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**REPORT ON GEOPHYSICAL SURVEYS
EAST NAT RIVER GROUP OF CLAIMS,
SUDBURY MINING DIVISION,
PROVINCE OF ONTARIO.**

Introduction:

The following report describes the geophysical surveys completed during the latter part of 1964 on Canadian Johns-Manville Company Limited claims located in Penherwood Township, Sudbury Mining Division, Province of Ontario.

Cutting and chaining of picket lines were contracted to J. Alix Company Limited of Val d'Or, Quebec. Picket lines were cut at right angles to an east - west trending base line and were established at 200 foot intervals. Pickets were fixed every 50 feet along these offset lines by chainage.

Magnetometer surveying was conducted by R. F. Haley, geophysical operator with Canadian Johns-Manville Company Limited, using a Jalander type instrument. R. McBride assisted during the course of this work. Readings were recorded at 25 or 50 foot intervals along the offset lines - spacing was dependent upon the amount of detail required over the magnetic anomalies.

Electromagnetic surveying was carried out by R. A. Haley, geophysical operator with this Company, using a Renka Mark IV horizontal loop type unit. T. McChristie and M. Linkar assisted during the course of this work. Readings were recorded at 100 foot intervals along the offset lines.

Supervision and interpretation of this work was the responsibility of the writer, Senior Geologist with Canadian Johns-Manville Company Limited.

Property:

The claims surveyed are located in the northeast section of Penherwood Township and are numbered as follows: -

9-124799 - 12812 inclusive

These fourteen claims comprise approximately 560 acres.

Location and Accessibility:

The Canadian Johns-Manville claims group is situated in the northeast

Location and Accessibility: (cont'd)

section of Penherwood Township, Sudbury Mining Division, Province of Ontario.

Ready access by car or truck is provided by Highway No. 101 - Timmins to Chapleau - to a point approximately 43 miles southwest of Timmins. A bush road, passable by truck or four-wheeled drive vehicle, has been cleared by this Company from Highway No. 101 to Hanrahan Lake in Kenegaming Township. This road crosses the East Nat River Group of claims at about five miles south of the Highway.

Topography:

The claims group is one of moderate relief with an esker chain being located in the westernmost part and narrow sand plains fingering to the east through the property. The sand areas are timbered with dense jackpine growth.

Drainage is by the Nat River and subsidiary streams flowing to the north and west. River and stream valleys are densely timbered with alders, cedar and spruce trees.

Narrow poplar ridges covered with boulder clay cover the remainder of the surveyed area. Although far from numerous, several areas of rock outcrop were noted during the course of the geophysical surveys. These have since been tied in by geological mapping.

Previous Work:

The general area was mapped by E. W. Tedd for the Ontario Department of Mines in 1923 and the results of this work are shown on Map No. 33g, entitled "Groundhog River Area" on a scale of 1 inch equals $1\frac{1}{2}$ miles. Further regional mapping was carried out by V. K. Priest (Geology of Keith-Muskege Area) and W. D. Harding (Geology of Herwood Lake Area) in 1949 and 1936 respectively for the Ontario Department of Mines.

Detailed geological and geophysical surveys followed by diamond drilling were carried out during 1956 - 57 on Canadian Johns-Manville Company Limited claims situated immediately to the west of the East Nat River Group. However, as far as the writer could ascertain, no previous work of interest has been completed on the

Previous Work:

claims discussed in this report.

Due to a renewed interest in the ultrabasic intrusives of the Reeves Area the East Nat River Group of claims was staked, recorded and transferred to Canadian Johns-Manville Company Limited during May and June of 1964. Exploration work as described in this report, was carried out during the fall of 1964 and geological mapping and prespecting is currently in progress on the claims.

Line Cutting and Chaining:

A base line was started from the steel pin at the number one post of patented claim S-90108 and was cut and chained to the east to the limit of the group. Right-angled offset lines were established at 200 foot intervals along the base line and were cut to the north and south to the boundaries of the claims. Pickets with numbered locations were established at 50 foot intervals along the offset lines by chainage. All offset lines were tied in along the north and south claim boundaries by chainage to increase the accuracy of the plans.

Line cutting and chaining were contracted to J. Alix Company Limited of Val d'Or, Quebec, and were carried out during the fall of 1964. A total of 18.77 miles of picket and base lines was cut and chained during the course of this work.

General Geology:

The geology of Penherweed Township and immediately adjacent areas was mapped by E. W. Todd for the Ontario Department of Mines in 1923. The results of this work are shown on Map No. 33g on a scale of 1 inch equals $1\frac{1}{2}$ miles entitled "Groundhog River Area" which accompanies Ontario Department of Mines Report, Vol. XXXIII, Part 6, dated 1924. To the west and south the areas were mapped by V. K. Priest and W. D. Harding as mentioned under the heading "Previous Work". More recently, (1965), the "Foleyet Sheet" of the Ontario Department of Mines geological compilation series compiled by H. D. Carlsen which covers Penherweed Township, was published. The following "Table of Formations" has been taken from the legend portion of this map.

General Geology: (cont'd)

Precambrian

Proterozoic

Keweenaw

Alkaline syenite - carbonatite complex

Keweenaw and Matachewan

Diabase

Archean

Acid igneous rocks - granitoid rocks, megmatites and hybrid granitoid rocks.

Basic and ultrabasic intrusive rocks - gabbro, diorite, peridotite and pyroxenite.

Sedimentary and metasedimentary rocks - conglomerate, greywacke, slate, etc., gneisses, granulites and amphibolites.

Iron Formation

Basic and Intermediate volcanic rocks - andesite, basalt, etc.

Iron Formation

Acid volcanic rocks - rhyelite, dacite, etc.

Iron Formation.

The geology of the claims immediately to the west of the East Nat River Group was mapped in detail by Company geologists during 1956 and same was compiled as part of a report on the Jehann South Extension Group of claims. In general, the geology of the area of the East Nat River Group of claims indicates same to be underlain by intermediate to basic volcanic rocks and a highly altered sedimentary series intruded by basic (gabbro and diorite) and ultrabasic (peridotite - highly serpentized and pyroxenite) rocks. Further intrusions by granitic rocks and diabase dykes are also indicated. The general strike of the formations is slightly north of east with a steep north dip. Details of the geology will be discussed under the heading "Interpretation of the Magnetometer Survey".

Magnetometer Survey:

A magnetometer survey was conducted over the East Nat River Group of

Magnetometer Survey: (cont'd)

claims by R. F. Haley, geophysical operator with Canadian Johns-Manville Company Limited. R. McBride assisted during the course of this work.

This survey was carried out using a Jalander type instrument having sensitivities or scale constants as shown below: -

Scale #1 - 10 gammas per division
" #2 - 30 " " "
" #3 - 100 " " "

Parts of the survey were checked by R. Kaltwasser, senior fieldman with this Company, using a Sharpe's A-2 type magnetometer (GJM #166) and Jalander readings were corrected to the base as established by the A-2. Note that GJM magnetometer #166 had been previously checked on a base control station at Munre Mine near Matheson. Consequently, on the claims discussed in this report, a relative gamma value of 1220 corresponds closely with an absolute value of $57,599 \pm 15$ gammas.

Base control stations were established on the claims group and given fixed values as shown below: -

Line 2+00 East at the base line - value - 1590 gammas

Line 36+00 East at the base line - value - 1690 gammas

The locations of these base control stations are shown on the accompanying Geo-Magnetic Contour Plans. Readings were recorded on the base control stations at least four times per day as a check on the working condition of the instrument and to determine the daily diurnal variation.

Stations were spaced at 25 or 50 foot intervals along the offset lines - spacing was dependent upon the magnetic intensity of the underlying formations. A total of 2,078 stations was recorded on the East Nat River Group of claims during the course of the magnetometer survey.

Electromagnetic Survey:

An electromagnetic survey was conducted over the claims group by R. A.

Electromagnetic Survey: (cont'd)

Haley, geophysical operator with this Company. T. McChristie and M. Linkar assisted during the course of the work. Three men were used throughout this survey in an attempt to cut down lost time due to cable breaks.

Readings were recorded using a Ronka Mark IV Horizontal Loop type unit with coil spacing fixed at 200 feet. This unit had been zeroed, previous to this survey, over the ultrabasic sill at the Beatty Mine of Canadian Johns-Manville Company Limited in Beatty Township.

A total of 854 stations, spaced at 100 foot intervals, was recorded during the course of this survey.

Test surveys have been completed with this unit over a graphitic zone, a massive sulphide zone and a disseminated sulphide zone as aids in interpreting the results obtained on unexplored claims groups. The following results were obtained during these tests: -

1. Massive sulphide zone -- a strong positive rise on the in phase followed by an intense negative with a resumption to zero or near zero when the station was off the conductor. The out of phase component remained within ± 5 of zero.
2. Disseminated sulphide zone -- similar to No. 1 but with lower in phase peaks.
3. Graphitic zone -- both the in phase and out of phase components paralleled one another and followed the pattern of No. 1.

It should also be noted that coil spacing (should be exactly 200 feet) and the angle of the coils to the horizontal (each coil should be horizontal) play a large part in this work. Errors in one or both of the above may cause anomalies of sufficient magnitude to indicate the presence of a disseminated sulphide zone. Consequently topography is an important factor in this type of survey.

The results of the electromagnetic survey are shown on the accompanying electromagnetic profile plans on a scale of one inch equals 200 feet.

Interpretation of Magnetometer Survey

The results of the magnetometer survey are depicted on the accompanying "Geo-Magnetic Contour Plans" on a scale of one inch equals 200 feet. Contour lines of equal magnetic intensity have been drawn at 500 gamma intervals from 0 to 4500. Interpretation has been based upon a study of the contoured magnetometer plans, geophysical and geological data previously completed by this Company, and other interests on other claims in the area, and aerial photographs.

The major portion of the surveyed area is underlain by highly altered intermediate to basic volcanic rocks. Magnetic readings over these andesites and basalts range in intensity from 1300 to slightly over 2000 gammas. In general, the readings range in value from 1500 to 1800 gammas which is a normal background for this area. Scattered erratic "highs" - up to 2900 gammas - occur associated with a diabase dyke in the east part of the group. These have been shown as volcanics but may be due to the occurrence of basic intrusives. Note that intense carbonate alteration was noted in these volcanic rocks during the recent mapping program.

A narrow band of rhyolite occurs in the south part of the group and has been closely delineated by geological mapping. Magnetic readings over these acid volcanics range in value from 1300 to 2000 gammas. It would be extremely difficult to interpret this rhyolitic horizon on the basis of the magnetic results.

It should be pointed out that sediments - quartzite, greywacke, etc. - occur with the volcanics on claims to the south of the surveyed area. In consequence, same no doubt occur on the East Nat River claims group but as no exposures were noted during the mapping program, no sediments are shown on the accompanying plans.

Basic and ultrabasic intrusives have been outlined by the work completed to date, striking in an easterly to slightly north of east direction across the property. These intrusives occur as narrow sill-like bodies or small plugs or pods

Interpretation of Magnetometer Survey: (cont'd)

conformable with the regional trend of the formations. Values over the basic intrusives - diorite and/or gabbro - range in magnetic intensity from 2000 to 2900 gammas. An exception occurs on the south part of picket line 44+00 East where a reading of 4800 gammas was reported. Same may be due to a marked concentration of magnetite. Readings over the ultrabasic intrusive - serpentized peridotite - range in value from 2000 to over 4500 gammas. It is assumed, on the basis of geological data along strike, that the contact zones - 2,000 - 3000 gammas in intensity - around the ultrabasic intrusives are caused by talc-carbonate alteration. This is typical of the highly serpentized peridotites of the Reeves - Penherwood Townships area.

In the northwest part of the property, an intrusive body of syenite has been discovered by recent geological work. Magnetic readings indicate the occurrence of the syenite with values, in general, ranging in intensity from 1100 to 1500 gammas.

Two diabase dykes intrude the aforementioned rock types but are not defined magnetically. However, a contact dipole effect is indicated on the south part of picket line 58+00 East. These dykes strike in a northeasterly direction across the property and have been tied in during a recent mapping program.

Structurally, the claims occur along a marked northeasterly trending fault or shear zone (same has been indicated by work on claims along strike to the southwest). A series of northerly trending cross structures have been outlined by the magnetic survey and the occurrence of several of these zones is substantiated by topographic and geologic data. The formations are offset a maximum of 100 feet as shown in the west part of the group. Movement along the diabase dyke in the southwest section of the claims shows the ultrabasic intrusive to be offset a maximum of 400 feet indicating a major fault zone.

Interpretation of Magnetometer Survey: (cont'd)

The results of the magnetometer survey indicate the occurrence of several narrow, sill-like bodies of ultrabasic intrusives striking in a northeasterly direction across the claims group.

Interpretation of Electromagnetic Survey:

The interpretation has been based upon a study of the Electromagnetic Profile Plans and all available geological and geophysical maps and reports. Results of the survey are shown on the accompanying Electromagnetic Profile Plans on a scale of one inch equals 200 feet.

Electromagnetic surveying was carried out on this group to check the acid volcanics for sulphide mineralisation and also to test the ultrabasic contact zones.

Several extremely weak conductors occur in the intermediate to basic volcanics which no doubt are indicative of minor, disseminated pyrite mineralisation. Moderate to weak conductors occur in the syenite intrusive in the northwest part of the map area. Some appear to occur over narrow quartz stockworks in the syenite containing minor pyrite mineralisation.

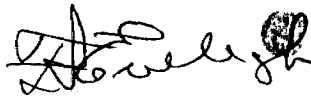
One conductor occurs in the ultrabasic intrusive in the extreme northwest part of the group. However, as same is extremely weak, little importance is attached to this zone.

The results of the electromagnetic survey failed to reveal any conducting zones of interest on the claims group.

Recommendations:

No further work is proposed for this claims group during 1965. However, results should be studied as part of our regional program prior to dropping same in 1966.

June 3rd, 1965.


F. J. Eveleigh,
Sr. Geologist.

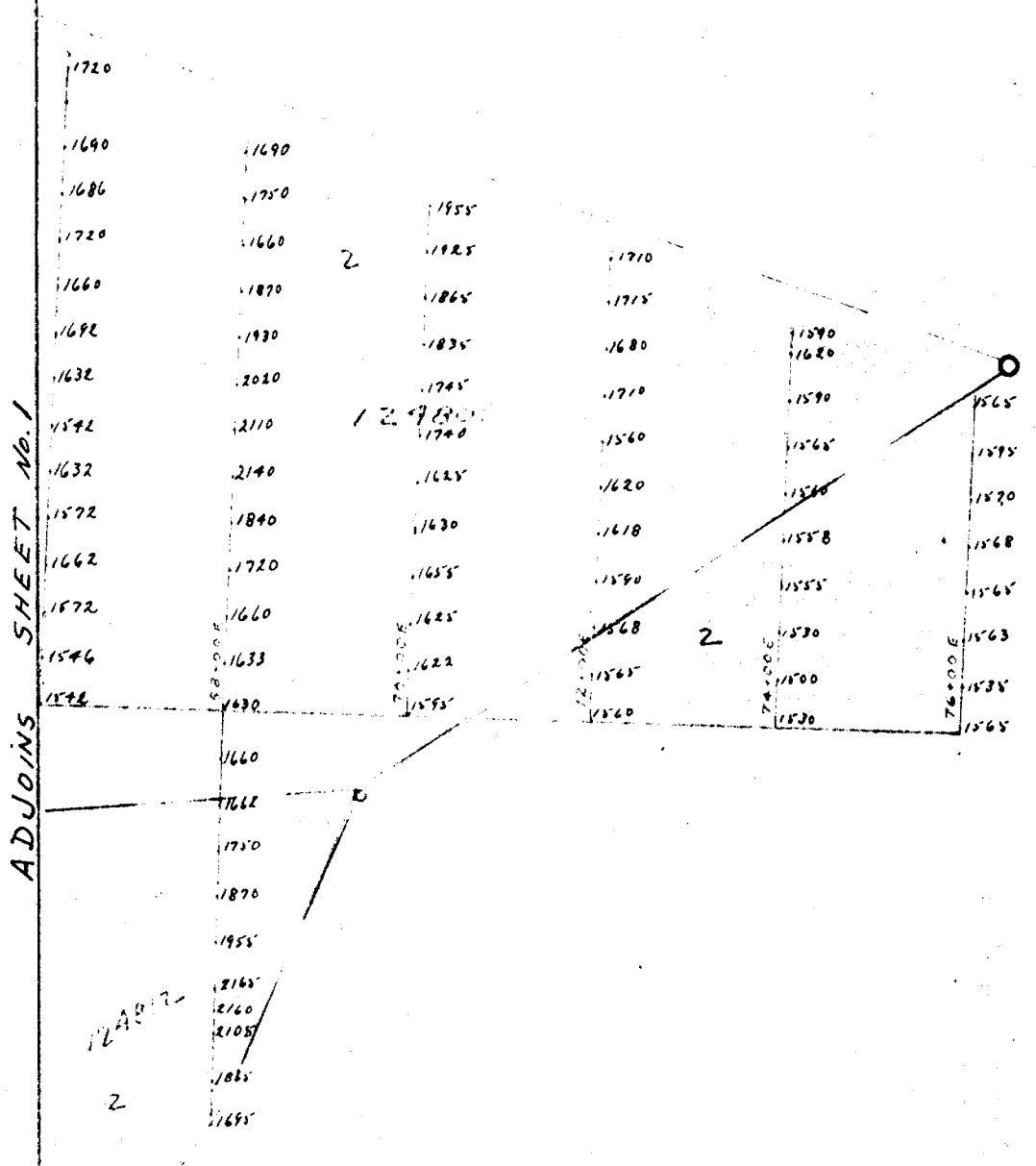
PENNINGWOOD TWP.
 GEO-MORPHOMETRIC CONTOUR PLAN

1:200 ft = 1-INCH

July 25, 65
 U.S. GEOLOGICAL SURVEY

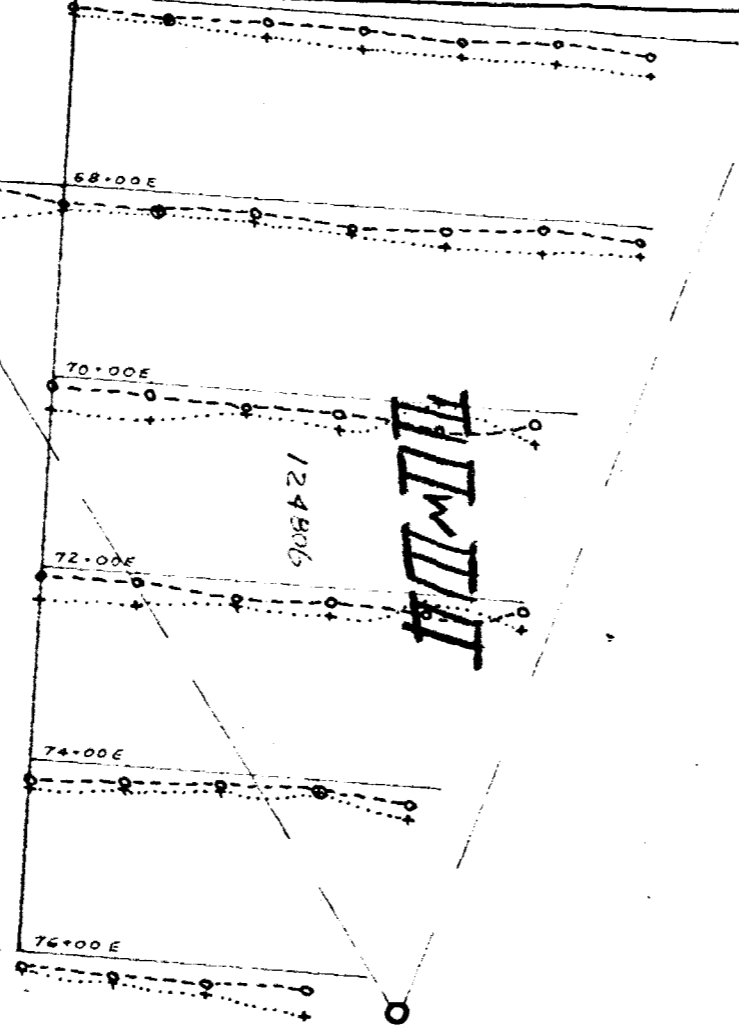
SHEET No. 2

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ADJOINS SHEET No. 1

124812



124806

HILL

68+00E

70+00E

72+00E

74+00E

76+00E

SHEET No. 2
[Signature]

PENHORWOOD TWP.
ELECTRIC POWER ACROSS
: 200 ft - 1 inch
: 100 ft
: 50 ft

CANADIAN JOHNS-MANVILLE CO. LTD.

MATHESON MUNRO MINE ONTARIO

LEGEND SHEET

PENHORWOOD TOWNSHIP

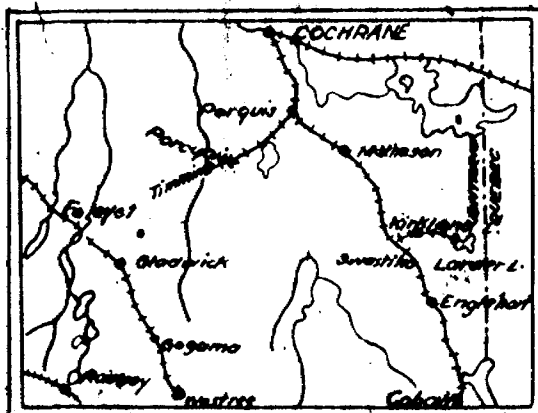
SCALE 1" = 200'

DATE JULY 26/65

DRAWN R.F.K.

TRACED

APPROVED F.J.E.



LOCATION SKETCH

Scale 1" = 50 Miles

GEOLOG. LEGEND

DIABASE

GRANITE SYENITE

SERP. PERIDOTITE

GABBRO-DIORITE

ACID VOLCANIC

INTERMEDIATE TO BASIC VOLCANICS
DARK VOLCANICS

TOPO-SYMBOLS

Outcrop

Higher Ground

Scarp

Muskeg or Swamp

Creek

Drill Hole

Bush Road

GEO-MAG. SYMBOLS



Contour Interval: 500 gammas



Magnetic Base Control Station



Geological Contact



Fault Zone

B-Geologic
M-Magnetic
T-Topographic

ELECTRO-MAG SYMBOLS



In phase Curve



Out phase Curve



Conducting Zone

S-SWAMP
M-MAGNETIC
W-WATER

Scale 40 Units = 1 inch

East is positive

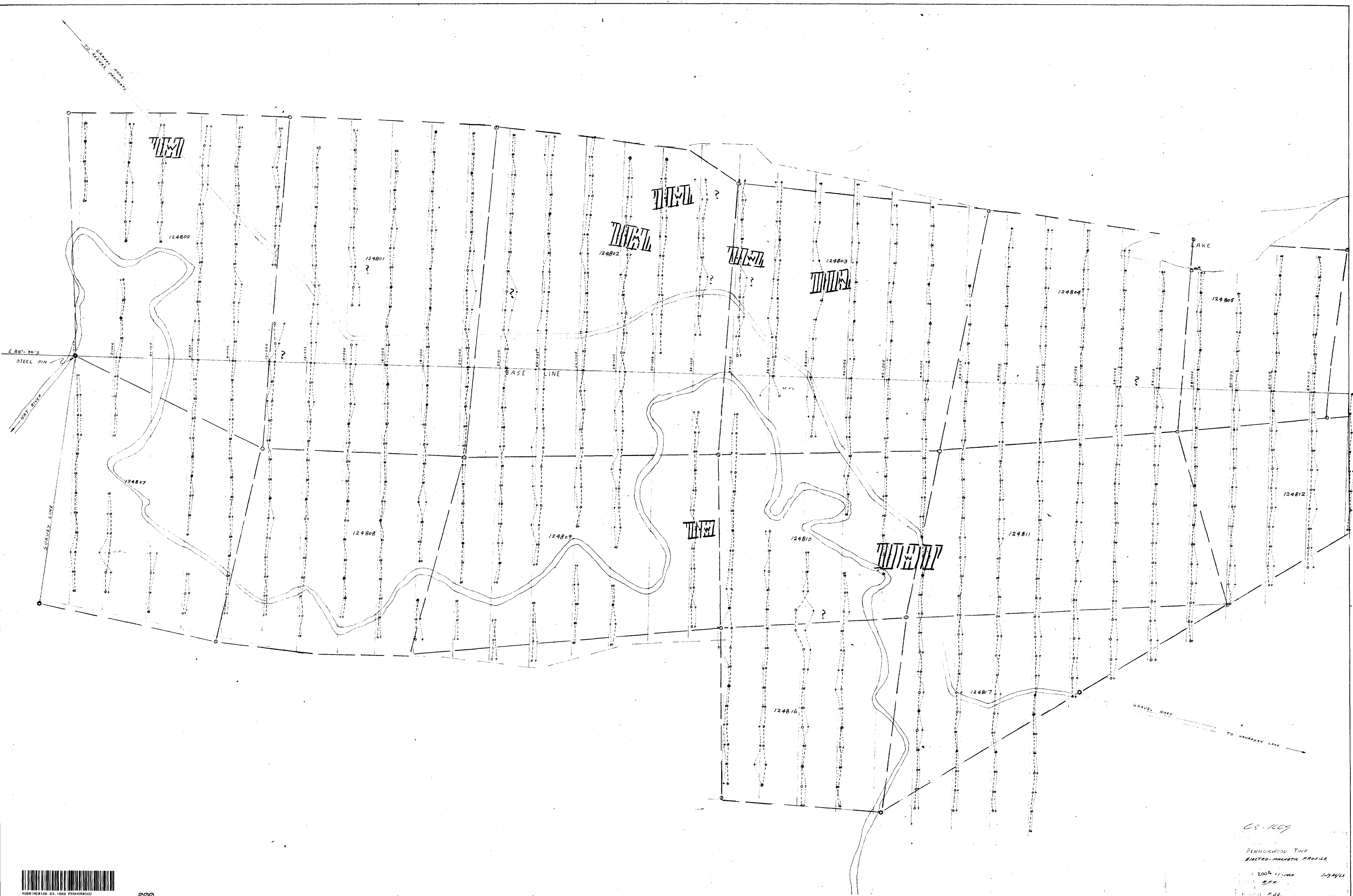
West is negative

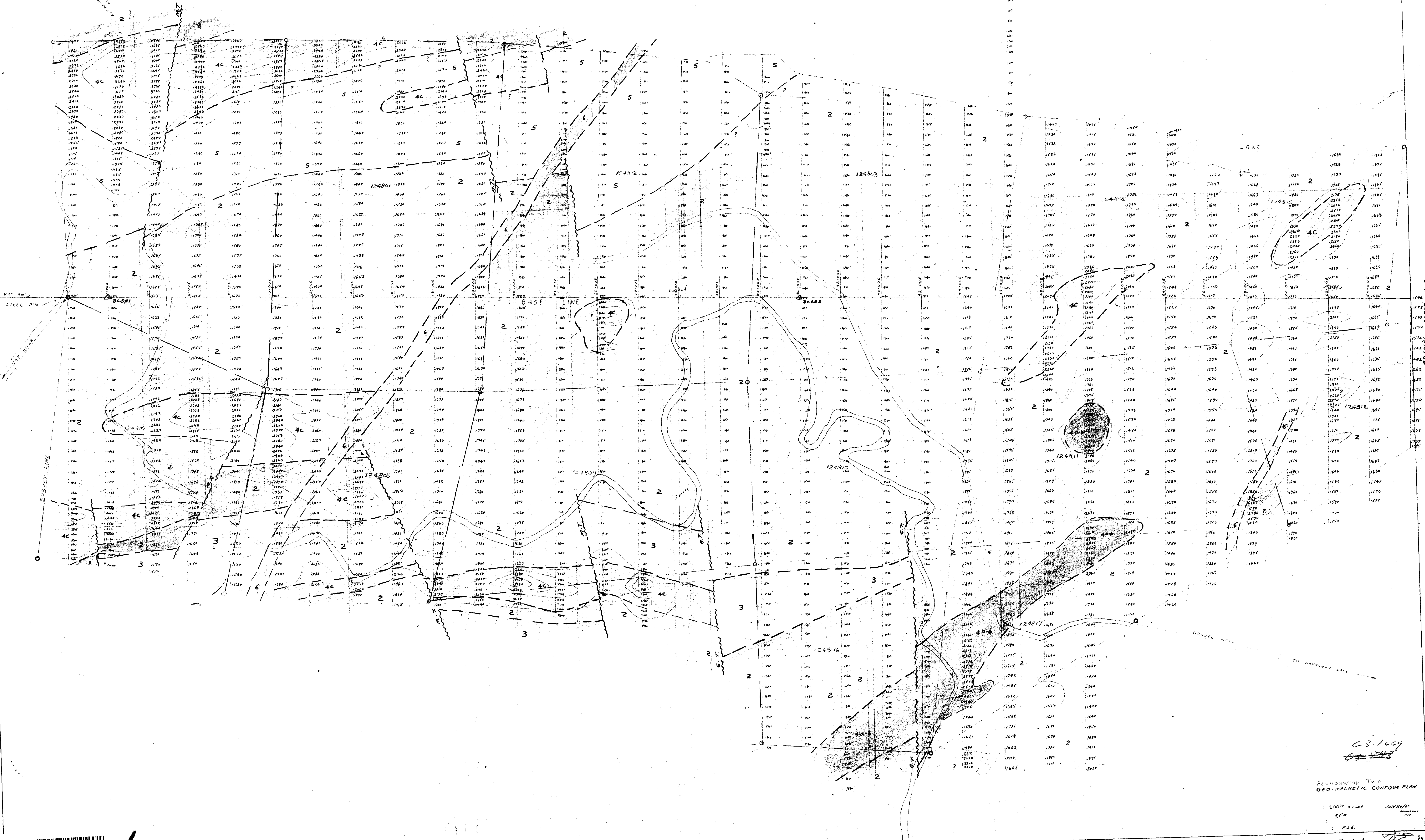
N.P.C.S. - Not proper coil spacing

Magnetometer Survey by - R.F. HALEY

E.M. Survey by - R.R. HALEY

R.F. Haley





C.S. 1669
 PENNSYLVANIA TOP
 GEO-MAGNETIC CONTOUR PLAN
 1:2000 SCALE
 JUNE 20, 1969
 R.C.K.
 F.L.E.
 SHEET No. 1