides	80 ppm Au
4	Grab	Sheared Basalt	Minor sulphides	150 ppm Au
5	Grab	Highly sheared Basalt	Minor sulphides	590 ppm Au
6	Grab	Highly sheared and altered Basalt	Minor sulphides	.1 oz/ton Au

Location of Stripping and Trenching



Scale 1:5000

Ontario

Office of the Minister

Ministry of Northern Development and Mines

159 Cedar Street
7th Floor
Sudbury, Ontario
P3E 6A5

Bureau du Ministre

Ministère du Développement du Nord et des Mines

159, rue Cedar
7e étage
Sudbury (Ontario)
P3E 6A5

June 11, 1993

HAROLD J. TRACANELLI
582 VERMILLION LK RD., BOX 167
CHELMSFORD, ONTARIO
POM 1L0

Dear Mr. TRACANELLI:

Re: OPAP File Number OP93-146

I would like to congratulate you on your successful application under the Ontario Prospectors Assistance Program (OPAP). Once again this year, there has been a very strong demand for the program. A strong and active prospecting industry is vital to the future of mining in Ontario and, as such, I wish you much success with your project.

As this ministry is very interested in the Ontario Prospectors Assistance Program and the results it generates, we would be interested in hearing any suggestions you may have on how to improve it. Please forward any comments you may have directly to Dr. Dick Cowan or Mr. Ed Solonyka, Ministry of Northern Development and Mines, Mineral Development Section, 5th Floor, Willet Green Miller Centre, 933 Ramsey Lake Road, Sudbury, Ontario P3E 6B5.

Once again, good luck with your project.

Sincerely,

Shelley Martel
Minister

Ontario

Ministry of
Northern Development
and Mines

Ministère du
Développement du Nord
et des Mines

The Ontario
Prospectors Assistance
Program

Programme d'aide
aux prospecteurs
de l'Ontario

Certificate of Initial Grant Approval

Certificat d'allocation d'une subvention initiale

Grant No./Subvention No.
OPG93-060
OPAP Registration No./ No. d'enregistrement au PAPO
OP93-146

Applicant - Name/Nom du demandeur

HAROLD J. TRACANELLI

Street Name and Number/Adresse (rue et numéro)

582 VERMILLION LK RD., BOX 167

City, Town, Village/Localité	Province	Postal Code/Code postal
CHELMSFORD	ONTARIO	P0M 1L0

Period of designation is from / L'agrément porte sur la période du

Year année	Month mois	Day jour		Year année	Month mois	Day jour
93	04	01	to au	94	01	31

Total proposed eligible exploration expenses to be incurred in Ontario that have been approved

$ 10,000

Montant total des dépenses d'exploration admissibles projetées (devant être effectuées en Ontario) approuvées par le présent certificat

This is to certify that an initial grant of 50% based on the above proposed eligible expenses is payable to the Applicant and that this payment of

$ 5,000

Le présent certificat atteste qu'une subvention égale à 50% du montant des dépenses admissible projetées (indiqué ci-dessus) est payable au demandeur, et que le paiement de la somme de

is hereby approved.

est approuvé.

Manager, Mineral Development Section/Chef, Section du développement minéralogique

Date: May 13, 1993

Original-Applicant/demandeur

Copy- Financial Services Branch
Copie-Direction des services financiers

Copy- File
Copie-Archives

0023 (5/92)

APPENDIX IX

REFERENCES

REFERENCES

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Index to Land Disposition
Plan (claim map)
G-4086
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Sudbury Mining Division
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Scale 1:20,000

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T-H Option
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September 1989

TRENCHING REPORT

ON

T-H PROPERTY

MONCRIEFF TOWNSHIP

SUDBURY MINING DIVISION

ONTARIO

for

J.G.HUYCKE

(OPAP GRANT NO. OP93-145)

Yves P. Clement

January, 1994

TABLE OF CON

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LIST OF FIGURES

APPENDICES

1. *INTRODUCTION*

The T-H property consists of twenty-two (22) contiguous, unleased, mining claims within Moncrieff Township. The claims are located in the Sudbury Mining Division and cover an area of approximately 345 hectares.

The property is centered at 46 48'N latitude, 81 36'W longitude and is located approximately 70 kilometers northwest of Sudbury, along highway 144 (figure 1). The highway bisects the central portion of the claim block as illustrated in figure 2.

The T-H property is located along the northeastern fringe of the Benny Greenstone Belt, an east-west trending belt of Early Precambrian metavolcanic/metasedimentary rocks. A number of stratabound, base metal deposits occur within the belt. The most important of these is the Geneva Lake Mine which is located southeast of the T-H property in Hess Township. This mine produced 4,717,000 kilograms of zinc, 1,632,900 kilograms of lead and $28,416 of silver between 1941 and 1944.

A recent compilation, by the property owners, of the exploration data generated over the years appears to show that the felsic-mafic metavolcanic rock sequence which extends across the northern portion of the T-H property is stratigraphically equivalent to the sequence hosting the Geneva Lake and Stralak base metal deposits. Contained within the T-H property, and along this potential mineral bearing zone, are coincidental magnetic, electromagnetic and induced polarization anomalies with corresponding anomalous soil and lithogeochemical values.

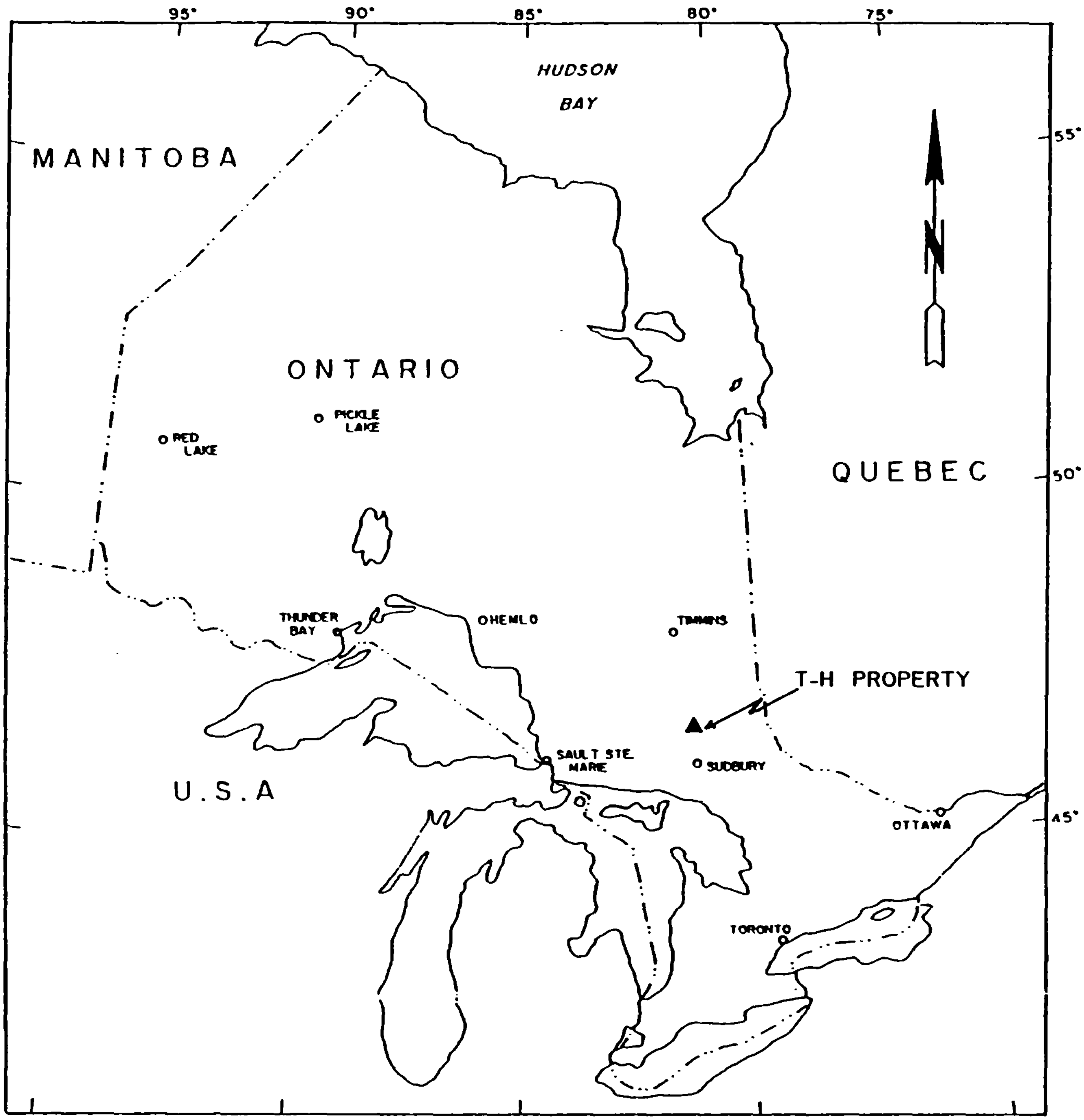


FIGURE I

GENERAL LOCATION MAP

T-H PROPERTY

MONCRIEFF TOWNSHIP

DECEMBER, 1993

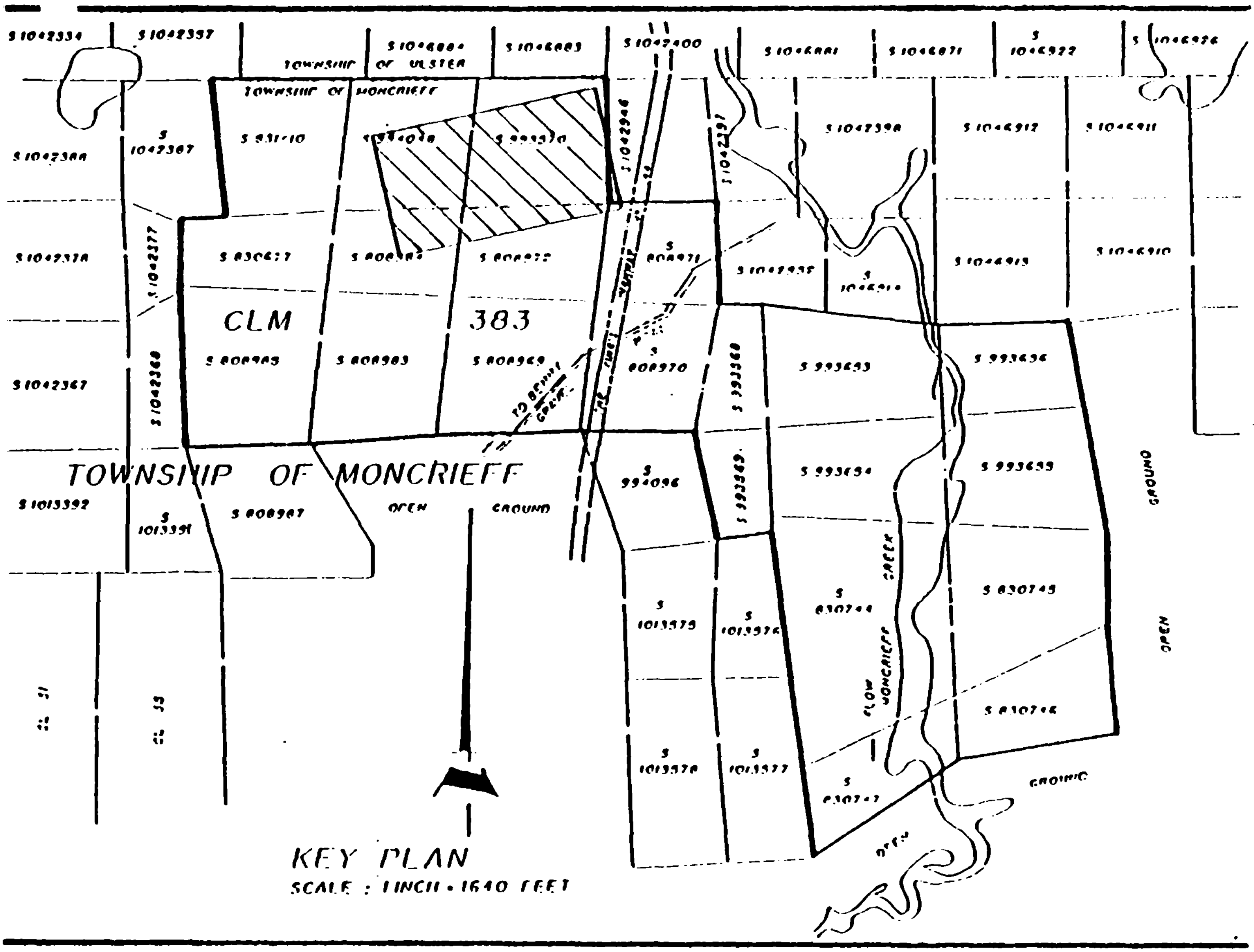


FIGURE 2

CLAIM LOCATION

T-H PROPERTY

MONCRIEFF TWP

(G-4086)

——: T-H PROPERTY BOUNDARY

▨: AREA COVERED BY 1993 TRENCHING

DECEMBER, 1993

During the 1993 field season a programme of trench mapping and lithogeochemical sampling was conducted along this favourable horizon. The objective of the trenching programme was two fold. In addition to directly evaluating the exposed subcrop, trenching data was used to strategically position a diamond drill hole along the zone. The drilling programme was undertaken by the property co-owner, Harold Tracanelli (OP93-146), during September, 1993. Trenching and diamond drilling were possible through the assistance provided by the Ontario Prospectors Assistance Program (OPAP). Results of the trenching programme form the basis for this report.

2. ***PROPERTY DESCRIPTION***

2.1 Claim Description:

The T-H property encompasses twenty-two (22) contiguous, unleased, mining claims totalling approximately 345 hectares (table 1). The block is located in the north-central portion of Moncrieff Township within the Sudbury Mining Division (Map # G-4086). The property claims, with the exception of claim no.S-808987, have been surveyed but have not been brought to lease. The claims are held jointly by Mr. Harold Tracanelli of Chelmsford (50%) and Mr. John G. Huycke of Dowling (50%). Physiographic features and infrastructures with respect to the claim block are depicted in figure 2.

TABLE 1:

CLAIM NUMBERS	NUMBER OF CLAIMS
S.808969 - S.808972 (incl)	4
S.808983 - S.808985 (incl)	3
* S.808987	1
S.830744 - S.830747 (incl)	4
S.830677	1
S.831410	1
S.993568 - S.993570 (incl)	3
S.993653 - S.993656 (incl)	4
S.994048	1
Total Claims:	22

* - not surveyed

2.2 Location and Access:

The T-H property is centered at 46 48'N latitude, 81 31'W longitude, approximately 70 kilometers northwest of Sudbury, Ontario (figure 1).

The property is readily accessible via paved Highway 144 which passes through the central portion of the claim group. The Benny road, an all season gravel road, provides access to the property's southwestern extremity while the eastern portion is accessed via Bannerman Creek.

2.3 Topography and Vegetation:

Property topography is characterized by hilly terrain with a maximum relief of approximately 45 meters. For the most part fault controlled ravines separate hilly areas. Outcrop exposure varies from <5% to 20% with the remainder of the property being overlain by glacial drift and swamps.

The hills are mantled with thin to moderate thicknesses of boulder till which is in turn covered largely by spruce, poplar and birch. Sandy areas of low relief are characterized by jackpine with spruce, tamarack and alders present along ravine and water course borders.

2.4 Services:

The closest services to the property occur at Cartier which is located 12 kilometers southeast of the property.

A low voltage power line, along Highway 144, extends to within 7 kilometers of the property's south boundary. Bannerman Creek, which disects the property's eastern side, constitutes an adequate water supply for mining operations. Benny, a railway siding along the transcontinental line of Canadian Pacific Railways (CPR), is located 800 meters southwest of the property's southwestern extremity.

3. *PREVIOUS WORK*

Exploration for base metals, gold, silver, iron and uranium has been carried out throughout the property area over the years. Within the Benny Greestone Belt, the bulk of the exploration work has been conducted between Stralak and Geneva Lake. There are a number of stratabound, base metal deposits within the Benny metavolcanic-metasedimentary belt. The most important of these deposits, the Geneva Lake Mine in Hess Township, was discovered by John Collins in 1924 and produced some 4,717,000 kilograms of zinc, 1,632,900 kilograms of lead and $28,416 of silver between 1941 and 1944. The Stralak Deposit was discovered in the mid 1890's and although it is of considerable tonnage and grade has never been brought into production.

On the T-H property, most of the work has been carried out on a pyrite-pyrrhotite bearing horizon that trends across the central portion of the claim block. A drilling programme conducted by

Northcal Oil Ltd. (1959) on this zone yielded relatively poor results.

The potential base metal bearing felsic sequence located within the northern portion of the property has been subjected to very little exploration activity over the years. Work carried out in the northern portion of the property, as part of property-wide programmes, include geological mapping, lithogeochemical sampling, ground geophysics and soil geochemistry. Figure 5 depicts significant findings encountered, within the area of question, by Chevron (1976), Noranda Explorations (1985) and Falconbridge Ltd. (1987-1990).

4 *GEOLOGY*

4.1 Regional Geology:

The property area lies along the southern flank of the Superior Province of the Canadian Shield, a short distance north of the Sudbury Intrusive Complex (figure 3). The geological terrain has been subject to Early, Middle and Late Precambrian depositional, deformational, metamorphic and intrusive events.

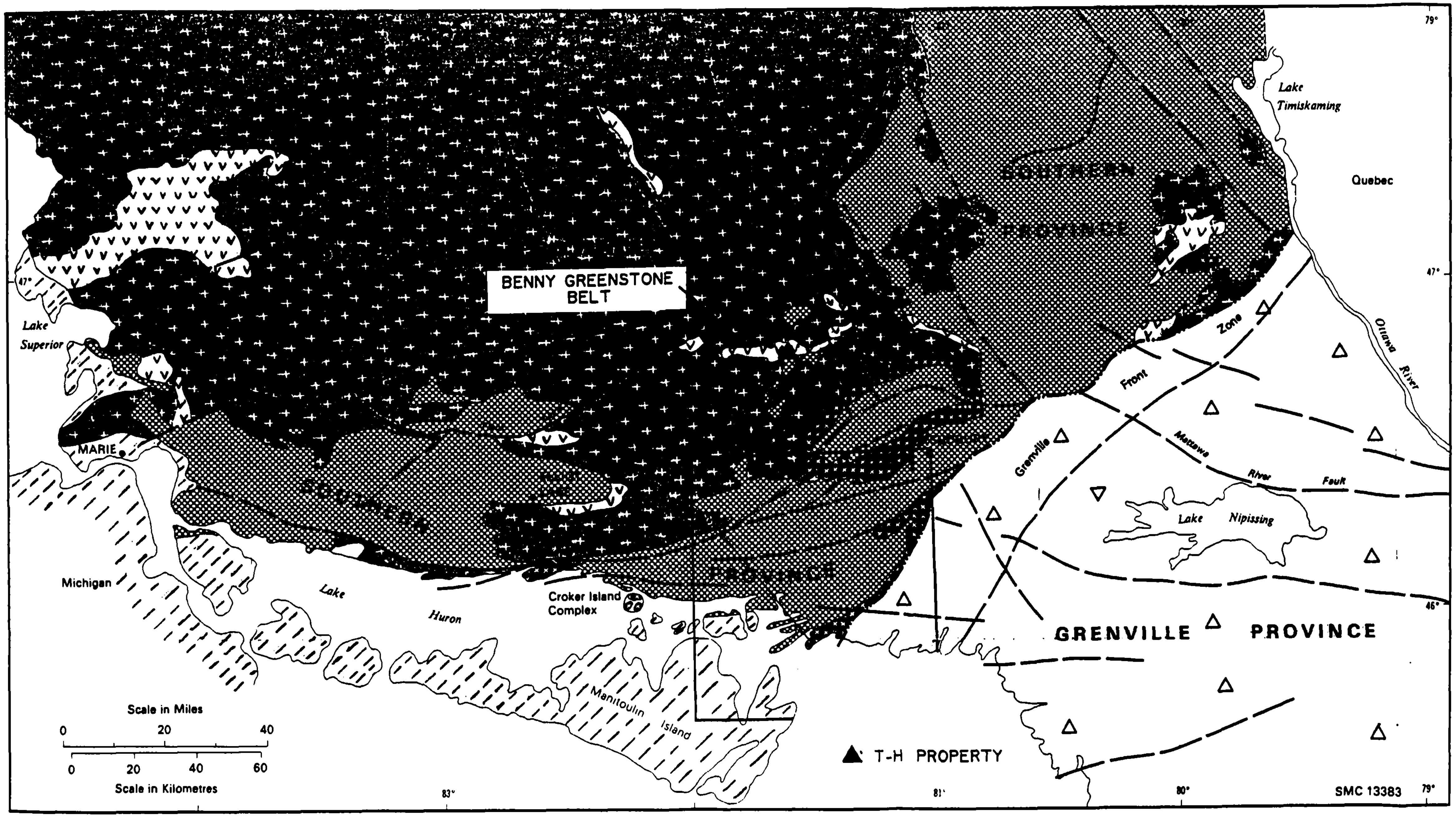
The following lithologies are present within the property area; Early Precambrian metavolcanic and metasedimentary rocks; several ages of Early Precambrian mafic and felsic intrusive rocks; Middle Precambrian metasedimentary rocks of the Huronian Supergroup; Middle Precambrian Nipissing Diabase dykes and sills; lamprophyre and breccia bodies of varying compositions and ages and Late Precambrian olivine diabase dykes.

The Benny Greenstone Belt consists of an east-west trending zone of Early Precambrian metavolcanic and metasedimentary rocks. The belt

FIGURE 3

T-H PROPERTY

REGIONAL GEOLOGY



LEGEND

Late Precambrian and Paleozoic rocks.

GRENVILLE PROVINCE

Middle and Late Precambrian metasediments and felsic plutons.

SOUTHERN PROVINCE

Middle Precambrian intrusions.

Middle Precambrian, Huronian, and Whitewater rocks and Nipissing Diabase intrusions.

SUPERIOR PROVINCE

Early Precambrian felsic plutons and migmatites.

Early Precambrian metavolcanics.

SYMBOLS

Grenville Front Boundary Fault.

Fault.

Approximate northern limit of Middle Precambrian orogenic effects.

Modified Figure 2, Chart C, OGS REPORT No. 166.

DECEMBER, 1993

is approximately 40 kilometers long and averages approximately 2.4 kilometers in width. The belt is enclosed within Early Precambrian granitic and migmatitic rocks which dips steeply southward and may represent the remnant of a previously more extensive supracrustal sequence. A number of cyclic repetitions from mafic to intermediate to felsic are observed in the metavolcanic rock sequence. Major lithologies include mafic flows (basaltic and andesitic), (andesitic-rhyolitic) pyroclastics including tuffs, lapilli tuffs and tuff-breccias and minor felsic flows (rhyolitic and dacitic). Metasedimentary rocks include wackes, siltstones, sandstones, cherts, graphitic and sulphide bearing metasedimentary rocks and oxide facies iron formations. The rocks of the Benny Belt have been subjected to upper greenschist to lower amphibolite facies, regional metamorphism and are generally strongly deformed in character. There are a number of stratabound base metal deposits within the Benny Greenstone Belt.

4.2 Property Geology:

The T-H property lies along the eastern extremity of the Benny Greenstone Belt, an east-west trending belt of Early Precambrian metavolcanic and metasedimentary rocks (figure 4). The Benny Belt is approximately 40 kilometers long and averages approximately 2.4 kilometers in width. Major lithologies include mafic flows (basaltic and andesitic), (andesitic-rhyolitic) pyroclastics including tuffs, lapilli tuffs and tuff-breccias and minor felsic (rhyolitic and dacitic) flows.

The southeastern half of the T-H property is dominated by andesitic tuff-breccia while the northwestern half consists of a

repetative mafic, intermediate and felsic metavolcanic rock sequence. The metavolcanic sequence is east-northeasterly trending and steeply dipping to the south. The prospective felsic-mafic metavolcanic horizon which forms the objective of the 1993 trenching programme lies along the northern margin of this sequence. According to OGS Map No.2435, major lithologies within the metavolcanic rock sequence include intermediate tuffs and tuff-breccias, mafic flows and tuffs of basaltic-andesitic composition and porphyritic felsic rocks of rhyolitic-dacitic composition. Intercalated metasedimentary rocks consisting mainly of tuffaceous wackes and siltstones are also present within the sequence. A thick sequence of pyrite-pyrrhotite-graphite bearing, volcanoclastic, micaceous metasediments extends across the central portion of the northeastern half of the property. This horizon, which host large amounts of iron sulphide but relatively low base metal tenor, has been the object of most exploration programmes on the T-H property over the years.

Middle Precambrian metasedimentary outliers, of the Huronian Supergroup, consisting of Gowganda Formation sandstones, wackes and conglomerates are present along the northern flank of the property. An extensive Nipissing diabase intrusion is present within the northwestern portion of the claim block. Late mafic intrusives (metagabbro dykes) are relatively abundant throughout the property. The Bannerman Creek and Benny Creek faults trend across the southeastern and northwestern portions of the property respectively.

5. *TRENCHING PROGRAMME*

A detailed compilation of past exploration data (geological, geophysical and geochemical) indicates that the felsic-mafic metavolcanic rock sequence that trends through the northern portion of the T-H property is stratagraphically equivalent to the sequence hosting the Geneva Lake and Stralak base metal deposits. The horizon is further enhanced on the T-H property by coincident geophysical anomalies (magnetic, electromagnetic and induced polarization) with geochemical anomalies from soils and lithogeochemical sampling. Past geological mapping and lithogeochemical sampling programmes have been restricted due to extensive glacial drift cover in the perspective area. The implementation of a trenching programme was deem to be the most cost effective way to further evaluate this potential base metal bearing horizon.

During the 1993 field season a programme of mechanical trenching, trench preparation (subcrop washing), geological mapping and lithogeochemical sampling was conducted along this horizon within the northern portion of the T-H property (claims S.993570,S.994048). The work was conducted under supervision of Yves Clement, a Sudbury-based geological contractor, during June and July, 1993.

The initial phase involved 78 hours of mechanical trenching. The trenching was completed by Mainville Lumber of Chelmsford utilizing a John Deer 440 skidder with a mounted backhoe. A total of approximately 730 linear meters of trenching/stripping was completed along the potential base metal bearing felsic horizon. Five (5) sections (grid lines) spanning over a 600 meter strike length were trenched across the prospective horizon. Sections were positioned to expose lithological contacts, lineaments/structural features and areas encompassing geophysical or geochemical anomalies (figure 5). Due to time and funding constraints, the southeast trench of section 3+00W and line 5+00W trenching remain unwashed and unmapped. The property owners plan to complete the trench mapping during the coming field season.

The exposed subcrops were subjected to power washing in preparation for geological mapping and lithogeochemical sampling. Upon establishment of spray painted base lines the trenches were mapped at a scale of 1:100. Representative lithogeochemical sampling was conducted in combination with the mapping. The results of the mapping/sampling portions of the programme will be discussed in the remainder of this report.

5.2a <u>Trenching Area Geology (Lithologies and Field Relationships):</u>

The area encompassing the trenched sections is dominated lithologically by feldspar phyric felsic (rhyo-dacitic) volcanic rocks. The unit typically consists of light grey to light pinkish-white, buff to light salmon pink weathered, very fine grained felsic material containing trace-3%, locally 5-15%, feldspar crystals and rare-trace, locally 2%, quartz crystals. Feldspar crystals are subhedral-euhedral (+/- equant) and range in size from <0.5 millimeters to 3.0 millimeters. On average the crystals range from 0.75 millimeters to 1.0 millimeters. Quartz crystals exhibit roughly equant outlines and range in size from 0.5 millimeters to 2.0 millimeters in diameter. Aphanitic groundmass appears to consist of a

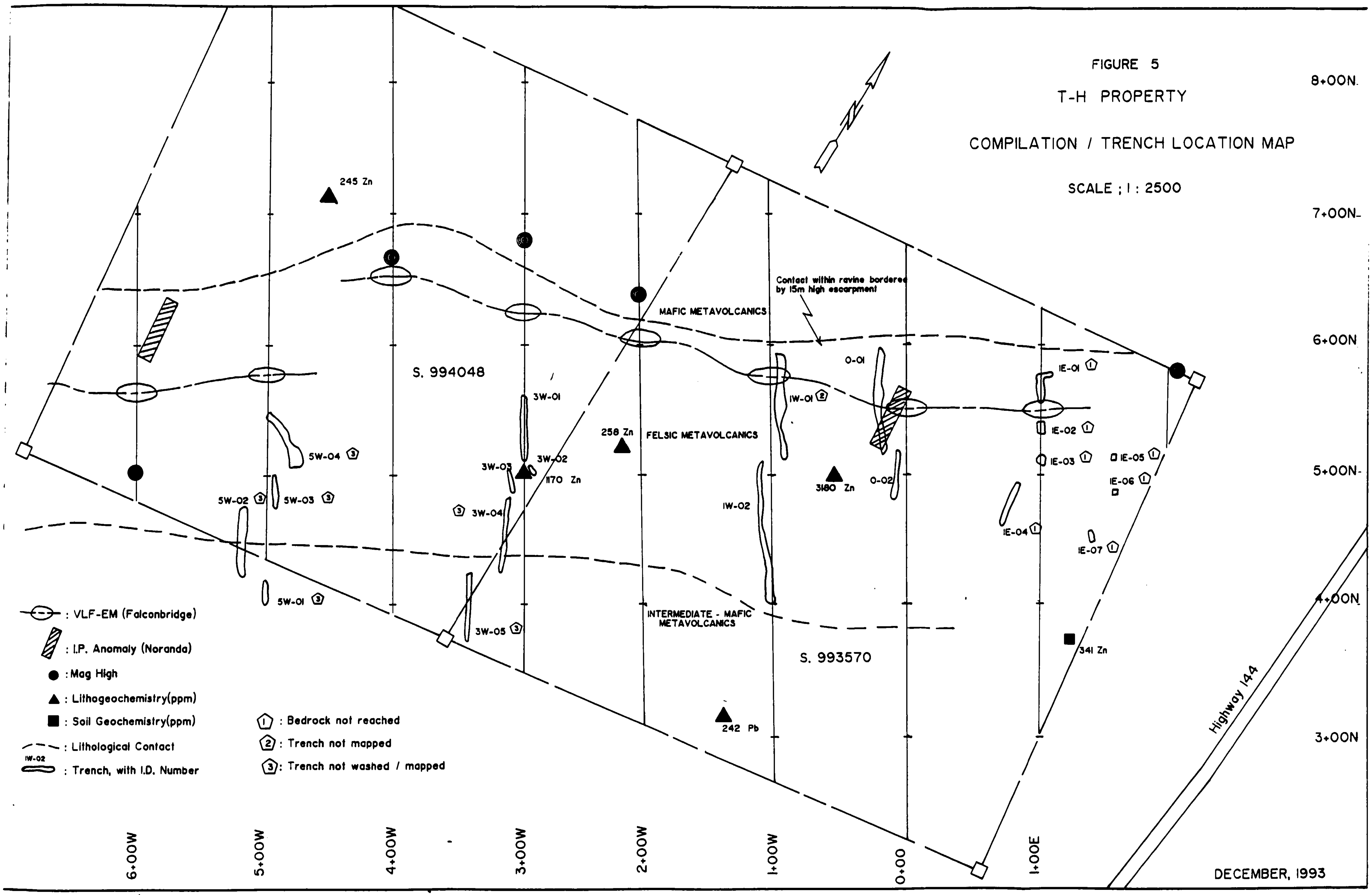


FIGURE 5
T-H PROPERTY
COMPILATION / TRENCH LOCATION MAP
SCALE ; 1 : 2500

DECEMBER, 1993

quartz/feldspar mixture and generally contains a maximum of +/- 5% fine grained mafics (chlorite + biotite). The rock is relatively homogeneous in appearance with local increases and decreases in feldspar crystal percentage being the only differentiating characteristic. The unit is massive in character with no apparent signs of stratification being observed during the mapping programme. Flattened, rounded to subangular, breccia-size (5-20 centimeters), monolithic felsic fragments comprise 1-5%, locally to 15%, of the rock mass. Fragments are strongly vesiculated/pumiceous in texture and unsorted in character. Rare, lensoid shaped, quartz amygdules up to 3.0 millimetes in length were observed in a few localities.

Due to the following criterias the felsic rocks dominating the trenching area are tentatively interpreted to constitute a pyroclastic flow(s): minimal internal stratification; presence of relatively rounded, strongly vesiculated/pumiceous fragments and the unsorted nature of these fragments. This interpretation is tentative however and based on limited lateral exposure provide by relatively narrow, 1-3 meter wide, trenches.

The area in question is characterized by a moderate-strong, northeasterly striking (050-070 degree), moderately steeply (60-80 degree) southeasterly dipping, penetrative foliation. The foliation is defined by parallel orientation of chlorite, biotite and sericite along foliation planes as well as the flattened nature of fragments. Relatively extensive expanses of the trenched sections exhibit moderate-strong deformation (shearing). Sheared feldspar phyric felsic material typically exhibits weak-moderate, locally strong, foliation controlled silica, sericite, chlorite +/- biotite. The felsic horizon is sulphide poor with sulphide mineralization typically consisting of nil-rare, locally trace, finely disseminated and foliation controlled pyrite.

Mafic intrusive (gabbroic) bodies are prevalent within the trenched area. These rocks fall within two(2) main categories: Early (pre-tectonic) Mafic Intrusive rocks and Late (post-tectonic) Mafic Intrusive rocks. Early mafic (metagabbro) sills/dykes are by far the most common of the two intrusive types. The metagabbro bodies are characterized by moderate-strong deformation and metamorphism, indicative of their pre-tectonic nature in respect to Early Precambrian deformation activities. The early metagabbros are fine-medium grained, subequigranular to locally feldspar subporphyritic, moderately to strongly foliated rocks which are a relatively homogenous mixture of amphibole (uralite?) and plagioclase? feldspar. These metagabbros are typically moderately chloritized and exhibit weak-strong fracture controlled quartz and epidote which occur as fine fracture fills and pods. The unit also shows a very deep weathering. The early metagabbros occur in northeasterly trending, steep southeasterly dipping sills with their orientation being conformable with the northeasterly trend of the metavolcanic rock sequence. The sills range in width from 1.0 centimeter to 5.0 meters but average 10-30 centimeters in width.

Late (post-tectonic) mafic, metagabbro bodies are essentially undeformed and transect earlier formed tectonic features exhibited in older lithologies. Late metagabbros tend to occur as erratically oriented dykes ranging in width from 10.0 centimeters to 15.0 meters. These dykes average between 30 centimeters and 2.0 meters in width. A fine grained, Nipissing Diabase dyke, in excess of 30 meters in width, occurs at the southern extremity of the L1+00W trench section. Rare-trace, locally 2%, pyrite is present within, along and/or proximate to all mafic intrusive bodies.

The felsic-mafic metavolcanic rock contact, located along the northern flank of the trenched area, was not trenched during the 1993 programme due to it's location along a steep sided/swampy ravine (fault?). Similarly, the southern felsic-mafic contact was not exposed due to heavy glacial drift cover.

5.2b Structure:

The dominant tectonic feature of the trenched area is a moderate to strong penetrative foliation/cleavage. The northeasterly striking (050-060 degree) moderate-steeply dipping (60-80 degrees) foliation is defined by hairline wafers of secondary minerals such as sericite, chlorite and biotite. Although not observed at many localities within the trenches, flattened and parallel breccia size lithic fragments also define the foliation. The foliation appears to be subconcordant to the metavolcanic rock sequence's primary stratification. Extensive zones of stronger deformation/shearing occur within the trenched sections. Shearing in combination with alteration is responsible for the formation of pseudo-fragments within the felsic metavolcanic rocks. These fragments result from the truncation of the rock by intersecting cleavage planes, thus forming lenses of isolated material. Foliation controlled quartz, sericite, chlorite bands and stringer accentuate the process by further isolating the truncated fragments from the main rock mass.

Minor faults and joints are numerous throughout the area. Most faults and joints have steep to vertical dips and relatively erratic orientations, although the principal directions are north-east and north north-westerly. Minor dextral and sinistral displacements of 2-20 centimeters were observed along quartz stringers and narrow mafic sills/ dykes. A strong east north-easterly (070 degrees) trending, topographic lineament interpreted as a fault/shear occurs along the northern flank of the trenched area. A narrow breccia zone was observed along the edge of the ravine at the northern extremity of trench #0-01.

5.2c <u>Alteration:</u>

The type and degree of alteration within the trenched area appears to be dependant on lithology, structural features and proximity to intrusive bodies. Typically the felsic volcanic rocks exhibit very weak to weak foliation and fracture controlled sericite and chlorite. Weak-moderate, locally strong, foliation controlled sericite and chlorite characterize zones of deformation and shearing. In addition to sericite and chlorite, sheared felsic rocks commonly exhibit weak, locally moderate foliation controlled silica and very weak to weak biotite enrichment. Silicification generally consists of very thin (<0.5-2.0 millimeter) foliation concordant bands and lenses. Weak-moderate patchy, light pink to cream bleaching occurs locally within the felsic volcanic rocks. This bleaching may be indicative of feldspathization.

The early mafic intrusives typically exhibit moderate, pervasive chloritization of mafic minerals and weak to moderate saussuritization of the feldspars. Weak, locally moderate-strong, fine fracture controlled quartz, epidote and chlorite commonly occur within, along and/or proximate to mafic intrusive bodies. Early mafic intrusives also exhibit moderately to strongly developed alteration ribbing. This feature is the result of differential weathering of quartz-epidote-chlorite fracture fillings.

5.2d <u>Mineralization and Lithogeochemistry:</u>

Sulphide mineralization is relatively restricted in terms of occurrence and abundance within the trenched area. Sulphide mineralization consists, for the most part, of rare-trace, locally 2%, finely disseminated and fracture controlled pyrite. These sulphides occur within and/or proximate to mafic intrusive bodies. Felsic metavolcanic rocks are essentially sulphide barren with only rare, finely, disseminated pyrite observed in a few localities.

A total of 22 lithogeochemical samples were collected during the 1993 trenching programme. Samples were collected in the field on basis of sulphide mineralization, veining, shearing and/or alteration. Representative composite chip samples were collected wherever possible. Of the 22 rock samples, 17 consisted of felsic metavolcanic rock, four (4) of mafic intrusive rock and one (1) of quartz veining. Samples were analyzed by XRAY Laboratories Limited of Don Mills, Ontario. Analytical procedure utilized a multi-acid digestion followed by a 32 element induced current plasma (ICP) analysis. Gold analyses were obtained using conventional fire assay with an atomic absorption (A.A.) finish. Sample descriptions are provided in Appendix 1 and analytical result are presented in Appendix 2.

Reflecting the sulphide poor nature of the felsic rocks within the trenched area, the feldspar phyric felsic volcanic samples failed to return any anomalous base metal values. Mafic intrusive samples yielded a few weakly anomalous (80-220 ppm) base metal values for zinc, copper and nickel. Kard (1981) obtained similar base metal values from the Benny Area mafic intrusives. As anticipated all samples returned gold values below the detection limit of 1 ppb.

5.3 <u>Section 1+00E Trenching:</u>

Trenching on section (line) 1+00E targeted the mafic-felsic rock contact, a VLF-EM conductor and an anomalous soil geochemistry value of 341 ppm zinc. Unfortunately the contact lies within an alder swamp while the area over the geophysical and geochemical anomalies coincides with a plain of extensive glacial drift (sand). A total of seven(7) test trenches/pits were excavated along the section but all trenches failed to reach bedrock (figure 6).

5.4 <u>Section 0+00 Trenching:</u>

Section 0+00 targeted coincidental VLF-EM and induced polarization anomalies lying along the northern fringe of the prospective felsic metavolcanic horizon. The area also yielded an anomalous lithogeochemical zinc value of 3180 ppm during a previous programme. Section 0+00 consists of two(2) trenches spanning approximately 175 meters, from 4+80N to 5+95N.

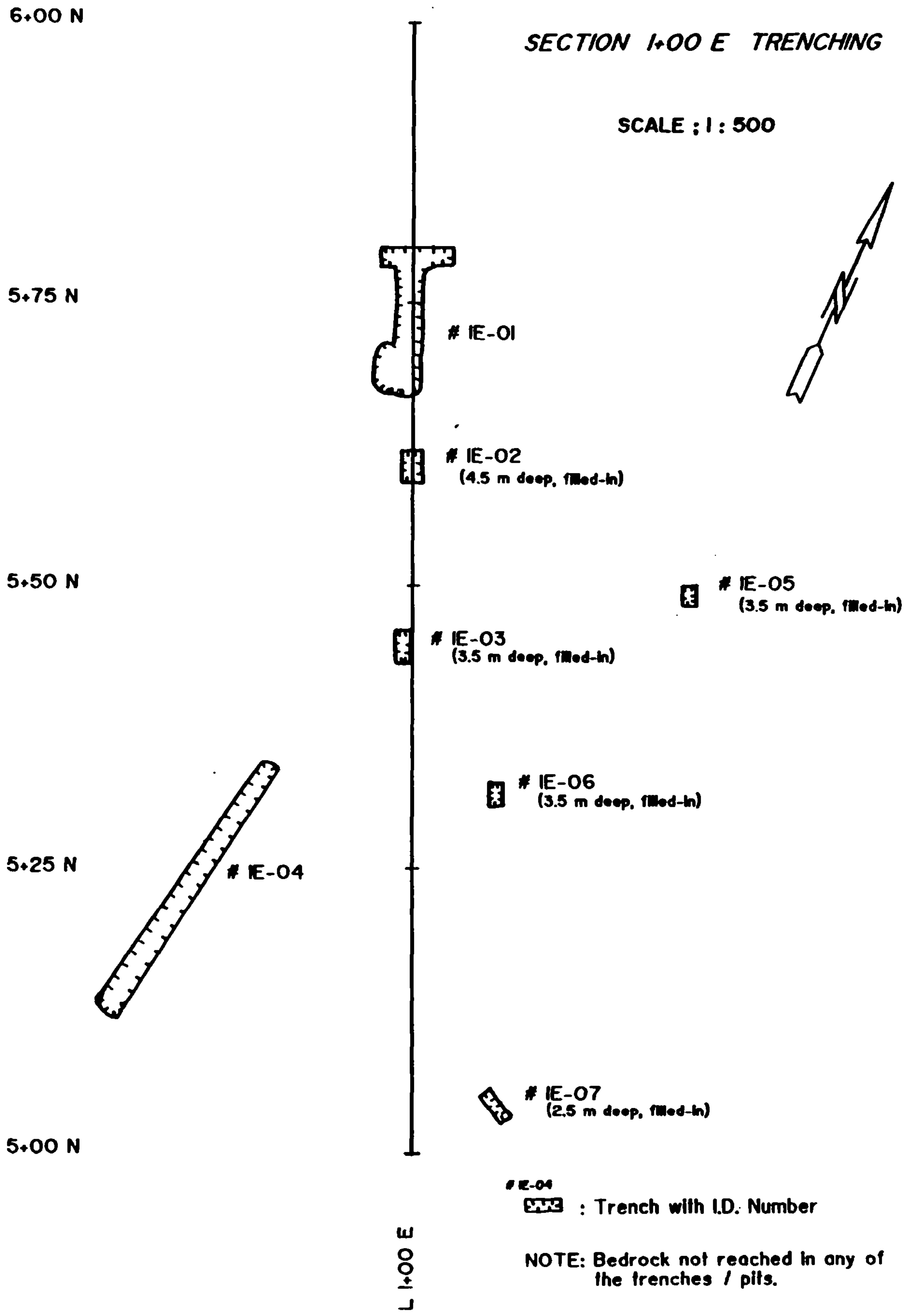
Trenched section 0+00 is dominated lithologically by feldspar phyric felsic volcanic rocks. The unit typically consists of an aphanitic, felsic groundmass with trace-3%, locally 15%, relatively

FIGURE 6

T-H PROPERTY

SECTION 1+00 E TRENCHING

SCALE ; 1 : 500



NOTE: Bedrock not reached in any of the trenches / pits.

DECEMBER, 1993

equant, greyish-white feldspar grains/crystals. Rare to locally 1% equant quartz grains are also present. The felsic horizon is characterized by a moderate-strong, northeasterly striking, southeasterly dipping, penetrative foliation. The southern third of trench #0-01 exhibits a moderate-strongly developed shearing. Local horizons contain rare-10%, flattened, breccia sized (5-15 centimeter), vesiculated/pumaceous fragments. The fragments tend to be monolithic and felsic in character and occur in otherwise homogenous, feldspar phyric material. Early (pre-tectonic) mafic intrusives, containing moderately -strongly deformed and altered metagabbros are prevalent within the trenched section. Metagabbros tend to occur as narrow sills ranging in width from <1.0 centimeters to 1.0 meters with average widths of between 20-30 centimeters. Moderately to strongly foliated, biotite phenocryst bearing, lamprophyre dykes also occur within the section.

Alteration within the feldspar phyric felsic volcanic rock consists, for the most part, of weak foliation controlled sericite, chlorite and silica. Zones of stronger deformation, specifically along the southern third of trench #0-01, typically exhibits weak-moderate, locally strong, shear controlled sericite, silica and chlorite. Local zones of weak-moderate, semi-pervasive, bleaching (silicification?) are also characteristic of areas with stronger deformation. The northern extremity (10 meters) of trench #0-02 exhibits weak-moderate, locally strong, semi-pervasive silicification with the primary feldspar phyric texture being obliterated.

The feldspar phyric felsic unit is relatively sulphide barren with rare, locally trace, finely disseminated pyrite encountered.

Rare-trace, locally 2%, finely disseminated pyrite is typically present within, along and/or proximate to mafic intrusive bodies. The induced polarization anomaly, lying within the southern portion of trench #0-01, appears to reflect such metagabbro related mineralization. Trace to 1% pyrite bearing metagabbro sills and to a lesser degree lamprophyre dykes comprise approximately 20% of this moderately-strongly sheared zone. The VLF-EM anomaly lying approximately at 5+50N appears to reflect the moderately sheared, fractured and blocky nature of the rocks.

5.5 Section 1+00W Trenching:

Section 1+00W, approximately 175 meters in length, exposed practically the entire width of the prospective felsic horizon. As in the case of section 0+00, the northern felsic-mafic metavolcanic rock contact lies within a steep sided, swampy ravine (fault?) while the southern contact falls within an alder swamp. Unfortunately, due to time/funding constraints the northern half of section 1+00W (trench #1W-01) was not mapped.

The southern half of section 1+00W (trench #1W-02), like the entire trench area is dominated lithologically by feldspar phyric felsic volcanic rocks. The trench is characterized by moderate-strong deformation (shearing) along more or less it's entire 115 meter length. Deformation consists of a strong, northeasterly striking (050-060 degree), southeasterly dipping (70-75 degree), penetrative fabric (shearing/cleavage). Shearing commonly results in the formation of pseudo-fragments within the feldspar phyric felsic rocks. Deformation zones typically exhibit weak-moderate, locally strong, foliation controlled silica and sericite with weak, locally moderate, chlorite and biotite. Weak-moderate, semi-pervasive silicification is locally present within the trench. Patchy, pinkish to cream, bleaching (feldspathization?) is commonly associated, at least spatially, with zones of silicification. Trace orangy-brown garnets were locally observed within sheared felsic rocks. The feldspar phyric felsic volcanic rocks are relatively sulphide barren, with nil-rare, locally trace, fine foliation controlled pyrite observed during mapping.

Early mafic intrusives consisting of moderately-strongly deformed/ altered metagabbros are prevalent within trench #1W-02. These rocks typically occur as narrow (10 centimeter to 5 meter) wide sills that strike northeasterly and dip steeply to the south. Average sill widths are between 50-100 centimeters. The northeasterly trend of these intrusive bodies is roughly concordant to the general attitude of the metavolcanic rock sequence. Late mafic intrusive dykes are not as common within the trench but tend to be more extensive in nature. A fine grained diabase dyke, in excess of 30 meters in width, dominates the southern extremity of trench #1W-02. Rare-trace, locally to 2%, pyrite is found in association to these mafic intrusive bodies. Sample # **2803**, collected from a strongly foliated to schistose, early metagabbro unit returned very weakly elevated values of 72 ppm zinc and 132 ppm copper.

5.6 <u>Section 3+00W Trenching:</u>

Section 3+00W trenching was positioned to investigate an anomalous value of 1170 ppm zinc from a lithogeochemical sample obtained by Noranda in 1985. The trench was also utilized to expose the southern portion of the felsic-mafic metavolcanic contact. Approximately 180 linear meters of trenching was conducted along section 3+00W. Unfortunately, due to time and funding constraints the southern trenches (#3W-04 and #3W-05) were not washed and mapped.

The northern portion of the 3+00W trenched section consisting of trenches #3W-01, #3W-02 and #3W-03 is dominated lithologically by feldspar phyric felsic volcanic rocks. Rare to locally 10%, flattened, breccia-size (5-15 centimeters), vesiculated/pumiceous, monolithic felsic fragments occur within the southern portion of trench #3W-01. Fragments appear unsorted in character and do not appear to form a distinct horizon. Felsic volcanic rocks are characterized by a moderate-strong, northeasterly trending (055-065 degrees), southerly dipping (60-75 degrees), penetrative foliation with weak, locally moderate, foliation controlled sericite and chlorite. Narrow zones of stronger deformation (shearing) with associated weak-moderate, locally strong, silica, sericite and chlorite alteration are common within the trench. Trace-2%, locally to 10%, reddish-brown, equantly shaped, garnets occur in a variety of locations within trench #3W-01. Garnets average 0.5-4 millimeters in diamter.

Sampling of the feldspar phyric felsic volcanic unit failed to return any anomalous base metal values, thus reflecting the relatively sulphide barren nature of the felsic unit within the northern portion of section 3+00W. As is the case throughout the trenched area, early northeasterly striking metagabbro sills are prevalent within the trenches along this line.

6. ***CONCLUSIONS AND RECOMMENDATIONS***

In summary a recent compilation of exploration work conducted over the years appears to indicate that the felsic-mafic metavolcanic rock sequence trending across the northern portion of the T-H property is stratigraphically equivalent to a similar sequence that hosts the Geneva Lake and Stralak base metal deposits. Coincidental magnetic, electromagnetic and induced polarization anomalies with corresponding soil and lithogeochemical values are present along this potential mineral bearing horizon within the northern portion of the property.

Sampling of the prospective horizon during the 1993 trenching programme failed to reproduce anomalous base metal values (250-3180ppm) zinc obtained along the horizon during previous exploration ventures. However only 22 samples were collected along approximately 475 meters of mapped trenches which is by no means exhaustive for a lithogeochemical programme. In addition, the trenched sections provided good vertical representation but poor lateral exposure of the horizon with trench widths of 1-3 meters. The 1993 trenching programme did however expose moderate- strong deformation (shearing) with associated silica, sericite, chlorite and biotite alteration along the horizon in question. The trenches also provide geological information which allowed the felsic volcanic rocks to be tentatively interpreted as a pyroclastic flow unit. If this evidence is true then the area would be located in a relatively proximal environment.

Based on the results of work to date and the relatively unexplored nature of the northern portion of the T-H property and of the potential base metal horizon in general, an on going exploration programme is recommended. To continue the evaluation of the T-H property and the area in general the following recommendations should be implemented:

1) As already planned by the property co-owners the remaining L3+00W and 5+00W trenches should be washed and subjected to detailed mapping.

2) Further detailed mapping to enhance and clarify the geological environment established so far.

3) The implementation of a detailed lithogeochemistry programme utilizing classical whole rock analyses. A study of the major oxides and trace elements may establish alteration patterns within the prospective horizon. In addition, a REE (rare earth elements) study should be conducted in order to determine if the felsic volcanic rocks in question correspond to the so called FIII group of felsic volcanic rocks with negative EU anomalies.

4) Conclusive to recommendation #3, the established geochemical alteration signature of the prospective horizon should be compared to alteration signatures associated with the Geneva Lake and Stralak base metal deposits.

CERTIFICATE OF QUALIFICATION

I, Yves Pierre Clement do hereby certify:

1. that I am a geological technologist and reside at #209, 227 Notre Dame Avenue, Sudbury, Ontario, P3C-5K4,

2. that I graduated from Cambrian College in 1986 with a Geological Technologist Diploma,

3. that I have partially fulfilled the requirements (missing one credit) for a Bachelor of Applied Sciences in Geology at Lake Superior State University,

4. that I have practised my profession continuously for the past seven seasons,

5. that my report on the T-H Property, Moncrieff Township, Sudbury Mining Division, Ontario, is based on my personal knowledge of the area, my work on the property and a review of published and unpublished information on the property and surrounding area,

6. that I have no interest, whether direct or indirect , in the T-H Property.

Yves Pierre Clement

Yves P. Clement

Geological Technologist
January, 1994

References

Card, K.D.

1978: Geology of the Sudbury-Manitoulin Area, Districts of Sudbury and Manitoulin; Ontario Geological Survey Report 166, 238p. Accompanied by Map 2360 and 4 charts.

Card, K.D.and Innes, D.G.

1981: Geology of the Benny Area, District of Sudbury; Ontario Geological Survey Report 206, 117p. Accompanied by Maps 2434 and 2435, scales 1:31,680 and 4 charts.

Ontario Geological Survey

1985: Moncrieff Township, District of Sudbury; Ontario Geological Survey, Geological Data Inventory Folio 243, compiled by the staff of the Resident Geologist's Office, Sudbury, 20p. and 2 maps.

APPENDIX 1

SAMPLE DESCRIPTIONS

T-H PROPERTY SAMPLE DESCRIPTIONS

SAMPLE # 2801
TRENCH # 1W-02
NORTHING: 4+55N
EASTING: 1+05W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Sheared feldspar phyric, felsic volcanic rock exhibiting moderate foliation controlled silica and sericite alteration. No visible sulphides but rock contains rare-trace,light brown specks, (sphalerite?).

SAMPLE # 2802
TRENCH # 1W-02
NORTHING: 4+59N
EASTING: 1+05W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Strongly foliated/sheared, felspar phyric felsic volcanic in contact with a narrow metagabbro (EMI) body. Felsic volcanic contains 5% fine, drusy quartz (epidote) fracture fills. Rare, very locally trace, finely disseminated pyrite within felsic material and minor brownish, resinous, staining (sphalerite) along quartz fracture fills.

SAMPLE # 2803
TRENCH # 1W-02
NORTHING: 4+68N
EASTING: 1+03W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Strongly foliated to schistose, moderately chloritic metagabbro (EMI) containing rare-trace, locally 1%, foliation controlled pyrite.

SAMPLE # 2804
TRENCH # 0-02
NORTHING: 4+96N
EASTING: 0+08W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Strongly foliated, moderately chloritic, metagabbro (EMI) containing minor disseminated and foliation controlled pyrite.

SAMPLE # 2805
TRENCH # 0-01
NORTHING: 5+93N
EASTING: 0+21W
SAMPLE TYPE: Grab sample.
DESCRIPTION: Weakly-moderately foliated, feldspar phyric felsic volcanic exhibiting weak foliation controlled chlorite. Nil, locally rare, finely disseminated pyrite present. Rare foliation controlled, brownish, resinous specks (sphalerite?).

SAMPLE # 2806
TRENCH # 0-01
NORTHING: 5+87N
EASTING: 0+21W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Moderately foliated, feldspar subporphyritic metagabbro (EMI) exhibiting moderate fracture controlled epidote, chlorite and calcite. Rare-trace, locally 1-2%, very finely disseminated pyrite present within the metagabbro.

SAMPLE # 2807
TRENCH # 0-01
NORTHING: 5+75N
EASTING: 0+20W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Moderately foliated, feldspar phyric felsic volcanic exhibiting weak foliation controlled chlorite and biotite. Minor fine quartz-epidote fracture fills. Rare, locally trace, finely disseminated pyrite and rare-nil chalcopyrite.

SAMPLE # 2808
TRENCH # 3W-01
NORTHING: 5+15N
EASTING: 2+98W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Feldspar phyric felsic volcanic containing trace-2%, locally 5%, reddish-brown, round (equant) garnets? (Iron stained quartz?).

SAMPLE # 2809
TRENCH # 3W-01
NORTHING: 5+11N
EASTING: 3+01W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Moderately foliated feldspar phyric felsic volcanic exhibiting weak foliation controlled sericite/chlorite. Numerous fine foliation concordant and cross-cutting quartz (iron carbonate?) stringers. Rare, locally trace, fine pyrite within and/or proximate to the stringers.

SAMPLE # 2810
TRENCH # 3W-02
NORTHING: 5+06N
EASTING: 2+94W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Feldspar phyric felsic volcanic exhibiting weak spotty fracture controlled chlorite and hematite. No visible sulphides but rock very weakly rusted on weathered surface. Surface also pitted in character.

SAMPLE # 2811
TRENCH # 0-01
NORTHING: 5+61N
EASTING: 0+25W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Strongly sheared/schistose metagabbro (EMI) containing 10-20% foliation concordant quartz-calcite stringers. No sulphides noted.

SAMPLE # 2812
TRENCH # 0-02
NORTHING: 5+07N
EASTING: 0+02W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Outcrop-large boulder? Chloritic metagabbro with irregular drusy quartz (chlorite/epidote) veining. Trace, locally 2-3%, pyrite within and/or proximate to veining.

SAMPLE # 2813
TRENCH # 0-02
NORTHING: 5+09N
EASTING: 0+05W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Moderate-strong pervasively silicified feldspar phyric felsic volcanic. Rock also exhibits moderate fracture controlled chlorite and calcite. Sample contains rare finely disseminated pyrite.

SAMPLE # 2814
TRENCH # 3W-01
NORTHING: 5+46N
EASTING: 2+99W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Strongly foliated/sheared feldspar phyric felsic volcanic containing 2-3% reddish-brown garnets? Rock contains rare-nil, locally trace, very finely disseminated pyrite.

SAMPLE # 2815
TRENCH # 0-02
NORTHING: 5+02N
EASTING: 0+06W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Weak-moderate semi-pervasively silicified, feldspar phyric felsic volcanic exhibiting moderate patchy pinkish bleaching (feldspathization?). Rock contains very rare, finely disseminated pyrite.

SAMPLE # 2816
TRENCH # 0-01
NORTHING: 5+20N
EASTING: 0+21W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Strongly foliated/sheared feldspar phyric felsic volcanic exhibiting moderate foliation controlled sericite. Unit appears to contain very rare, very fine foliation controlled pyrite.

SAMPLE # 2817
TRENCH # 0-01
NORTHING: 5+20N
EASTING: 0+21W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Strongly foliated/sheared feldspar phyric felsic volcanic exhibiting weak-moderate foliation controlled silica, sericite and chlorite. Few hairline fracture fillings of hematite present. No sulphide mineralization observed but locally very weakly rusted.

SAMPLE # 2818
TRENCH # 0-01
NORTHING: 5+30N
EASTING: 0+20W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Strongly foliated feldspar phyric felsic volcanic exhibiting moderate semi-pervasive bleaching (silica and sericite). Rock contains +/- 2% fine fractures which exhibit orangy-red alteration (feldspathization?). Rare, locally trace, very fine grained pyrite in fracture fills.

SAMPLE # 2819
TRENCH # 0-01
NORTHING: 5+37N
EASTING: 0+22W
SAMPLE TYPE: 30 centimeter chip sample.
DESCRIPTION: Chip sample along contact between feldspar phyric felsic volcanic and dioritic dyke. Sample consists of mostly weakly oxidized (rusty) felsic volcanic proximate to the contact. No visible sulphides.

SAMPLE # 2820
TRENCH # 0-01
NORTHING: 5+39N
EASTING: 0+21W
SAMPLE TYPE: Grab sample.
DESCRIPTION: Sheared feldspar phyric felsic volcanic material which exhibits moderate to strong foliation controlled chlorite and sericite. Rock contains rare-trace, locally trace-1%, finely disseminated pyrite.

SAMPLE # 2821
TRENCH # 0-01
NORTHING: 5+43N
EASTING: 0+23W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Strongly deformed, sheared, feldspar phyric felsic volcanic exhibiting moderate bleaching (silica?-sericite?). Minor iron oxides along foliation planes. No visible sulphides noted.

SAMPLE # 2822
TRENCH # 0-01
NORTHING: 5+70N
EASTING: 0+23W
SAMPLE TYPE: Composite chip sample.
DESCRIPTION: Sheared feldspar phyric felsic volcanic exhibiting weak-moderate foliation controlled silica. Sample contains very rare finely disseminated pyrite.

APPENDIX 2

ANALYTICAL RESULTS

XRAL
A DIVISION OF SGS CANADA INC.
1885 LESLIE STREET • DON MILLS, ONTARIO M3B 3J4 • CANADA
TEL: (416)445-5755 TELEX: 06-986947 FAX: (416)445-4152

CERTIFICATE OF ANALYSIS

REPORT 24198

TO: YVES CLEMENT
227 NOTRE DAME
#209
SUDBURY, ONTARIO
P3C 5K4

CUSTOMER No. 2228

DATE SUBMITTED
30-Aug-93

REF. FILE 15951-A6

Total Pages 4

22 ROCKS Proj. T-H PROPERTY

	METHOD	DETECTION LIMIT		METHOD	DETECTION LIMIT
AU PPB	FADCP	1.	ZN PPM	ICP	.5
BE PPM	ICP	.5	AS PPM	ICP	3.
NA %	ICP	.01	SR PPM	ICP	.5
MG %	ICP	.01	Y PPM	ICP	.1
AL %	ICP	.01	ZR PPM	ICP	.5
P %	ICP	.01	MO PPM	ICP	1.
K %	ICP	.01	AG PPM	ICP	.1
CA %	ICP	.01	CD PPM	ICP	1.
SC PPM	ICP	.5	SN PPM	ICP	10.
TI %	ICP	.01	SB PPM	ICP	5.
V PPM	ICP	2.	BA PPM	ICP	1.
CR PPM	ICP	1.	LA PPM	ICP	.5
MN PPM	ICP	2.	TA PPM	ICP	1.
FE %	ICP	.01	W PPM	ICP	10.
CO PPM	ICP	1.	PB PPM	ICP	2.
NI PPM	ICP	1.	BI PPM	ICP	3.
CU PPM	ICP	.5			

*** UNLESS INSTRUCTED OTHERWISE WE WILL DISCARD PULPS IN 90 DAYS ***
AND REJECTS IN 30 DAYS FROM THE DATE OF THIS REPORT

DATE 16-Sep-93

CERTIFIED BY ....
Jean H.L. Opdebeeck, General Manager

SAMPLE	AU PPB	BE PPM	NA %	MG %	AL %	P %	K %	CA %	SC PPM
2801	<1	<.5	.09	.35	.58	.02	.05	.13	3.0
2802	<1	<.5	.09	.44	.60	.01	.04	.26	2.6
2803	<1	1.1	.05	1.97	2.72	.09	.87	.72	3.2
2804	<1	.8	.07	2.12	2.46	.12	.44	1.10	2.9
2805	<1	<.5	.08	.24	.66	.03	.18	.32	1.2
2806	<1	.9	.08	1.49	2.19	.08	.70	.49	3.3
2807	<1	<.5	.08	.38	.71	.03	.17	.30	2.0
2808	<1	<.5	.08	.29	.63	.02	.16	.18	1.8
2809	<1	<.5	.05	.09	.34	.01	.16	.15	.8
2810	<1	<.5	.08	.28	.55	.02	.12	.21	1.8
2811	<1	1.4	.02	2.37	2.36	.13	.08	.85	6.4
2812	<1	<.5	.05	.71	1.12	.04	.49	.33	2.3
2813	<1	<.5	.06	.58	.68	<.01	.11	.22	1.7
2814	<1	<.5	.05	.30	.50	<.01	.08	.10	1.3
2815	<1	<.5	.05	.49	.80	.03	.17	.22	2.0
2816	<1	<.5	.05	.68	.87	.02	.21	.09	.8
2817	<1	<.5	.04	.60	.65	<.01	.21	.05	.8
2818	<1	<.5	.05	.40	.59	<.01	.13	.06	1.0
2819	<1	.9	.04	2.55	2.29	.07	.16	.40	4.7
2820	<1	1.0	.03	3.05	2.74	.09	.23	.51	5.2
2821	<1	<.5	.04	.31	.57	<.01	.25	.06	.5
2822	<1	<.5	.04	.35	.72	.03	.26	.19	.9
D 2801	--	<.5	.08	.34	.56	.01	.05	.13	2.9
D 2813	--	<.5	.06	.59	.70	<.01	.11	.23	1.8

D - QUALITY CONTROL DUPLICATE

SAMPLE	TI %	V PPM	CR PPM	MN PPM	FE %	CO PPM	NI PPM	CU PPM
2801	.08	8	152	226	1.20	4	5	9.1
2802	.08	11	163	325	1.12	5	5	12.0
2803	.20	71	145	1370	4.94	24	37	72.7
2804	.15	70	184	756	4.20	27	82	50.5
2805	.06	11	115	229	1.10	4	6	8.7
2806	.17	102	66	680	4.50	19	24	17.2
2807	.03	18	110	236	1.42	6	6	27.6
2808	.07	6	98	271	.93	2	2	10.8
2809	.04	3	122	179	.44	2	3	4.1
2810	.07	5	116	274	.92	3	3	23.6
2811	.08	74	541	910	4.10	22	87	8.4
2812	.14	52	212	411	2.29	11	11	32.1
2813	.06	5	118	267	.91	3	4	12.2
2814	.05	3	69	365	.81	2	1	4.1
2815	.08	14	72	293	1.21	3	5	3.8
2816	.03	5	61	250	1.11	4	6	3.1
2817	.03	4	60	168	.75	4	2	4.3
2818	.03	4	70	166	.83	3	4	4.8
2819	.11	74	439	697	3.29	23	119	43.0
2820	.12	78	332	795	3.90	32	109	88.9
2821	.02	3	104	142	.58	2	4	5.6
2822	.05	8	66	158	.93	4	4	6.2
D 2801	.08	8	147	260	1.18	3	3	8.1
D 2813	.07	5	120	272	.92	3	4	12.5

D - QUALITY CONTROL DUPLICATE

SAMPLE	ZN PPM	AS PPM	SR PPM	Y PPM	ZR PPM	MO PPM	AG PPM	CD PPM
2801	28.3	<3	2.2	7.0	13.4	<1	.2	<1
2802	47.3	<3	7.7	8.0	11.3	<1	<.1	<1
2803	132	<3	19.7	8.6	3.3	2	.5	<1
2804	112	<3	18.6	6.9	2.2	<1	<.1	<1
2805	75.1	<3	8.5	7.6	6.7	<1	<.1	<1
2806	112	<3	7.8	6.2	4.8	<1	.3	1
2807	28.2	<3	16.3	7.7	10.4	2	<.1	<1
2808	46.1	<3	10.2	8.4	14.4	<1	<.1	<1
2809	24.6	<3	8.8	5.9	10.4	<1	<.1	<1
2810	44.2	<3	8.0	8.3	10.6	<1	<.1	<1
2811	131	39	10.8	13.0	5.7	<1	<.1	<1
2812	51.1	<3	13.5	4.2	3.4	2	.5	<1
2813	30.3	<3	7.7	8.0	19.2	<1	.5	<1
2814	88.2	<3	2.2	5.5	15.1	<1	.7	<1
2815	44.9	<3	9.2	6.9	11.5	<1	<.1	<1
2816	37.1	<3	1.5	6.6	27.0	1	<.1	<1
2817	41.6	<3	1.3	6.7	36.2	<1	.3	<1
2818	28.8	<3	2.7	5.1	19.2	2	<.1	<1
2819	164	9	6.8	5.7	5.8	<1	.2	<1
2820	222	<3	10.6	6.6	6.1	<1	.5	<1
2821	28.3	<3	2.7	8.1	34.4	5	.5	<1
2822	35.4	<3	5.3	8.1	10.4	<1	<.1	<1
D 2801	27.0	<3	2.2	7.0	13.1	<1	<.1	<1
D 2813	30.8	<3	8.0	8.2	20.4	<1	.3	<1

D - QUALITY CONTROL DUPLICATE

SAMPLE	SN PPM	SB PPM	BA PPM	LA PPM	TA PPM	W PPM	PB PPM	BI PPM
2801	<10	<5	12	15.8	<1	<10	4	<3
2802	<10	<5	11	28.1	2	<10	36	<3
2803	<10	<5	56	19.2	3	<10	3	<3
2804	<10	<5	39	13.8	<1	<10	<2	4
2805	<10	<5	33	27.5	<1	<10	26	5
2806	<10	<5	89	17.6	<1	<10	<2	7
2807	<10	<5	20	30.7	<1	<10	<2	4
2808	<10	<5	38	25.0	4	<10	3	<3
2809	<10	<5	60	18.6	1	<10	4	3
2810	<10	<5	35	28.2	<1	<10	<2	<3
2811	<10	<5	28	15.7	3	<10	8	10
2812	<10	<5	48	8.7	3	<10	6	6
2813	<10	<5	21	30.7	2	<10	<2	<3
2814	<10	<5	20	19.5	3	<10	8	<3
2815	<10	<5	48	18.3	<1	<10	<2	<3
2816	<10	<5	29	10.6	<1	<10	<2	<3
2817	<10	<5	25	14.0	<1	<10	3	<3
2818	<10	<5	19	15.7	2	<10	<2	<3
2819	<10	<5	18	15.8	<1	<10	4	<3
2820	<10	<5	23	16.1	<1	<10	6	5
2821	<10	<5	20	13.0	3	<10	7	<3
2822	<10	<5	23	32.9	<1	<10	5	<3
D 2801	<10	<5	12	15.6	<1	<10	2	<3
D 2813	<10	<5	22	30.9	<1	<10	<2	<3

D - QUALITY CONTROL DUPLICATE

LEGEND FOR REPORT DRAWINGS:

GENERALIZED SURFACE GEOLOGY

1 LOWER MAFIC METAVOLCANICS
2 MIDDLE FELSIC (RHYOLITIC) METAVOLCANICS
3 UPPER MAFIC METAVOLCANICS
4 HURONIAN METASEDIMENTS.
5 MAFIC INTRUSIVES - METAGABBRO.

PILLOW LAVAS

FOLIATION - LAYERING OR BEDDING

MAJOR FAULT STRUCTURE

DRILL HOLE GEOLOGY

C-93-1 DRILL HOLE IDENTIFICATION NUMBER
-55° INCLINATION OF DRILL HOLE FROM HORIZONTAL.
E.O.H END OF HOLE.
6+16N 0+20W. METRIC COORDINATES OF DRILL HOLE TAKEN FROM THE FALCONBRIDGE GRID SYSTEM
VERTICAL PROJECTION OF DRILL HOLE TO SURFACE.

301 1.2 SAMPLE NUMBERS - SAMPLE LENGTHS WITHIN THE DRILL HOLE.

TRUE LENGTH X-SECTION THRU THE DRILL HOLE

FABRIC OF ROCK, MEASURED FROM THE CORE AXIS.

NOTABLE BRECCIATION

DIFFERENTIATED ROCK UNITS.

NOTEWORTHY SECTION OF ALTERATION - MINERALIZATION

FAULTING - SHEARING

GEOPHYSICS

PROBABLE SELF-POTENTIAL ANOMALY.

POSSIBLE SELF-POTENTIAL ANOMALY.

STRONG VLF-EM ANOMALY

WEAK VLF-EM ANOMALY

16817 MAGNETOMETER SURVEY PEAK, VALUES IN GAMMAS.

INDUCED POLARIZATION ANOMALY

CUT GRID LINE, WITH PLOTTED AND PROFILED GEOPHYSICS DATA.
GRID LINE DESIGNATION, STATION SPACING OF 15.25 M+/- = 50 FEET.

12+50'S. GRID LINE STATION DESIGNATION IN FEET USED FOR THE 1993 SELF-POTENTIAL SURVEY.
2+95N. GRID LINE STATION AS ESTABLISHED ON THE FALCONBRIDGE GRID SYSTEM, ESTABLISHED IN 1989.
—25— SELF POTENTIAL CONTOUR LINES WITH INTERVALS IN M.Vs.

SOIL GEOCHEMISTRY

3180 PPM Zn SOIL SAMPLE, ANOMALOUS METAL VALUES REPORTED IN PARTS PER MILLION.

LITHO GEOCHEMISTRY

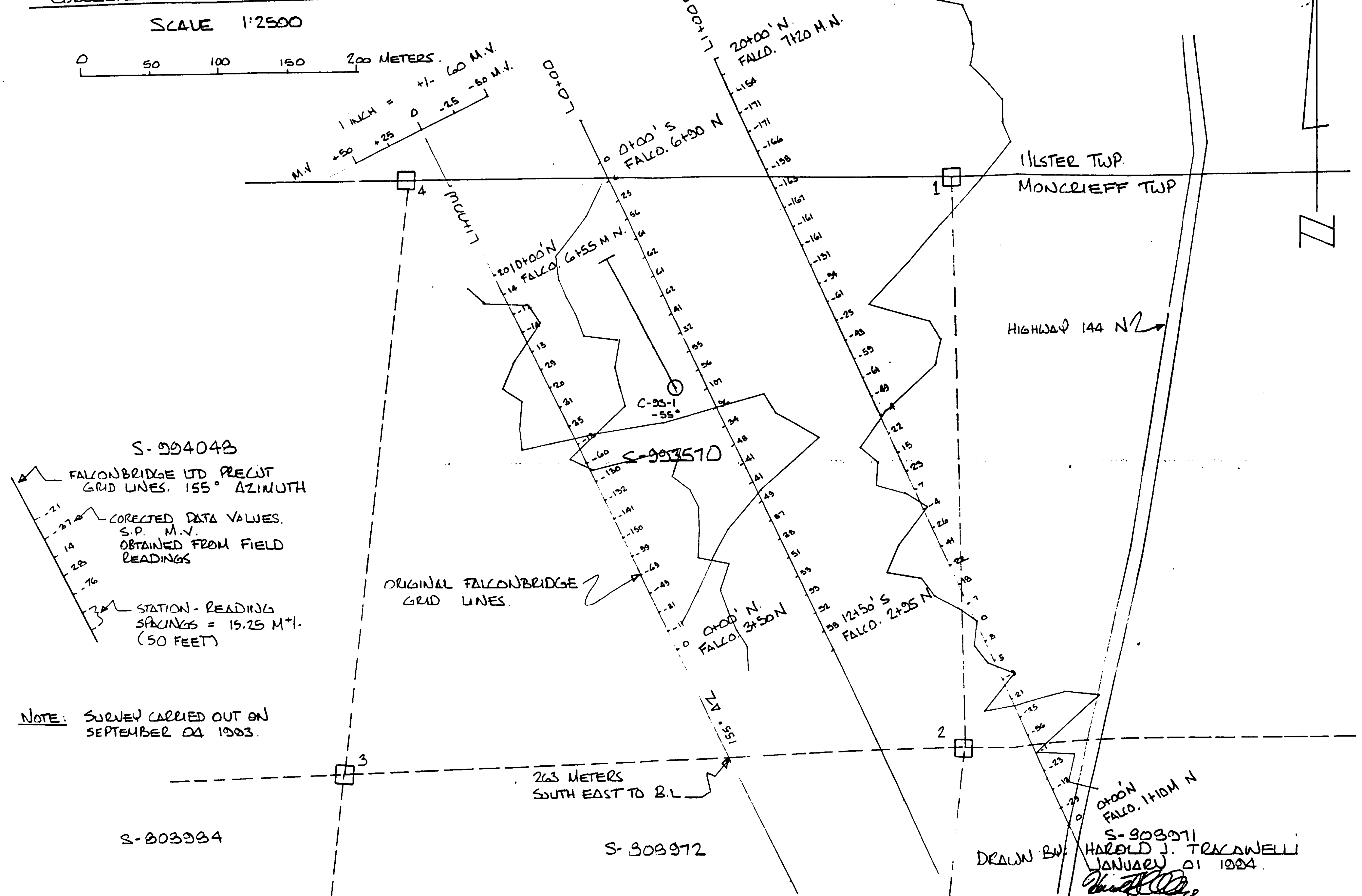
2090 PPM Zn MINERALIZED ROCK SAMPLE, WITH SIGNIFICANT METAL VALUES. REPORTED IN PARTS PER MILLION.

GEOGRAPHIC FEATURES

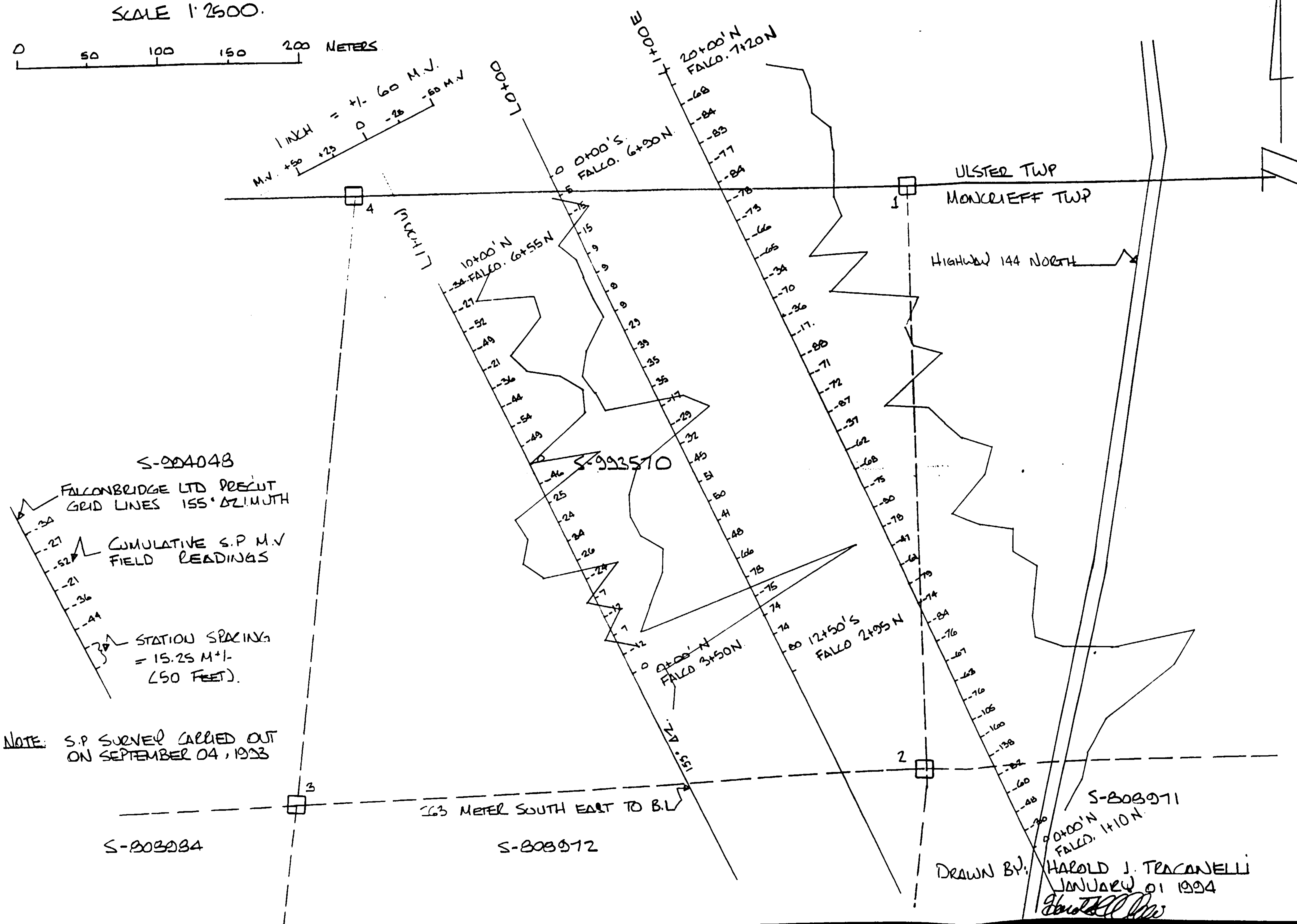
CLAIM POST.
BLAZED CLAIM LINE (1994).
TOWNSHIP (TWP) LINE.
PAVED HIGHWAY.
S-993570 CLAIM NUMBER.

DRAWN BY: HAROLD J. TRACANELLI
JANUARY 02. 1994

CORRECTED SELF-POTENTIAL DATA - PROFILE PLOT

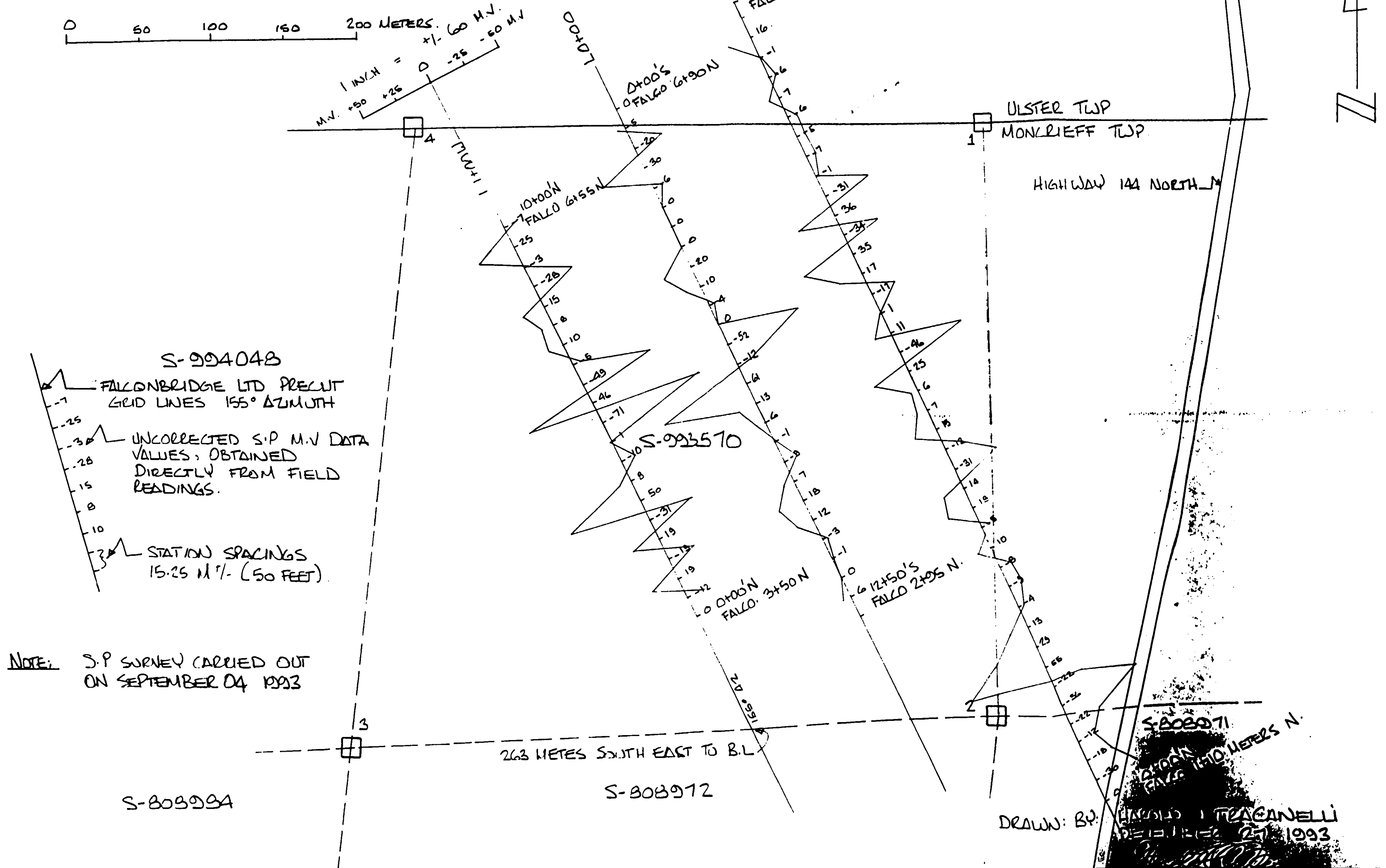


CUMULATIVE SELF-POTENTIAL DATA - PROFILE PLOT.



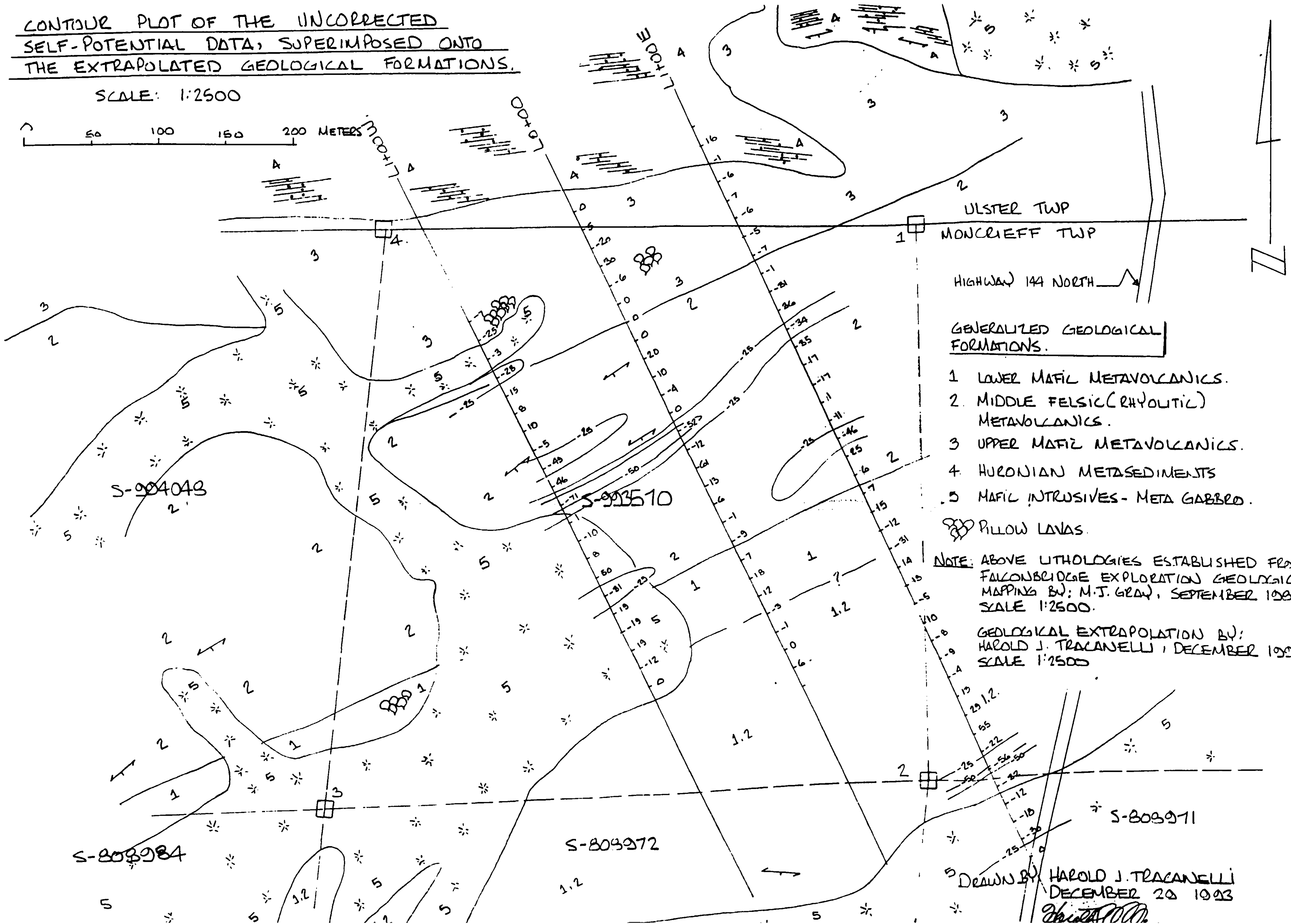
UNCORRECTED SELF-POTENTIAL FIELD DATA-
PROFILE PLOT

SCALE 1: 2500.



CONTOUR PLOT OF THE UNCORRECTED SELF-POTENTIAL DATA, SUPERIMPOSED ONTO THE EXTRAPOLATED GEOLOGICAL FORMATIONS.

SCALE: 1:2500



GENERALIZED GEOLOGICAL FORMATIONS.

1 LOWER MAFIC METAVOLCANICS.
2 MIDDLE FELSIC (RHYOLITIC) METAVOLCANICS.
3 UPPER MAFIC METAVOLCANICS.
4 HURONIAN METASEDIMENTS
5 MAFIC INTRUSIVES - META GABBRO.
PILLOW LAVAS.

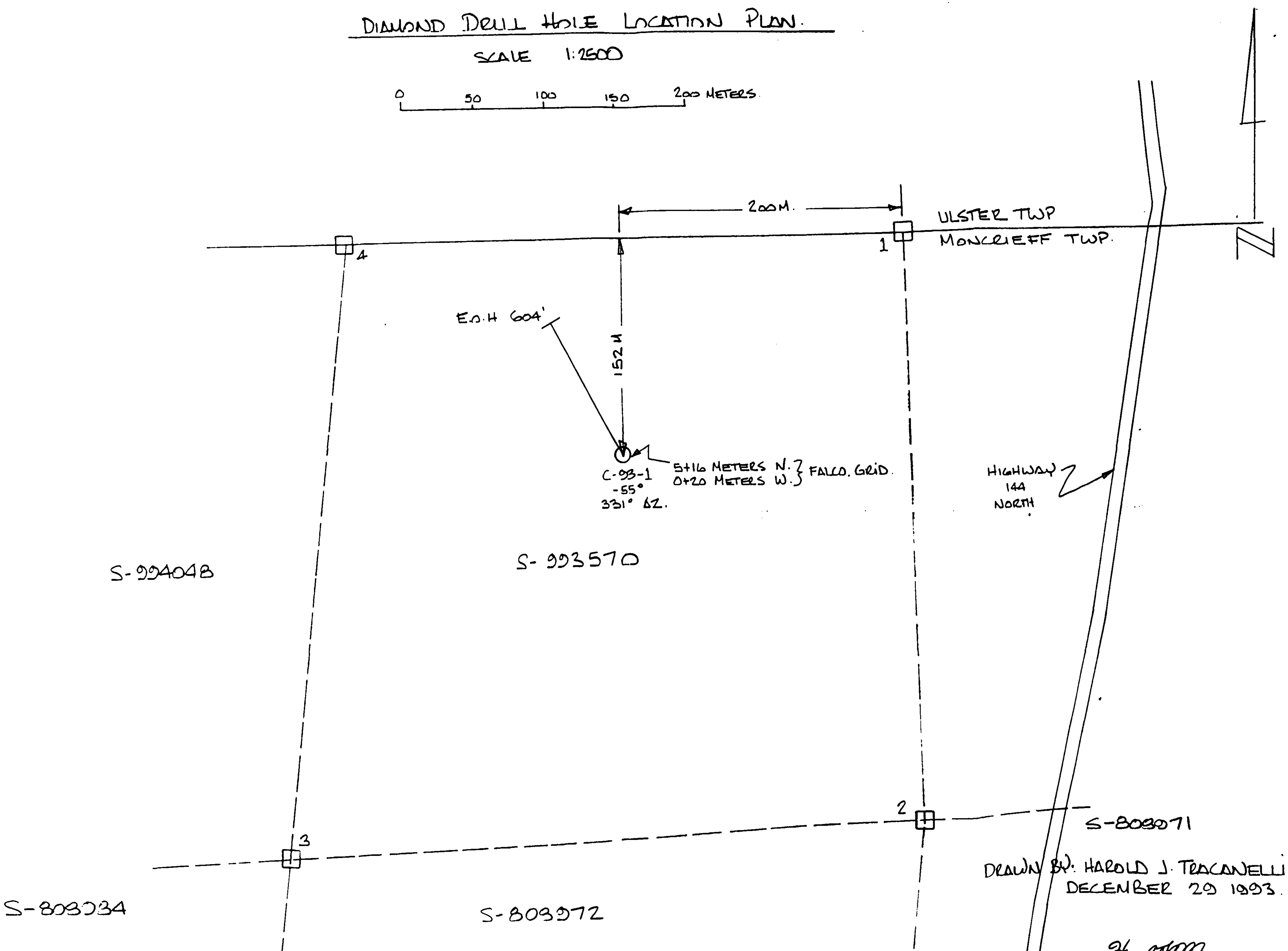
NOTE: ABOVE LITHOLOGIES ESTABLISHED FROM FALCONBRIDGE EXPLORATION GEOLOGICAL MAPPING BY: M.J. GRAY, SEPTEMBER 1989. SCALE 1:2500.

GEOLOGICAL EXTRAPOLATION BY: HAROLD J. TRACANELLI, DECEMBER 1993. SCALE 1:2500

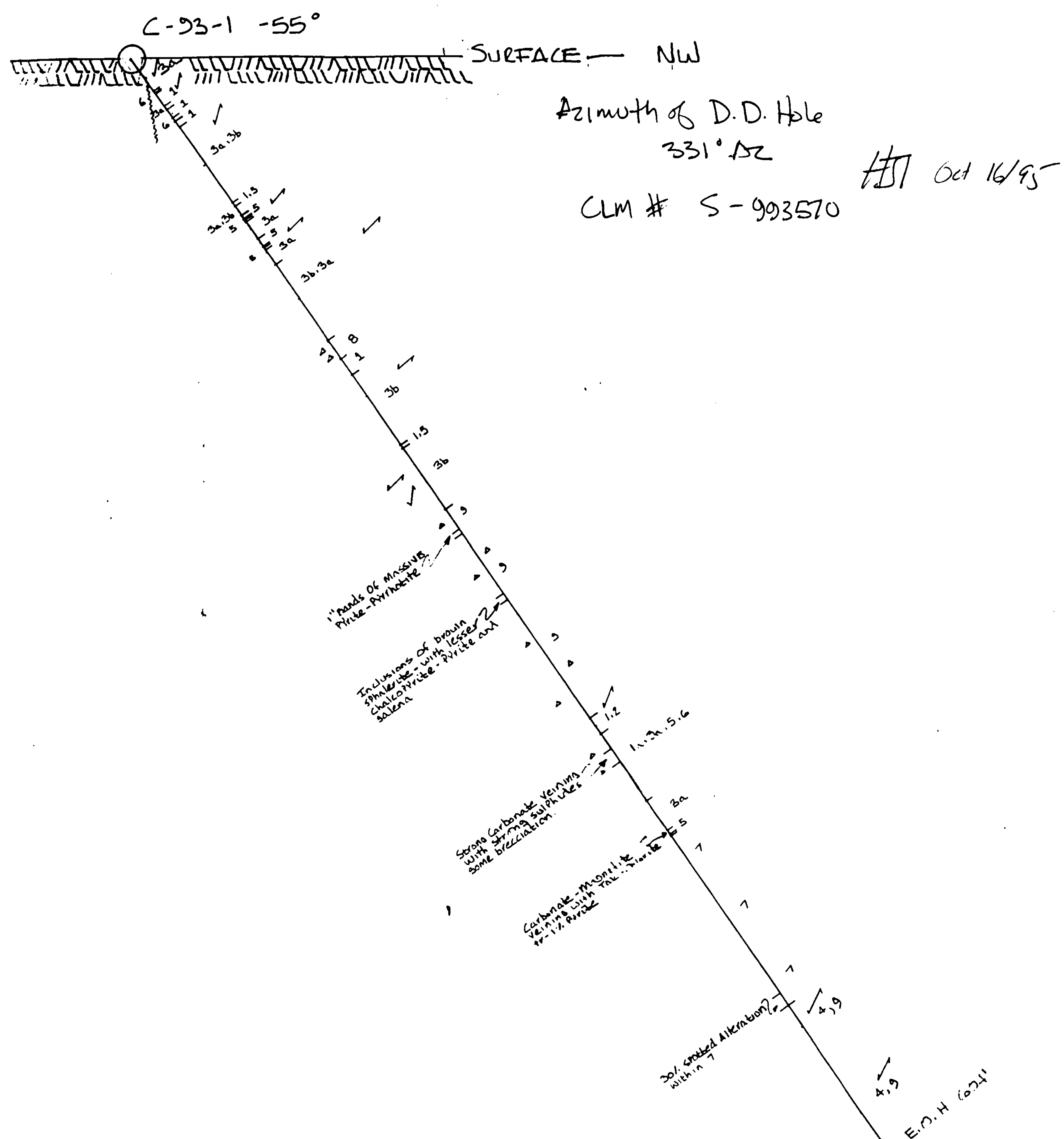
DRAWN BY HAROLD J. TRACANELLI DECEMBER 20 1993

DIAMOND DRILL HOLE LOCATION PLAN.

SCALE 1:2500



DRAWN BY: HAROLD J. TRACANELLI
DECEMBER 29 1993.



Pgs 1 to 4

DRILL HOLE GEOLOGY

X-SECTION SCALE 1 INCH = 50 FEET.

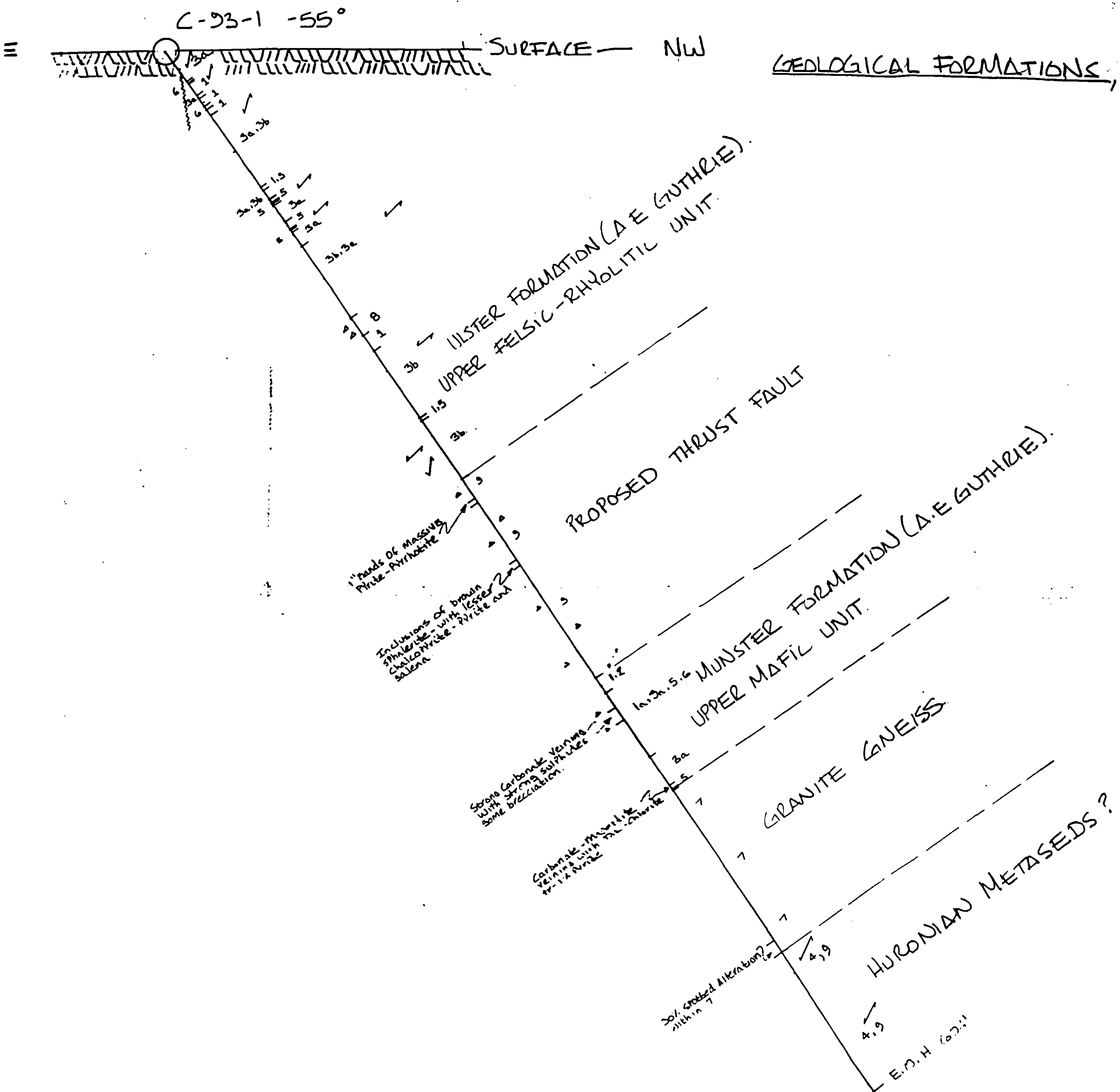
0' 25' 50' 100'

GEOLOGICAL LEGEND

1.	Undifferentiated mafic rock - possible mafic flow (basalt)
1a	Mafic tuffaceous rocks
2.	Undifferentiated - mafic - intermediate unit
3.	Undifferentiated felsic metavolcanis
3.a	Felsic ash tuff
3.b	Felsic crystal tuff.
4.	Clastic volcanogenetic-metasediments siltstones - argillites - greywicke - conglomerates
5.	Undifferentiated mafic intrusive dyke.
6.	Lamprophyre dykes with biotite - pyroxene phonocrysts
7.	Undifferentiated felsic intrusives Granite gneiss (Benny Gneissic Belt)
8.	Strongly oxidized fault-breccia zone made up of parts of units 1, 2 & 3. Altered with carbonate - chlorite - epidote - hematite - quartz
9.	Mylonitic fault zone - numerous rock types. Brecciated and highly contorted, localized slulphide - mineralization

DRILL HOLE X-SECTION
C-93-1
T-H PROPERTY
MONCRIEFF TOWNSHIP,
ONTARIO.

DRAWN BY HAROLD J. TRACANELLI
DECEMBER 20 1993.



DRILL HOLE GEOLOGY

X-SECTION SCALE 1 INCH = 50 FEET

0' 25' 50' 100'

GEOLOGICAL LEGEND

1.	Undifferentiated mafic rock - possible mafic flow (basalt)
1a	Mafic tuffaceous rocks
2.	Undifferentiated - mafic - intermediate unit
3.	Undifferentiated felsic metavolcanis
3.a	Felsic ash tuff
3.b	Felsic crystal tuff.
4.	Clastic volcanogenetic-metasediments siltstones - argillites - greywicke - conglomerates
5.	Undifferentiated mafic intrusive dyke.
6.	Lamprophyre dykes with biotite - pyroxene phonocrysts
7.	Undifferentiated felsic intrusives Granite gneiss (Benny Gneissic Belt)
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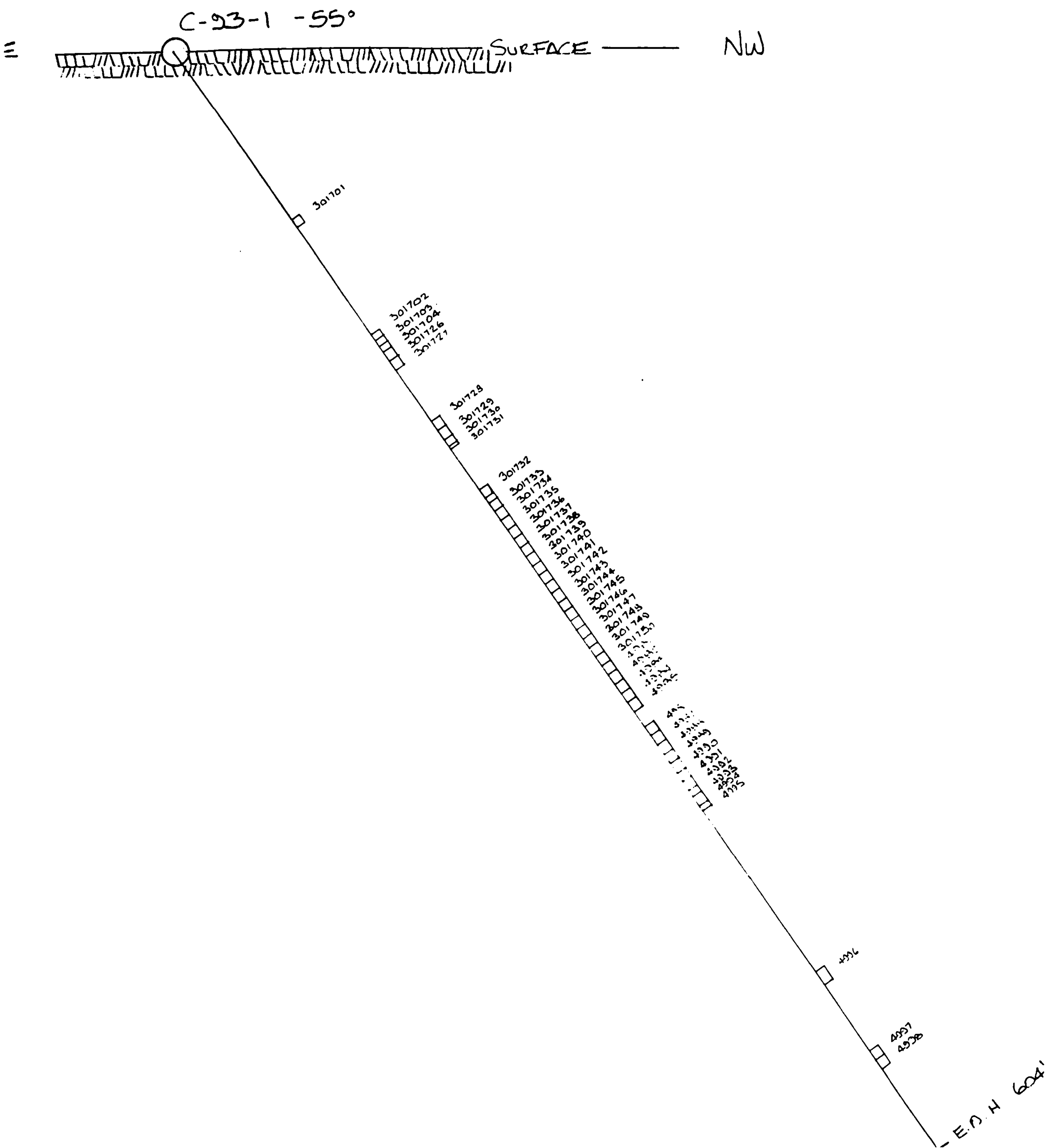
DRILL HOLE X-SECTION
C-93-1
T-H PROPERTY
MONCRIEFF TOWNSHIP,
ONTARIO.

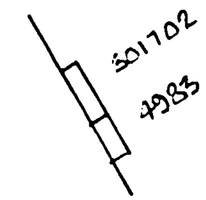
DRAWN BY HAROLD J. TRACANELLI
DECEMBER 20 1993.



DRILL CORE SAMPLINGS

X-SECTION SCALE 1 INCH = 30 FEET

0' 25' 50' 100'



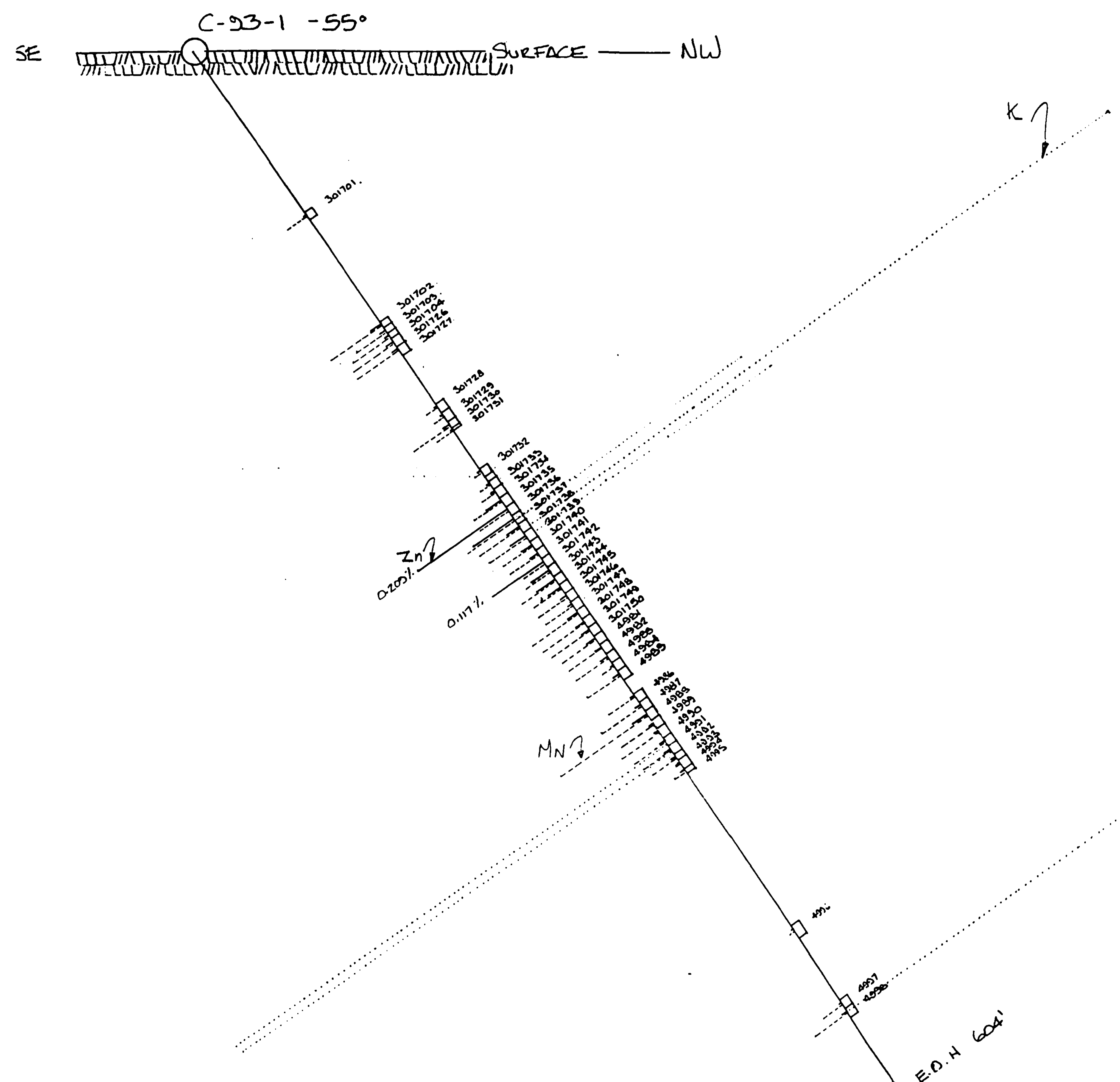
SAMPLE NUMBERS - SAMPLE LENGTHS - LOCATIONS

PLEASE SEE REPORT FOR COMPLETE ASSAY RESULTS.

DRILL HOLE X-SECTION
C-93-1

T-H PROPERTY
MONCRIEFF TOWNSHIP
ONTARIO.

DRAWN BY: HAROLD J. TRACANELLI
DECEMBER 21, 1993



TRACE ELEMENT GEOCHEMISTRY

——	Zn.	PPM
------	Mn.	PPM
....	K	PPM

0 1000 2000 3000 4000 5000 PARTS PER MILLION

1/2" = 1000 PPM

X-SECTION SCALE: 1 INCH = 50 FEET

0' 25' 50' 100'

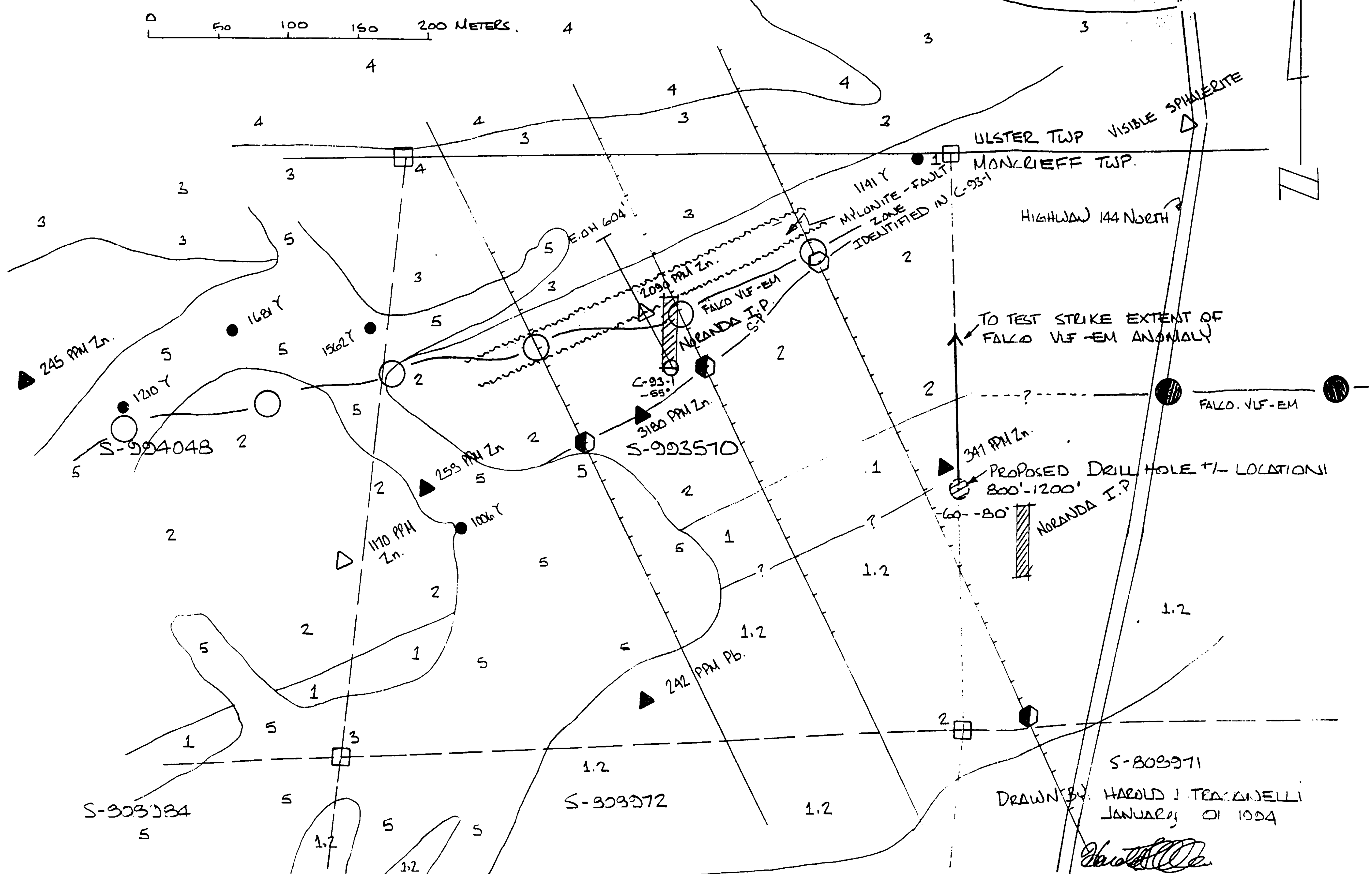
DRILL HOLE X-SECTION
C-93-1

T-H PROPERTY
MONCREIFF TOWNSHIP
ONTARIO

DRAWN BY: HAROLD J. TRACANELLI
DECEMBER 21, 1993

SUPERIMPOSED GEOLOGICAL-GEOPHYSICAL-GEOCHEMICAL DATA FOR THE S-993570 CLAIM AREA

SCALE 1:2500



DRAWN BY: HAROLD J. TRACANELLI
JANUARY 01 1994

Ministry of Northern Development and Mines

Ontario

Report of Work Conducted After Recording Claim

Mining Act

Transaction Number: W9570.00089

Personal information collected on this form is obtained under the authority of the Minin[g Act] ... this collection should be directed to the Provincial Manager, Mining Lands, Ministry ... Sudbury, Ontario, P3E 6A5, telephone (705) 670-7264.

41I13SE0003 2 16200 MONCRIEFF 900

Instructions:
- Please type or print and submit in duplicate.
- Refer to the Mining Act and Regulations for requirements of filing assessment work or consult the Mining Recorder.
- A separate copy of this form must be completed for each Work Group.
- Technical reports and maps must accompany this form in duplicate.
- A sketch, showing the claims the work is assigned to, must accompany this form.

Recorded Holder(s)		Client No.
Harold J Tracandli / John George Huycke		202732 / 147219
Address		**Telephone No.**
Box 167, Chelmsford, P0M-1L0 / Box 793 Dowling P0M-1R0		855-5356 / 855-5415
Mining Division	**Township/Area**	**M or G Plan No.**
Sudbury, Ontario	Moncrieff Township	G-4086
Dates Work Performed From: July 14 1993	To: Aug-1-1993	

Work Performed (Check One Work Group Only)

	Work Group	Type
	Geotechnical Survey	
✓	Physical Work, Including Drilling	Surface trenching
	Rehabilitation	
	Other Authorized Work	SECTION 18 ONLY
	Assays	
	Assignment from Reserve	

Total Assessment Work Claimed on the Attached Statement of Costs $ 5232.00

Note: The Minister may reject for assessment work credit all or part of the assessment work submitted if the recorded holder cannot verify expenditures claimed in the statement of costs within 30 days of a request for verification.

Persons and Survey Company Who Performed the Work (Give Name and Address of Author of Report)

Name	Address
Clement Mainville Mainville Lumber Co Ltd	304 Leroux Street, Chelmsford, Ont. 1-705 855-2571
Nova Rentals	Lively Ontario, P3Y-1L7 1-705 682-0613

(attach a schedule if necessary)

Certification of Beneficial Interest * See Note No. 1 on reverse side

I certify that at the time the work was performed, the claims covered in this work report were recorded in the current holder's name or held under a beneficial interest by the current recorded holder.	Date	Recorded Holder or Agent (Signature)
	Sept-6-95	[signatures]

Certification of Work Report

I certify that I have a personal knowledge of the facts set forth in this Work report, having performed the work or witnessed same during and/or after its completion and annexed report is true.

Name and Address of Person Certifying		
George Huycke, Box 793 ~~[illegible]~~ 1st, Dowling, Ontario P0M-1R0		
Telephone No.	**Date**	**Certified By (Signature)**
1-705-855-5415	Sept-6-95	[signatures]

For Office Use Only

Total Value Cr. Recorded	Date Recorded	Mining Recorder	Received Stamp
$5,232	July 19/95	[signature]	SEP - 7 1995 A.M. 7 8 9 10 11 12 1 2 3 4 P.M.
	Deemed Approval Date: Oct. 17/95	Date Approved: October 11/95	
	Date Notice for Amendments Sent: August 21/95		

I certify that the recorded holder ... leased land at the time the work was performed ...

Numéro de rapport sur les travaux exécutés pour l'affectation de la réserve	Numéro de claim	Nombre d'unités	Valeur des travaux d'évaluation exécutés sur ce claim	Valeur affectée à ce claim	Valeur transférée de ce claim	Réserve : travaux à réclamer à une date ultérieure
	S-993653	1		237		
	S-993654	1		237		
	S-993655	1		237		
	S-993656	1		237		
	S-994048	1	1308.00	255	1053	
	22		5232.00	5232.00	4740	
	Nombre total de claims		Valeur totale des travaux exécutés	Valeur totale des travaux qui a été affectée	Total transféré	Réserve totale

Les crédits que vous réclamez dans le présent rapport peuvent être réduits. Afin de diminuer les conséquences défavorables de telles réductions, veuillez indiquer l'ordre dans lequel vous désirez qu'elles soient appliquées à vos claims. Veuillez cocher (✓) l'une des options suivantes :

1. ☐ Les crédits doivent être réduits en commençant par le dernier claim sur la liste.
2. ☐ Les crédits doivent être réduits également entre tous les claims figurant dans le présent rapport.
3. ☐ Les crédits doivent être réduits selon l'ordre donné en annexe.

Si vous [redacted] pas choisi d'option, la première sera appliquée.

Note 1 : Examples d'intérêts bénéficiaires : cessions non enregistrées, ententes sur des options, protocoles d'entente, etc. relatifs aux claims.

Note 2: [redacted] travaux ont été exécutés sur un terrain faisant l'objet de lettres patentes ou d'un bail, veuillez remplir ce qui suit:

Je certi[redacted] titulaire enregistré possédait un intérêt bénéficiaire sur le terrain [redacted] l'objet de lettres patentes ou d'un bail, au moment où les travaux [redacted]	Signature [redacted]	Date

Ontario

Northern Development and Mines

Ministère du Développement du Nord et des mines

Statement of Costs for Assessment Credit

État des coûts aux fins du crédit d'évaluation

W9570.00059

Mining Act/Loi sur les mines

Personal information collected on this form is obtained under the authority of the Mining Act. This information will be used to maintain a record and ongoing status of the mining claim(s). Questions about this collection should be directed to the Provincial Manager, Minings Lands, Ministry of Northern Development and Mines, 4th Floor, 159 Cedar Street, Sudbury, Ontario P3E 6A5, telephone (705) 670-7264.

Les renseignements personnels contenus dans la présente formule sont recueillis en vertu de la Loi sur les mines et serviront à tenir à jour un registre des concessions minières. Adresser toute quesiton sur la collece de ces renseignements au chef provincial des terrains miniers, ministère du Développement du Nord et des Mines, 159, rue Cedar, 4e étage, Sudbury (Ontario) P3E 6A5, téléphone (705) 670-7264.

1. Direct Costs/Coûts directs

Type	Description	Amount Montant	Totals Total global
Wages Salaires	Labour Main-d'oeuvre		
	Field Supervision Supervision sur le terrain		
Contractor's and Consultant's Fees Droits de l'entrepreneur et de l'expert-conseil	Type Hainville lumber Co. surface trenching	5008.00	
			5008.00
Supplies Used Fournitures utilisées	Type		
Equipment Rental Location de matériel	Type Nova Rentals Rental of Water		
	Pump & Equipment	224.00	
			224.00
		Total Direct Costs Total des coûts directs	5232.00

2. Indirect Costs/Coûts indirects

** Note: When claiming Rehabilitation work Indirect costs are not allowable as assessment work.
Pour le remboursement des travaux de réhabilitation, les coûts indirects ne sont pas admissibles en tant que travaux d'évaluation.

Type	Description	Amount Montant	Totals Total global
Transportation Transport	Type		
Food and Lodging Nourriture et hébergement			
Mobilization and Demobilization Mobilisation et démobilisation			
		Sub Total of Indirect Costs Total partiel des coûts indirects	
		Amount Allowable (not greater than 20% of Direct Costs) Montant admissible (n'excédant pas 20 % des coûts directs)	Ø
		Total Value of Assessment Credit (Total of Direct and Allowable Indirect costs) Valeur totale du crédit d'évaluation (Total des coûts directs et indirects admissibles)	5232.00

Note: The recorded holder will be required to verify expenditures claimed in this statement of costs within 30 days of a request for verification. If verification is not made, the Minister may reject for assessment work all or part of the assessment work submitted.

Note : Le titulaire enregistré sera tenu de vérifier les dépenses demandées dans le présent état des coûts dans les 30 jours suivant une demande à cet effet. Si la vérification n'est pas effectuée, le ministre peut rejeter tout ou une partie des travaux d'évaluation présentés.

Filing Discounts

1. Work filed within two years of completion is claimed at 100% of the above Total Value of Assessment Credit.
2. Work filed three, four or five years after completion is claimed at 50% of the above Total Value of Assessment Credit. See calculations below:

Total Value of Assessment Credit		Total Assessment Claimed
	× 0.50 =	

Remises pour dépôt

1. Les travaux déposés dans les deux ans suivant leur achèvement sont remboursés à 100 % de la valeur totale susmentionnée du crédit d'évaluation.
2. Les travaux déposés trois, quatre ou cinq ans après leur achèvement sont remboursés à 50 % de la valeur totale du crédit d'évaluation susmentionné. Voir les calculs ci-dessous.

Valeur totale du crédit d'évaluation		Évaluation totale demandée
	× 0,50 =	

Certification Verifying Statement of Costs

I hereby certify:
that the amounts shown are as accurate as possible and these costs were incurred while conducting assessment work on the lands shown on the accompanying Report of Work form.

that as Harold J. Tracanelli I am authorized
(Recorded Holder, Agent, Position in Company)

to make this certification

Attestation de l'état des coûts

J'atteste par la présente :
que les montants indiqués sont le plus exact possible et que ces dépenses ont été engagées pour effectuer les travaux d'évaluation sur les terrains indiqués dans la formule de rapport de travail ci-joint.

Et qu'à titre de ____________ je suis autorisé
(titulaire enregistré, représentant, poste occupé dans la compagnie)

à faire cette attestation.

Signature: [signature] Date: Sept 06/95

Nota : Dans cette formule, lorsqu'il désigne des personnes, le masculin est utilisé au sens neutre.

Ministry of Northern Development and Mines

Ontario

Report of Work Conducted After Recording Claim

Transaction Number: W9570.00070

Mining Act

Personal information collected on this form is obtained under the authority of the Mining Act. This information will be used for correspondence. Questions about this collection should be directed to the Provincial Manager, Mining Lands, Ministry of Northern Development and Mines, Fourth Floor, 159 Cedar Street, Sudbury, Ontario, P3E 6A5, [redacted]

Instructions:
- Please type or print and submit in duplicate.
- Refer to the Mining Act and Regulations for requirements of filing assessment work or consult the Mining Recorder.
- A separate copy of this form must be completed for each Work Group.
- Technical reports and maps must accompany this form in duplicate.
- A sketch, showing the claims the work is assigned to, must accompany this form.

Recorded Holder(s): Harold J Tracanelli / John George Huycke		Client No.: 202732/147219
Address: Box 167 Chelmsford P0M-1L0 / Box 793 Dowling P0M-1R0		Telephone No.: 855-5356 / 855-5415
Mining Division: Sudbury ontario	Township/Area: Moncrieff township	M or G Plan No.: G-4086
Dates Work Performed From: oct-2-1993	To: NOV-13-1993	

Work Performed (Check One Work Group Only)

	Work Group	Type
	Geotechnical Survey	
✓	Physical Work, Including Drilling	Diamond drilling
	Rehabilitation	
	Other Authorized Work	SECTION 13 ONLY
	Assays	
	Assignment from Reserve	

Total Assessment Work Claimed on the Attached Statement of Costs $ 7200.00

Note: The Minister may reject for assessment work credit all or part of the assessment work submitted if the recorded holder cannot verify expenditures claimed in the statement of costs within 30 days of a request for verification.

Persons and Survey Company Who Performed the Work (Give Name and Address of Author of Report)

Name	Address
Larry J Salo Sparta, Diamond drilling	General delivery, Connaught ontario 1-705-363-2108

(attach a schedule if necessary)

Certification of Beneficial Interest * See Note No. 1 on reverse side

	Date	Recorded Holder or Agent (Signature)
I certify that at the time the work was performed, the claims covered in this work report were recorded in the current holder's name or held under a beneficial interest by the current recorded holder.	Sept-6-95	[signatures]

Certification of Work Report

I certify that I have a personal knowledge of the facts set forth in this Work report, having performed the work or witnessed same during and/or after its completion and annexed report is true.

Name and Address of Person Certifying: George Huycke Box 793 Dowling ont P0M-1R0		
Telephone No.: 1-705-855-5415	Date: Sept-6-95	Certified By (Signature): George Huycke

For Office Use Only

Total Value Cr. Recorded	Date Recorded	Mining Recorder	Received Stamp
$7,200	July 19/95	[signature]	SEP - 7 1995 A.M. 7 8 9 10 11 12 1 2 3 4 5 6 P.M.
	Deemed Approval Date: October 17, 1995	Date Approved: October 17/95	
	Date Notice for Amendments Sent: Aug. 01/95 / Oct. 11/95		

Work Report Number for Applying Reserve	Claim Number (see Note 2)	Number of Claim Units	Value of Assessment Work Done on this Claim	Value Applied to this Claim	Value Assigned from this Claim	Reserve: Work to be Claimed at a Future Date
[redacted]	S-808969	1		327		
	S-808970	1	[illegible] HJ	327	[illegible] HJ	
	S-808971	1		327		
	S-808972	1		327		
	S-808983	1		327		
	S-808984	1		327		
	S-808985	1		327		
	S-808987	1		327		
	S-830677	1		327		
	S-830744	1		327		
	S-830745	1		327		
	S-830746	1		327		
	S-830747	1		327		
	S-831460	1		327		
	S-993568	1		327		
	S-993569	1		327		
	S-993570	1	7200.00	327	6873.00	
	Total Number of Claims		Total Value Work Done	Total Value Work Applied	Total Assigned From	Total Reserve

Credits you are claiming in this report may be cut back. In order to minimize the adverse effects of such deletions, please indicate from which claims you wish to priorize the deletion of credits. Please mark (✓) one of the following:

1. ☐ Credits are to be cut back starting with the claim listed last, working backwards.
2. ☑ Credits are to be cut back equally over all claims contained in this report of work.
3. ☐ Credits are to be cut back as priorized on the attached appendix.

In the event that you have not specified your choice of priority, option one will be implemented.

Note 1: Examples of beneficial interest are unrecorded transfers, option agreements, memorandum of agreements, etc., with respect to the mining claims.

Note 2: If work has been performed on patented or leased land, please complete the following:

0241 (03/91)

Numéro de rapport sur les travaux exécutés pour l'affectation de la réserve	Numéro de claim	Nombre d'unités	Valeur des travaux d'évaluation exécutés sur ce claim	Valeur affectée à ce claim	Valeur transférée de ce claim	Réserve : travaux à réclamer à une date ultérieure
	S-993653	1		327		
	S-993654	1		327		
	S-993655	1		327		
	S-993656	1		327		
	S-994048	1	[illegible] HJT	333	[illegible] HJT	
					6873.00 HJT	
	22		7200.00	7200.00	[illegible] HJT	
	Nombre total de claims		Valeur totale des travaux exécutés	Valeur totale des travaux qui a été affectée	Total transféré	Réserve totale

Les crédits que vous réclamez dans le présent rapport peuvent être réduits. Afin de diminuer les conséquences défavorables de telles réductions, veuillez indiquer l'ordre dans lequel vous désirez qu'elles soient appliquées à vos claims. Veuillez cocher (✓) l'une des options suivantes :

1. ☐ Les crédits doivent être réduits en commençant par le dernier claim sur la liste.
2. ☐ Les crédits doivent être réduits également entre tous les claims figurant dans le présent rapport.
3. ☐ Les crédits doivent être réduits selon l'ordre donné en annexe.

Si vous n'avez pas choisi d'option, la première sera appliquée.

Note 1 : [illegible] d'intérêts bénéficiaires : cessions non enregistrées, ententes sur des options, protocoles d'entente, etc. relatifs aux claims.

Note 2: Si des travaux ont été exécutés sur un terrain faisant l'objet de lettres patentes ou d'un bail, veuillez remplir ce qui suit:

Je certifie que le titulaire enregistré possédait un intérêt bénéficiaire sur le terrain [illegible] l'objet de lettres patentes ou d'un bail, au moment où les travaux [illegible] exécutés.	Signature	Date

Ontario

Ministry of Northern Development and Mines

Ministère du Développement du Nord et des mines

Statement of Costs for Assessment Credit

État des coûts aux fins du crédit d'évaluation

Transaction No./N° de transaction: W9570.00070

Mining Act/Loi sur les mines

Personal information collected on this form is obtained under the authority of the **Mining Act**. This information will be used to maintain a record and ongoing status of the mining claim(s). Questions about this collection should be directed to the Provincial Manager, Minings Lands, Ministry of Northern Development and Mines, 4th Floor, 159 Cedar Street, Sudbury, Ontario P3E 6A5, telephone (705) 670-7264.

Les renseignements personnels contenus dans la présente formule sont recueillis en vertu de la **Loi sur les mines** et serviront à tenir à jour un registre des concessions minières. Adresser toute quesiton sur la collece de ces renseignements au chef provincial des terrains miniers, ministère du Développement du Nord et des Mines, 159, rue Cedar, 4e étage, Sudbury (Ontario) P3E 6A5, téléphone (705) 670-7264.

1. Direct Costs/Coûts directs

Type	Description	Amount Montant	Totals Total global
Wages Salaires	Labour Main-d'oeuvre		
	Field Supervision Supervision sur le terrain		
Contractor's and Consultant's Fees Droits de l'entrepreneur et de l'expert-conseil	Type Sparta D. Drilling Diamond Drilling	7200.00	
			7200.00
Supplies Used Fournitures utilisées	Type		
Equipment Rental Location de matériel	Type		
		Total Direct Costs Total des coûts directs	7200.00

2. Indirect Costs/Coûts indirects

** **Note:** When claiming Rehabilitation work Indirect costs are not allowable as assessment work.
Pour le remboursement des travaux de réhabilitation, les coûts indirects ne sont pas admissibles en tant que travaux d'évaluation.

Type	Description	Amount Montant	Totals Total global
Transportation Transport	Type		
Food and Lodging Nourriture et hébergement			
Mobilization and Demobilization Mobilisation et démobilisation			
		Sub Total of Indirect Costs Total partiel des coûts indirects	
		Amount Allowable (not greater than 20% of Direct Costs) Montant admissible (n'excédant pas 20 % des coûts directs)	0
		Total Value of Assessment Credit (Total of Direct and Allowable Indirect costs) Valeur totale du crédit d'évaluation (Total des coûts directs et indirects admissibles)	7200.00

Note: The recorded holder will be required to verify expenditures claimed in this statement of costs within 30 days of a request for verification. If verification is not made, the Minister may reject for assessment work all or part of the assessment work submitted.

Note : Le titulaire enregistré sera tenu de vérifier les dépenses demandées dans le présent état des coûts dans les 30 jours suivant une demande à cet effet. Si la vérification n'est pas effectuée, le ministre peut rejeter tout ou une partie des travaux d'évaluation présentés.

Filing Discounts

1. Work filed within two years of completion is claimed at 100% of the above Total Value of Assessment Credit.
2. Work filed three, four or five years after completion is claimed at 50% of the above Total Value of Assessment Credit. See calculations below:

Total Value of Assessment Credit		Total Assessment Claimed
	× 0.50 =	

Remises pour dépôt

1. Les travaux déposés dans les deux ans suivant leur achèvement sont remboursés à 100 % de la valeur totale susmentionnée du crédit d'évaluation.
2. Les travaux déposés trois, quatre ou cinq ans après leur achèvement sont remboursés à 50 % de la valeur totale du crédit d'évaluation susmentionné. Voir les calculs ci-dessous.

Valeur totale du crédit d'évaluation		Évaluation totale demandée
	× 0,50 =	

Certification Verifying Statement of Costs

I hereby certify:
that the amounts shown are as accurate as possible and these costs were incurred while conducting assessment work on the lands shown on the accompanying Report of Work form.

that as Harold J. Tracanelli (Recorded Holder, Agent, Position in Company) I am authorized

to make this certification

Attestation de l'état des coûts

J'atteste par la présente :
que les montants indiqués sont le plus exact possible et que ces dépenses ont été engagées pour effectuer les travaux d'évaluation sur les terrains indiqués dans la formule de rapport de travail ci-joint.

Et qu'à titre de ______ (titulaire enregistré, représentant, poste occupé dans la compagnie) je suis autorisé

à faire cette attestation.

Signature: [signature] Date: Sept 06/95

0212 (04/91)

Nota : Dans cette formule, lorsqu'il désigne des personnes, le masculin est utilisé au sens neutre.

Ministry of Northern Development and Mines
Ontario

[redacted]

Report of Work Conducted After Recording Claim

Mining Act

Transaction Number: W9510.00091

2.16

Personal information collected on this form is obtained under the authority of the Mining Act. This information will be used for correspondence. Questions about this collection should be directed to the Provincial Manager, Mining Lands, Ministry of Northern Development and Mines, Fourth Floor, 159 Cedar Street, Sudbury, Ontario, P3E 6A5, [redacted]

Instructions:
- Please type or print and submit in duplicate.
- Refer to the Mining Act and Regulations for requirements of filing assessment work or consult the Mining Recorder.
- A separate copy of this form must be completed for each Work Group.
- Technical reports and maps must accompany this form in duplicate.
- A sketch, showing the claims the work is assigned to, must accompany this form.

Recorded Holder(s)		Client No.
Harold J. Thacanelli / John George Huycke		202732/147219
Address		**Telephone No.**
Box 167, Chelmsford P0M-1L0 / Box 793 Dowling P0M-1R0		855-5356/855-5415
Mining Division	**Township/Area**	**M or G Plan No.**
Sudbury, Ontario	Moncrieff Township	G-4036
Dates Work Performed From: Sept 04 1993	To: Sept 04 1993	

Work Performed (Check One Work Group Only)

	Work Group	Type
✓	Geotechnical Survey	Self-potential survey
	Physical Work, Including Drilling	
	Rehabilitation	
	Other Authorized Work	SECTION 18 ONLY
	Assays	
	Assignment from Reserve	

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SEP 21 199?
MINING LANDS BR...

Total Assessment Work Claimed on the Attached Statement of Costs $ 100.00

Note: The Minister may reject for assessment work credit all or part of the assessment work submitted if the recorded holder cannot verify expenditures claimed in the statement of costs within 30 days of a request for verification.

Persons and Survey Company Who Performed the Work (Give Name and Address of Author of Report)

Name	Address
George Huycke	Box 793 Dowling Ont P0M-1R0
Harold Thacanelli	Box 167 Chelmsford Ont P0M-1L0

(attach a schedule if necessary)

Certification of Beneficial Interest * See Note No. 1 on reverse side

I certify that at the time the work was performed, the claims covered in this work report were recorded in the current holder's name or held under a beneficial interest by the current recorded holder.	Date	Recorded Holder or Agent (Signature)
	Sept 6 95	[signatures]

Certification of Work Report

I certify that I have a personal knowledge of the facts set forth in this Work report, having performed the work or witnessed same during and/or after its completion and annexed report is true.		
Name and Address of Person Certifying		
George Huycke Box 793 Dowling P0M-1R0		
Telephone No.	**Date**	**Certified By (Signature)**
1-705-855-5415	Sept-6-95	George Huycke [signatures]

For Office Use Only

Total Value Cr. Recorded	Date Recorded	Mining Recorder	Received Stamp
Applied $100.00	July 19, 1995	[signature]	MINING D... RECEIVED SEP - 7 1995 A.M. P.M. 7,8,9,10,11,12,1,2,3,4,5,6
	Deemed Approval Date October 17/95	**Date Approved**	
	Date Notice for Amendments Sent Aug. 21/95		

0241 (03/91)

Work Report Number for Applying Reserve	Claim Number (see Note 2)	Number of Claim Units	Value of Assessment Work Done on this Claim	Value Applied to this Claim	Value Assigned from this Claim	Reserve: Work to be Claimed at a Future Date
	S-808969	1		4.00		
	S-808970	1		4.00		
	S-808971	1		4.00		
	S-808972	1		4.00		
	S-808983	1		4.00		
	S-808984	1		4.00		
	S-808985	1		4.00		
	S-808987	1		4.00		
	S-830677	1		4.00		
	S-830744	1		4.00		
	S-830745	1		~~4.00~~ 5.00		
	S-830746	1		5.00		
	S-830747	1		5.00		
	S-834460	1		5.00		
	S-993568	1		5.00		
	S-993569	1		5.00		
	S-993570	1	75.00	5.00	70.00	
	Total Number of Claims		Total Value Work Done	Total Value Work Applied	Total Assigned From	Total Reserve

0241 (03/91)

Credits you are claiming in this report may be cut back. In order to minimize the adverse effects of such deletions, please indicate from which claims you wish to priorize the deletion of credits. Please mark (✓) one of the following:

1. ☐ Credits are to be cut back starting with the claim listed last, working backwards.
2. ☑ Credits are to be cut back equally over all claims contained in this report of work.
3. ☐ Credits are to be cut back as priorized on the attached appendix.

In the event that you have not specified your choice of priority, option one will be implemented.

Note 1: Examples of beneficial interest are unrecorded transfers, option agreements, memorandum of agreements, etc., with respect to the mining claims.

Note 2: If work has been performed on patented or leased land, please complete the following:

I certify that the recorded holder had a beneficial interest in the patented or leased land at the time the work was performed

Signature: [illegible]

Date: [illegible]

Numéro de rapport sur les travaux exécutés pour l'affectation de la réserve	Numéro de claim	Nombre d'unités	Valeur des travaux d'évaluation exécutés sur ce claim	Valeur affectée à ce claim	Valeur transférée de ce claim	Réserve : travaux à réclamer à une date ultérieure
	S-993653	1		5.00		
	S-993654	1		5.00		
	S-993655	1		5.00		
	S-993656	1		5.00		
	S-994048	1	25.00	5.00	20.00	
	Nombre total de claims: 22		Valeur totale des travaux exécutés: 100.00	Valeur totale des travaux qui a été affectée: 100.00	Total transféré: 90.00	Réserve totale: [illegible]

Les crédits que vous réclamez dans le présent rapport peuvent être réduits. Afin de diminuer les conséquences défavorables de telles réductions, veuillez indiquer l'ordre dans lequel vous désirez qu'elles soient appliquées à vos claims. Veuillez cocher (✓) l'une des options suivantes :

1. ☐ Les crédits doivent être réduits en commençant par le dernier claim sur la liste.
2. ☐ Les crédits doivent être réduits également entre tous les claims figurant dans le présent rapport.
3. ☐ Les crédits doivent être réduits selon l'ordre donné en an[redacted]

Si vous[redacted]z pas choisi d'option, la première sera appliquée.

Note 1 : Exemples d'intérêts bénéficiaires : cessions non enregistrées, ententes sur des options, protocoles d'entente, etc. relatifs aux claims.

Note 2: Si des travaux ont été exécutés sur un terrain faisant [redacted] lettres patentes ou d'un bail, veuillez remplir ce qui suit:

Je cer[redacted] terrain[redacted] travaux[redacted]	Date

Ministry of Northern Development and Mines
Ontario

Ministère du Développement du Nord et des mines

Statement of Costs for Assessment Credit
État des coûts aux fins du crédit d'évaluation
Mining Act/Loi sur les mines

Transaction No./N° de transaction: W9570.00091

Personal information collected on this form is obtained under the authority of the **Mining Act**. This information will be used to maintain a record and ongoing status of the mining claim(s). Questions about this collection should be directed to the Provincial Manager, Minings Lands, Ministry of Northern Development and Mines, 4th Floor, 159 Cedar Street, Sudbury, Ontario P3E 6A5, telephone (705) 670-7264.

Les renseignements personnels contenus dans la présente formule sont recueillis en vertu de la **Loi sur les mines** et serviront à tenir à jour un registre des concessions minières. Adresser toute quesiton sur la collece de ces renseignements au chef provincial des terrains miniers, ministère du Développement du Nord et des Mines, 159, rue Cedar, 4e étage, Sudbury (Ontario) P3E 6A5, téléphone (705) 670-7264.

1. Direct Costs/Coûts directs

Type	Description	Amount Montant	Totals Total global
Wages Salaires	Labour Main-d'oeuvre		
	Field Supervision Supervision sur le terrain		
Contractor's and Consultant's Fees Droits de l'entrepreneur et de l'expert-conseil	Type Ground Geophysic. S.P Survey	100.00	
			100.00
Supplies Used Fournitures utilisées	Type		
Equipment Rental Location de matériel	Type		
		Total Direct Costs Total des coûts directs	100.00

2. Indirect Costs/Coûts indirects

** **Note:** When claiming Rehabilitation work Indirect costs are not allowable as assessment work.
Pour le remboursement des travaux de réhabilitation, les coûts indirects ne sont pas admissibles en tant que travaux d'évaluation.

Type	Description	Amount Montant	Totals Total global
Transportation Transport	Type		
Food and Lodging Nourriture et hébergement			
Mobilization and Demobilization Mobilisation et démobilisation			
		Sub Total of Indirect Costs Total partiel des coûts indirects	
Amount Allowable (not greater than 20% of Direct Costs) Montant admissible (n'excédant pas 20 % des coûts directs)			Ø
Total Value of Assessment Credit (Total of Direct and Allowable Indirect costs)	**Valeur totale du crédit d'évaluation (Total des coûts directs et indirects admissibles)**		100.00

Note: The recorded holder will be required to verify expenditures claimed in this statement of costs within 30 days of a request for verification. If verification is not made, the Minister may reject for assessment work all or part of the assessment work submitted.

Note : Le titulaire enregistré sera tenu de vérifier les dépenses demandées dans le présent état des coûts dans les 30 jours suivant une demande à cet effet. Si la vérification n'est pas effectuée, le ministre peut rejeter tout ou une partie des travaux d'évaluation présentés.

Filing Discounts

1. Work filed within two years of completion is claimed at 100% of the above Total Value of Assessment Credit.
2. Work filed three, four or five years after completion is claimed at 50% of the above Total Value of Assessment Credit. See calculations below:

Total Value of Assessment Credit		Total Assessment Claimed
	× 0.50 =	

Remises pour dépôt

1. Les travaux déposés dans les deux ans suivant leur achèvement sont remboursés à 100 % de la valeur totale susmentionnée du crédit d'évaluation.
2. Les travaux déposés trois, quatre ou cinq ans après leur achèvement sont remboursés à 50 % de la valeur totale du crédit d'évaluation susmentionné. Voir les calculs ci-dessous.

Valeur totale du crédit d'évaluation		Évaluation totale demandée
	× 0,50 =	

Certification Verifying Statement of Costs

I hereby certify:
that the amounts shown are as accurate as possible and these costs were incurred while conducting assessment work on the lands shown on the accompanying Report of Work form.

that as Harold J. Tracanelli (Recorded Holder, Agent, Position in Company) I am authorized

to make this certification

Attestation de l'état des coûts

J'atteste par la présente :
que les montants indiqués sont le plus exact possible et que ces dépenses ont été engagées pour effectuer les travaux d'évaluation sur les terrains indiqués dans la formule de rapport de travail ci-joint.

Et qu'à titre de ______________ je suis autorisé (titulaire enregistré, représentant, poste occupé dans la compagnie)

à faire cette attestation.

Signature: [signature] Date: Sept 06/95

0212 (04/91)

Nota : Dans cette formule, lorsqu'il désigne des personnes, le masculin est utilisé au sens neutre.

Ministry of Northern Development and Mines

Ontario

Report of Work Conducted After Recording Claim

Mining Act

Transaction Number: W9570.00092

620

Personal information collected on this form is obtained under the authority of the Mining Act. This information will be used for correspondence. Questions about this collection should be directed to the Provincial Manager, Mining Lands, Ministry of Northern Development and Mines, Fourth Floor, [redacted] ar Street, Sudbury, Ontario, P3E 6A5, telephone (705) 670-7264.

Instructions:
- Please type or print and submit in duplicate.
- Refer to the Mining Act and Regulations for requirements of filing assessment work or consult the Mining Recorder.
- A separate copy of this form must be completed for each Work Group.
- Technical reports and maps must accompany this form in duplicate.
- A sketch, showing the claims the work is assigned to, must accompany this form.

Recorded Holder(s): Harold J Tracanelli / John George Huyck		Client No.: 202732 / 147249
Address: Box 167, Chelmsford, P0M-1L0 / Box 793 Dowling Ont P0M-1R0		Telephone No.: 855-5356
Mining Division: Sudbury, Ontario	Township/Area: Moncrieff Township	M or G Plan No.: G-4086
Dates Work Performed From: July 14 1993	To: Jan 20 1994	

Work Performed (Check One Work Group Only)

	Work Group	Type
✓	Geotechnical Survey	Geological Mapping, Geological support core logging
	Physical Work, Including Drilling	
	Rehabilitation	
	Other Authorized Work	SECTION 18 ONLY
	Assays	
	Assignment from Reserve	

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Total Assessment Work Claimed on the Attached Statement of Costs $ 6990.00

Note: The Minister may reject for assessment work credit all or part of the assessment work submitted if the recorded holder cannot verify expenditures claimed in the statement of costs within 30 days of a request for verification.

Persons and Survey Company Who Performed the Work (Give Name and Address of Author of Report)

Name	Address
Yves Clement, consult geologist	422 St Georges Street Sudbury 1-705-673-9297
Harold Tracanelli, consulting geologist	Box 167 Chelmsford Ontario 1-705-855-5356

(attach a schedule if necessary)

Certification of Beneficial Interest * See Note No. 1 on reverse side

I certify that at the time the work was performed, the claims covered in this work report were recorded in the current holder's name or held under a beneficial interest by the current recorded holder.	Date: Sept 06/95	Recorded Holder or Agent (Signature): [signature]

Certification of Work Report

I certify that I have a personal knowledge of the facts set forth in this Work report, having performed the work or witnessed same during and/or after its completion and annexed report is true.

Name and Address of Person Certifying: George Huyck Box 793 Dowling Ont P0M-1R0		
Telepone No.: 1-705-855-5415	Date: Sept-6-95	Certified By (Signature): [signature]

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Total Value Cr. Recorded	Date Recorded	Mining Recorder	Received Stamp
Applied $6,990.00	July 19, 1995	[signature]	SEP - 7 1995 A.M. P.M. 7 8 9 10 11 12 1 2 3 4 5 6
	Deemed Approval Date: October 17/95	Date Approved	
	Date Notice for Amendments Sent: Aug 21/95		

Work Report Number for Applying Reserve	Claim Number (see Note 2)	Number of Claim Units	Value of Assessment Work Done on this Claim	Value Applied to this Claim	Value Assigned from this Claim	Reserve: Work to be Claimed at a Future Date
	S-808969	1		317		
	S-808970	1	[illegible] 45	317	[illegible] 45	
	S-808971	1		317		
	S-808972	1		317		
	S-808983	1		317		
	S-808984	1		317		
	S-808985	1		317		
	S-808982	1		317		
	S-830677	1		317		
	S-830744	1		317		
	S-830745	1		317		
	S-830746	1		317		
	S-830747	1		317		
	S-831410	1		317		
	S-993568	1		317		
	S-993569	1		317		
	S-993570	1	5243.00	317	4926.00	
	Total Number of Claims		Total Value Work Done	Total Value Work Applied	Total Assigned From	Total Reserve

2.16200

Credits you are claiming in this report may be cut back. In order to minimize the adverse effects of such deletions, please indicate from which claims you wish to priorize the deletion of credits. Please mark (✓) one of the following:

1. ☐ Credits are to be cut back starting with the claim listed last, working backwards.
2. ☑ Credits are to be cut back equally over all claims contained in this report of work.
3. ☐ Credits are to be cut back as priorized on the attached appendix.

In the event that you have not specified your choice of priority, option one will be implemented.

Note 1: Examples of beneficial interest are unrecorded transfers, option agreements, memorandum of agreements, etc., with respect to the mining claims.

Note 2: If work has been performed on patented or leased land, please complete the following:

I certify that the recorded holder had a beneficial interest in the patented or leased land at the time the work was performed.	Signature [signature]	Date Sept 06/95

0/- (03/91)

Numéro de rapport sur les travaux exécutés pour l'affectation de la réserve	Numéro de claim	Nombre d'unités	Valeur des travaux d'évaluation exécutés sur ce claim	Valeur affectée à ce claim	Valeur transférée de ce claim	Réserve : travaux à réclamer à une date ultérieure
	S-993653	1		317		
	S-993654	1		317		
	S-993655	1		317		
	S-993656	1		317		
	S-994048	1	1747	333	1414	
	22		6990.00	6990.00	6657.00	
	Nombre total de claims		Valeur totale des travaux exécutés	Valeur totale des travaux qui a été affectée	Total transféré	Réserve totale

0241 (06/91)

Les crédits que vous réclamez dans le présent rapport peuvent être réduits. Afin de diminuer les conséquences défavorables de telles réductions, veuillez indiquer l'ordre dans lequel vous désirez qu'elles soient appliquées à vos claims. Veuillez cocher (✓) l'une des options suivantes :

1. ☐ Les crédits doivent être réduits en commençant par le dernier claim sur la liste.
2. ☐ Les crédits doivent être réduits également entre tous les claims figurant dans le présent rapport.
3. ☐ Les crédits doivent être réduits selon l'ordre donné en [redacted]

[redacted] n'avez pas choisi d'option, la première sera appliquée [redacted]

Note 1 : Exemples d'intérêts bénéficiaires : cessions non enregistrées, ententes sur des options, protocoles d'entente, etc. relatifs aux claims.

Note [redacted] Si des travaux ont été exécutés sur un terrain faisant l'objet de lettres patentes ou d'un bail, veuillez remplir ce qui suit:

[redacted] que le titulaire enregistré possédait un intérêt bénéficiaire [redacted]	[redacted]	Date

Ministry of Northern Development and Mines
Ontario
Ministère du Développement du Nord et des mines

Statement of Costs for Assessment Credit

État des coûts aux fins du crédit d'évaluation

Mining Act/Loi sur les mines

Transaction No./N° de transaction: W9570.00092

Personal information collected on this form is obtained under the authority of the **Mining Act**. This information will be used to maintain a record and ongoing status of the mining claim(s). Questions about this collection should be directed to the Provincial Manager, Minings Lands, Ministry of Northern Development and Mines, 4th Floor, 159 Cedar Street, Sudbury, Ontario P3E 6A5, telephone (705) 670-7264.

Les renseignements personnels contenus dans la présente formule sont recueillis en vertu de la **Loi sur les mines** et serviront à tenir à jour un registre des concessions minières. Adresser toute quesiton sur la collece de ces renseignements au chef provincial des terrains miniers, ministère du Développement du Nord et des Mines, 159, rue Cedar, 4e étage, Sudbury (Ontario) P3E 6A5, téléphone (705) 670-7264.

1. Direct Costs/Coûts directs

Type	Description	Amount Montant	Totals Total global
Wages Salaires	Labour Main-d'oeuvre		
	Field Supervision Supervision sur le terrain		
Contractor's and Consultant's Fees Droits de l'entrepreneur et de l'expert-conseil	Type Geological mapping, Geological support, core logging, [illegible]		
	Yves Clement Consulting Geologist	4762.00	
~~**Supplies Used Fournitures utilisées**~~	Type H. Tracanelli Consulting Geologist	2228.00	
			6990.00
Equipment Rental Location de matériel	Type		
		Total Direct Costs Total des coûts directs	6990.00

2. Indirect Costs/Coûts indirects

** **Note:** When claiming Rehabilitation work Indirect costs are not allowable as assessment work.
Pour le remboursement des travaux de réhabilitation, les coûts indirects ne sont pas admissibles en tant que travaux d'évaluation.

Type	Description	Amount Montant	Totals Total global
Transportation Transport	Type		
Food and Lodging Nourriture et hébergement			
Mobilization and Demobilization Mobilisation et démobilisation			
		Sub Total of Indirect Costs Total partiel des coûts indirects	
		Amount Allowable (not greater than 20% of Direct Costs) Montant admissible (n'excédant pas 20 % des coûts directs)	0
		Total Value of Assessment Credit (Total of Direct and Allowable Indirect costs) Valeur totale du crédit d'évaluation (Total des coûts directs et indirects admissibles)	6990.00

Note: The recorded holder will be required to verify expenditures claimed in this statement of costs within 30 days of a request for verification. If verification is not made, the Minister may reject for assessment work all or part of the assessment work submitted.

Note : Le titulaire enregistré sera tenu de vérifier les dépenses demandées dans le présent état des coûts dans les 30 jours suivant une demande à cet effet. Si la vérification n'est pas effectuée, le ministre peut rejeter tout ou une partie des travaux d'évaluation présentés.

Filing Discounts

1. Work filed within two years of completion is claimed at 100% of the above Total Value of Assessment Credit.
2. Work filed three, four or five years after completion is claimed at 50% of the above Total Value of Assessment Credit. See calculations below:

Total Value of Assessment Credit		Total Assessment Claimed
	× 0.50 =	

Remises pour dépôt

1. Les travaux déposés dans les deux ans suivant leur achèvement sont remboursés à 100 % de la valeur totale susmentionnée du crédit d'évaluation.
2. Les travaux déposés trois, quatre ou cinq ans après leur achèvement sont remboursés à 50 % de la valeur totale du crédit d'évaluation susmentionné. Voir les calculs ci-dessous.

Valeur totale du crédit d'évaluation		Évaluation totale demandée
	× 0,50 =	

Certification Verifying Statement of Costs

I hereby certify:
that the amounts shown are as accurate as possible and these costs were incurred while conducting assessment work on the lands shown on the accompanying Report of Work form.

that as Harold J. Tracanelli (Recorded Holder, Agent, Position in Company) I am authorized to make this certification

Attestation de l'état des coûts

J'atteste par la présente :
que les montants indiqués sont le plus exact possible et que ces dépenses ont été engagées pour effectuer les travaux d'évaluation sur les terrains indiqués dans la formule de rapport de travail ci-joint.

Et qu'à titre de ______ (titulaire enregistré, représentant, poste occupé dans la compagnie) je suis autorisé à faire cette attestation.

Signature	Date
[signature]	Sept 06/95

0212 (04/91)

Nota : Dans cette formule, lorsqu'il désigne des personnes, le masculin est utilisé au sens neutre.

Ministry of Northern Development and Mines
Ontario

Report of Work Conducted After Recording Claim

Mining Act

Transaction Number [redacted]
W9570.00093

2.16200

Personal information collected on this form is obtained under the authority of the Mining Act. This information will be used for correspondence. Questions about this collection should be directed to the Provincial Manager, Mining Lands, Ministry of Northern Development and Mines, Fourth Floor, 159 Cedar Street, Sudbury, Ontario, P3E 6A5, telephone (705) 670-7264. [redacted]

Instructions:
- Please type or print and submit in duplicate.
- Refer to the Mining Act and Regulations for requirements of filing assessment work or consult the Mining Recorder.
- A separate copy of this form must be completed for each Work Group.
- Technical reports and maps must accompany this form in duplicate.
- A sketch, showing the claims the work is assigned to, must accompany this form.

Recorded Holder(s): Harold J. Tracanelli / John George Huycke		Client No.: 202732/147219
Address: Box 167, chelmsford, P0M-1L0 / Box 793 Dowling P0M-1R0		Telephone No.: 855-5356/ 855 5415
Mining Division: Sudbury, ontario	Township/Area: moncrieff township	M or G Plan No.: G-4086
Dates Work Performed From: July 14 1993	To: Jan 20 1994	

Work Performed (Check One Work Group Only)

	Work Group	Type
	Geotechnical Survey	
	Physical Work, Including Drilling	
	Rehabilitation	
	Other Authorized Work	SECTION 18 ONLY
	Assays	Surface & drill core assays
	Assignment from Reserve	

RECEIVED
SEP 21 19..
MINING LANDS BRANCH

Total Assessment Work Claimed on the Attached Statement of Costs $ 1362.00

Note: The Minister may reject for assessment work credit all or part of the assessment work submitted if the recorded holder cannot verify expenditures claimed in the statement of costs within 30 days of a request for verification.

Persons and Survey Company Who Performed the Work (Give Name and Address of Author of Report)

Name	Address
Chemex Labs Ltd.	212 brooksbank ave North Vancouver 1-604 984-0221
X-Ray assay Laboratories	1885 Leslie Street, Don mills ontario 1-416-445-5755

(attach a schedule if necessary)

Certification of Beneficial Interest * See Note No. 1 on reverse side

I certify that at the time the work was performed, the claims covered in this work report were recorded in the current holder's name or held under a beneficial interest by the current recorded holder.	Date: Sept-6-95	Recorded Holder or Agent (Signature): [signature]

Certification of Work Report

I certify that I have a personal knowledge of the facts set forth in this Work report, having performed the work or witnessed same during and/or after its completion and annexed report is true.		
Name and Address of Person Certifying: J G Huycke Box 793, Dowling ontario P0M-1R0		
Telepone No.: 1-705-855-5415	Date: Sept-6-95	Certified By (Signature): [signature]

For Office Use Only

Total Value Cr. Recorded	Date Recorded	Mining Recorder	Received Stamp
applied $1,362.00	July 19, 1995	[signature]	RECEIVED SEP - 7 1995 A.M. P.M. 7 8 9 10 11 12 1 2 3 4 5
	Deemed Approval Date: October 17/95	Date Approved	
	Date Notice for Amendments Sent: Aug. 21/95		

0241 (03/91)

Work Report Number for Applying Reserve	Claim Number (see Note 2)	Number of Claim Units	Value of Assessment Work Done on this Claim	Value Applied to this Claim	Value Assigned from this Claim	Reserve: Work to be Claimed at a Future Date
	S-808969	1		62		
	S-808970	1		62		
	S-808971	1		62		
	S-808972	1		62		
	S-808983	1		62		
	S-808984	1		62		
	S-808985	1		62		
	S-808987	1		62		
	S-830677	1		62		
	S-830744	1		62		
	S-830745	1		62		
	S-830746	1		62		
	S-830747	1		62		
	S-831410	1		62		
	S-993568	1		62		
	S-993569	1		62		
	S-993570	1	~~[illegible]~~ 1022	62	~~[illegible]~~ 960	
	Total Number of Claims		Total Value Work Done ~~[illegible]~~	Total Value Work Applied ~~[illegible]~~	Total Assigned From ~~[illegible]~~	Total Reserve

0241 (03/91)

Credits you are claiming in this report may be cut back. In order to minimize the adverse effects of such deletions, please indicate from which claims you wish to priorize the deletion of credits. Please mark (✓) one of the following:

1. ☐ Credits are to be cut back starting with the claim listed last, working backwards.
2. ☑ Credits are to be cut back equally over all claims contained in this report of work.
3. ☐ Credits are to be cut back as priorized on the attached appendix.

In the event that you have not specified your choice of priority, option one will be implemented.

Note 1: Examples of beneficial interest are unrecorded transfers, option agreements, memorandum of agreements, etc., with respect to the mining claims.

Note 2: If work has been performed on patented or leased land, please complete the following:

I certify that the recorded holder had a beneficial interest in the patented or leased land at the time the work was performed.	Signature [signature]	Date Sept 06/95

Numéro de rapport sur les travaux exécutés pour l'affectation de la réserve	Numéro de claim	Nombre d'unités	Valeur des travaux d'évaluation exécutés sur ce claim	Valeur affectée à ce claim	Valeur transférée de ce claim	Réserve : travaux à réclamer à une date ultérieure
	S-993653	1		62		
	S-993654	1		62		
	S-993655	1		62		
	S-993656	1		62		
	S-994048	1	340	60	280	
						2.16200
				1362		
	Nombre total de claims		Valeur totale des travaux exécutés: 1362	Valeur totale des travaux qui a été affectée: ~~[illegible]~~	Total transféré: 1240	Réserve totale

Les crédits que vous réclamez dans le présent rapport peuvent être réduits. Afin de diminuer les conséquences défavorables de telles réductions, veuillez indiquer l'ordre dans lequel vous désirez qu'elles soient appliquées à vos claims. Veuillez cocher (✓) l'une des options suivantes :

1. ☐ Les crédits doivent être réduits en commençant par le dernier claim sur la liste.
2. ☐ Les crédits doivent être réduits également entre tous les claims figurant dans le présent rapport.
3. ☐ Les crédits doivent être réduits selon l'ordre donné en annexe.

Si vous n'avez pas choisi d'option, la première sera appliquée.

[redacted]

Note 1 : Exemples d'intérêts bénéficiaires : cessions non enregistrées, ententes sur des options, protocoles d'entente, etc. relatifs aux claims.

Note 2: Si des travaux ont été exécutés sur un terrain faisant l'objet de lettres patentes ou d'un bail, veuillez remplir ce qui suit:

Je certifie [redacted]	Signature [redacted]	Date [redacted]

41 (05/91)

Ministry of Northern Development and Mines

Ontario

Ministère du Développement du Nord et des mines

Statement of Costs for Assessment Credit

État des coûts aux fins du crédit d'évaluation

Mining Act/Loi sur les mines

Transaction No./N° de transaction W9570-00093

2.16200

Personal information collected on this form is obtained under the authority of the **Mining Act**. This information will be used to maintain a record and ongoing status of the mining claim(s). Questions about this collection should be directed to the Provincial Manager, Minings Lands, Ministry of Northern Development and Mines, 4th Floor, 159 Cedar Street, Sudbury, Ontario P3E 6A5, telephone (705) 670-7264.

Les renseignements personnels contenus dans la présente formule sont recueillis en vertu de la **Loi sur les mines** et serviront à tenir à jour un registre des concessions minières. Adresser toute quesiton sur la collece de ces renseignements au chef provincial des terrains miniers, ministère du Développement du Nord et des Mines, 159, rue Cedar, 4e étage, Sudbury (Ontario) P3E 6A5, téléphone (705) 670-7264.

1. Direct Costs/Coûts directs

Type	Description	Amount Montant	Totals Total global
Wages Salaires	Labour Main-d'oeuvre		
	Field Supervision Supervision sur le terrain		
Contractor's and Consultant's Fees Droits de l'entrepreneur et de l'expert-conseil	Type Chemex Labs Ltd [illegible]	880.00	
	X-Ray Assay Labs	482.00	
			1362.00
Supplies Used Fournitures utilisées	Type		
Equipment Rental Location de matériel	Type		
		Total Direct Costs Total des coûts directs	1362.00

2. Indirect Costs/Coûts indirects

** **Note:** When claiming Rehabilitation work Indirect costs are not allowable as assessment work.
Pour le remboursement des travaux de réhabilitation, les coûts indirects ne sont pas admissibles en tant que travaux d'évaluation.

Type	Description	Amount Montant	Totals Total global
Transportation Transport	Type		
Food and Lodging Nourriture et hébergement			
Mobilization and Demobilization Mobilisation et démobilisation			
		Sub Total of Indirect Costs Total partiel des coûts indirects	
		Amount Allowable (not greater than 20% of Direct Costs) Montant admissible (n'excédant pas 20 % des coûts directs)	0
		Total Value of Assessment Credit (Total of Direct and Allowable Indirect costs) Valeur totale du crédit d'évaluation (Total des coûts directs et indirects admissibles	1362.00

Note: The recorded holder will be required to verify expenditures claimed in this statement of costs within 30 days of a request for verification. If verification is not made, the Minister may reject for assessment work all or part of the assessment work submitted.

Note : Le titulaire enregistré sera tenu de vérifier les dépenses demandées dans le présent état des coûts dans les 30 jours suivant une demande à cet effet. Si la vérification n'est pas effectuée, le ministre peut rejeter tout ou une partie des travaux d'évaluation présentés.

Filing Discounts

1. Work filed within two years of completion is claimed at 100% of the above Total Value of Assessment Credit.
2. Work filed three, four or five years after completion is claimed at 50% of the above Total Value of Assessment Credit. See calculations below:

Total Value of Assessment Credit		Total Assessment Claimed
	× 0.50 =	

Remises pour dépôt

1. Les travaux déposés dans les deux ans suivant leur achèvement sont remboursés à 100 % de la valeur totale susmentionnée du crédit d'évaluation.
2. Les travaux déposés trois, quatre ou cinq ans après leur achèvement sont remboursés à 50 % de la valeur totale du crédit d'évaluation susmentionné. Voir les calculs ci-dessous.

Valeur totale du crédit d'évaluation		Évaluation totale demandée
	× 0,50 =	

Certification Verifying Statement of Costs

I hereby certify:
that the amounts shown are as accurate as possible and these costs were incurred while conducting assessment work on the lands shown on the accompanying Report of Work form.

that as Harold J. Tracanelli I am authorized
(Recorded Holder, Agent, Position in Company)

to make this certification

Attestation de l'état des coûts

J'atteste par la présente :
que les montants indiqués sont le plus exact possible et que ces dépenses ont été engagées pour effectuer les travaux d'évaluation sur les terrains indiqués dans la formule de rapport de travail ci-joint.

Et qu'à titre de ______________ je suis autorisé
(titulaire enregistré, représentant, poste occupé dans la compagnie)

à faire cette attestation.

Signature [illegible] Date Sept 06/95

0212 (04/91)

Nota : Dans cette formule, lorsqu'il désigne des personnes, le masculin est utilisé au sens neutre.

Ontario

Ministry of
Northern Development
and Mines

Ministère du
Développement du Nord
et des Mines

Mining Recorder's Office
Willet Green Miller Centre
933 Ramsey Lake Road
3rd Floor (B)
Sudbury, ON
P3E 6B5

Telephone: (705) 670-5742
Fax: (705) 670-5681

File: W9570.00090

October 17, 1995

Harold Tracanelli
Box 167
Chelmsford, ON P0M 1L0

Dear Sir:

Subject: Approval of Assessment - Moncrieff Township

The assessment work credits for Diamond Drilling, as outlined on the **AMENDED** report of work form, have been approved as of October 17, 1995.

Yours truly,

Roy Denomme
Mining Recorder
Sudbury Mining Division

/kg

Encl.

c.c. George Huycke

Ontario

Ministry of
Northern Development
and Mines

Ministère du
Développement du Nord
et des Mines

Geoscience Approvals Office
933 Ramsey Lake Road
6th Floor
Sudbury, Ontario
P3E 6B5

Telephone: (705) 670-5853
Fax: (705) 670-5863

Our File: 2.16200
Transaction #W9570.00091
#W9570.00092
#W9570.00093

September 27, 1995

Mining Recorder
Ministry of Northern Development & Mines
933 Ramsey Lake Road, 3rd Floor
Sudbury, Ontario
P3E 6B5

Dear Mr. Denomme:

SUBJECT: APPROVAL OF ASSESSMENT WORK CREDITS ON MINING CLAIMS 993570 ET AL IN MONCRIEFF TOWNSHIP

Assessment work credits have been approved as outlined on the original report of work forms for this submission. The credits have been approved under Section 14,12,17, Geophysics(SP), Geology, Assays, Mining Act Regulations.

The approval date is **September 26, 1995.** Please indicate this approval on the claim record sheets.

If you have any questions regarding this correspondence, please contact Bruce Gates at (705) 670-5856.

Yours sincerely,

Mark Hall
Acting Senior Manager, Mining Lands Section
Mining and Land Management Branch
Mines and Minerals Division

BIG/

cc: Resident Geologist
Sudbury, Ontario

Assessment Files Library
Sudbury, Ontario

W9570.00090

SEPTEMBER 21, 1995

NOTE TO: MINING LANDS - ASSESSMENT OFFICE

RE: W9570.00089 TO W9570.00093

Please find attached Work Reports W9570.00091, W9570.00092 and W.9570.00093 along with **one** copy of the technical report. I have the other copy of the report as it supports Reports of Work W9570.00089 and W9570.00090, which were filed under Physical Work and Diamond Drilling. Once the physical work and Diamond Drillig reports have been assessed and approved, I'll forward the second set of technical data to you.

Kim Giroux
Senior Clerk
Sudbury

Yves Clément Exploration Services
422 St-George St., Sudbury, Ont, P3B 2L6
(705) 673-9297

January 16, 94

Invoice # 21
on account with: John G. Huyke
19 Emile Crescent
Dowling, Ontario
P0M 1R0

Re: T-H Property Trenching
Moncrieff Township

Field Days (trench supervision, washing, mapping)

17 days @ $ 175.00/day — $ 2,975.00

Report Preparation (Report, trench sections) — $ 1,000.00

Helper (trench washing)

3 days @ $ 100/day — $ 300.00

Travelling Expenses

17 trips x $ 15/trip — $ 255.00

Analytical Costs
(includes $ 22.47 for shipping) — $ 481.50

eld Supplies ✓ $32.13
(Flagging tape, spray paint,
gas for pump)

Word Processing ✓ $150.00

Report Expenditures

4 copies x 12.50/copy ✓ $50.00

Invoice Total : $5,243.63

Yves P. Clement

Yves Clement. Consulting project geologist

~~$4762.13~~ → 4762.00

MAINVILLE LUMBER COMPANY LIMITED
304 Leroux Street
CHELMSFORD, ONTARIO POM 1L0

Phone 855-2577

STATEMENT

DATE Aug 1/93
NUMBER 855-5415

John George Huycke
14 Emile Cresent - General Delivery
Dowling Ont. POM 1R0

TERMS $

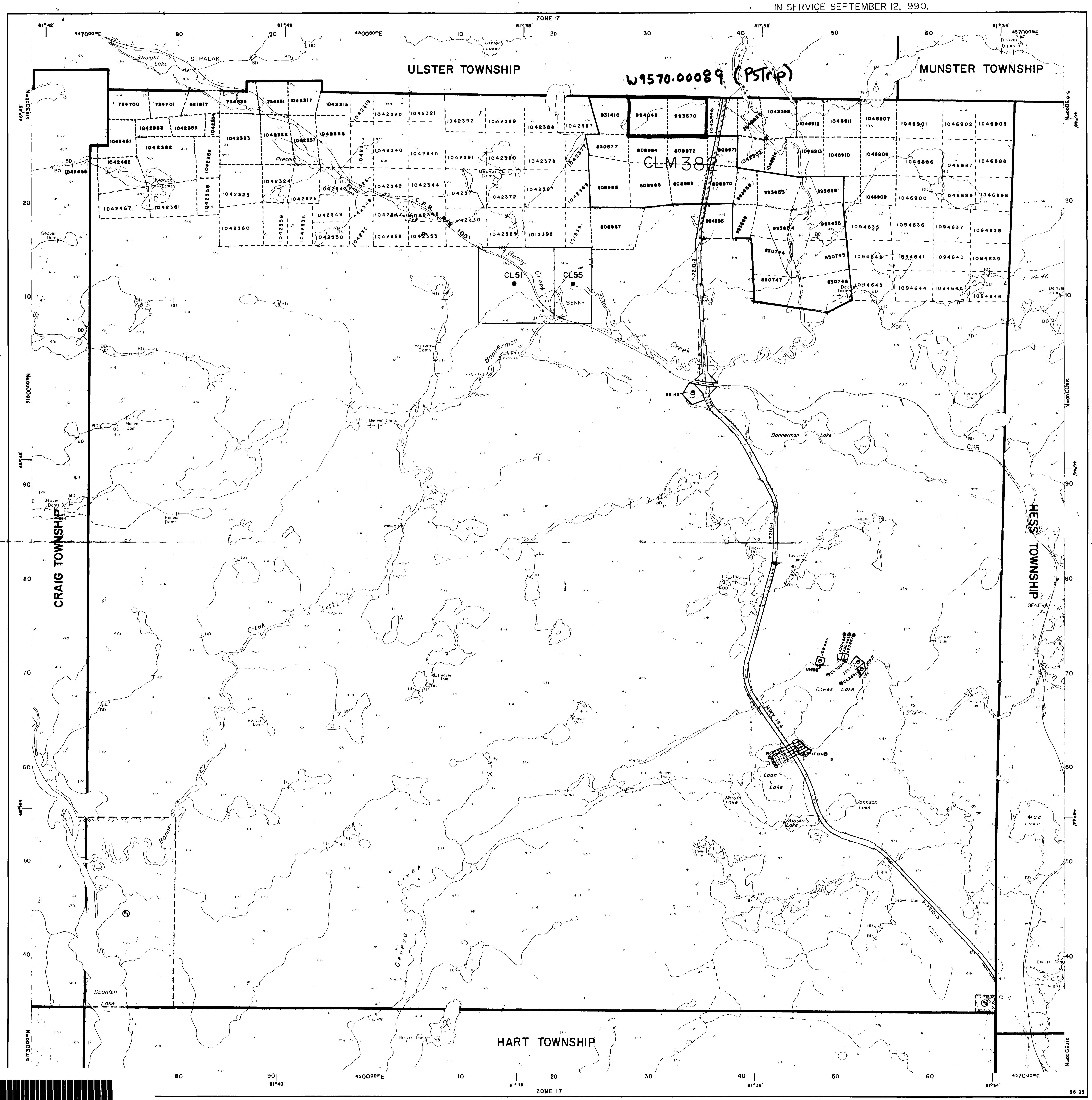
PLEASE DETACH AND RETURN WITH YOUR REMITTANCE

DATE	CHARGES AND CREDITS	BALANCE
	BALANCE FORWARD ▶	
July 14/93	Inv# 3730	5,007.60
	Payable upon Receipt	

Thank You — PAY LAST AMOUNT IN THIS COLUMN

MAINVILLE LUMBER COMPANY LIMITED

IN SERVICE SEPTEMBER 12, 1990.



Ministry of Natural Resources
Ministry of Northern Development and Mines
Ontario

INDEX TO LAND DISPOSITION

PLAN
G-4086
TOWNSHIP
MONCRIEFF

DATE OF ISSUE
SEP 21 1995
SUDBURY
MINING RECORDER'S OFFICE

M.N.R. ADMINISTRATIVE DISTRICT
SUDBURY
MINING DIVISION
SUDBURY
LAND TITLES/REGISTRY DIVISION
SUDBURY

Scale 1 20 000

Metres 1000 0 1000 2000 Metres

Feet 1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 Feet

1182572

Contour Interval 10 Metres

AREAS WITHDRAWN FROM DISPOSITION

MRO - Mining Rights Only
SRO - Surface Rights Only
M + S - Mining and Surface Rights

	Description	Order No	Date	Disposition	File
(R1)	SEC 36/80	W 4/82	14/6/82	SRO	137685
(R2)	SEC 36/80	W 59/86		SRO	

SYMBOLS

Boundary
- Township, Meridian, Baseline
- Road allowance, surveyed
  - shoreline
- Lot/Concession, surveyed
  - unsurveyed
- Parcel, surveyed
  - unsurveyed
- Right-of-way, road
  - railway
  - utility
- Reservation

Cliff, Pit, Pile

Contour
- Interpolated
- Approximate
- Depression

Control point (horizontal)

Flooded land

Mine head frame

Pipeline (above ground)

Railway, single track
- double track
- abandoned

Road, highway, county, township
- access
- trail, bush

Shoreline (original)

Transmission line

Wooded area

NOTES

SUBDIVISION OF THIS TOWNSHIP INTO LOTS AND CONCESSIONS WAS ANNULLED 30th JUNE 1953

DOWES LAKE DEVELOPMENT PLAN DATED 11th JUNE 1970 FILE 183095

DISPOSITION OF CROWN LANDS

Patent
- Surface & Mining Rights
- Surface Rights Only
- Mining Rights Only

Lease
- Surface & Mining Rights
- Surface Rights Only
- Mining Rights Only

Licence of Occupation

Order-in-Council OC

Cancelled

Reservation

Sand & Gravel

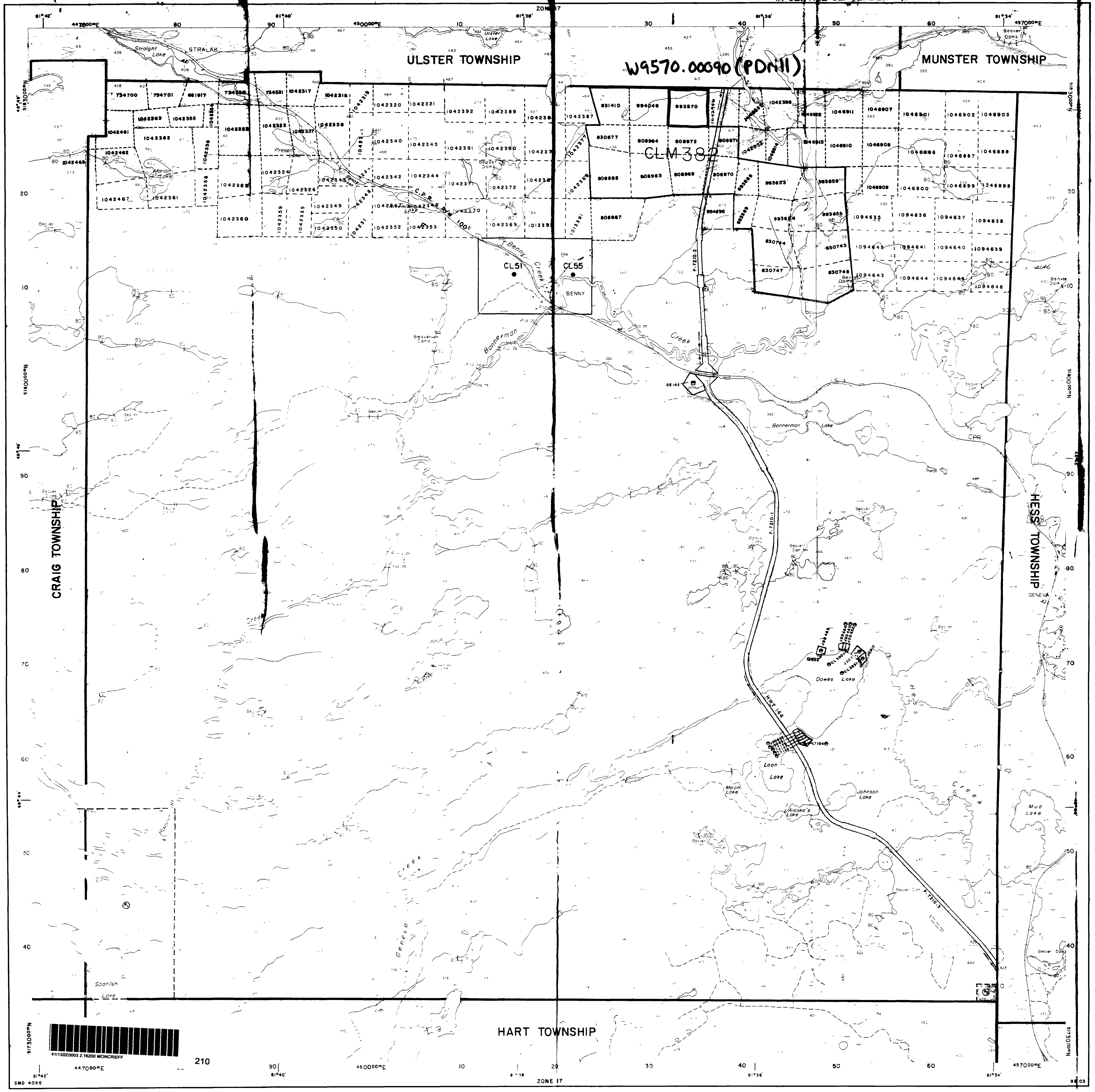
THE INFORMATION THAT APPEARS ON THIS MAP HAS BEEN COMPILED FROM VARIOUS SOURCES, AND ACCURACY IS NOT GUARANTEED. THOSE WISHING TO STAKE MINING CLAIMS SHOULD CONSULT WITH THE MINING RECORDER, MINISTRY OF NORTHERN DEVELOPMENT AND MINES, FOR ADDITIONAL INFORMATION ON THE STATUS OF THE LANDS SHOWN HEREON

Map base and land disposition drafting by Surveys and Mapping Branch, Ministry of Natural Resources

The disposition of land, location of lot fabric and parcel boundaries on this index was compiled for administrative purposes only

88 03

41I13SE0003 2.18200 MONCRIEFF



Ministry of Natural Resources
Ministry of Northern Development and Mines
Ontario

INDEX TO LAND DISPOSITION

PLAN
G-4086

TOWNSHIP
MONCRIEFF

M.N.R. ADMINISTRATIVE DISTRICT
SUDBURY

MINING DIVISION
SUDBURY

LAND TITLES/REGISTRY DIVISION
SUDBURY

Scale 1:20 000

Contour Interval 10 Metres

1182572

DATE OF ISSUE
SEP 21 1995
SUDBURY
MINING RECORDER'S OFFICE

AREAS WITHDRAWN FROM DISPOSITION

MRO - Mining Rights Only
SRO - Surface Rights Only
M + S - Mining and Surface Rights

Description	Order No	Date	Disposition	File
SEC 36/80	W 4/82	14/6/82	S.R.O	137685
SEC 36/80	W 59/86		S.R.O	

SYMBOLS

Boundary
- Township, Meridian, Baseline
- Road allowance, surveyed / shoreline
- Lot/Concession, surveyed / unsurveyed
- Parcel, surveyed / unsurveyed
- Right-of-way, road / railway / utility
- Reservation

Cliff, Pit, Pile

Contour
- Interpolated
- Approximate
- Depression

Control point (horizontal)

Flooded land

Mine head frame

Pipeline (above ground)

Railway single track / double track / abandoned

Road highway county township / access / trail bush

Shoreline (original)

Transmission line

Wooded area

NOTES

SUBDIVISION OF THIS TOWNSHIP INTO LOTS AND CONCESSIONS WAS ANNULLED 30th JUNE 1953

DOWES LAKE DEVELOPMENT PLAN DATED 11th JUNE 1970 FILE 183095

DISPOSITION OF CROWN LANDS

Patent
- Surface & Mining Rights
- Surface Rights Only
- Mining Rights Only

Lease
- Surface & Mining Rights
- Surface Rights Only
- Mining Rights Only

Licence of Occupation

Order-in-Council — OC

Cancelled

Reservation

Sand & Gravel

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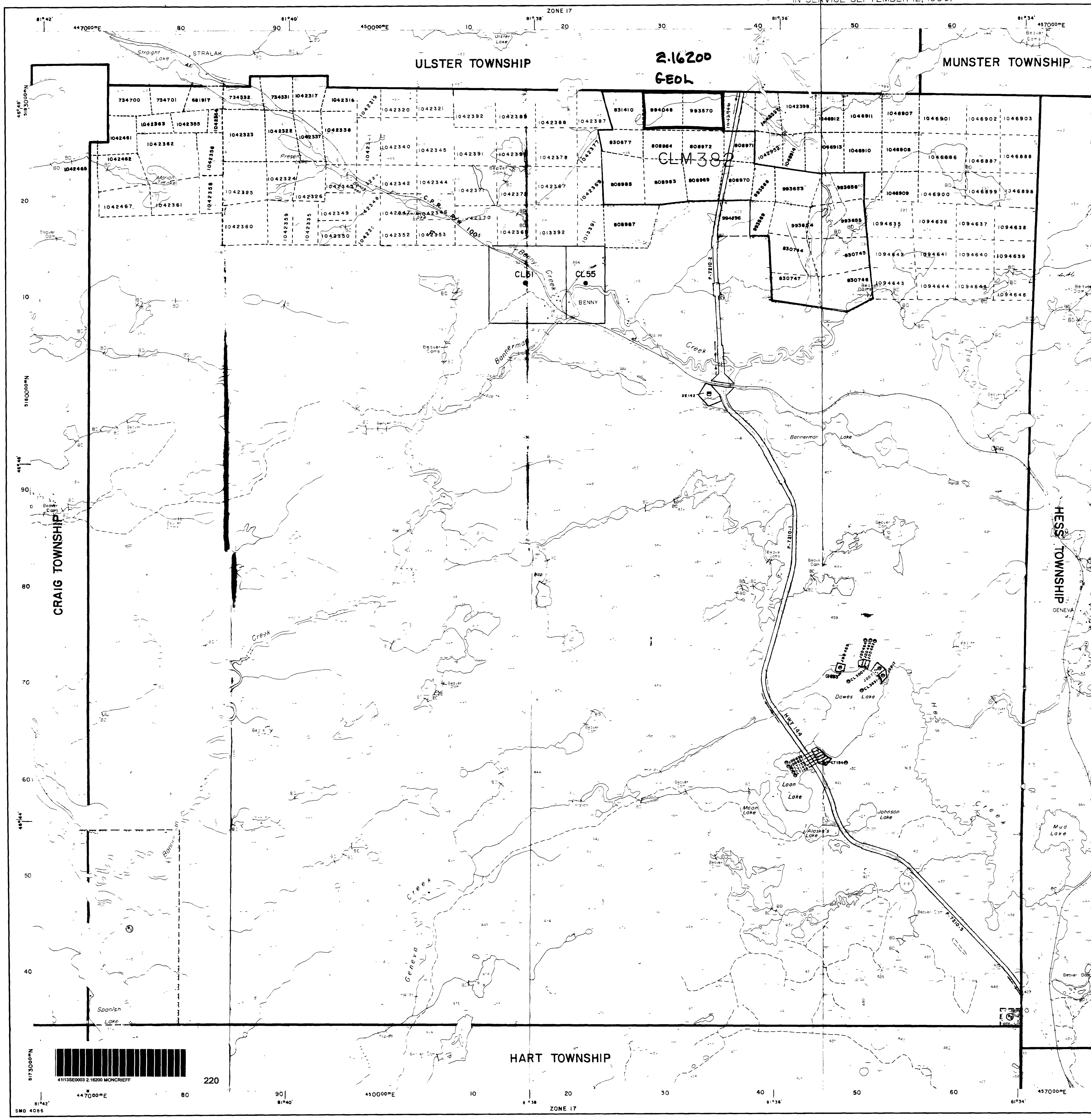
Map base and land disposition drafting by Surveys and Mapping Branch, Ministry of Natural Resources

The disposition of land, location of lot fabric and parcel boundaries on this index was compiled for administrative purposes only

IN SERVICE SEPTEMBER 12, 1990.

2.16200 GEOL



Ministry of Natural Resources | Ministry of Northern Development and Mines

Ontario

INDEX TO LAND DISPOSITION

PLAN

G-4086

TOWNSHIP

MONCRIEFF

M.N.R. ADMINISTRATIVE DISTRICT

SUDBURY

MINING DIVISION

SUDBURY

LAND TITLES/REGISTRY DIVISION

SUDBURY

Scale 1:20 000

Contour Interval 10 Metres

DATE OF ISSUE

SEP 21 1995

SUDBURY MINING RECORDER'S OFFICE

AREAS WITHDRAWN FROM DISPOSITION

MRO - Mining Rights Only
SRO - Surface Rights Only
M + S - Mining and Surface Rights

	Description	Order No	Date	Disposition	File
Ⓦ	SEC 36/80	W 4/82	14/6/82	S.R.O	137685
Ⓦ	SEC 36/80	W 59/86		S.R.O	

SYMBOLS

Boundary
- Township, Meridian, Baseline
- Road allowance surveyed / shoreline
- Lot/Concession surveyed / unsurveyed
- Parcel, surveyed / unsurveyed
- Right-of-way road / railway / utility
- Reservation
- Cliff, Pit, Pile

Contour
- Interpolated
- Approximate
- Depression

Control point (horizontal)
Flooded land
Mine head frame
Pipeline (above ground)
Railway single track / double track / abandoned
Road, highway county, township / access / trail, bush
Shoreline (original)
Transmission line
Wooded area

DISPOSITION OF CROWN LANDS

Patent
- Surface & Mining Rights
- Surface Rights Only
- Mining Rights Only

Lease
- Surface & Mining Rights
- Surface Rights Only
- Mining Rights Only

Licence of Occupation
Order-in-Council — OC
Cancelled
Reservation
Sand & Gravel

NOTES

SUBDIVISION OF THIS TOWNSHIP INTO LOTS AND CONCESSIONS WAS ANNULLED 30th JUNE 1953

DOWES LAKE DEVELOPMENT PLAN DATED 11th JUNE 1970 FILE 183095

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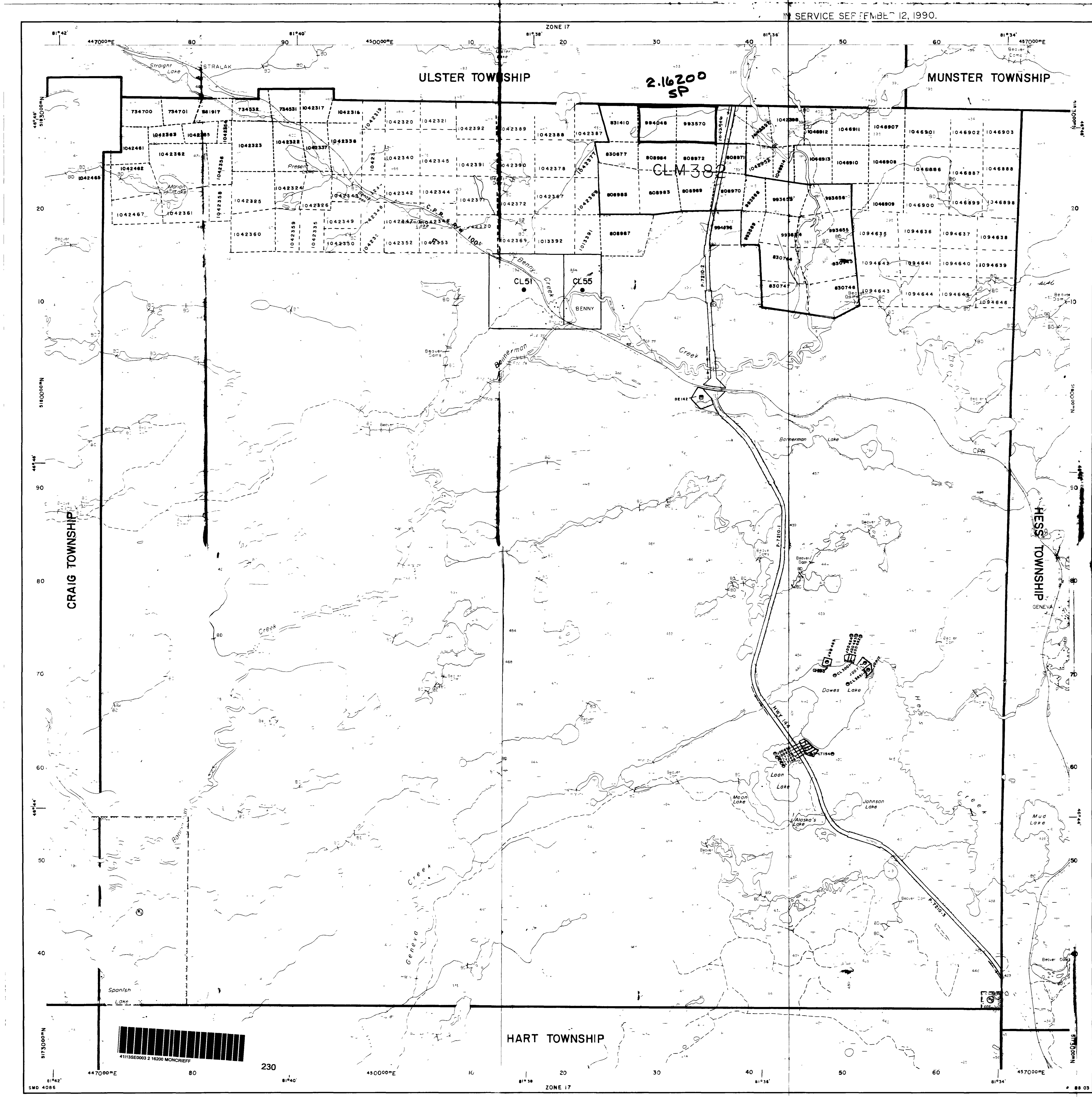
Map base and land disposition drafting by Surveys and Mapping Branch, Ministry of Natural Resources

The disposition of land, location of lot fabric and parcel boundaries on this index was compiled for administrative purposes only



Ministry of Natural Resources
Ministry of Northern Development and Mines
Ontario

INDEX TO LAND DISPOSITION

PLAN

G-4086

TOWNSHIP

MONCRIEFF

DATE OF ISSUE
SEP 21 1995
SUDBURY
MINING RECORDER'S OFFICE

M.N.R. ADMINISTRATIVE DISTRICT
SUDBURY
MINING DIVISION
SUDBURY
LAND TITLES/REGISTRY DIVISION
SUDBURY

Scale 1 20 000

Metres 1000 0 1000 2000 Metres

Feet 1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 Feet

1182572

Contour Interval 10 Metres

AREAS WITHDRAWN FROM DISPOSITION

MRO - Mining Rights Only
SRO - Surface Rights Only
M + S - Mining and Surface Rights

	Description	Order No	Date	Disposition	File
R1	SEC 36/80	W 4/82	14/6/82	S R O	137685
R2	SEC 36/80	W 59/86		S R O	

SYMBOLS

Boundary
- Township Meridian, Baseline
- Road allowance, surveyed
  - shoreline
- Lot/Concession surveyed
  - unsurveyed
- Parcel surveyed
  - unsurveyed
- Right-of-way, road
  - railway
  - utility
- Reservation

Cliff, Pit, Pile

Contour
- Interpolated
- Approximate
- Depression

Control point (horizontal)

Flooded land

Mine head frame

Pipeline (above ground)

Railway, single track
- double track
- abandoned

Road, highway, county, township
- access
- trail, bush

Shoreline (original)

Transmission line

Wooded area

NOTES

SUBDIVISION OF THIS TOWNSHIP INTO LOTS AND CONCESSIONS WAS ANNULLED 30th JUNE 1953

DOWES LAKE DEVELOPMENT PLAN DATED 11th JUNE 1970 FILE 183095

DISPOSITION OF CROWN LANDS

Patent
- Surface & Mining Rights ●
- Surface Rights Only
- Mining Rights Only

Lease
- Surface & Mining Rights ■
- Surface Rights Only
- Mining Rights Only

Licence of Occupation ▼

Order-in-Council OC

Cancelled

Reservation

Sand & Gravel

THE INFORMATION THAT APPEARS ON THIS MAP HAS BEEN COMPILED FROM VARIOUS SOURCES, AND ACCURACY IS NOT GUARANTEED. THOSE WISHING TO STAKE MINING CLAIMS SHOULD CONSULT WITH THE MINING RECORDER, MINISTRY OF NORTHERN DEVELOPMENT AND MINES FOR ADDITIONAL INFORMATION ON THE STATUS OF THE LANDS SHOWN HEREON

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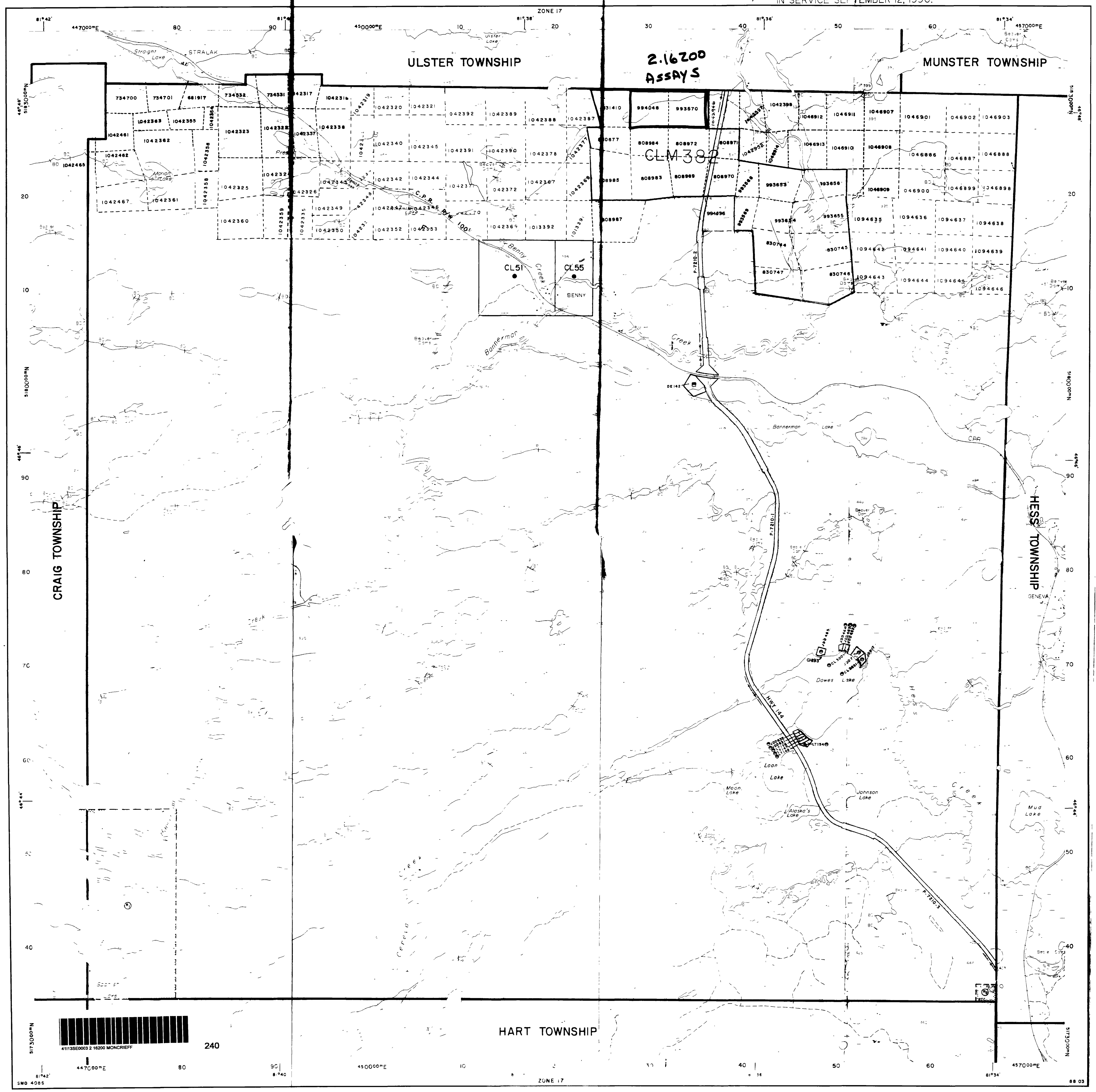

Ministry of Natural Resources
Ministry of Northern Development and Mines
Ontario

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M.N.R. ADMINISTRATIVE DISTRICT
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LAND TITLES/REGISTRY DIVISION
SUDBURY

DATE OF ISSUE
SEP 21 1995
SUDBURY
MINING RECORDER'S OFFICE

Scale 1 20 000

Metres 1000 0 1000 2000 Metres

Feet 1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10 000 Feet

1182572

Contour Interval 10 Metres

AREAS WITHDRAWN FROM DISPOSITION

MRO - Mining Rights Only
SRO - Surface Rights Only
M - S - Mining and Surface Rights

	Description	Order No.	Date	Disposition	File
(R1)	SEC 36/80	W 4/82	14/6/82	S R O	137685
(R2)	SEC 36/80	W 59/86		S R O	

SYMBOLS

Boundary
Township Meridian Baseline
Road allowance surveyed
shoreline
Lot/Concession surveyed
unsurveyed
Parcel surveyed
unsurveyed
Right-of-way road
railway
utility
Reservation
Cliff Pit Pile
Contour
Interpolated
Approximate
Depression
Control point (horizontal)
Flooded land
Mine head frame
Pipeline (above ground)
Railway single track
double track
abandoned
Road, highway, county township
access
trail bush
Shoreline (original)
Transmission line
Wooded area

NOTES

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DISPOSITION OF CROWN LANDS

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Surface & Mining Rights
Surface Rights Only
Mining Rights Only
Lease
Surface & Mining Rights
Surface Rights Only
Mining Rights Only
Licence of Occupation
Order-in-Council OC
Cancelled
Reservation
Sand & Gravel

THE INFORMATION [illegible] APPEARS ON THIS MAP HAS BEEN COMPILED FROM [illegible] SOURCES AND ACCURACY IS NOT GUARANTEED [illegible]

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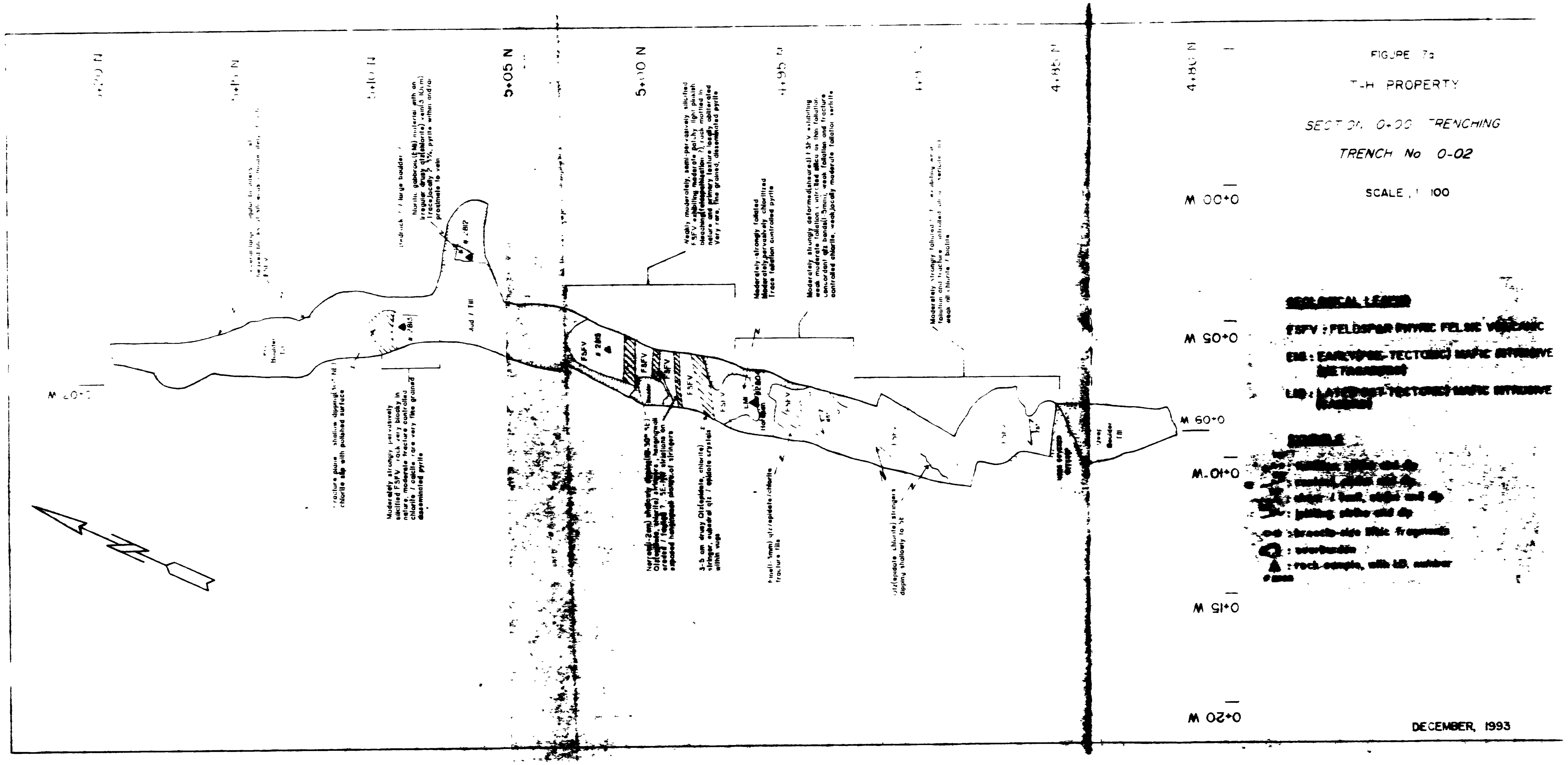
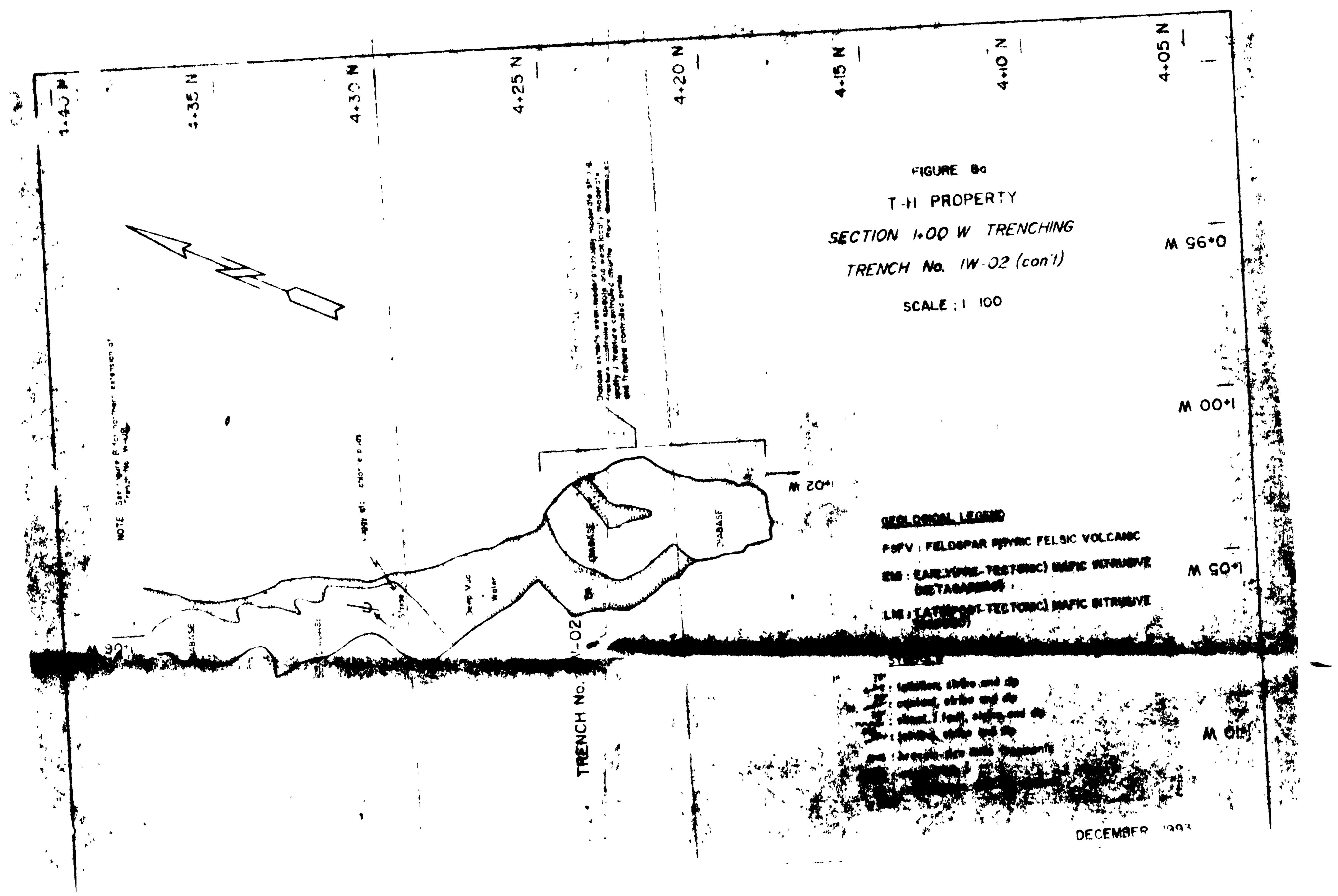


FIGURE 7a
T-H PROPERTY
SECTION 0+00 TRENCHING
TRENCH No 0-02
SCALE 1:100
GEOLOGICAL LEGEND
FSFV : FELDSPAR PHYRIC FELSIC VOLCANIC
EMI : EARLY(PRE-TECTONIC) MAFIC INTRUSIVE
LMI : LATE(POST-TECTONIC) MAFIC INTRUSIVE
5+05 N
5+10 N
0+00 W
0+05 W
0+09 W
0+10 W
0+15 W
0+20 W
DECEMBER, 1993

GEOLOGICAL LEGEND
FSFV - FELDSPAR PHYRIC FELSIC VOLCANIC
EM - EARLY(PRE-TECTONIC) MAFIC INTRUSIVE (METAGABBRO)
LM - LATE(POST-TECTONIC) MAFIC INTRUSIVE (GABBRO)
SYMBOLS
foliation, strike and dip
contact, strike and dip
shear / fault, strike and dip
jointing, strike and dip
breccia-size lithic fragments
overburden
rock sample, with I.D. number
TRENCH No. 3W-01
TRENCH No. 3W-02
TRENCH No. 3W-03
Stripped Outcrop
FIGURE 9
T-H PROPERTY
SECTION 3+00 W TRENCHING
SCALE 1:100
December, 1993
5+60 N
5+55 N
5+50 N
5+45 N
5+40 N
5+35 N
5+30 N
5+25 N
5+20 N
5+15 N
5+10 N
5+05 N
5+00 N
4+95 N
4+90 N
4+85 N
3+00 W
3+15 W
3+10 W
3+05 W
3+00 W
2+95 W
2+90 W
155°


5+70 N
5+65 N
5+50 N
5+30 N
5+25 N
0+35 W
DECEMBER, 1983


5+95 N
5+90 N
5+85 N
5+75 N
5+70 N
5+65 N
5+60 N
5+55 N
5+50 N
5+45 N
5+35 N
5+30 N
5+25 N
5+20 N



T-H Property

41I13SE0003 2.16200 MONCRIEFF 280


FIGURE 6
T-H PROPERTY
SECTION 1+00 W TRENCHING
TRENCH No. 1W-02
SCALE : 1 : 100
DEFORMATION ZONE
5+10 N
5+05 N
5+00 N
4+95 N
4+45 N
0+95 W
1+00 W

5+35 N
5+30 N
5+25 N
5+10 N
5+05 N
5+00 N
4+95 N
4+90 N
4+85 N
4+80 N
4+75 N
4+70 N
4+65 N
4+60 N
4+55 N
OUTCROP
DEFORMATION ZONE
(Strong Penetrative Fabric)