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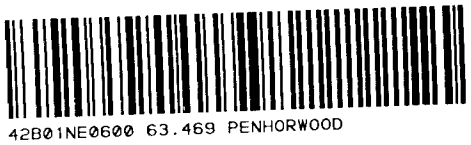

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REPORT ON GEOPHYSICAL AND GEOLOGICAL SURVEYS ON PENHORWOOD TOWNSHIP CLAIMS, GROUNDHOG RIVER AREA, SUDBURY DISTRICT. PROVINCE OF ONTARIO.

by

F. J. Evelegh

- Exploration Division -
Canadian Johns-Manville Co. Limited

Asbestos, Quebec.
July 29th, 1954.

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REPORT ON GEOPHYSICAL AND GEOLOGICAL
SURVEYS ON PENHORWOOD TOWNSHIP CLAIMS,
GROUNDHOG RIVER AREA, SUDBURY DISTRICT.
PROVINCE OF ONTARIO.

Introduction

The following report describes the dip needle, magnetometer and geological surveys recently completed on a block of thirteen claims, located in Penhorwood Township, Province of Ontario. Dip needle surveys were carried out by D. Doal and J. Mason during the summer of 1953 and winter of 1954 and upon completion of this work preparations were started for a magnetometer survey.

D. Doal of Matheson, Ontario contracted the line cutting and layed out a base line, trending east-west astronomic, across the central portion of the group. Picket lines were cut at 200 foot intervals over the claims and pickets with numbered locations were established by chaining at 100 foot intervals along the base line and offset picket lines. The chaining was completed by Doal and three assistants.

A magnetometer survey was conducted on the property by J. Mason and the writer during May and June of 1954. Readings were observed using a Sharpes D-1-M Type Magnetometer. Stations were spaced at 100 foot intervals except where further detail was required.

Geological mapping of the outcrops was completed in June 1954, this work being conducted by J. Mason and the writer. An extensive search revealed only a few rock exposures in the southeastern portion of the claims group.

Supervision and interpretation of this work was the responsibility of the writer, a staff geologist of Canadian Johns-Manville Company Limited, Asbestos, Quebec.

Property:

The claims surveyed are located in east-central Penhorwood Township, Groundhog River Area, Sudbury District, Province of Ontario. The southeast corner post is situated along the east-west centre line of the Township between the seven and eight mile posts. Thirteen claims were included in the group and are numbered as follows:

S-67747-48-49-50-51-52-53-54-55
S-75578-79-80-81

This group comprises approximately 520 acres.

Location and Accessibility

The east-central Penhorwood group of claims is situated approximately three miles north east of Tionaga, a small settlement on the transcontinental line of the Canadian National Railway. Communication by telegram and passage on the trains can be arranged at this station.

Two routes provide access to the claims from Tionaga. A bush road passable by truck during the summer months extends north approximately 2 miles to George Sweet's cabin on the Nat River. From the cabin another bush road leads northward to Johann Lake, and a branch of this road crosses the western portion of the claims group. The distance from George Sweet's cabin to the area surveyed is approximately 3 miles.

The second route is by canoe through Great Lake and into Montgomery Lake - by creek when the water level is high and by portage (approximately 800 feet) during the dry seasoh. From the north end of Montgomery Lake an old bush road extends north for $\frac{1}{4}$ mile, then crosses the creek and is passable by foot to the Nat River. However, approximately 2000feet west of the creek a trail has been blazed northward to the Nat River where a camp site was established

during the recent surveys, and from this point only a ¼ mile walk is required to reach the southeast corner of the claims group.

A third route to the property is by air from South Porcupine to Montgomery Lake. Difficulties might be encountered at Montgomery Lake during very dry periods, as soundings in the north end of this lake gave a maximum depth of 8 feet.

Topography

The entire region is characterized by relatively flat topography. On the claims group a clay covered hill is located over the entire central and northern portions, with cedar swamp, alders and patches of muskeg on all four sides. The cedar swamp covers parts of the four claims along the eastern side of the group. With the exception of the areas of swamp this section has been burned over, probably within the last fifteen years, the growth now consisting of moose maple, alders and poplar. Due to the half burned windfalls and thick second growth traversing in this area is extremely difficult.

Outcrops occurred only in the eastern and southeastern portions of the claims, on the flanks of the cedar swamp and on the east side of the clay covered hill. Overburden on this hill has been estimated at a minimum of 40 feet.

Water is extremely scarce on the claims group. Several spring creeks are shown on the accompanying topographic plan, however, during the summer months it is quite probable that these would be dry. However, the Nat River drains this section of the country and is situated only a few hundred feet east of the southeast corner post.

Dip Needel Surveys:

Two separate dip needle surveys were carried out on the claims described in this report. The original survey was conducted by D. Doal, W. Charest and L. Allison from July 13th to 20th, 1953, and was carried out along claim lines on the 13 claims staked at this time. A second survey was conducted by J. Mason and D. Doal from February 21st to 23rd 1954, on the 4 claims to the east of the original group.

The purpose of these dip needle surveys was to determine whether serpentinite occurred on the property and, if such was the case delineate the approximate size of the intrusives. As shown on the accompanying dip needle plan several areas, one of considerable extent, and having readings sufficiently high to be indicative of the presence of underlying serpentinized peridotite, were outlined by these surveys. On the basis of this work, more detailed exploration was planned.

A Keuffel and Esser dip needle having an accuracy of $\pm 2^{\circ}$ was used for the surveys. This instrument has a sensitivity of 200 gammas per degree as determined over the orebodies at the Munro Mine in Matheson. Readings were taken with the instrument oriented in the earth's magnetic field and the readings indicate the total field. Readings were observed along claim lines and where further detail was required along pace and compass lines. A total of 8.4 miles of traversing was completed and 305 readings were recorded.

Line cutting and Chining:

D. Doal with three helpers, contracted the line cutting and chaining on the Penhorwood group of claims. J. Mason supervised this work.

A base line trending east west astronomic was established across the central part of the claims group and offset picket lines were cut at 200 foot intervals at right angles to this base line. Pickets with numbered locations were

established at 100 foot intervals by chaining.

This work was started on February 3rd and completed on March 9th/54. A total of 22.1 miles of picket lines, base line and detail lines was cut and chained.

Geological Survey:

The geology of the Groundhog River Area is shown on Map No. 33C on a scale of 1 inch equals 1½ miles. This map was compiled by E. W. Todd and accompanies Volume XXXIII, Part VI, 1924, published by the Ontario Department of Mines.

The outcrops on the property described in this report were mapped by J. Mason and the writer and the survey was conducted from June 9th to 17th, 1954. Mapping was carried out from offset picket lines spaced at 200 foot intervals and the results are shown on the accompanying Geologic and Topographic Plan at a scale of 1 inch equals 200 feet.

This survey was carried out to determine the nature of the anomalies outlined by the dip needle and magnetometer surveys and to map any chrysotile asbestos mineralization discovered in the outcrops. Traverses were run between picket lines in the areas of high magnetic readings, in an attempt to locate further rock exposures. Pace and compass lines were run along the boundaries of the property.

The rock formations in the area may be classified as follows (Vol. XXXIII, Part VI, 1924, O.D.M.)

Glacial and Recent:	Sand Gravel, Clay, Swamp,
Matachewan Series?	Diabase dikes
	Intrusive Contact
Algoman?	Granite, feldspar porphyry, syenite, pegmatite
	Intrusive Contact
Keewatin:	Schistose basalt, andesite, dacite, rhyolite, diorite and diabase; carbonate schists; iron formation and associated sediments; volcanic tuff; altered peridotite.

Keewatin lavas of presumed andesitic origin were mapped in the southeastern portion of the claims group. The schistosity in these volcanics strikes approximately east-west astronomic and has a near vertical dip. Alteration of the lavas has formed areas of chlorite and hornblende schist in some of the exposures. In the southernmost outcrops, immediately north of the narrow, high magnetic anomaly, the andesite is at least partially serpentinized and the original texture and minerals have been completely altered. Thin sections are being prepared but at the time of compilation of this report are not available to the writer. Due to the intense alteration of these basic lavas and the paucity of rock exposures no attempt was made to determine detailed structure.

Along the south boundary and also to the east of the claims group small outcrops of acidic material were mapped which have been tentatively termed rhyolite. The exposures were white weathering, the rock itself being felsitic in texture and containing minute quartz "eyes".

Peridotite was mapped in the eastern portion of the claims group along the east west base line. The ultrabasic was brownish weathering, medium green on a fresh surface and moderately serpentinized. Prospecting on the serpentinite outcrop revealed no chrysotile asbestos cross fibre but minor amounts of slip fibre and several narrow fractures filled with brucite were observed. Considerable carbonatigation was noted in the serpentinized peridotite. As shown by the magnetometer survey this exposure appears as an isolated lense and has no connection with the presumed larger body to the west.

Although no acid intrusives were mapped on the property, magnetic results indicate the presence of minor bodies of either granite or porphyry. The major granite body lies immediately to the southeast of the claims group in the vicinity of Montgomery Lake and is a biotite granite.

Magnetometer Survey

A magnetometer survey was conducted over the east central Penhorwood claims by J. Mason and the writer from May 24th to June 10th, 1954. Magnetic readings were observed using a Sharpes D-1-M type instrument. This magnetometer had been corrected in such a manner that readings approximate those obtained when using a Watts Type Vertical Variometer having a sensitivity of 35 gammas per scale division. In addition the D-1-M was zeroed over a base station in Garrison Township having a value of 1220 gammas as established by the Watts Vertical Variometer and this station was tied into the Government Magnetic Base Station at Matheson and had an absolute value of 57,559 $\pm$ 15 gammas.

One base control station was established at the south boundary of the claims group as shown on the accompanying magnetometer plan and readings were recorded at this location morning and evening as a check on the work condition

of the instrument and also to detect magnetic distrubances. The value of this station was established at 1100 gammas.

The results of the magnetometer survey are depicted on the accompanying plan at a scale of 1 inch equals 200 feet. Contour lines of equal magnetic intensity have been drawn at 500 gamma intervals from 0 to 6000 gammas. Interpretation was based on the contoured magnetometer plan, geologic and topographic data as well as air photographes of the region.

A total of 21.2 miles of picket lines, base line and detail lines was surveyed using the Sharpes D-1-M type magnetometer and 1181 stations were observed.

Interpretation of Magnetic Results:

The magnetometer survey verified the results of the dip needle work and clearly delineated the extent and structure of the areas of high magnetic readings. Four anomalies were outlined on the claims group and are designated by the letters "A", "B", "C", and "D" on the accompanying magnetometer plan. These zones of magnetic "highs" will be discussed separately.

Anomaly "D", although of minor areal extent is of prime importance as serpentinized peridotite exposures were mapped within its limits. This lense extends over a maximum length of 900 feet and has a width of 250 feet at the widest point. Magnetic readings ranged in value from 3000 to 8400 gammas. Detailed prospecting of the serpentinite exposures failed to reveal the occurrence of chrysotile asbestos cross fibre, however minor amounts of slip fibre and several fractures containing brucite were observed. The presence of serpentinite in this anomaly lends importance to the larger area of magnetic "highs" outlined in the western portion of claims group.

The "A" anomaly, by virtue of both size and structure, is sufficiently important to be worthy of further interest and, although not definitely established, is believed to be caused by an intrusive body of ultrabasic rocks. These ultrabasics have intruded the Keewatin lavas and later were subjected to two separate periods of deformation. First, the intrusive was folded into the major structure depicted on the accompanying plan and then during some later period, secondary folding or faulting further complicated the original structure.

The ultrabasic, as outlined by the magnetometer survey is located with the nose of the major fold in the west central portion of the claims group and the two limbs extending to the northeast and southeast respectively. Both limbs are tentatively interpreted as dipping relatively steeply to the northwest. The limbs of this fold extend over a length of one-half mile, and widths vary from 100 to 500 feet. Magnetic readings range in value from 3000 to 20,000 gammas.

Three cross structures striking approximately east-west have been interpreted as offsetting this anomaly. In each case the south side of the structure shows a narrower width of intrusive combined with a displacement to the east. It is highly probable that these structures are folds rather than cross faults however the similar pattern and apparent easterly displacement of the ultrabasic on the south side of each structure weakly indicate faulting as shown on the accompanying plan. Between the two most northerly cross structures the intrusive attains a length of 1600 feet and a width of 500 feet - sufficient areal extent for economic mining operations, depending on the nature of, and mineralization in the underlying rocks.

Anomaly "B" covers an area 800 feet long and 800 feet wide with magnetic readings ranging in value from 3000 to 7000 gammas. This lense is presumably due to the presence of ultrabasic rocks dipping at relatively shallow angles to the north and west. The irregularity and size of this anomaly would warrant further development if the "A" anomaly proved of economic interest.

The "C" anomaly extends over a length of 2600 feet and varies in width from 150 feet to 500 feet at the widest point on a fold immediately west of the east boundary of the claims. Due to the narrow width, high magnetic readings and contorted nature of this intrusive it was originally interpreted as iron formation. However serpentinization was observed in the volcanic rocks on the north contact of the anomaly indicating the presence of ultrabasics perhaps associated with narrow bands of iron formation.

A cross fault striking north-south and located immediately west of picket line 14+00 east has been depicted as offsetting this intrusive. As shown on the accompanying plan, a marked change in strike occurs to the east of this cross structure. The narrow width of this intrusive combined with the probability of narrow bands of iron formations occurring with the ultrabasic does not justify further development.

Acid intrusives (granite or porphyry) have been interpreted as occurring in the southeast corner of the claims group on the basis of the weak magnetic readings. However, these lows may be caused by pot hole topography in the cedar swamp.

The remainder of the property has been depicted as being underlain by volcanic rocks (Andesitic lavas of the Keewatin) Magnetic readings range in value from 1500 to 3000 gammas. Although basic intrusives may occur it is

extremely difficult to differentiate same on the basis of magnetic data.

F. J. Evelegh
Sr. Geologist
Exploration Division
Canadian Johns-Manville Co. Limited.

July 29th, 1954.

REPORT ON GEOLOGICAL AND MAGNETOMETER SURVEYS ON CANADIAN JOHNS-MANVILLE COMPANY LIMITED CLAIMS IN NORTHEASTERN PENHORWOOD TOWNSHIP, SUDBURY MINING DIVISION PROVINCE OF ONTARIO

by

F. J. Evelegh

- Exploration Division -
Canadian Johns-Manville Co. Ltd.

Matheson, Ontario.
October 8th, 1956.

I N D E X

REPORT ON GEOLOGICAL AND MAGNETOMETER SURVEYS ON CANADIAN JOHNS-MANVILLE COMPANY LIMITED CLAIMS IN NORTHEASTERN PENHORWOOD TOWNSHIP, SUDBURY MINING DIVISION, PROVINCE OF ONTARIO

Introduction:

The following report describes the geological and magnetometer surveys recently completed on the Montgomery Lake Northeast Extension and Montgomery Lake Fringe Groups of claims held by Canadian Johns-Manville Company Limited and located in the northeastern part of Penhorwood Township, Sudbury Mining Division, Province of Ontario.

For purposes of this report, the claims will be discussed under three headings, as shown below.

A. Montgomery Lake Northeast Extension Group:

These claims were staked by G. MicMac and H. McDougall on September 17th, 18th and 19th, 1955, and recorded and transferred to Canadian Johns-Manville Company Limited on October 7th and 25th, 1955. Tagging of this group was completed during the latter part of November by R. Rintamaki.

A base line, striking S51°W was established by R. Todd, using a transit starting at a point 2000 feet north of the seven mile post on the Penhorwood - Kenogaming Township line. Line cutting and chaining of offset picket lines was contracted to Line Mining Service of Toronto. Picket lines were established at 300 foot intervals with numbered pickets every 100 feet.

Geological mapping of the group was conducted by R. Todd and H. Gebhardt, with the assistance of J. Chisolm. Both Todd and Gebhardt are field geologists of Canadian Johns-Manville Company Limited. Rock outcrops were tied into the numbered pickets on the offset lines and base line by the pace and compass method. All prominent topographic features were noted during the survey and are shown on the accompanying plan.

The magnetometer survey was carried out by John Black and L. Allison, geophysical operators for this Company, with the assistance of H. McDougall

R. Rintamaki. Readings were observed using two Sharpe's D-I-H type magnetometers. Stations were spaced at 100 foot intervals except where further detail was required.

B. Montgomery Lake Fringe Group:

These claims were staked by P. Kaltwasser, On September 1st, 1955, A. Van Horne on September 7th, 8th and 11th of 1955, H. McDougall on September 16th and S. MicMac on September 21st, both of 1955, and were recorded and transferred to Canadian Johns-Manville Company Limited on October 7th and 24th, 1955. Tagging of this group was completed by R. Rintamaki during the month of November, 1955.

The original Montgomery Lake base line was extended to both the east and west to cover the Fringe claims, and a second base line, trending east, and used primarily as a tie line on this group, was established 3000 feet to the south. A third base line, trending east, was established, as shown, to cover claim S-89509 and also claims S-89514 and 15 in the Northeast Extension Group.

I. Soutar conducted transit surveys along these three lines. Picket lines were established at 200 and 300 foot intervals, depending upon the detail required, and numbered pickets were located every 100 feet.

Line cutting was contracted to Jean Alix Company Limited, Val d'Or, Quebec, except for a small section in the southwestern part of the map area which was cut by Company employees.

Geological mapping of this group was conducted by E. Rowley, a field geologist of Canadian Johns-Manville Company Limited, with the assistance of D. Denis and A. Brownlee. R. Seavoy, also a field geologist with this Company, helped out for several days. Similar procedure, as used on the Northeast Extension Group, was followed.

The magnetometer survey was conducted by John Black and L. Allison, as in the Northeast Extension Group. S. O'Connor and W. Scott also helped out as assistants during the course of this work.

c. Montgomery Lake Group:

Magnetic readings, outcrops and re-interpretation are shown on the accompanying plans for these claims. Previous work was carried out by the writer during the field season of 1954.

Supervision and interpretation of this work was the responsibility of the writer, senior geologist with Canadian Johns-Manville Company Limited, Matheson, Ontario.

Property:

Forty-six (46) claims are included in these three groups which are numbered as follows:

A. Montgomery Lake Northeast Extension Group:

S-89514 - 15 - 16 - 20 - 21 - 23 - 24 - 25; S-90131 - 32 - 33 - 34 - 35 - 36.

Fourteen claims comprise this group.

B. Montgomery Lake Fringe Group:

S-89490 - 91 - 92 - 93 - 94 - 95 - 96 - 97 - 98 - 99.

S-89506 - 07 - 09 - 10 - 11 - 12 - 13

S-90137 - 38.

Nineteen claims comprise this group.

C. Montgomery Lake Group:

S-67747 - 48 - 49 - 50 - 51 - 52 - 53 - 54 - 55; S-75578 - 79 - 80 - 81.

Thirteen claims comprise this group.

Location and Accessibility:

The Canadian Johns-Manville claims are located in the northeastern section of Penhorwood Township, Sudbury Mining Division, Province of Ontario. The southern boundary of the claims is situated approximately three miles north of Tionaga, a small settlement on the main southern line of the Canadian National Railway, which is approximately 110 miles northwest of Capreol.

Old logging roads, which have been cleaned out and a road recently bulldozed by this Company, render the claims group readily accessible. The

new jeep road starting at the junction of Storm Creek and the Warren Lake Road connects with an old logging road at the south end of Tentcamp Lake. From this point the old road is passable to the Montgomery Lake Group and northeastwards into the Montgomery Lake Northeast Extension Group. The southern extension of this road is passable by jeep to Tiogaga. Another old logging road follows the Nat River and crosses the eastern section of the Fringe Group - this road is passable by muskeg tractor only.

Topography:

The topography of the Montgomery Lake Northeast Extension Group is described below by R. Todd, who mapped the area.

The area mapped is largely covered with glacial drift deposits which, for the most part, determine the topography. The surface is low and rolling with few, if any, ridges rising to over 100 feet above the surrounding land. A marked ridge, however, does trend northeast from the point at which the base line crosses the Nat River - the highest ground here being attributed to a rise in the bedrock surface. Areas of swampy ground are comparatively few, being located along the course of the Nat River, which drains the claims group to the north. Other drainage in the area consists of only narrow, minor creeks which also follow a northerly course. Water would not be a problem if diamond drilling was carried out on this group.

The topography of the Montgomery Lake Fringer Group is described below by E. Rowley, who mapped the area.

Although the area covered by these claims is characterised by relatively flat topography, the western and northern sections are more hilly. The higher ground is timbered with poplar, and the underbrush consists of moose maple and alders. Due to the thickness of this underbrush, traversing is comparatively slow. The flatter portions of the group are more open. Black spruce is to be found on the drier ground with cedar in the swampy and semi-swampy areas.

The only rock exposures occur in the five claims making up the extreme southeast part of the group. Overburden is shallower and the outcroppings are chiefly on the edges of the swamps.

Water, although scarce, is to be found in the southeastern portion of the claims group where the Nat River, together with one small brook, drains this section of the country.

Previous Work:

This area was mapped by E. W. Todd and the results were published in 1924 in Volume XXXIII, Part VI - Annual Report of the Ontario Department of Mines. The general geology of the Reeves - Penhorwood area is shown on Map No. 33 - Groundhog River Area - on a scale of 1 inch equals 1½ miles. This map accompanies Todd's report.

During the winter of 1953, a thirteen claim group (Montgomery Lake Group), was staked and transferred to Canadian Johns-Manville Company Limited. Dip needle, magnetometer and geological surveys were completed on these claims during the field season of 1954. Diamond drilling of the major anomalies followed during the later summer and fall of 1955. As a result of this exploration work, the claims surveyed and described in this report were staked by Canadian Johns-Manville Company Limited.

Line Cutting and Surveying:

A. Montgomery Lake Northeast Extension Group:

During the early part of July of this year, R. Todd established a base line, striking S51°W starting 2000 feet north of the seven mile post on the Penhorwood - Kenogaming Township line. The first picket line was established 4500 feet southwest of the Township line which was marked as 0400 for surveying purposes. Offset picket lines (at right angles to the base line) were established at 300 foot intervals. The base line was cut to the southwest for an overall length of 11,400 feet.

Line cutting and chaining was contracted to Line Mining Service of Toronto who did the work during the period July 18th to August 5th, 1956. Line cutting on claims S-89514 and 15 was contracted to J. Alix Company Limited, Val d'or, Quebec and lines were extended northward from the short base line shown on the accompanying plan. During the course of these contracts, a total of 19.8 miles of line was cut and chained. This mileage is divided as follows: -

Picket lines	-	17.6 miles
Base line	-	2.2 miles.

B. Montgomery Lake Fringe Group:

During the latter part of August of this year, I. Soutar and two helpers carried out a transit survey starting at the junction of the Warren Lake road and a road bulldozzed by this Company. This survey was run to the south through Reeves and Penhorwood Townships to the south end of Tentcamp Lake. From this point, the extension of the original Montgomery Lake base line was surveyed in and a second base line established 3000 feet to the south. These base lines strike east and S88°E (astronomic) respectively. The southern base line was used as a tie line for this line cutting with the exception of the claims in the extreme eastern section of the group. A third short base line was established starting from 4000 feet north on picket line 14+00 east and offset lines cut to cover the claims in this area.

Over a majority of the map area the old picket lines (from the original Montgomery Lake Group) were extended to the north and south to cover the fringe claims. These lines are spaced at 200 foot intervals. New offset picket lines, spaced at 200 and 300 foot intervals (depending upon the detail required), have been cut over the Fringe claims on both the east and west sides of the Montgomery Lake Group.

Line cutting and chaining was contracted to J. Alix Company Limited, Val d'Or, Quebec, who did the work during the period August 21st to September

10th, 1956. Line cutting over claims S-90137 - 38 was carried out by Company employees during the early part of May of this year. During the course of this work a total of 30.5 miles of line was cut and chained. This mileage is divided as follows: -

Picket lines	28.0 miles
Extensions, Base Lines and Tie Lines	2.5 miles.

Geological Survey:

The following sections entitled "General Geology" and the "Geology of the Montgomery Lake Northeast Extension Group", have been written by R. Todd.

The oldest rocks, generally accepted as belonging to the Keewatin period, comprise a great series of intermediate and basic volcanics, banded iron formation and minor occurrences of argillaceous sediments. For the most part, the lavas are andesitic in composition and often highly chloritized and schistose. Where secondary silicification has occured the dark greey and grey andesites and basalts have, in many cases, undergone minor sulphide enrichment. This has especially been marked in the area approximately 1½ miles northwest of Montgomery Lake where the andesites are in contact with iron formation. Exposures of this formation are not to be found, but recent diamond drilling (1955 - 56) has shown it to be a highly silicified and folded zone, interbedded with sheared chloritic andesites and basalts. Porphyry dikes of later age are found cutting the formation at various horizons. The sulphides include pyrite and pyrrhotite, the latter of which, with magnetite, renders the formation very magnetic. In the northwest portion of the township, there is a typically banded iron formation which strikes east-west and continues west into Keith Township. The formation is composed of bands of magnetite, hematite and ferruginous (?) cherty and quartz-rich material. The northern contact is with Keewatin volcanics while to the south there is a small occurrence of argillaceous (?) sediments. It is in the area of the

third iron rich formation that the present survey was conducted.

Lying in the central part of the area and extending to the southwest and northeast, are a series of ultrabasic intrusions of sill-like nature. They are younger in age than the volcanics and are probably Haileyburian in age. The group includes peridotites, dunites and gabbros now largely serpentinized. The the south, east and northeast of Jehann Lake, the basic and ultrabasic rocks have been subjected to intense metamorphism and alteration leading to the development of a highly carbonated facies. The main gabbro mass lies to the north and east, and north of Jehann Lake. It is a coarse granular rock - often carbonated - and also includes a more acidic dioritic phase.

The acidic rocks are represented by two masses of Algoman granite and granodiorite. The western mass extends five miles eastwards from the Penhorwood-Keith Township line south of Kukatush. The eastern granitic mass covers the southeast portion of the area and has its northern limit one and a half miles north of Montgomery Lake.

The granite, which is a pink hornblende rich variety, is well exposed in rock-cuts on the Canadian National Railway line between Tionaga and Kukatush, where it is intruded by diabase and intrusions. Quartz porphyry is found in some exposures in the extreme northwestern part of the Township.

The following Table of Formations is taken from the Fifty-Ninth Annual Report of the Ontario Department of Mines, entitled Geology of the Keith-Muskego Townships Area and compiled by V. K. Prest.

CENOZOIC	
Pleistocene:	Glacio-fluvial sands and gravels
	Till
PRECAMBRIAN	
Matachewan:	Diabase
	Quartz veins, carbonate veins
	Lamprophryre
Algoman:	Granite, granite gneiss; granodiorite, hornblende-quartz diorite, syenite; porphyries
	Feldspar porphyry
	Granite porphyry, associated feldspar porphyry

Algoman(?):	quartz-feldspar porphyry Felsite and felsite breccia Quartz porphyry and quartz porphyry breccia
	Serpentinite
Haileyburian(?):	Granodiorite, quartz diorite, diorite, gabbro
Keewatin(?):	Feldspar porphyry, granite porphyry
	Banded iron formation Conglomerate, arkose, greywacke, argillite; phyllite, slate
Keewatin:	Acidic volcanics and associated intrusives; minor dioritic tuffs and dikes; derived schists Intermediate to basic volcanics and associated intrusives; minor acidic volcanics and sediments; derived schists.

The outcrops on the claims group described in the following section were mapped by R. Todd and H. Gebhardt with the assistance of J. Chisolm, during the period September 1st - 17th, 1956. Mapping was carried out from offset picket lines spaced at 300 foot intervals and the results are shown on the accompanying plan on a scale of one inch equals 400 feet.

Geology of the Montgomery Lake Northeast Extension Group:

Rock exposures in the claims group are extremely sparse. A careful search, however, in the areas of ground magnetic "highs" yielded one or two outcrops of iron formation. The largest outcrop occurs between the base line and the Nat River at approximately 80W - 83W.

Iron Formation: This iron formation is similar to those in the area although does not seem so typically banded. The formation maintains a fairly constant dip of 60° to northwest, while the base line runs sub-parallel to the strike of the formation which is probably continued east into Kenogaming Township south of Nest and Benbow Lakes. The rock is typically a reddish-brown in color due probably to the presence of hematite which renders the rock fairly non-magnetic. Magnetite has been found in one narrow band on L6OW at 5+00S and from the ground magnetic survey it appears likely that this magnetite band continues across the property with a strike of N50°E. The formation is highly silicified, containing numerous quartz stringers and

occasional chert bands. Bronze-weathering pyrite is developed - often in cube form - the cubes being as large as one quarter of an inch across.

An old trench on line 105+00W at 12+00S shows quite a development of pyrite. Here the rock is a grey color and has a pronounced slaty cleavage. This is probably due to an increase in argillaceous impurities followed by subsequent metamorphism. There appears to be no doubt that the pyrite was formed at a later stage. No outcrops of volcanics were found on the group mapped but that these lie to the east is known by the presence of basic volcanics at location 42+00W, 5+50 feet south of the base line. The rock is a basic andesite.

One large outcrop mapped as a sediment, is located on the left bank of the Nat River between lines 69 and 72W at approximately 20+00N. This rock weathers to a buff color and is composed almost entirely of quartz, with iron impurities. It is probably a quartzite similar to those described by V. K. Prest in Keith Township. The outcrop strikes northeast and contains steeply dipping joint planes.

The boulders which are numerous in the drift covering the group, are of two main lithological types. The most abundant is a hornblende-granite variety such as is found in the area. The other is a gabbro which may have been derived from the north or northwest where this rock type is exposed to the northeast of Jehann Lake.

The outcrops on the claims group described in the following section were mapped by E. Rowley with the assistance of D. Denis and A. Brownlee during the period August 27th to September 29th, 1956. It should be noted that R. Seavoy conducted the traversing on claims S-90137-38.

The following section entitled "Geology of the Montgomery Lake Fringe Group" has been written by E. Rowley.

Geology of the Montgomery Lake Fringe Group:

A geological survey was conducted on this group of twenty-two claims during August and September of 1956. The purpose of the survey was to produce a 400 scale geological map to aid in interpretation of magnetometer results. Work was hindered by an extremely wet season.

Control for the survey was established by means of chained base lines (east - west) and north - south picket lines at 200 or 300 foot intervals. These lines were chained with picket locations at every 100 feet. Traverses along the lines and midway between them produced the results shown on the accompanying map.

Altered Keewatin lavas were mapped on claim 89497. The rock is highly schistose with a general strike of 60° and vertical dip. The lavas are of presumably andesitic composition and have been chloritized. The most northerly outcrop shown was more highly altered, showing a gneiss-like structure with lenses of acidic material up to five inches wide. This rock typically weathers with a brown-green surface.

Diorite exposures were mapped on the western section of Claim 89495 and along the Nat River on claim 89498. This rock is typically a medium to fine grained hornblende diorite although quartz-rich phases do occur.

At the latter location the diorite forms a ridge on the west side of the River. Carbonate alteration of the diorite has occurred and some secondary quartz is present as blue eyes and small lenses along a lineation which strikes 35° and dips about 70°N. Well developed joints at 35° (dip 80°W) and 133° (dipping vertically) were observed.

Outcrops of peridotite are shown on the claims tying on to the southeast and east edges of the Montgomery Lake Group. This rock type, forming a ridge at the edge of the swamp, provides the majority of the exposures mapped. The ultrabasics are medium green in color but weather with a medium to light brown surface. The peridotites are moderately serpentinized to the south but the most northerly exposures are more highly serpentinized.

Some carbonatization was noted in all outcrops. One highly carbonatized peridotite outcrop is located about 200 feet southwest of the northeast corner of claim 89494. Poorly developed lineation strikes 60° with a steep northerly dip. Most favoured joint system is about 15° (dip 75°N) and 135° (dip 58°E). Examination of these outcrops failed to reveal any chrysotile asbestos fibre.

Two outcrops, (probably sediments), are exposed in the north central part of claim 89498. The rock is light grey in color and weathers readily due to slight carbonatization and the presence of sparse pyrite. Lineation, slightly undulating, is at 55° with a 75° dip north. No definite bedding was observed and top determination was impossible.

A small, poorly exposed gossan can be seen about 200 feet south of the above sediments(?). The rock is badly decomposed and the rusty sample obtained appeared to be a sericitised sediment. A few malformed crystals were thought to be arsenopyrite.

Magnetometer Survey:

A. Montgomery Lake Group:

Magnetic work was completed over this group of claims during the field season of 1954 and a report, complete with magnetic and geologic plans, was submitted for assessment purposes in July of that year. The results of this work have been reinterpreted on the basis of diamond drilling on the Montgomery Lake Group and mapping and surveying on the adjoining claims, and are shown on the accompanying plan to give a broader picture of the regional structure.

B. Montgomery Lake Fringe and Northeast Extension groups:

A magnetometer survey was conducted over these claims by L. Allison and John Black during the field season of 1956. S. O'Connor, W. Scott, R. Rintamaki and H. McDougall served as assistants during the course of this work. This surveying was carried out at irregular intervals from May 12th to October

3rd. Magnetic readings were recorded using two Sharpe's D-I-M type instruments. These magnetometers had been calibrated in such a manner that readings approximate those obtained when using a Watts Type Vertical Variometer. Both of these instruments were checked and set on the Government Magnetic Base Station at Matheson and a gamma value of 1220 corresponded to an absolute value of 57,559±15 gammas.

One base control station, having a fixed value of 2049 gammas, was established behind the Penhorwood Camp on the south shore of Tentcamp Lake. This station was used as the major control point for all magnetic surveying in Penhorwood, Reeves and Kenogaming Townships. Ten control stations, all tied into the base station, were established over the claims group and are indicated by triangles on the accompanying plan. Readings were observed on control and/or base stations at least four times per day as a check on the working condition of the instrument, and the daily diurnal variation.

The results of the magnetic surveys are depicted on the accompanying plan at a scale of one inch equals 400 feet. Contour lines of equal magnetic intensity have been drawn at 1000 gamma intervals from 0 to 6000 inclusive. A 10,000 gamma contour is also shown. Interpretation has been based on a study of the contoured magnetometer plan, geological plans, aerial photographs and diamond drilling on the Montgomery Lake Group.

Interpretation of the magnetometer results over these claims has been rendered extremely difficult due to the following factors:

1. Paucity of rock exposures. No outcrops were located over the extreme magnetic "highs" and approximately 90 percent of the area is drift covered.
2. Variations in magnetic intensity over different members of the iron formation.
3. Similarity in magnetic values over weakly magnetic iron formation and serpentinised peridotite.
4. Close association, in most cases, of the ultrabasic and the iron formation.
5. Similarity in magnetic values over highly carbonatised serpentinised perid-

otite and gabbroic intrusives.

6. Similarity of magnetic readings over sedimentary and volcanic rock types.

7. Intense folding throughout the map area.

8. Similarity in many instances of readings obtained over basic intrusives and intermediate volcanics.

On the Montgomery Lake Northeast Extension Group of claims a narrow band (approximately 300 feet wide) of magnetite-rich iron formation has been delineated, striking N50°E and dipping 60°NW. In the northeastern section of this group a hematitic phase, weakly magnetic, was noted in a large exposure on the base line - as scattered moderate magnetic "highs" occur along strike, the iron formation has been shown having a width of approximately 1400 feet to the east of line 93+00 west. Magnetic readings over this iron formation range in value from less than 1000 gammas over the hematitic phase to over 30,000 in the magnetite-rich sections.

With the exception of a narrow band of sediments mapped in the northwest part of claim 90134, the map area has been interpreted as being underlain by intermediate to basic volcanics. Gabbro intrusives may occur but cannot be differentiated on the basis of present information. Magnetic readings over the volcanics range in value from 1500 to 2500 gammas in most of the map area.

The iron formation apparently is discontinuous and pinches out on the northeast side of claim 67753. This northern limb is again outlined magnetically in the southwest corner of this claim - this being the start of the major fold shown on the accompanying plan on the Montgomery Lake Group. Diamond drilling indicated a highly silicified, sulphide enriched (pyrite and pyrrhotite mineralisation) band of iron formation with both limbs dipping in a northerly direction and the nose of the fold plunging to the west or southwest. The iron formation is bounded by highly carbonatized andesitic volcanics cut by small dikes of quartz-porphyry which contain minor pyrite mineralisation. Magnetically, it is impossible to distinguish sulphide-rich sections from

normal magnetic iron formation due to erratic variations in the magnetite content. Sulphides were encountered in anomalies ranging in value from 6000 to 20,000 gammas. Ultrabasic intrusives have been shown along the Montgomery Lake base line to the east of the nose of this fold. Diamond drilling indicated a body of slightly carbonatized serpentinized peridotite in the vicinity of line 0+00 and exposures of moderately serpentinized peridotite were mapped in the magnetic "highs" on lines 14+00 to 24+00 East inclusive. Magnetic values over the ultrabasic range from 2700 to 8400 gammas.

Ultrabasics have also been interpreted to the west and north of the north limb of the fold on claims 67754, 89511, 89512, 89513 and 89507. Magnetic values vary from 3000 to over 6000 gammas. It should be noted that these weak "highs" could represent a continuation, possibly faulted, of the north limb of the iron formation. Magnetic readings over the volcanics in this part of the map area range in value from less than 1000 to over 5000 gammas (the latter lying along the footwall of the iron formation).

Magnetometer surveying and subsequent diamond drilling has indicated the presence of a southern limb, (offset from the main fold) to the iron formation. This limb strikes N65°E and has been interpreted as dipping to the northwest and extends across the southeastern portion of the map area. Sulphide enriched zones (pyrite and pyrrhotite) were logged in drill holes which penetrated this iron formation.

Serpentinized peridotite was indicated along the north contact of the iron formation on claim 89497 by diamond drilling. Magnetic values ranged from 3000 to 5000 gammas. Intermediate volcanics occur along the remainder of the north contact of the southern limb of the iron formation. The iron formation pinches out to the southwest but a small magnetic "high", interpreted as a continuation of the iron formation, occurs in the centre of claim 89491. Ultrabasics lie in contact and to the southwest of this mass. Magnetic values over the ultrabasics range from 3000 to 4000 gammas and from

4000 to 6900 gammas on the iron formation. Gabbroic intrusives, indicated by diamond drilling and geological mapping, lie to the south of the iron formation. Two narrow bands of acidic to intermediate volcanics have been mapped to the southeast of the iron formation, within the gabbro intrusive mass.

A narrow band of iron formation? striking S30°W extends into claim 89495. The possibility exists that this is a narrow band of ultrabasic rocks rather than a faulted segment of the south limb of the magnetite-rich formation.

A narrow band, approximately 400 feet wide, of highly carbonated, serpentinized peridotite strikes N40°E across the southeastern portion of the claims group. The presence of this ultrabasic is indicated by geological mapping. Magnetic results are more indicative of a basic intrusive. A narrow band of sediments has been mapped on claim 89498 and occurs in an area of low magnetic readings. Scattered weak magnetic "highs" along the east boundary have been interpreted as prepresenting ultrabasics within the main gabbro mass.

Structurally, the iron formation has been interpreted as representing a major fold with both limbs dipping to the north or northwest and the nose plunging to the west or southwest. Intense folding, causing pinching and swelling, occurs along the iron formation which magnetically is not continuous.

A major cross structure may occur on claim 89491, offsetting the southern limb of the iron formation to the southwest and a similar condition may exist on claim 89498 along the eastern boundary of the claims group.

Due to the lack of rock exposures and the intense folding in the area, it is impossible to delineate minor structures on the claims group.

Conclusions and Recommendations:

Detailed geological and magnetometer surveys have been completed on the three groups of claims in the map area and a limited amount of diamond drilling on the Montgomery Lake Group. Results of this work indicate the

presence of a highly folded, and possibly faulted, band of iron formation containing both magnetite-rich and sulphide-rich sections. Unfortunately sulphides encountered to date have been of no economic value. Similarly, iron concentrations have been too low to warrant interest. However, only a very small section of the iron formation has been tested by diamond drilling and in this respect I would recommend that a ground electromagnetic survey be conducted over the iron formation, overlapping well into the bounding andesites or gabbros. The results of this work would determine whether or not further drilling would be warranted.

Small, scattered bodies of serpentinised peridotite have been indicated on the claims group. However, on the basis of size and the intense carbonate alteration found throughout the map area, these bodies appear to hold little promise for an economic fibre deposit. The anomalies occurring in the north-eastern corner of the group are larger in size and might possibly warrant testing by diamond drilling if a drill rig was in the area. However, the possibility exists that these magnetic "highs" represent faulted sections of moderately magnetic iron formation.

F. J. Evelegh,
Sr. Geologist.

File 63.469 (3)

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REPORT ON

MAGNETOMETER SURVEY

JEHANN GROUP OF CLAIMS

PENHORWOOD TOWNSHIP

SUDBURY MINING DIVISION

PROVINCE OF ONTARIO

by

F. J. Evelegh.

- Exploration Department -
Canadian Johns-Manville Co. Limited

February 1958
Matheson, Ontario.

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REPORT ON MAGNETOMETER SURVEY
JEHANN GROUP OF CLAIMS, PENHORWOOD
TOWNSHIP, SUDBURY MINING DIVISION
PROVINCE OF ONTARIO

Introduction:

The following report describes the magnetometer survey recently completed on the Canadian Johns-Manville Company Limited claims located in the north-central section of Penhorwood Township, Sudbury Mining Division, Province of Ontario.

The original group, consisting of nineteen claims and numbered S-82787 - S-82805 inclusive was staked during the latter part of January 1955 and recorded and transferred to Canadian Johns-Manville Company Limited on February 17th of the same year. An additional six claims (formerly part of the Jehann East Extension Group) were staked during the early part of March 1956 and were recorded and transferred on March 28th of the same year. These claims are now included as part of the Jehann Group and are numbered S-94199, 200, 04, 05, 06 and 11. All claims were tagged within six months of the date of recording.

It should be noted that claims of the Reeves Group and Jehann Fringe Group were also surveyed during the course of this work and the results are shown on the accompanying plans to give a more complete interpretation of the results.

Cutting of picket lines on this group of claims was contracted to Jean Alix Company Limited of Val d'Or, Quebec. Picket lines were cut in an east-west direction from north-south base lines and were established at 200 and 100 foot intervals depending upon the amount of detail required. Pickets were established by chaining at 50 foot intervals along these offset lines. Tie lines were established at the east and west extremeties of the claims to maintain a more accurate control of the picket lines.

Magnetometer surveying was carried out by P. Broughton, G. Adams and

J. Black, geophysical operators for this Company, with the assistance of G. Cobby and R. Rintamaki. Readings were observed using a Sharpe's D-I-M type magnetometer. Stations were spaced at 50 and 100 foot intervals depending upon the amount of detail required.

Supervision and interpretation of this work was the responsibility of the writer, senior geologist with Canadian Johns-Manville Company Limited, Matheson, Ontario.

Property:

Assessment work is currently being filed on nineteen claims of the Jehann Group. These claims are listed below:

S-82787 to S-82805 inclusive - 19 claims

S-94199 - 200 - 204 - 205 - 206 - 211 - 6 claims

However, the accompanying plans show the results of this survey on the following additional claims -

Reeves Group - S-63911-12-13-14 and 60442 and part of 59017

Jehann Fringe Group- S-97107 and S-97131 - 38 inclusive

Penhorwood Patented Group - S-64063 and 64.

The claims of the Jehann Group comprise approximately 1000 acres.

Location and Accessibility:

The Jehann Group of claims is situated in the north-central section of Penhorwood Township, Sudbury Mining Division, Province of Ontario. These claims are located immediately to the northeast of Jehann Lake and extend northwards to the Reeves-Penhorwood Township line - the three mile post being situated on the north boundary of claim S-94200. The Nat River drains the western section of the group as it flows north towards the Groundhog River.

Access to these claims has been greatly facilitated by completion of the Warren Lake Road. It is now possible to drive to the Nat River bridge on the Warren Lake Road and then travel by canoe to a campsite on claim

S-82804. The Nat River bridge is situated approximately 42 miles south-west of Timmins along the Warren Lake Road.

A tractor road, bulldozzed during the fall of 1956, further facilitates access. This road starts approximately 2 miles north of the Nat River bridge and has been cleared as far south as Tentcamp Lake (approximately 8 miles to the south). The exact location of this road is shown on the accompanying plans.

Topography:

As topography is mapped in detail during the course of a geological survey(proposed for the coming field season) only the main features will be mentioned in this report.

Drainage in this area is supplied by the Nat River which flows northwards through the western portion of the claims group. Several small creeks drain the eastern part of the holdings and flow to the west emptying into the river. The ground along the river is extremely low lying and is covered by cedar and alder bush. To both the east and west sides of this broad belt of low relief, higher, north-south trending ridges occur. These ridges are timbered with mixed bush - poplar, spruce, balsam, birch etc. - and attain a maximum height of 100 feet (south part of the Jeahnn Fringe Group). Numerous rock exposures occur scattered throughout these areas of higher relief.

Previous Work:

This area was mapped by E. W. Todd and the results were published in 1924 in Vol. XXXIII, Part 6 - Annual Report of the Ontario Department of Mines. The general geology of the area is shown on Map No. 33-G - Groundhog River Area - on a scale of 1 inch equals 1½ miles. This map accompanies Todd's report.

During the middle 1940's most of the Jehann Claims were staked by "Companies" who explored the area for gold occurrences. As no showings of

Geology:

As no detailed geological work has been completed at the time of writing this report, the geology of the claims group will be discussed under the next section entitled "Magnetometer Survey".

However, the following Table of Formations has been included and was taken directly from the fifty-Ninth Annual Report of the Ontario Department of Mines, entitled "Geology of the Keith-Muskego Townships Area" and compiled by V. K. Prest:-

CENOZOIC	
Pleistocene:	Glacio-fluvial sands and gravels Till
PRECAMBRIAN	
Matachewan:	Diabase
Algoman:	Quartz veins, carbonate veins Lamprophyre Granite, granite gneiss; granodiorite, hornblende-quartz diorite, syenite, porphyries
Algoman (?):	Feldspar porphyry Granite porphyry, associated feldspar porphyry, quartz-feldspar porphyry Felsite and felsite breccia Quartz porphyry and quartz porphyry breccia
Haileyburian (?):	Serpentinite Granodiorite, quartz diorite, diorite, gabbro
Keewatin (?):	Feldspar porphyry, granite porphyry
Keewatin:	Banded iron formation Conglomerate, arkose greywacke, argillite; phyllite, slate Acidic volcanics and associated intrusives; minor dioritic tuffs and dikes; derived schists Intermediate to basic volcanics and associated intrusives; minor acidic volcanics and sediments; derived schists.

interest were discovered in Penhorwood Township, most of the holdings were allowed to lapse and consequently when the Reeves Orebody was discovered in 1951 the immediate area was open for staking.

Part of the Jehann claims were staked by Arkell and were later optioned by Canadian Johns-Manville Company Limited. During the course of this option a magnetometer survey and reconnaissance geological mapping was completed on the Arkell holdings. This work was followed by a limited diamond drilling program. As the results were of little interest the option was dropped and Arkell later allowed the claims to lapse.

Early in 1955 the claims were staked by this Company and a limited diamond drilling program ensued. This was followed by line cutting and a detailed magnetometer survey. Geological mapping and intensive prospecting has been proposed for this claims group prior to further diamond drilling.

Line Cutting:

On November 2nd, 1956 a base line trending due south was turned off from the steel pin at the No. 1 post of claim S-63914 on the Reeves - Penhorwood Township line. This base line was cut and chained over a length of 11,200 feet. A second base line was started from the No. 1 Post of claim S-94199 on the Reeves - Penhorwood Township line and was cut due south for a length of 5800 feet. Right angled offset lines were established at 200 foot intervals along these base lines and were cut and chained both east and west to the limits of the claims. Picket lines were established at 100 foot intervals on claims S-82792 - 93 and 94, also 95 and chained along the east and west boundaries of the claims to more accurately locate the ends of the picket lines. Pickets with numbered locations were established along the base lines and offset lines at 50 foot intervals.

Line cutting and chaining was contracted to Jean Alix Company Limited of Val d'Or, Quebec and this work was carried out during the period November 2nd, 1956 to February 15th, 1957 inclusive.

Magnetometer Survey:

A magnetometer survey was conducted over the Jehann and surrounding claims by P. Broughton, G. Adams and J. Black (geophysical operators) with the assistance of G. Cobby intermittently, during the period April 3rd to December 18th, 1957.

Magnetic readings were recorded using a Sharpe's D-I-M type instrument (note that the same instrument - #201 - was used throughout the entire survey). This magnetometer had been calibrated in such a manner that readings approximate those obtained when using a Watts Type Vertical Variometer. This instrument has been checked periodically on the Government Magnetic Base Station at Matheson and a gamma value of 1220 corresponds to an absolute value of 57,559$\pm$15 gammas.

Base control stations, as listed below, were tied into a main base station at the Nat River campsite in accordance with our standard procedure for claims groups in this area.

B, C. S. No. 1 - value - 3104 gammas - 1100 south on base line No. 1

B. C. S. No. 2 - value - 3219 gammas - 3400 south on base line No. 1

B. C. S. No. 3 - value - 3036 gammas - 1500 east on line 40+00 South

B. C. S. No. 4 - value - 2197 gammas - 1500 east on line 62+00 South

B. C. S. No. 5 - value - 2219 gammas - 200 south on base line No. 2

Temporary control stations were established along the base lines at 800 foot intervals to further facilitate checking the working condition of the instrument and recording the daily diurnal variation.

The results of the magnetometer survey are depicted on the accompanying eight plans on a scale of 1 inch equals 100 feet. Contour lines of equal magnetic intensity have been drawn at 500 gamma intervals from 0 to 5,000 gammas. Contour lines are spaced at 1000 gamma intervals for readings in excess of 5,000. Also attached is a plan showing the geomagnetic interpretation for

all the claims covered during the course of this survey, on a scale of 1 inch equals 400 feet.

Interpretation has been based upon a study of the contoured magnetometer plan, reconnaissance geological mapping, earlier diamond drilling, regional geology and aerial data.

Magnetic results indicate the presence of a sizeable intrusive body of ultrabasic rocks in the central and western sections of the surveyed area. The ultrabasics trend in a north-south direction, appear to dip relatively steeply to the east and vary in width from 3500 feet to 50 feet. The intrusive extends over a continuous length of 7,400 feet with numerous faulted blocks and small lenticular masses occurring beyond and on both fringes of the main sill-like body. The magnetic intensity varies greatly over the serpentinized peridotite due to a series of factors. Alteration - mainly talc-carbonate - greatly reduces the magnetic susceptibility and complicates the distinction between altered serpentinite and the surrounding gabbro, diorite or basic volcanics. Depth of overburden has a large affect - depths of 60 to 100 feet effectively mask a weakly to moderately magnetic ultrabasic. In this regard detailed topography is of major importance in interpreting magnetic results. Faulting also plays a large part. Dip changes in the various fault blocks are difficult to perceive without a certain amount of surface mapping or diamond drilling.

Magnetic readings over the intrusive range in value from less than 2,000 gammas to slightly over 10,000 gammas depending directly upon the factors listed above. Note that the strong zone of magnetic "highs" in the northeastern section of Map Sheet No. 2 is due to a large percentage of magnetite in the ultrabasic and to extremely shallow overburden.(several coutcrops were noted in this area) Similar conditions occur along the base line in the north part of this map sheet where zones of moderate magnetic "highs" have been outlined. Strong, semi-isolated zones of a similar nature occur on Map Sheets 7 and 8

along the western fringes of the main ultrabasic. No geologic or topographic information is available on the small ultrabasic bodies delineated in the south part of Map Sheet 4. The magnetic intensity exceeds 10,000 gammas at one station possibly indicating shallow overburden. The broad area depicted as serpentinized peridotite on claim S-97137 (Map Sheet 7) is extremely weak - magnetically. This is due to moderate talc - carbonate alteration as noted by P. Freeman and F. Vokes during the geological survey of the Jehann Fringe Group of claims.

Economically of course the zones of magnetic "highs" indicate an increased magnetite content which is usually found in chrysotile asbestos-fibre deposits. Consequently the strong zones mentioned in the preceding paragraph are excellent locations for further exploration work. This is consistent with the results obtained over the Reeves orebody which is located approximately three-quarters of a mile north of Map Sheet No. 2.

The talc-carbonate alteration zones shown on the accompanying plans have been intersected at several localities during the course of previous diamond drilling programs. This alteration is most pronounced along the easterly contact of the ultrabasic and associated with the strong cross structures shown on the accompanying plans. The magnetic intensity over this alteration zone ranges from 2000 to 4000 gammas in most instances. Similar conditions occur along the Munro-Beatty ultrabasic sill in the Matheson Area and also in the Reeves area. It should be noted that carbonate alteration throughout Reeves and Penhorwood Townships is widespread and highly carbonated volcanic rocks have been mapped at several localities. For a rock to be classed as "carbonate" (for purposes of this report) the alteration must exceed fifty percent. Ultrabasics containing 20 to 30 percent carbonate have been shown on the accompanying plans as serpentinized peridotite. This is the situation which exists on claim S-97137 - Jehann Fringe Group.

A complex of intrusives is in contact with the ultrabasics in the area

surveyed. Gabbro, diorite, quartz-diorite and granodiorite comprise this group. The magnetic intensity over these rocks varies from less than 1000 to nearly 4000 gammas causing extreme difficulty in differentiating between carbonated ultrabasics, carbonate rock, basic volcanics and the rocks of the intrusive complex. As a consequence large errors may occur in the interpretation of the magnetic results, especially along the west contact of the serpentinized peridotite. In the other sections of the map-area outcrop or drill hole information has corroborated the magnetic interpretation . Intermediate to basic volcanic rocks have been mapped as shown on the accompanying plans. In most instances these volcanics are highly altered (chloritization and carbonatization) and are extremely schistose. Due to the similar magnetic qualities of the volcanics and basic intrusives the interpretation as shown has been taken mainly from geologic and diamond drilling data. The contour lines over the volcanics indicate a marked linearity giving the general strike of the formations.

Gneissic granitic rocks occur on Map Sheets 5 and 7 and have been closely delineated by geological mapping. Little or no distinction can be made between the acidic intrusives and the volcanics on the basis of the magnetic survey.

As shown on Map Sheet 1 narrow bands of graphitic sediments have been outlined striking in a north-south direction across the eastern section of the area surveyed. Narrow zones have also been outlined on Map Sheets 3 and 8. These sediments have been intersected in diamond drill holes and were further traced by electromagnetic surveying. Sparse pyrite mineralisation is associated with the graphitic schists.

The diabase dike depicted in the northeast corner of Map Sheet 2 has been interpreted from geologic data. This dike is a continuation of the diabase which cuts the Reeves orebody approximately three-quarters of a mile

to the north.

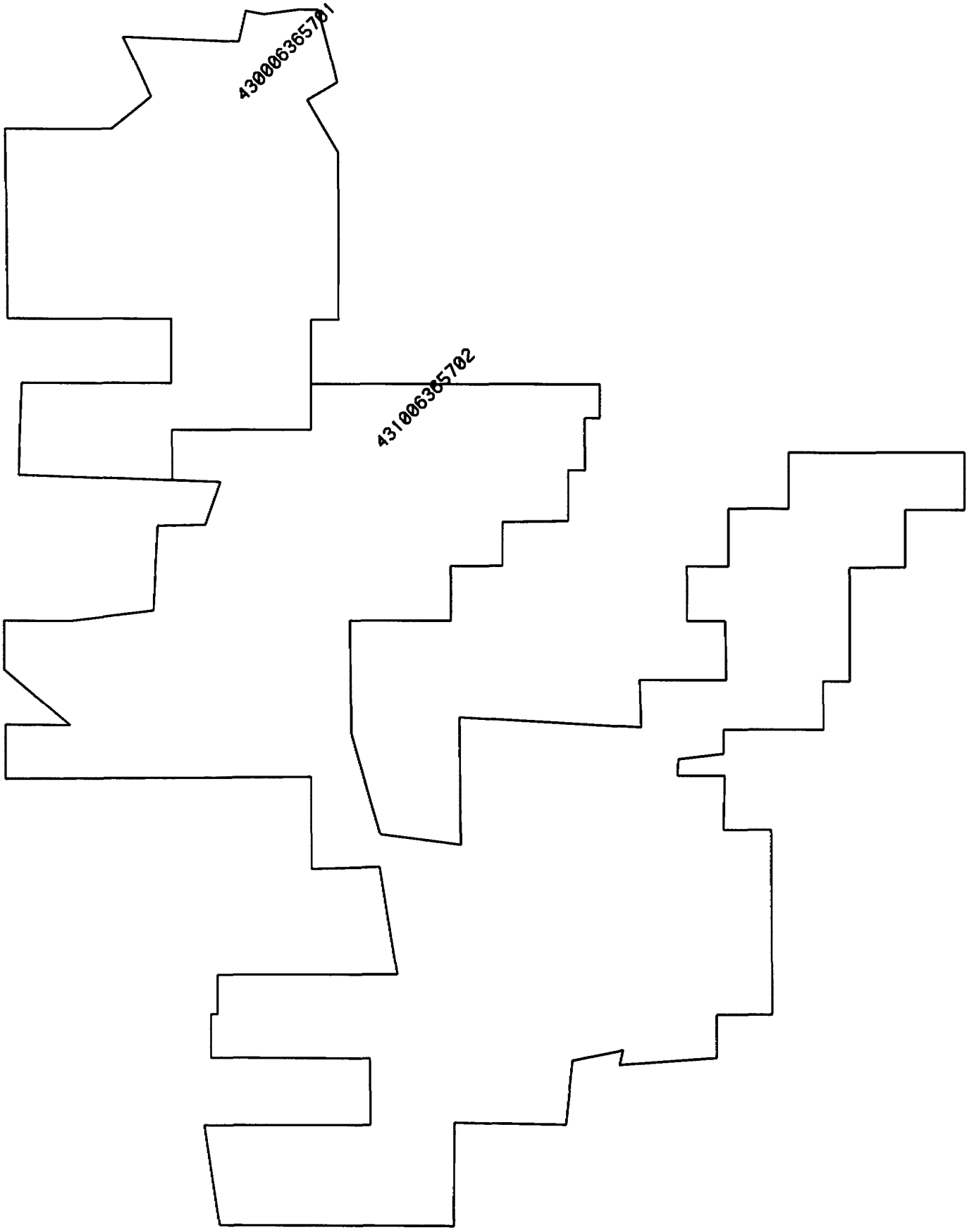
Structurally, a large number of cross faults have been depicted as offsetting the ultrabasic intrusive and dividing the main mass into a series of fault blocks. Horizontal movement along these structures varies from a few feet to several hundred feet. No doubt numerous longitudinal structures occur in the map area but it is extremely difficult to interpret same from the magnetic data. On the basis of present knowledge (Munro-Beatty Sill, Garrison sill, &c.) only a small percentage of the overall structure has been shown on the accompanying plans. Faulting and shearing is exceedingly complex in the ultrabasic rocks as shown by recent mapping of the Munro "A" Orebody. Detailed geological mapping and further diamond drilling will aid in interpreting the structural picture of the Jehann ultrabasic intrusive.

Conclusions and Recommendations:

Magnetic surveying of the Jehann Group of claims has indicated the occurrence of a large, irregular, sill-like intrusion of ultrabasic rocks - serp-entinized peridotite and dunite. Carbonate alteration is intense around the fringes of the intrusive especially in the vicinity of the strong cross structures. This is a similar condition to the alteration in the Munro-Beatty sill.

Previous geological work and diamond drilling has been extremely limited and, consequently, on the basis of the magnetic results, geological mapping and prospecting is strongly recommended for this group of claims. Intensive diamond drilling would be the next logical step. Due to the proximity of the Reeves Orebody and the profusion of strong cross-structures in the Jehann ultrabasic the possibilities for finding economic chrysotile asbestos fibre are excellent.

F. J. Evelegh,
Sr. Geologist.



PENHORWOOD 63.469 42B01NE0600

63.469

CASTLE

CANADIAN JOHNS MANVILLE

CANADIAN JOHNS MANVILLE

63.469

63.469

GEOL + GEOPH

= GEOPHYSICS (MAG)

GEOLOGY

RPT GEOL/GEOPH

PENHORWOOD TWP

63.469

REPORT ON GEOLOGICAL AND MAGNETOMETER SURVEYS ON NAT RIVER - BURTHO GROUPS OF CLAIMS PENHORWOOD TOWNSHIP SUDBURY MINING DIVISION PROVINCE OF ONTARIO

by

E. Rowley

and

F. J. Evelegh

- Exploration Division -
Canadian Johns-Manville Co. Limited

Matheson, Ontario
November 15th, 1956

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REPORT ON GEOLOGICAL AND MAGNETOMETER SURVEYS ON THE NAT RIVER-BURTHO GROUP OF CLAIMS IN PENHORWOOD TOWNSHIP, SUDBURY MINING DIVISION, PROVINCE OF ONTARIO

Introduction:

The following report describes the geological and magnetometer surveys recently completed on the Canadian Johns-Manville claims located in the south-eastern section of Penhorwood Township, Sudbury Mining Division, Province of Ontario.

Staking of the Burtho Group of claims was carried out by O. Lydon on October 22nd, 1955 and these claims were recorded and transferred to Canadian Johns-Manville Company Limited on November 15th. The Nat River Group of claims was staked by W. Scott, J. Eby, J. Sharratt, and R. Rintamaki during the period March 5th to 9th, 1956. Several of these claims were recorded and transferred to Canadian Johns-Manville Company Limited on March 28th, 1956; the remainder were recorded and transferred on April 10th.

Three base lines, spaced at approximately one-half mile intervals, trending east - west, were established by I. Soutar using a transit. Picket lines were spaced at 300 foot intervals along these base lines. Line cutting and chaining of offset picket lines was contracted to Jean Alix Company Limited of Val d'Or, Quebec. Numbered pickets were located at 100 foot intervals along these lines.

Geological mapping of the groups was conducted by E. Rowley, a field geologist of Canadian Johns-Manville Company Limited, with the assistance of Jim Black. Rock outcrops were tied into the numbered pickets on the offset lines and base lines by the pace and compass method. All prominent topographic features were noted during the survey and are shown on the accompanying plan.

A magnetometer survey was conducted by L. Allison and John Black, both geophysical operators for Canadian Johns-Manville Company Limited. Readings were observed using Sharpe's D-I-M type magnetometers. Stations were spaced at 100 foot intervals.

Supervision and interpretation of this work was the responsibility of F. J. Evelegh, senior geologist with Canadian Johns-Manville Company Limited,

Matheson, Ontario.

Property:

Thirty claims are included in these groups and are numbered as follows:-

A. Burtho Group: S-90732 to S-90737 inclusive

B. Nat River Group: S-94280 to S-94303 inclusive.

Approximately 1,200 acres are comprised in these blocks of claims.

Location and Accessibility:

The Canadian Johns-Manville claims are located in the south-eastern section of Penhorwood Township, Sudbury Mining Division, Province of Ontario. The southern boundary of the claims is situated approximately one and a half miles north of Tionaga, a small settlement on the main southern line of the Canadian National Railway, which is approximately 110 miles northwest of Capreol. An old logging road, winding north from Tionaga, crosses the claims group and connects with a jeep road recently built by this Company. This new road starts at the junction of Storms Creek and the Warren Lake Road and continues south to Tentcamp Lake, a total of 8 miles. These roads render the claims group readily accessible. Several old logging roads, passable by tractor, traverse the claims in an east-west direction.

Topography:

The topography of the ground covered by these claims is typical of this section of the country. The area is, for the most part, covered with low hills of glacial debris although flatter sections occur, chiefly bordering the Nat River, which flows through the eastern edge of the group.

Poplar, with scattered balsam, and dense moose maple and alder underbush, covers the higher areas, while spruce and cedar forrest the lower ground.

Although rock outcrops are not plentiful, there are considerably more than on the Montgomery Lake Fringe Group to the north where the overburden appears to be heavier.

Water is scarce in the central section but numerous small lakes in the

northwest and the Nat River to the southeast supply water in these areas.

Previous Work:

This area was mapped by E. W. Todd and the results were published in 1924 in Vol. XXXIII, Part 6, - Annual Report of the Ontario Department of Mines. The general geology of the area is shown on Map #33-G - Groundhog River Area - on a scale of 1 inch equals one and a half miles. This map accompanies Todd's report.

During the gold rush in the Joburke area in the late 1940's, part of the claims described were staked by Burtho Gold Mines Limited. A geological survey was carried out and was followed by a limited diamond drilling program. No gold values of interest were discovered and the claims were subsequently allowed to lapse. No further exploration work was conducted in the area until 1953, at which time Canadian Johns-Manville Company Limited staked a thirteen claim group to the northwest of Montgomery Lake. Geological and magnetometer surveys were conducted on the claims during the field season of 1954. Diamond drilling of the major anomalies following during the winter of 1955 at which time the Nat River-Burtho Groups of claims were staked.

Line Cutting and Surveying:

During the latter part of August of this year, I. Soutar and two helpers carried out a transit survey starting at the junction of the Warren Lake Road and a road bulldozzed by this Company. This survey was run to the south through Reeves and Penhorwood Townships to the south end of Tentcamp Lake. From this point, the extension of the original Montgomery Lake base line was surveyed in and a second base line established 3000 feet to the south. This is designated as base line No. 1 on the accompanying plans. The No. 2 base line was established 2,675 feet south of No. 1, and No. 3 base line established 2,875 feet south of No. 2. These base lines trend south 88° east astromic. Right-angled offset lines were established at 300 foot intervals. Line cutting and chaining was contracted to Jean Alix Company Limited of Val d'or, Quebec, and this work

was conducted during the period August 15th to September 12th, 1956 inclusive.

During the course of this contract, a total of 39.7 miles of lines was cut and chained. This mileage is divided as follows:

Picket lines	35.2
Base lines	4.5

Geological Survey:

The outcrops on the property described in this report, were mapped by E. Rowley with the assistance of Jim Black, during the period September 30th to November 2nd, 1956. Mapping was carried out from offset picket lines spaced at 300 foot intervals and the results are shown on the accompanying plan on a scale of 1 inch equals 400 feet.

This survey was conducted to discover, wherever possible, the cause of the anomalies outlined by the magnetometer survey, and to try and locate mineralized sections in the basic volcanics and intrusives.

The following "Table of Formations" is taken from the Fifty-Ninth Annual Report of the Ontario Department of Mines, entitled Geology of the Keith-Muskego Townships Area, and compiled by V. K. Prest.

CENOZOIC	
Pleistocene:	Glacio-fluvial sands and gravels
	Till
PRECAMBRIAN	
Matachewan:	Diabase
	Quartz veins, carbonate veins
	Lamprophryre
Algoman:	Granite, granite gneiss; granodiorite, hornblende-quartz diorite, syenite; porphyries
	Feldspar porphyry
	Granite porphyry, associated feldspar porphyry
	quartz-feldspar porphyry
Algoman (?):	Felsite and felsite breccia
	Quartz porphyry and quartz porphyry breccia
Haileyburian(?):	Serpentinite
	Granodiorite, quartz diorite, diorite, gabbro
Keewatin(?):	Feldspar porphyry, granite porphyry
	Banded iron formation
	Conglomerate, arkose,

greywacke, argillite; phyllite, slate

Keewatin: Acidic volcanics and associated intrusives; minor dioritic tuffs and dikes; derived schists
Intermediate to basic volcanics and associated intrusives; minor acidic volcanics and sediments; derived schists.

Keewatin volcanics of probable andesitic composition are exposed in the southwest section of the Nat River Group. These are typically green, medium grained rocks with a green-brown weathered surface. They are sometimes carbonated and where lineation is evident it has an average strike of 170° with a vertical to steep easterly dip.

Highly metamorphosed and altered volcanics outcrop on claims S-94298 and S-94301. These rocks are now horneblende schists for the most part, although outcrops of gneiss were observed. Original structure has been completely obliterated. Schistosity strikes 45° to 80° with a northerly dip of from 45° to 70°. This schistosity is parallel to the diorite volcanic contact. It is possible that some of these schists are the result of the metamorphism of a rock type other than volcanics.

Fourteen outcrops of gabbro (or diorite) were mapped, most of them being located on the Nat River Group. Grain size varied from fine to medium and the rock is composed almost entirely of horneblende and feldspar. The rock is generally quite fresh and weathers to a dull brown.

No exposures of sediments or acid volcanics were mapped on the claims group.

Granite, quartz porphyry and diorite outcrop on the property. The granite is exposed in a series of small outcrops on claims S-94281. Pink feldspar, quartz and biotite give the medium grained rock a light pink color. No contacts with the surrounding rocks were observed and the size and attitude of this body is therefore unknown.

Diorite is exposed on claims S-94300, S-94298 and S-90737. The rock has a slight to medium lineation as shown on the accompanying map. The diorite-altered volcanic contact strikes south 75° and dips 48° to the north. Lineation

parallels this contact. The rock is grey-green on the fresh surface and weathers brown. Feldspar, horneblende and biotite with magnetite and pyrite were identified.

The quartz porphyry outcrops on claims S-90737 and shows less lineation than the diorite. The rock is pale yellow to cream in color and contains lenticular quartz eyes up to 1/10 of an inch. It is made up almost entirely of feldspar and quartz. Some pyrite was noted.

The presence of heavy overburden makes structural interpretation impractical but there are strong suggestions of a fault in claim S090737. Intense movement is suggested by the presence of well developed lineation, drag folds and the development of talc-chlorite schists. This fault, if present, would have a general southeasterly strike as indicated by the lineation and topographic depression. These conditions - a probable fault zone near the Algoman granite with outcrops of quartz porphyry adjacent - were investigated by Burtho Gold Mines in 1945 but results were not encouraging.

Magnetometer Survey:

A magnetometer survey was conducted over the Nat River-Burtho claims groups by L. Allison and John Black, during the field season of 1956. R. Rintamaki, W. Scott and J. Chisolm served as assistants during the course of this work. Magnetic readings were recorded using two Sharpe's D-I-M type instruments. These magnetometers had been calibrated in such a manner that readings approximate those obtained when using a Watts Type Vertical Variometer. Both of these instruments were checked and set on the Government Magnetic Base Station at Matheson and a gamma value of 1220 corresponded to an absolute value of 57,559$\frac{1}{2}$15 gammas.

The base control station, established on the southwest side of Tentcamp Lake and shown on the plans for the Jehann South Extension claims and the Montgomery Lake Area claims, has been used for this survey. The fixed value for this station is 2049 gammas. The following temporary control stations were established during the course of this survey:

Temporary Control Station #11 - value 1049 gammas

Temporary Control Station #12 - value 1595 gammas

Temporary Control Station #13 - value 2171 gammas

It should be noted that Temporary Control Stations 4, 5 and 6, established during the course of the surveying on the Montgomery Lake Fringe Group, were used for this survey. All Temporary Control Stations are shown on the accompanying geomagnetic contour plan.

Readings were observed on control and/or base stations at least four times per day as a check on the working condition of the instrument and the daily diurnal variation.

The results of the magnetometer survey are depicted on the accompanying plan on a scale of 1 inch equals 400 feet. Contour lines of equal magnetic intensity have been drawn at 500 gamma intervals from 0 to 6000 gammas. Interpretation has been based on a study of the contoured magnetometer plan, geological plans, aerial photographs and regional geology.

Interpretation of the magnetic results over these claims has been rendered extremely difficult due to the paucity of rock exposures and the similarity in magnetic intensity of the intermediate to basic volcanics and the basic intrusives. However, after a study of the plans for the Jehann South Extension Group of claims and the Montgomery Lake Groups marked similarities were noted in the map area and a fairly accurate geomagnetic plan has been drawn up.

The marked north-south trend of the granitic intrusives was noted on the Jehann South Extension Group and these compare favourably in magnetic intensity. Magnetic readings over the acid intrusives range in value from 0 to 1500 gammas. A majority of the granitic intrusives occur as narrow dikes, however, a large mass of granite has been interpreted as occuring in the eastern section of the map area and east-west contacts strike sharply north-south.

Intermediate to basic volcanics occur scattered throughout the map area and trend northeasterly in the central and eastern section and north and northwesterly in the western part of the claims. Dips in general are steeply

north to northeast. Magnetic intensity over the volcanics ranges from 1200 to 2000 gammas.

A large part of the map area is underlain by basic intrusives - diorite and gabbro. Magnetic readings range in value from 1500 to 3000 gammas over the diorite-gabbro complex. In the central and western sections of the claims group these intrusives appear to have a north-south trend while in the eastern section the gabbro ? strikes northeasterly. Contacts, in most instances, are poorly defined due to the similarity in magnetic intensity of the basic intrusives and the volcanics.

Several areas of ultrabasic rocks have been interpreted from the magnetic results. In the eastern section of the map area, two ultrabasic intrusives, trending southwesterly, extend on to the Nat River Group from the adjoining Montgomery Lake Fringe claims. Magnetic readings over these intrusives range in value from 1100 to 4400 gammas. In the north-central part of the claims a strong east-west strending zone of "highs" has been outlined by the magnetometer survey. Magnetic readings over this intrusive range in value from 2500 to 4500 gammas. This zone of ultrabasics extends over a length of 3300 feet and widths vary from 300 to 1000 feet.

A strong, narrow zone of "highs", interpreted as indicating ultrabasics, occurs in the northwestern section of the claims group and trends southwesterly. Magnetic intensity over this anomaly varies from 2500 to 6100 gammas.

Several small lenses with magnetic values slightly greater than 3000 gammas, are shown on the accompanying plan as representing ultrabasic intrusives.

Structurally, no major cross or longitudinal fault or shear zones have been delineated by this survey. The strongest structural feature in the area is the pronounced north-south attitude of the acidic and possibly basic intrusives.

Conclusions and Recommendations:

Detailed magnetometer and geological surveys have been completed on the Nat River-Burtho Groups of claims which are underlain by acidic,basic and ultra-

basic intrusives and intermediate to basic volcanic rocks.

The ultrabasic occurences are the only features in the map area of interest at the present time. Due to the size and intensity of ultrabasic zones in the north-central and western sections of the map area, further exploratory work is warranted. I would recommend detailed magnetic surveying over these anomalies with lines spaced at 100 foot intervals and readings recorded every 25 feet. This work should be conducted using the Sharpe's A-2 type magnetometer. Further work would be dependent upon the results of the detailed survey.

F. J. Evelegh,
Sr. Geologist.

E. Rowley,
Field Geologist.

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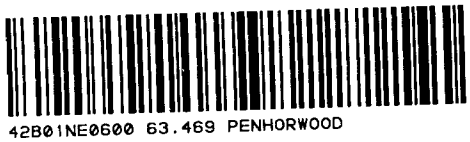

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GEOLOGICAL AND MAGNETOMETER REPORT

ON

JEHANN SOUTH EXTENSION GROUP OF CLAIMS

PENHORWOOD TOWNSHIP, SUDBURY MINING DIVISION

PROVINCE OF ONTARIO

by

R. Seavoy

- Exploration Division -
Canadian Johns-Manville Co. Limited

Matheson, Ontario
October 27th, 1956

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GEOLOGICAL and MAGNETOMETER REPORT
on
JEHANN SOUTH EXTENSION GROUP of CLAIMS

PENHORWOOD TOWNSHIP, SUDBURY MINING DIVISION

PROVINCE of ONTARIO.

Location & Access

The Jehann South Extension Group is located south of the Reeves ore zone. in Penhorwood Township, Northern Ontario. The entrance to the Reeves property is 43 miles west of Timmins on the Warren Lake Road. The Jehann South Extension group of claims is 5 miles south of the Warren Lake Road. At the present tiem, December 1956, the Warren Lake Road is complete through to Kukatush and Palomar on the main line of the CNR. The road is paved 7½ miles west of Timmins.

Penhorwood Township is a giant 9 x 9 mile township. It is surveyed, but unincorporated; the only permanent settlement being Tionaga, a station siding on the CNR, with a population of 7.

This group of claims is 5 miles south of the Warren Lake Road and 4 miles north of Tionaga. J.M. bulldozed an access road into the property in 1955, which connected up old logging and drill roads with some portion of new road. Transportation into Penhorwood Camp during the summer season of 1956 was by swamp buggy provided by the line cutting company to supply their own camps. At Penhorwood Camp, on the shore of Tentcamp Lake, there is an old logging road, still passable into Tionaga. In October 1956 a new road was bulldozed into the Penhorwood Camp, following an esker chain south from the Warren Lake Road. The road is high up on sand and gravel ridges, is very well drained, and will give all weather access to Reeves and Penhorwood Townships. It is now possible to take a jeep as far as Horwood Lake via Tionaga.

History

This group of 44 claims was staked in October 1955. During 1955, three diamond drill holes were put down in order to hold the ground. Two of the holes cut highly sheared and partially carbonated serpentine. The third hole cut a thin unaltered section of serpentine and the highly sheared and carbonated serpentine with two sections of highly altered volcanic inclusions within the serpentine body.

In 1946 most of southwestern Penhorwood was staked by gold mining companies as an aftermath of the Joburke discovery, in neighboring Keith Township A great deal of work was done but nothing commercial was found. In the northern part of the South Extension Group, McIntyre had a large block of ground. We found their old baseline and have used it as our Number 1 baseline North. This is the only part of the claim bloc on which lines had been previously cut.

T. geology of neighboring Keith and Muskego Townships was done in 1949 by V.K. Priest and was published in Vol. LIX 1950 by the Ontario Bureau of Mines. The geology of nearby Horwood Lake was done in 1936 by W.D.Harding and published in Vol. XLIV 1937 by the Ontario Bureau of Mines.

Topography

In the south, around Tentcamp Lake and Penhorwood Camp are sand plains and the termination of an esker chain that extends south from the Warren Lake Road and on which an all weather road has been built. This esker chain forms the eastern boundary of the property around the west shore of T-Bone Lake. In the northeast portion of the claim bloc near the end of Number 1 Baseline North, there is an extensive sand plain at the edge of the esker chain. This plain is covered with small to medium sized, but dense, jack pine.

Down the centre of the group, paralleling the original road of access, on both sides, is a low, long, flat crowned ridge of green boulder clay that has an occasional outcrop toward the south where it grades into sand. This is covered with poplar groves and a mixed forest. Much of the rest of the surface, about 50%, is a mixture of cedar swamp, spruce flats, bogs, and tag-alder second growth, all on low ground. Small outcrops are abundant in some part of this area away from the river.

Along the southern boundary of the claim group, is an east-west trending series of high hills with bare outcrop crests. The intervening ground is almost always swampy.

Regional Geology

The regional geology, as interpreted on the enclosed map, is in broad agreement with the regional geology as mapped in Keith and Muskego Townships. To the west, in these townships, the regional strike of the sediments and volcanics is approximately east-west. In Keith Township there are more sediments. There are a few sedimentary outcrops along the western edge of this group, but they diminish to the east. On this group of claims the strike of the sediments and volcanics is east-west in the west and south but, as one goes north and east, the strike of the sediments and volcanics swings N 50 E. Further east in Kenogaming Township, the strike of the sediments again swings more east-west to approximately N 75 E. Directly south of this South Extension bloc, in another group of claims and north into Reeves Township there is a secondary trend in the regional structure that goes north-south. This secondary trend is made up medium sized plutons of crystalline rocks.

To the west in Keith Township the serpentine bodies are usually narrow dikes while on this group they are more equi-dimensional with many volcanic inclusions, and having elongated arms of serpentine going both north-south across the regional strike and N 50 E in concordance with the regional structure. The north-south striking serpentine bodies are more common north in Reeves Township

This area could be a junction between and an overlapping of major regional structures, the major and earliest structures going east-west and mostly of intrusive igneous rocks going north-south. This latter set of north-south structures was imposed on the earlier sedimentary-volcanic structural complex.

If there is a great cross-flexure in the regional trend, it has according to this interpretation been favorable to the emplacement of medium sized intrusive bodies which includes ultra-basics. The larger bodies of ultra-basics

have b n highly and intensely deformed, as indicated by the limited drilling and examination of outcrops. The serpentine bodies to the north on the Jehann Group (Old Arkell group) have been intensely carbonated, as have the gabbros. The carbonation is more extensively developed to the north but all of the serpentine in the South Extension is to some degree carbonated, the least carbonation being in the fibre zones. To the north on the Jehann Group carbonation has proceeded so far that the gabbros and serpentines look like white limestones. This is probably the centre of carbonation which extends several miles to the north and south.

The oldest rocks in the area are sheared basic and intermediate volcanics, a few sediments and an occasional rhyolite flow. These rocks have the regional trend of east-west in the southwest and N 50 E in the central and northeast part of the bloc. These have been intruded by numerous plutons of different ages. Gabbro and diorite were probably the first intrusives, followed by granites, ultra-basics, porphyry and diabase-diabasic gabbro.

No iron formation was found on this group but it is present both to the east west, north and south. To the east and west, serpentine has shown a preferance to be next to, or near, the iron formation.

The chief structural features of this area are strike faults which follow the regional trend. Imposed on this regional trend is a series of north-south trending, en-echelon plutons of crystalline rock, varying in composition from granite to ultra-basics. These intrusives follow wither magnetic highs or lows which alternate, suggesting domal anticlines of crystalline rock. This suggests that any economic sulfide deposits may be associated with this secondary, intrusive,north-south structure rather than with the iron formation which we know is often mineralixed with barren sulfides. These north-south intrusives appear to have dragged and/or preserved narrow, steeply dipping to vertical synclines of sediments around their margins. Folding was difficult to determine due to intense shearing, similarity of rock types and insufficient outcrops.

II Assumptions in Magnetometer Interpretation & Correlation with Outcrops and Other Known or Inferred Structural Data

Magnetic lows in non-serpentine areas were interpreted as faults when it was found that these lows could be contoured as long troughs parallel to the liniation and shearing in the outcrops. These trough lows were lined up with the profound magnetometer lows (less than 1000 gammas). These faults, when a profound magnetometer low occured in the serpentine, were continued through the serpentine via paths of relative magnetic low. Highs in serpentine were interpreted as secondary fracture parallel to the main fault zones. These secondary fracture zones (magnetic highs in the serpentine) are also interpreted as favorable for the formation of fibre.

In the southwest corner of the area, the profound lows are interpreted as granites, but may be bands of siliceous sediments. Sediments become increasingly more abundant toward the west and south. Granite plutons are found in this area but sediments outcrop on some of the profound lows. Some fancy and intricate lensing of the inferred granite has been done to make it conform to the general interpretation. Since some of the outcrops do have stringers of granite through them, this interpretation is not without some evidence. But the general interpretation of profound lows as granite ismore open to question in this area than anywhere else. Since granite stringers were observed, the sediments or rock intruded by the granite could be silicified.

The small profound lows that occur in serpentine have been interpreted as prophyrys or chlorite granite, as have the small profound lows along the margins of the serpentine bodies. Porphyry has been found in several places intruding the serpentine as has granite; however, some of the granite is of a special type having a greenish cast and often having chlorite books. Some of the lows could be caused by bodies of rhyolite or sediments incorporated into the serpentine. Basalts have been observed as xenoliths in the serpentine; however, it is more likely that the small profound lows are of magmatic origin.

Faults have been postulated connecting the small profound lows, both along strike and in a north-south direction. The small profound lows line up in a north-south direction. The junction of these postulated faults is interpreted as a point of structural weakness and the place where small acid plutons are most likely to have been emplaced.

The 3000 gamma contour was usually interpreted as the serpentine, country rock contact, although the 2500 gamma contour was often used. Below this magnetic intensity only a serpentine outcrop dictated that an exception be made. The gabbro magnetic highs were not used as often as indications of faults as the small profound lows, because there are more reasons for magnetic highs than for magnetic lows. All faults are inferred and their existence assumed.

The alternating north-south magnetic high are found on all basic rocks, basalts, gabbros and ultra-basics. Why some basalts, striking east-west should be magnetic only in a north-south direction is a question I cannot answer. Perhaps there are basic or ultra-basic intrusions underneath or there is a nest of highly carbonated, sheared, serpentinized ultra-basic dikes which are extremely difficult to detect from the enclosing basalts. Perhaps the dikes are gabbro. There is evidence for both basic and ultra-basic dikes.

Detailed Geology

Rock Types and Relations

The oldest rocks exposed is a thick series of basic to intermediate volcanic with some interbedded siliceous sediments and a few rhyolite flows. These have been highly deformed and intruded by at least five ages of crystalline rocks. Everywhere but one the sediments were near-vertical or vertical. The volcanics have been sheared near the contacts with the intrusives but still retain their original mineral constituents and elsewhere their internal structures. The basic and intermediate volcanics make up 90% of the series; the rest being divided between sediments and acid volcanics. The intrusive series is as follows with the oldest list first:

Gabbro-diorite series
Pink Granite
Ultra-Basics
Porphyry, aplite, chlorite granite
Diabasic gabbro; Pinkish Diabase

A gabbro-diorite complex is the first intrusive. This seems to have been intruded both as large and small plutons. The large plutons are more equidimensional and tend to cut across the regional strike while the smaller plutons are dikes and lenses that are concordant with the regional structure. The

larger plutons of crystalline rock, of which the gabbro diorite complex is a prominent member, have an en-echelon arrangement and are emplaced across the regional structure. These larger plutons, because of their en-echelon arrangement have been interpreted as domal anticlines. The domal anticlines are represented as magnetic highs.

There are two ages of gabbro. In the south the very late gabbros have a high magnetic intensity and a very fresh appearance; sometimes these late gabbros have a faint diabase texture. These gabbros lack a sheared contact with either the granite or country rock. This group of gabbros is especially magnetic and was intruded as north-south interconnecting dikes.

The earlier gabbro-diorite complex was the first crystalline intrusive rock. This gabbro has intensely sheared contacts with the granite, volcanics and any other rock. Along the margins of this gabbro, where gabbro and volcanics are in juxtaposition, the granite is fresh and the gabbro sheared. This relationship was observed in two places. The gabbro mapped in these areas could be thick flows although thick flows were not observed elsewhere and there are volcanic outcrops nearby. In these sheared gabbro outcrops there were not extrusive structures to identify it as of volcanic origin. For this reason I have mapped it as gabbro. In these marginal locations there are intervening volcanics which probably deformed and sheared more readily under the pressures of intrusion, thus affecting the relatively competent gabbro.

South of the Net River there are no gabbro-diorite plutons of any size but there are many small dikes. This older gabbro, expecially to the north is often coarse grained and in many places partially to intensely carbonated.

In the northern part of the bloc, north of Baseline Number 1 North, there were three outcrops of a sheared, highly carbonated diorite which has been described as ** "rusty rotten rock". This rock type is probably caused by faulting through the diorite plutons. The rusty rock is highly sheared, brown weathering with many fresh crystals of some light carbonate mineral, which on the outcrop is also highly weathered. As one goes north, the carbonation gets more intense. To the south only the serpentines are carbonated while to the north both gabbros and serpentines are carbonated. In places to the north both the serpentines and gabbros are massively carbonated.

The next intrusive type is the ultra-basics. All of the ultra-basics are serpentinized and most are thoroughly carbonated; carbonate making up to 20% or more of the rock. The occasional outcrops of fresh serpentine seem to be along the margins of the serpentine bodies where they have been partially cut off from the main body by tongues of sediments and/or volcanics; however, the only light weathering, slightly carbonated serpentine is found in the margins in the fibre zones.

** P 14, Geology of the Keith Muskego Area - V.K. Priest
Ontario Bureau of Mines 1950.

The serpentine does not seem to be of very high grade; however, the intense carbonization obscures an accurate appraisal of this. In most cases the rock

seems originally to have been a fine-grained dunite. Where it has been carbonatized it is difficult to observe the fine, thin translucent flakes that good serpentine produces on a fresh break. The only good serpentine was found at the fibre showings.

Carbonation has produced structures that weather into ellipsoidal pseudo-pillow basalt patterns * * * This same carbonatization has also produced has also produced a fracture pattern which on a weathered surface produces pseudo-fragmental basalt structure. Originally these structures caused these rocks to be mapped as volcanics. I I I I

Associated with the same carbonatization process are dike-like masses of patchwork mineral aggregates. The dikes are several feet wide or have an indefinite shape. For an area the size of the palm of the hand, within these patch work zones, there are a series of mineral plates, all lined up exactly parallel and the same distance apart. The mineral plates, probably actinolite or tremolite, can be either very coarse (about 1/8 inch thick) or barely visible. The next palm sized patch may be at any angle to the original patch but within this patch the crystal plates will have the same parallel orientation. This patchwork pattern is found only in the carbonatized serpentine. An occasional narrow fibre vein may be found in this carbonated pseudo-pillow-fragmental basalt serpentine. The pseudo structures and mineral patchwork show up only on weathered surfaces.

The northern-most serpentine pluton is intensely sheared and highly carbonated, more highly carbonated than serpentine exposed elsewhere on this claim group. This evidence is from outcrops and drill logs. None of the carbonatization structures remain. They have been obliterated.during the intense shearing and intense carbonatization. In the central serpentine mass the carbonatization is less intense and so is the shearing but it is intense enough to obliterate most of the pseudo-basalt structures. This central serpentine pluton, with the exception of the fibre zone and scattered showings of less carbonated serpentine, was originally mapped as volcanics. However, on closer prospecting mapping the true relationship was observed.

To the south the carbonated serpentine is massive and fresh; the pseudo volcanic structures are finely developed. There is no intense shearing and the carbonated serpentine weathers a deep black. Off of this claim group, near the Penhorwood-Reeves Township line somewhere along the old jeep road into the Penhorwood Camp is the centre of carbonazation. The serpentine in this area is highly carbonated looking like a white limestone and the surrounding gabbros are likewise massively carbonated.

Another relationship that seems to hold is the structural preference of the ultra-basic plutons for emplacement along the north margins of aread of high magnetic intensity. To the west in Keith Township and east in Kenogaming Township and southern Penhorwood Township (around Montgomery Lake) this is true. In these areas the magnetic high is iron formation. In this claim bloc the serpentine prefers the north margin of magnetic basalts.

* * * Geology of the Keith Muskego Area; V.K. Priest
Ontario Bureau of Mines 1950.

I I I I P. 16 Geology of the Keith Muskego Area; V.K. Priest
Ontario Bureau of Mines 1950
See photographs 3, 4 8.

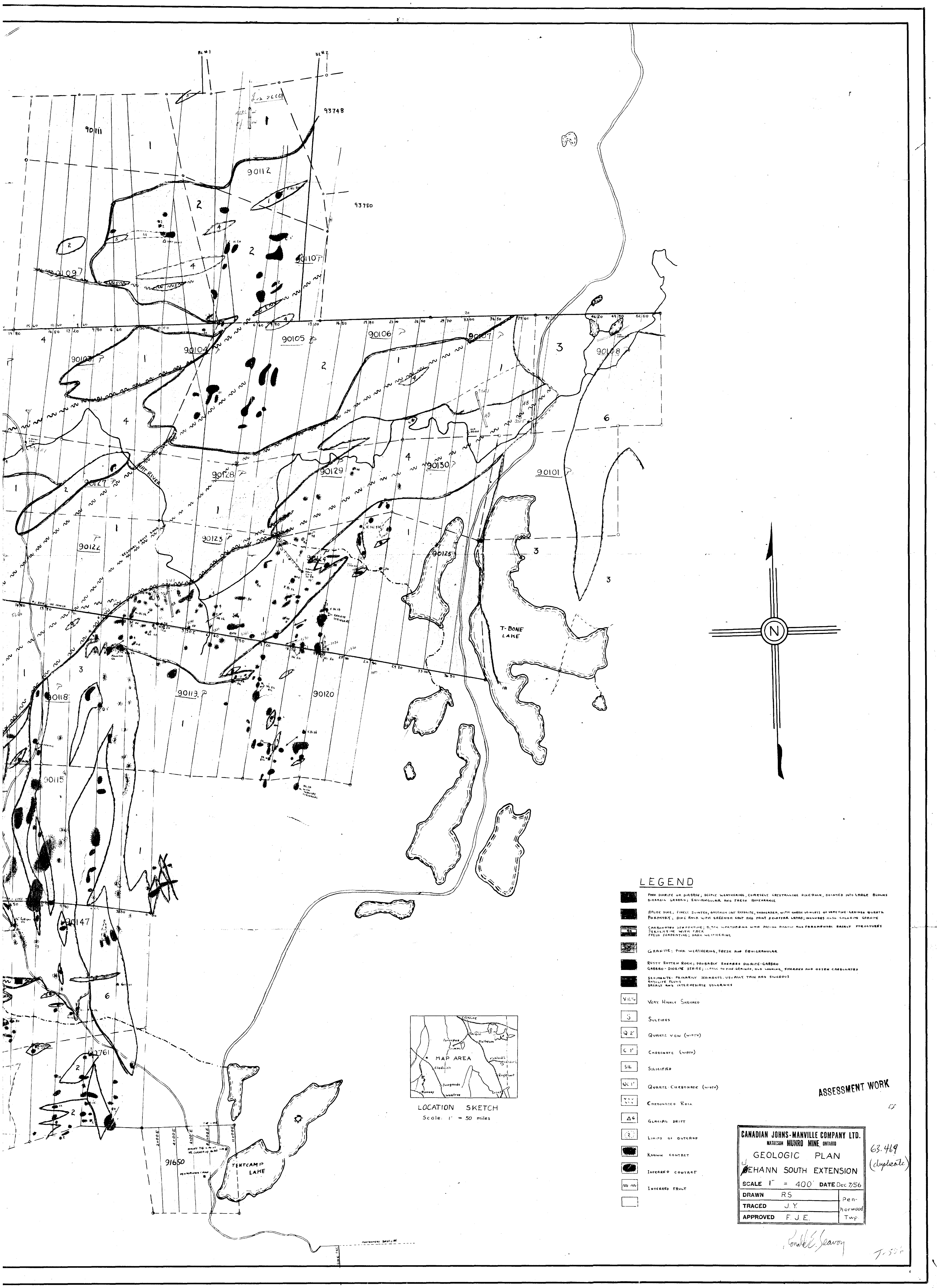
The next intrusive type and age is aplite and prophyry dikes. These follow the regional strike for the most part. The prophyry is fine grained and has a greenish cast; the aplite is micro-crystalline with a greenish cast on a fresh surface. Both have a pink weathering surface. The aplite has faint feldspar laths while the aplite has a few barely visible gnash veins of micro-crystalline quartz. The aplite is very finely jointed but unsheared. A granite with a greenish cast and books of cholorite is probably part of this complex, making up the small profound lows within the serpentine and along its immediate margins. Porphyry and granite outcrops were found within the serpentine masses and there was less carbonation near them but no other visible alteration.

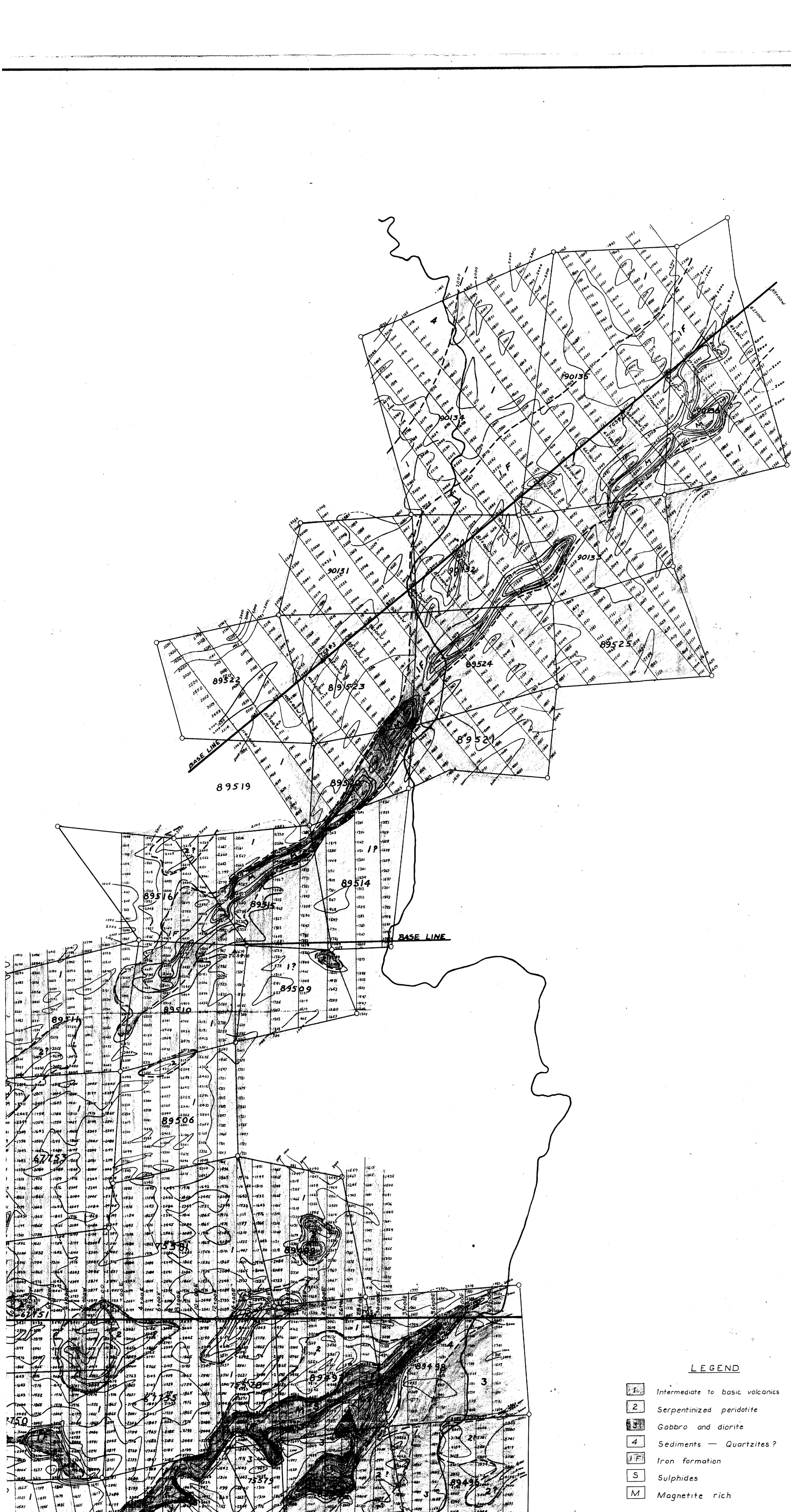
The last intrusion type and time is the second diabasic textured gabbro described in connection with the description of the eldest gabbro and a coarse grained pinkish cast diorite or diabase dike rock. The pink diabasic gabbro outcropped only in three places and one large drift was seen. It is jointed into very large blocks and weathers very deeply. On one outcrop the weathering was 6 inches deep, while still preserving the smooth glacially polished surface. It is rich in large (1/4 to 3/8) inch hornblende crystals. This rock could be postulated as the source for all of the carbonate solutions which have so altered the serpentine. Fortunately one of the outcrops was near the serpentine and it stands out as a magnetic high, while the nearby serpentine outcrop is less than usually carbonated. Right next to this high, caused by this rock type is a profound low that is definately granite. The source of the carbonating solutions is unknown.

Major Structures

The major faults that cut the claim group have been mapped as zones and often more than one zone; all roughly parallel. The main fault trend is along the regional strike which varies from east-west to N 50 E. These faults have probably had the greatest and most recent movement. These fault zones have no outcrops in them. The Nat River is to some degree, controlled by them, occupying the trace of the faults and/or the margins of the ultra-basic bodies. It is quite probable that sediments may be preserved in the fault zones, similar to the Dester-Porcupine fault zones in Garrison Township. There is a second set of faults that strikes north-south. This set has had considerable movement on it and seems to control the margins of some of the crystalline plutons, particularly the ultra-basics. These north-south faults line up with small profound lows which have been interpreted as prophyry dikes so that it is postulated that the dikes were intruded at the junctures of the north-south fault system and the regional strike fault system.

No folds were observed except small dragfolds at the contact between the serpentine and sediments. Because of the badly sheared condition of most of the rocks, the thick series of similar rocks and the large amount of cross-cutting intrusives, structural evidence of folding was next to impossible to find and what information was gathered was too separated to be well correlated. The sediments that did supply data were at the southwest and of the property and the dips were vertical or near vertical. At only one place was there a medium dip of the sediments. This was of 45 degrees and it was at the contact between the serpentine and a small off-shooting dike. Otherwise the contact between the serpentine and the country rock appeared to be vertical or near vertical.


LEGEND
PINK DIORITE OR DIABASE; DEEPLY WEATHERING, COARSELY CRYSTALLINE DIKE ROCK, JOINTED INTO LARGE BLOCKS
DIABASIC GABBRO; EQUIGRANULAR AND FRESH APPEARANCE
APLITE DIKE, FINELY JOINTED, GREENISH CAST RHYOLITE, UNSHEARED, WITH GNASH VEINLETS OF VERY FINE-GRAINED QUARTZ
PORPHYRY; DIKE ROCK WITH GREENISH CAST AND FAINT FELDSPAR LATHS; INCLUDES ALSO CHLORITE GRANITE
CARBONATED SERPENTINE; BLACK WEATHERING WITH PSEUDO PILLOW AND FRAGMENTAL BASALT STRUCTURES
SERPENTINE WITH FIBER
FRESH SERPENTINE; DARK WEATHERING
GRANITE; PINK WEATHERING, FRESH AND EQUIGRANULAR
RUSTY ROTTEN ROCK; PROBABLY SHEARED DIORITE-GABBRO
GABBRO-DIORITE SERIES; COARSE TO FINE-GRAINED, OLD LOOKING, SHEARED AND OFTEN CARBONATED
SEDIMENTS: PRIMARILY SEDIMENTS, USUALLY THIN AND SILICEOUS
RHYOLITE FLOWS
BASALT AND INTERMEDIATE VOLCANICS
V.Hi.Sh — VERY HIGHLY SHEARED
S — SULFIDES
Q 2' — QUARTZ VEIN (WIDTH)
C 1' — CARBONATE (WIDTH)
SIL — SILICIFIED
QC 1' — QUARTZ-CARBONATE (WIDTH)
CARBONATED ROCK
Δ6 — GLACIAL DRIFT
LIMITS OF OUTCROP
KNOWN CONTACT
INFERRED CONTACT
INFERRED FAULT
LOCATION SKETCH
Scale: 1" = 50 miles
MAP AREA
Cochrane
Porquis
Porcupine
Timmins
Matheson
Kirkland L.
Larder L.
Gladwick
Englehart
Sawgande
Romsay
Westree
Cobalt
ASSESSMENT WORK
CANADIAN JOHNS-MANVILLE COMPANY LTD.
MATHESON MUNRO MINE ONTARIO
GEOLOGIC PLAN
JEHANN SOUTH EXTENSION
SCALE 1" = 400' DATE Dec 7/56
DRAWN R.S.
TRACED J.Y.
APPROVED F.J.E.
Pen-horwood Twp.
63.469 (duplicate)
T-586
T-BONE LAKE
TENTCAMP LAKE
NAT RIVER
REGIONAL FAULT ZONE
OLD BRIDGE
PENHORWOOD CAMP
SURVEY TIE-IN POINT NE. CORNER OF BLDG
MONTGOMERY BASELINE
BL #1
BL #2
93748
93750
90111
90112
90110
91097
90103
90104
90105
90106
90107
90108
90101
90127
90128
90129
90130
90122
90123
90124
90125
90113
90118
90120
90115
90147
90761
91650
2+00E
4+00E
6+00E
8+00E
11+00E
GRANITE STRINGERS
Hi SH WITH PORPHYRY STRINGERS



LEGEND

- 1 — Intermediate to basic volcanics
- 2 — Serpentinized peridotite
- 3 — Gabbro and diorite
- 4 — Sediments — Quartzites ?
- IF — Iron formation
- S — Sulphides
- M — Magnetite rich
- BCS#1 — Magnetic base and control stations
- Contacts
- Fault and Shear zones { G - geologic, M - magnetic, T - topographic
- Magnetic contours — 1000 gamma intervals

Magnetometer Survey by: F. J. EVELEGH, L. ALLISON, J. BLACK

Interpretation by: F. J. EVELEGH, E. ROWLEY.

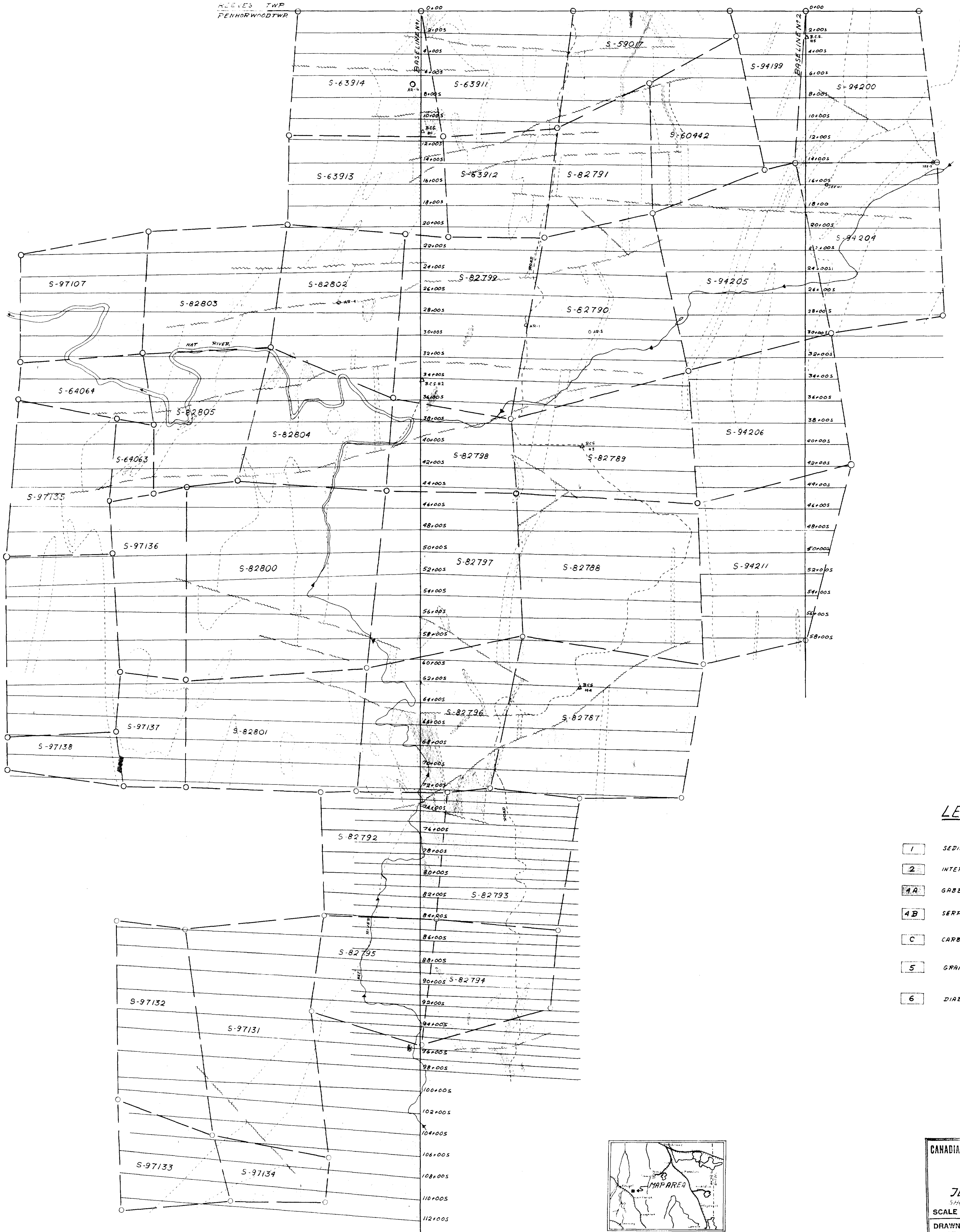
CANADIAN JOINT MAGNETIC COMPANY LTD.

Geomagnetic Contour Plan
Montgomery Lake Fringe and
Northeast Extension Groups
Scale 1" = 400' Date Nov 8/56

Drawn E.R. & R.T.	Pen-
Traced J.Y.	horwood
Approved F.J.E.	Twp.

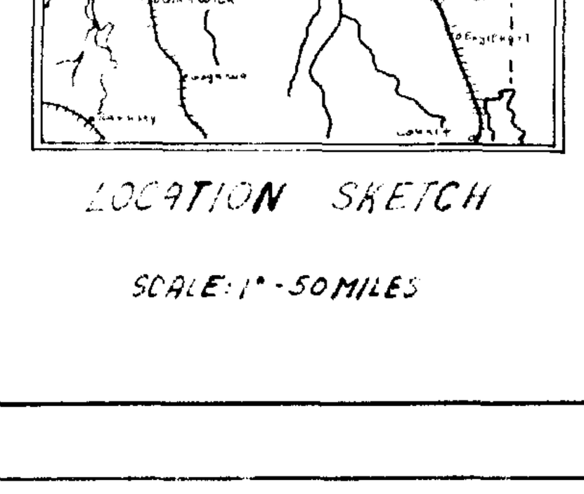
PLATE 5

File 63469



LEGEND

1	SEDIMENTS - GRAPHITIC
2	INTERMEDIATE - BASIC VOLCANICS
4A	GABBRO - DIORITE COMPLEX
4B	SERPENTINIZED PERIDOTITE
C	CARBONATE ROCKS
5	GRANITE AND ALLIED ROCKS
6	DIABASE



LOCATION SKETCH

SCALE: 1" - 50 MILES

CANADIAN JOHNS-MANVILLE COMPANY LTD.
MATHESON MUNRO MINE ONTARIO

KEY MAP OF

JEHANN LAKE GROUP

SHOWING MAGNETIC INTERPRETATION

SCALE	1" - 400'	DATE	1957
DRAWN		PENHORWOOD TWP.	
TRACED	H.J.R.		
APPROVED	F.J.E.		

(2)

42B01NE0600 63.469 PENHORWOOD

220

Pocket 5 File 63.469

S-82796

S-82797

S-82798

S-82787

S-82788

S-82789

SYMBOLS

- MAGNETIC BASE CONTROL STATION (BCS-41)
- GEOLOGIC CONTACT
- FAULT ZONE — G-GEOLOGIC, M-MAGNETIC, T-TOPOGRAPHIC
- MAGNETIC CONTOUR LINES, CONTOUR INTERVAL 500 GAMMAS (3500, 3000, 2500, 2000)

LEGEND

- 1 — SEDIMENTS - GRAPHITIC
- INTERMEDIATE - BASIC VOLCANICS
- GABBRO - DIORITE COMPLEX
- 1B — SERPENTINIZED PERIDOTITE
- C — CARBONATE ROCK
- 5 — GRANITE AND ALLIED ROCKS
- DIABASE

MAGNETOMETER SURVEY BY: P. BROUGHTON
G. ADAMS
J. BLACK

CANADIAN JOHNS-MANVILLE COMPANY LTD.
MATHESON MUNRO MINE ONTARIO

GEOMAGNETIC CONTOUR PLAN

JEHANN GROUP

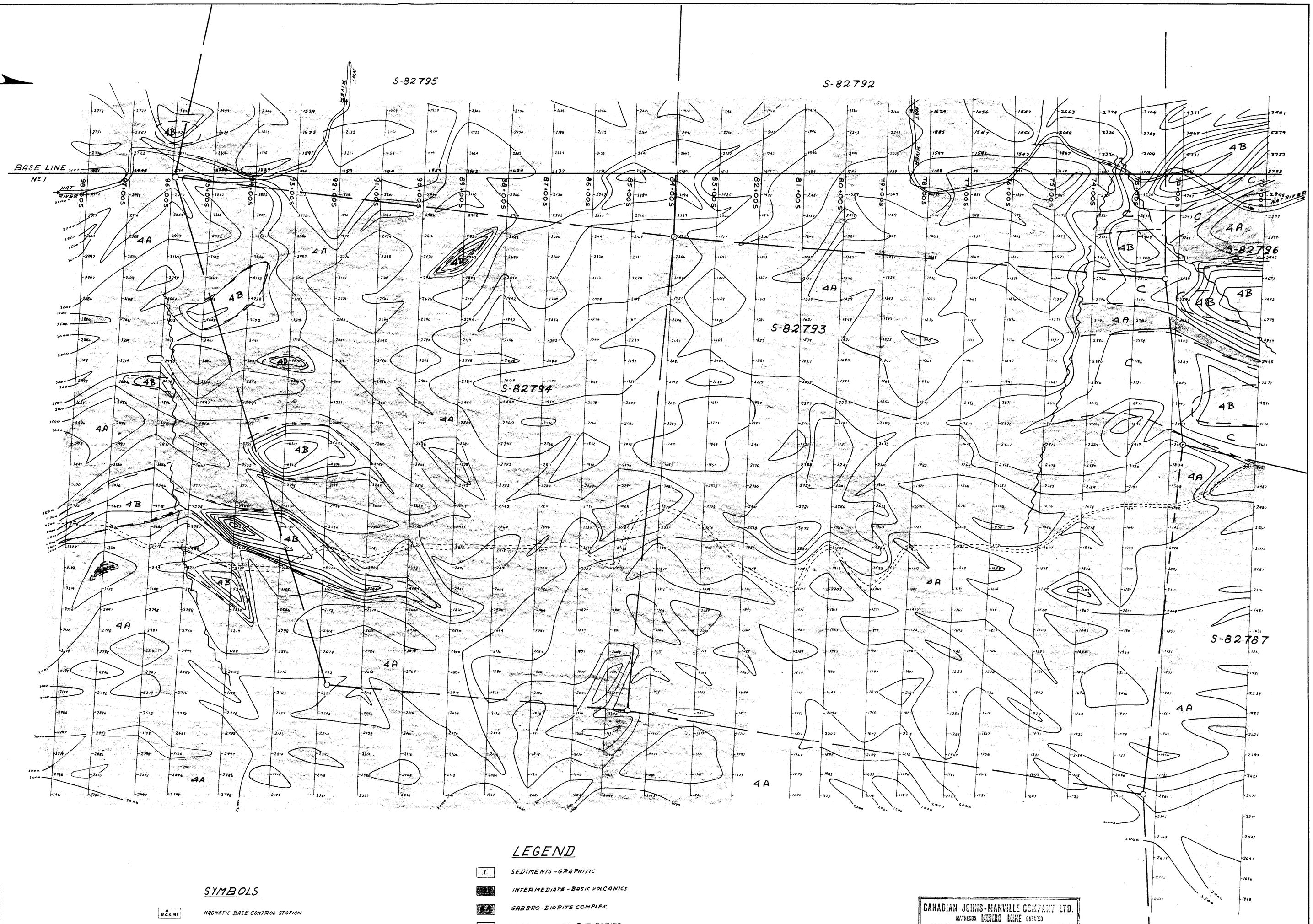
SHEET Nº 3

SCALE 1" = 100' DATE FEB. 58

DRAWN

TRACED H.J.R.

APPROVED F.J.E.

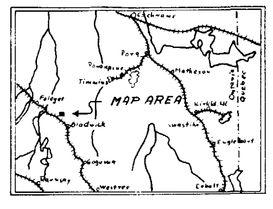


LEGEND

- 1 — SEDIMENTS - GRAPHITIC
- INTERMEDIATE - BASIC VOLCANICS
- GABBRO - DIORITE COMPLEX
- 4B — SERPENTINIZED PERIDOTITE
- CARBONATE ROCK
- 5 — GRANITE AND ALLIED ROCKS
- DIABASE

SYMBOLS

- MAGNETIC BASE CONTROL STATION
- GEOLOGIC CONTACT
- FAULT ZONE — G - GEOLOGIC, M - MAGNETIC, T - TOPOGRAPHIC
- MAGNETIC CONTOUR LINES, CONTOUR INTERVAL: 500 GAMMAS



LOCATION SKETCH

Scale: 1" - 50 miles

MAGNETOMETER SURVEY BY: P. BROUGHTON
G. ADAMS
J. BLACK

CANADIAN JOHNS-MANVILLE COMPANY LTD.
MATHESON BEARING MINE ONTARIO

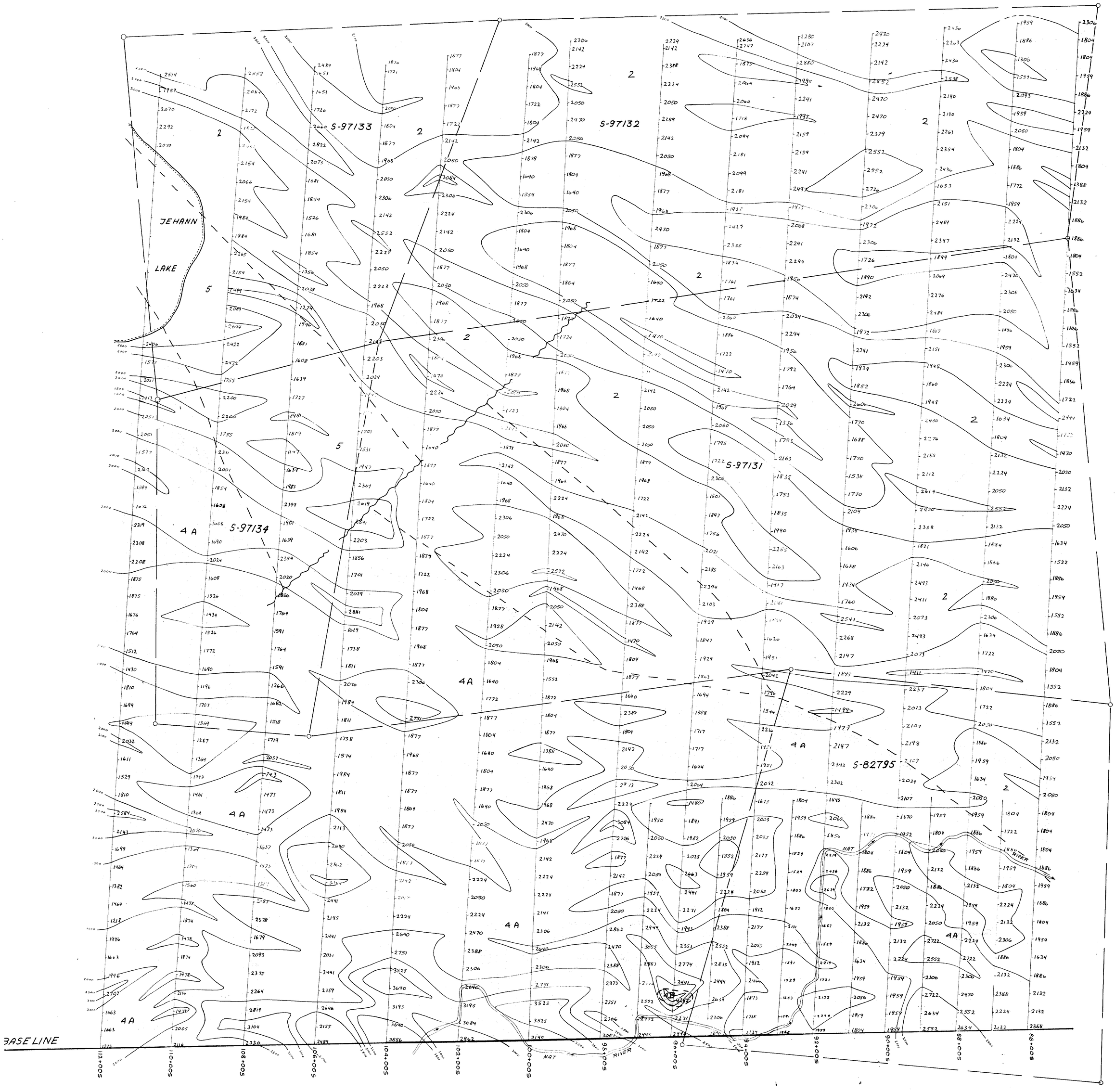
GEO-MAGNETIC CONTOUR PLAN

JEHANN GROUP

SHEET No 4

SCALE 1" - 100' DATE FEB. '58

DRAWN	H. J. R.	PENHORWOOD TWP.
TRACED		
APPROVED	F. J. E.	

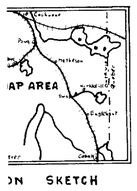


LEGEND

- SEDIMENTS - GRAPHITIC
- INTERMEDIATE - BASIC VOLCANICS
- GABBRO-DIORITE COMPLEX.
- SERPENTINIZED PERIDOTITE
- CARBONATE ROCK
- GRANITE AND ALLIED ROCKS
- DIABASE

SYMBOLS

- MAGNETIC BASE CONTROL STATION
- GEOLOGIC CONTACT
- FAULT ZONE G - GEOLOGIC, M - MAGNETIC, T - TOPOGRAPHIC
- MAGNETIC CONTOUR LINES. CONTOUR INTERVAL 500 GAMMAS

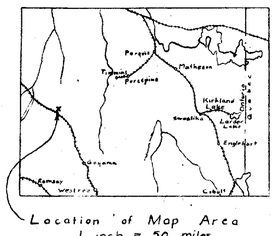


ON SKETCH

1" = 50 miles

MAGNETOMETER SURVEY BY: P. BROUGHTON
G. ADAMS
J. BLACK

CANADIAN JOHNS-MANVILLE COMPANY LTD.
MATHESON MUNRO MINE ONTARIO
GEO-MAGNETIC CONTOUR PLAN
JEHANN GROUP
SHEET No 5
SCALE
DATE FEB. '58
DRAWN H.J.R.
TRACED
APPROVED F.J.E
PENNYROYD TWP.



Location of Map Area
1 inch = 50 miles

LOGGED OVER SPRUCE AND POPLAR

90135

90134

90136

90131

90132

90133

T-BONE LAKE

MATURE JACKPINE

89522

89523

89524

89525

BASE LINE

89521

89519

89520

89516

89515

89514

89513

89512

89511

89510

89509

MIXED POPLAR AND BIRCH

PINE

89507

67754

67753

89506

MIXED BIRCH AND POPLAR

Cedar Swamp

75581

89499

SPRUCE

NAT RIVER

67752

67751

67747

67755

75578

89497

89498

67750

CEDAR SWAMP

67748

67749

75579

89495

89496

89490

89491

75580

89492

89493

89494

PINE

CLAIM GROUPS

- Montgomery Lake Group
- Northeast Extension Group
- Fringe Group

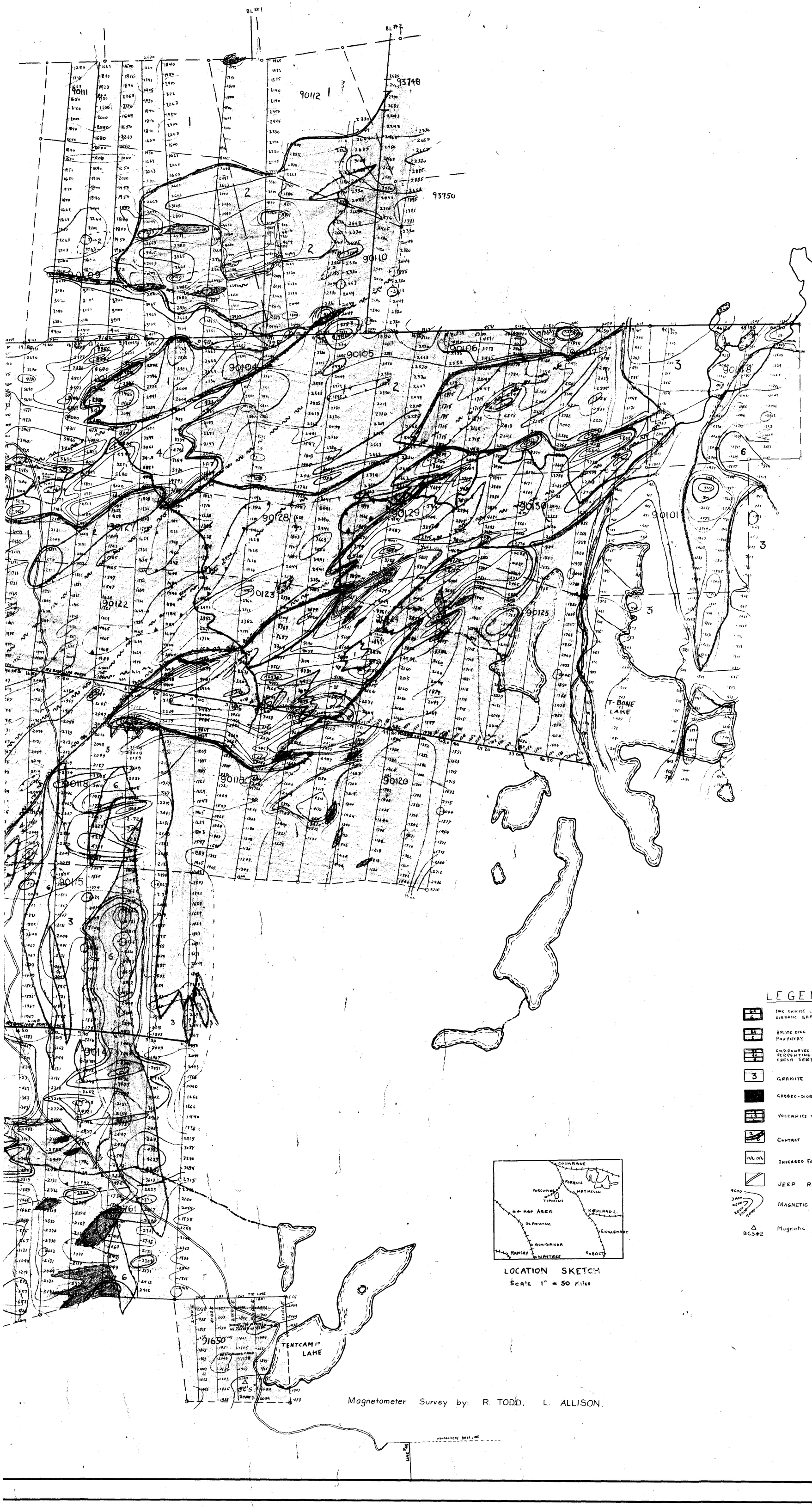
LEGEND

- OUTCROP
- HIGH GROUND
- ESKER
- STRIKE & DIP OF SCHISTOSITY
- STRIKE & DIP OF JOINTS
- Intermediate to Basic Volcanics — Andesite
- Acidic Volcanics — Rhyolite
- Sediments — Altered Quartzite?
- Basic Intrusives — Gabbro. Diorite
- Ultrabasics — Serpentinized Peridotite
- Iron Formation.

Geology by. E Rowley, R Todd & H. Gebhardt.

POCKET 4

File 65-469



LEGEND

- PINK DIORITE OR DIKE OF DIABASIC GABBRO
- APLITE DIKE PORPHYRY
- CARBONATED SERPENTINE; SERPENTINE WITH FIBER; FRESH SERPENTINE
- 3 — GRANITE
- GABBRO-DIORITE SERIES
- VOLCANICS & INTERBEDDED SEDIMENTS
- CONTACT
- INFERRED FAULT
- JEEP ROAD
- MAGNETIC CONTOURS: 500 GAMMA INTERVALS UP TO 3000 GAMMAS; 1000 " " ABOVE " "
- △ BCS #2 — Magnetic Base Station

LOCATION SKETCH
Scale 1" = 50 Miles

Magnetometer Survey by: R. TODD, L. ALLISON.

CANADIAN JOHNS-MANVILLE COMPANY LTD.
MATHESON **MUNRO MINE** ONTARIO

GEO-MAGNETIC CONTOUR PLAN
JEHANN SOUTH EXTENSION

SCALE 1" = 400' DATE Dec 10/56

DRAWN	R. S.	Pen-harwood Twp
TRACED	J.Y.	
APPROVED	F. J. E.	

Ronald E. Seavoy

2a

Pocket #3 File 63.469

LEGEND

- Intermediate to basic volcanics and derived metamorphics
- Acid volcanics
- Sediments
- Acid and intermediate intrusives
- Basic intrusives
- Ultrabasics
- Matachewan type dikes

SYMBOLS

- Swamp
- Higher ground
- Winter tractor road, old logging road
- Jeep road
- Camp
- Well
- Trench
- Outcrop
- Joint
- Strike and dip of schistosity
- Strike and dip of gneissosity or banding
- Fault
- Defined contact

CLAIM GROUPS

- Nat River Group
- Burtho Group

Geology by E. ROWLEY

CANADIAN JOHNS-MANVILLE COMPANY LTD.
MATHESON MUNRO MINE ONTARIO

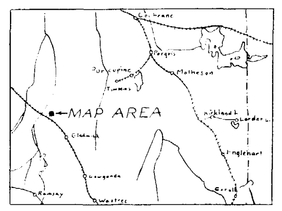
Geologic and Topographic Plan
Nat River and Burtho Groups

SCALE	1" = 400'	DATE Nov 16/56
DRAWN	E. R.	Penhorwood Twp
TRACED	J. Y.	
APPROVED	F. J. E.	

Eric P. Rowley

File 63.469 Pocket 1

280



AREA SKETCH
Scale: 1" = 50 miles

LEGEND

- 1 — Intermediate to basic volcanics and derived metamorphics
- Acid volcanics
- Sediments
- 5 — Acid and intermediate intrusives
- 3 — Basic intrusives
- 2 — Ultrabasics
- Matachewan type dikes

SYMBOLS

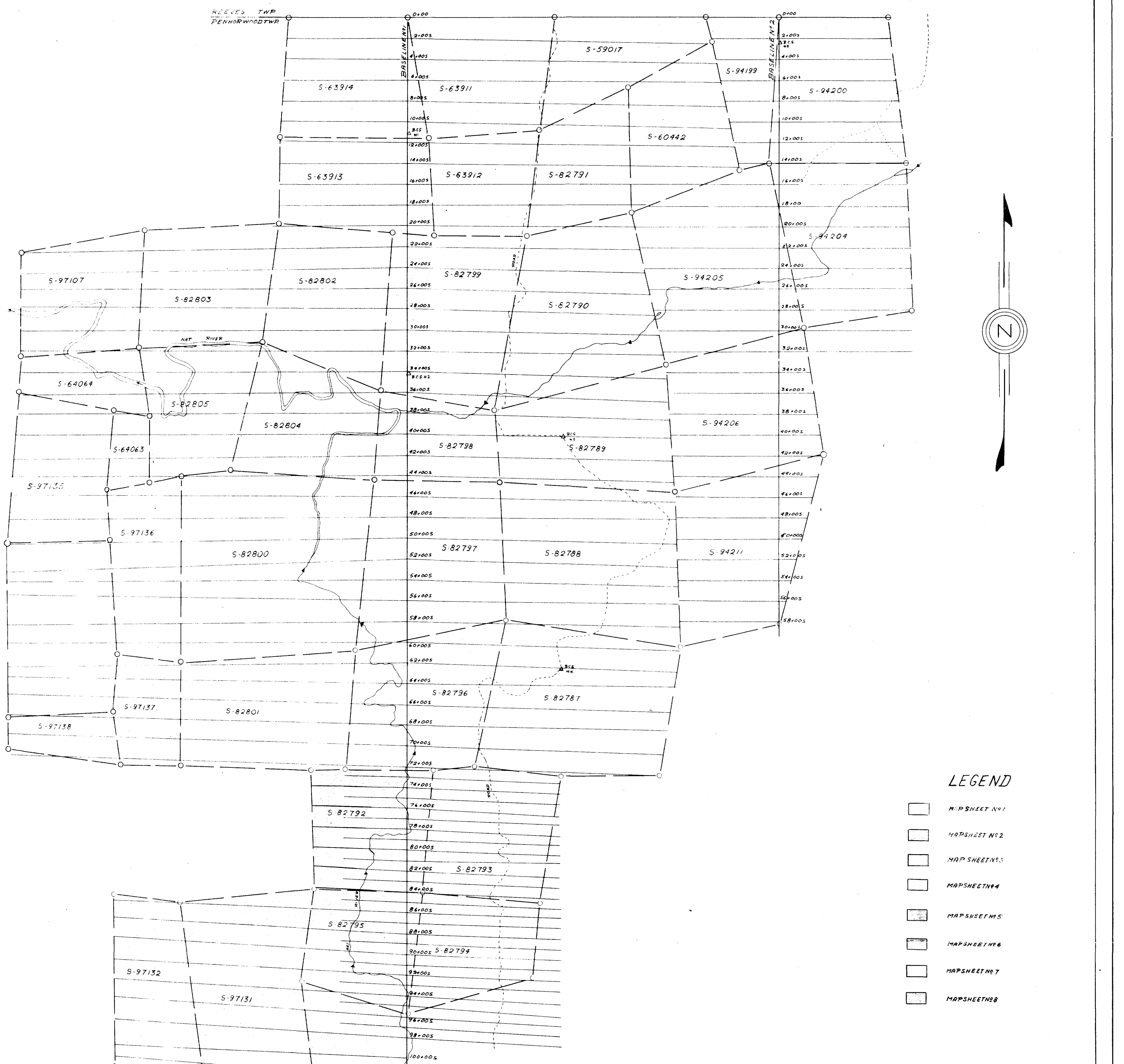
- Magnetic base and control stations (e.g. D.C.581)
- Contacts
- Fault and shear zones { G- geologic, M- magnetic, T- topographic
- Magnetic contours — 500 gamma intervals

Magnetometer survey by: J. BLACK, L. ALLISON.

CANADIAN JOHNS-MANVILLE COMPANY LTD.
MATHESON MUNRO MINE ONTARIO

Geo-Magnetic Contour Plan
Net River and Burtho Groups

SCALE 1" = 400'	DATE (revised) Nov 16/56
DRAWN E.R.	Pen-horwood
TRACED J.Y.	
APPROVED F.J.E.	Twp.



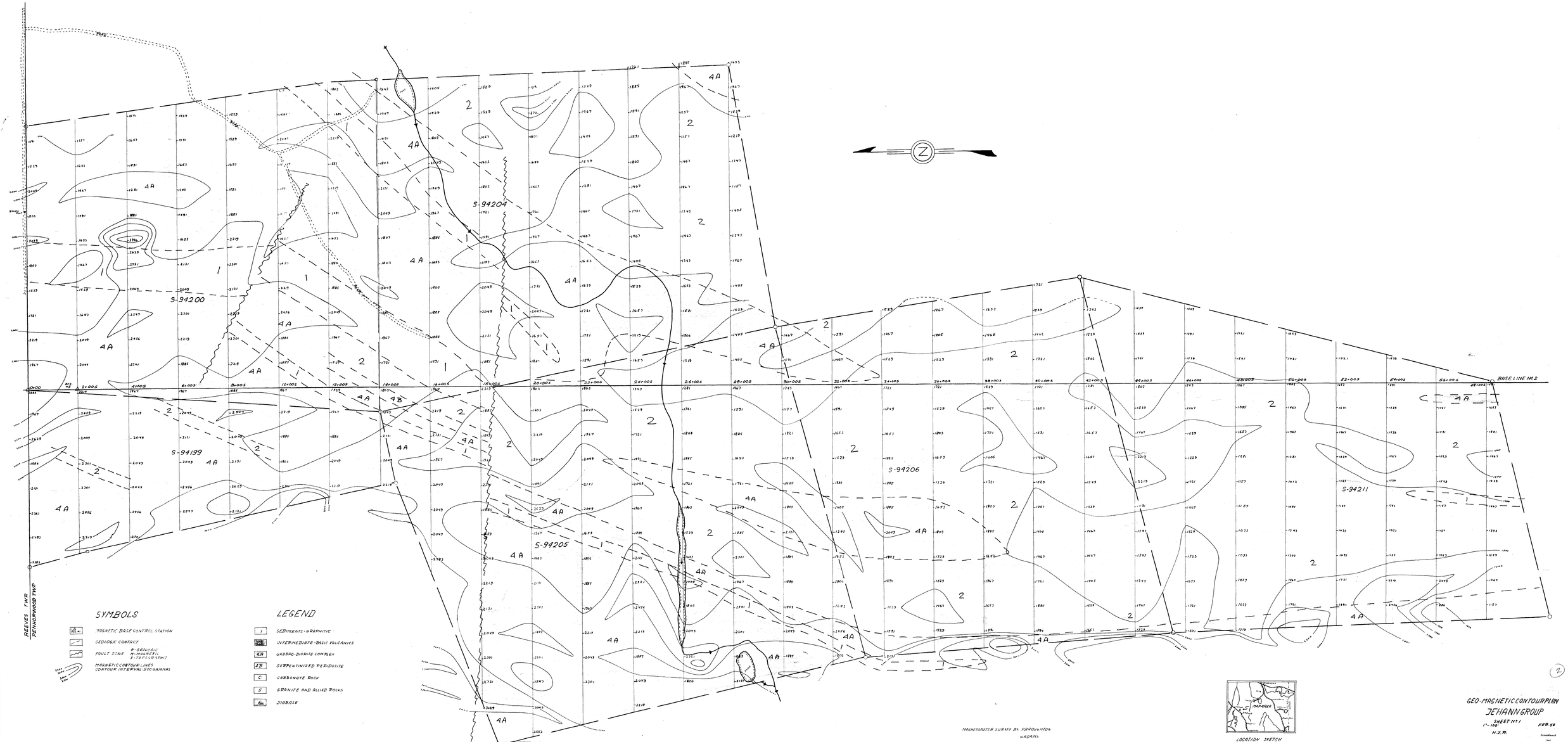
CANA... ...JOHNS-MANVILLE COMPANY LTD.
...HOHNO MINE ONTARIO
KEY MAP OF
JEHANN LAKE GROUP

SCALE 1" - 400' DATE 1957
DRAWN PENHORWOOD
TRACED H.J.R. TWP.
APPR... F.J.E.

(2)

42B01NE0600 63.469 PENHORWOOD

300



MAGNETOMETER SURVEY BY FERGUSON GEOPHYS. JUNE

LOCATION SKETCH
SCALE 1" = 5 MILES

GEO-MAGNETIC CONTOUR PLAN
JEHANN GROUP
SHEET N:1
1" = 100'
H.J.R.
FEB. 58

F.J.E.

7

S-59017
S-60442
S-82791
S-82790
S-82789
4A
4B
C
6
POND
B.C.S. #3
Cochrane
Porquis
Porcupine
Timmins
Matheson
Foleyet
MAP AREA
Kirkland L.
Ontario
Quebec
Gladwick
Swastika
Larder L.
Englehart
Gogama
Ramsay
Westree
Cobalt
LOCATION SKETCH
Scale: 1" = 50 miles
N
LEGEND
1 SEDIMENTS - GRAPHITIC
2 INTERMEDIATE-BASIC VOLCANICS
4A GABBRO-DIORITE COMPLEX.
4B SERPENTINIZED PERIDOTITE
C CARBONATE ROCK
5 GRANITE AND ALLIED ROCKS
6 DIABASE
SYMBOLS
B.C.S. #1 MAGNETIC BASE CONTROL STATION
GEOLOGIC CONTACT
FAULT ZONE G - GEOLOGIC M - MAGNETIC T - TOPOGRAPHIC
MAGNETIC CONTOUR LINES CONTOUR INTERVAL: 500 GAMMAS
MAGNETOMETER SURVEY BY: P. BROUGHTON
G. ADAMS
J. BLACK
CANADIAN JOHNS-MANVILLE COMPANY LTD.
MATHESON MUNRO MINE ONTARIO
GEOMAGNETIC CONTOUR PLAN
JEHANN GROUP
SHEET Nº 2
SCALE 1" = 100'
DATE FEB/58
DRAWN H. J. R.
TRACED
APPROVED F.J.E.
PENHORWOOD TWP

S-97131

S-82795

S-82792

S-82801

S-82796

NAT RIVER

BASELINE No 1

86+00S 85+00S 84+00S 83+00S 82+00S 81+00S 80+00S 79+00S 78+00S 77+00S 76+00S 75+00S 74+00S 73+00S 72+00S

SYMBOLS

- MAGNETIC BASE CONTROL STATION (B.C.S. #1)
- FAULT ZONE — G-GEOLOGIC, M-MAGNETIC, T-TOPOGRAPHIC
- GEOLOGIC CONTACT
- MAGNETIC CONTOUR LINES — CONTOUR INTERVAL: 500 GAMMAS

LEGEND

- 1 — SEDIMENTS - GRAPHITIC
- 2 — INTERMEDIATE - BASIC VOLCANICS
- 4A — GABBRO - DIORITE COMPLEX.
- 4B — SERPENTINIZED PERIDOTITE
- C — CARBONATE ROCK
- 5 — GRANITE AND ALLIED ROCKS
- 6 — DIABASE

MAGNETOMETER SURVEY BY: F. BROUGHTON
G. ADAMS
J. BLACK

(2)

CANADIAN JOHNS-MANVILLE COMPANY LTD.
MATHESON KUNRO MINE ONTARIO

GEO-MAGNETIC CONTOUR PLAN

JEHANN GROUP

SHEET No 6

SCALE 1" - 100' DATE FEB. '58

DRAWN H.J.R.	PENHORWOOD TWP.
TRACED	
APPROVED F.J.E.	

S-97135

S-97136

S-64063

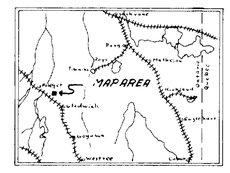
S-82800

S-82805

S-82804

S-82797

S-82798



LOCATION SKETCH

SCALE: 1"-50 MILES

LEGEND

1	SEDIMENTS - GRAPHITIC
2	INTERMEDIATE - BASIC VOLC.
4A	GABBRO-DIORITE COMPLEX
4B	SERPENTINIZED PERIDOTITE
C	CARBONATE ROCK
5	GRANITE AND ALLIED ROCKS
6	DIABASE

SYMBOLS

- B.C.S.#1 — MAGNETIC BASE CONTROL STATION
- GEOLOGIC CONTACT
- FAULT ZONE — G - GEOLOGIC, M - MAGNETIC, T - TOPOGRAPHIC
- MAGNETIC CONTOUR LINES (2500, 3000, 3500, 2500) — CONTOUR INTERVAL: 500 GAMMAS

MAGNETOMETER SURVEY BY: P. BRIGHTON, G. ADAMS, J. BLACK

GEO-MAGNETIC CONTOUR PLAN

JEHANN GROUP

SHEET No. 7

1"-100'

FEB. '58

H.J.R.

PENNSYLVANIA TWP.

F.J.E.

62+00S 60+00S 58+00S 56+00S 54+00S 52+00S 50+00S 48+00S 46+00S 44+00S 42+00S 40+00S

REEVES TOWNSHIP

PENHORWOOD TOWNSHIP

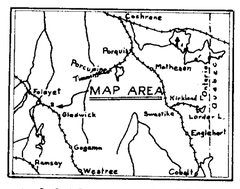
SYMBOLS

BASE CONTROL STATION

FAULT ZONE G - GEOLOGIC M - MAGNETIC T - TOPOGRAPHIC

GEOLOGIC CONTACT

MAGNETIC CONTOURLINES
CONTOUR INTERVAL: 500 GAMMAS



LOCATION SKETCH
Scale: 1" = 50 miles

LEGEND

SEDIMENTS - GRAPHITIC

INTERMEDIATE - BASIC VOLCANICS

GABBRO - DIORITE COMPLEX.

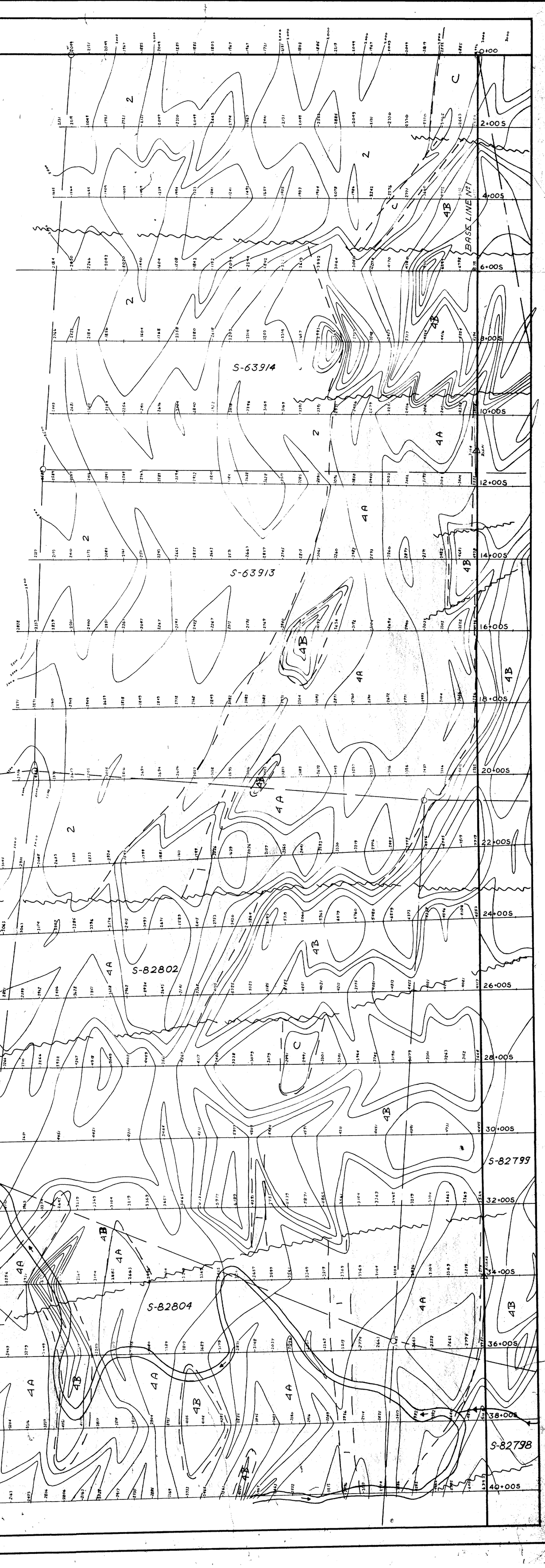
SERPENTINIZED PERIDOTITE

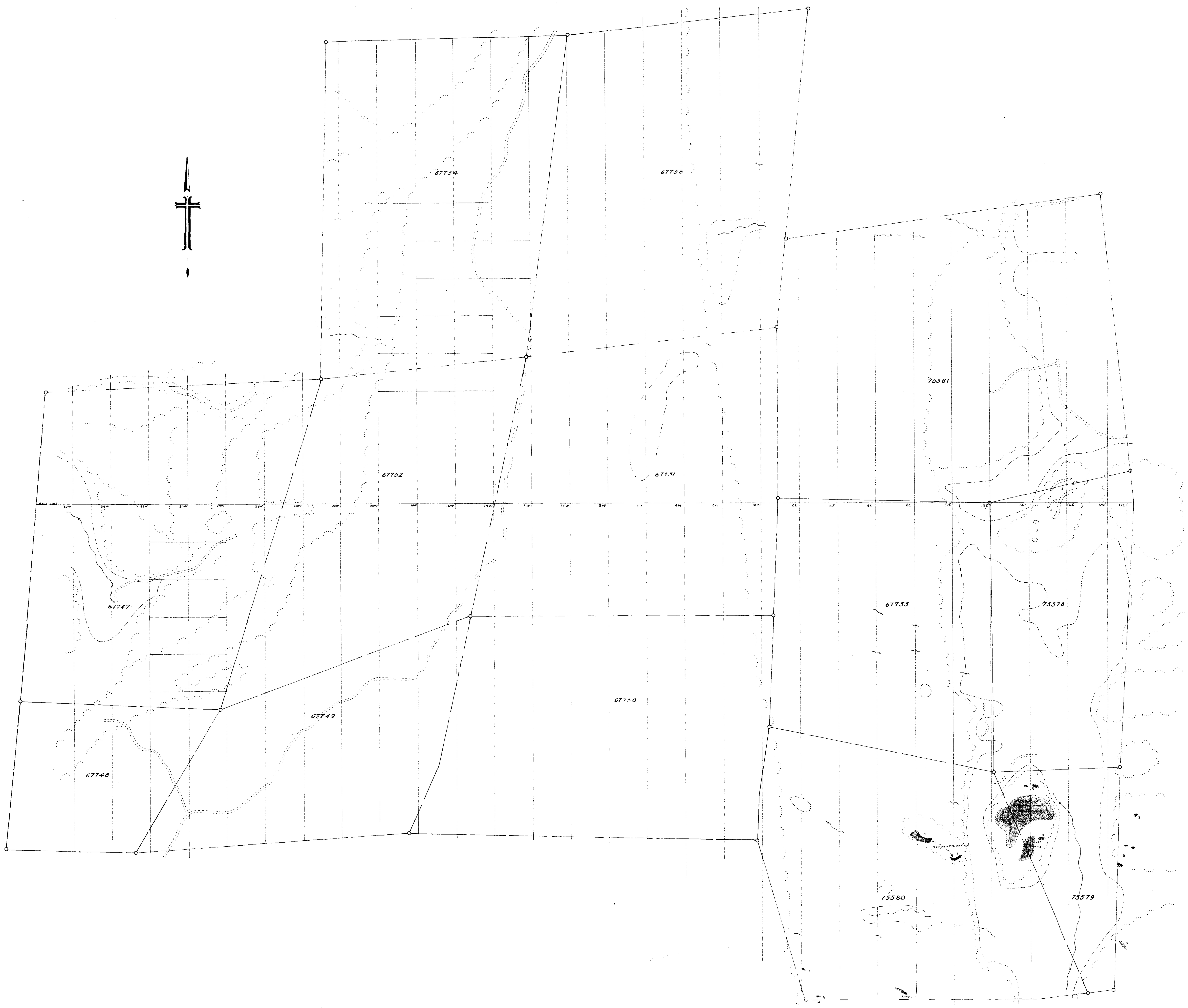
CARBONATE ROCK

GRANITE AND ALLIED ROCKS

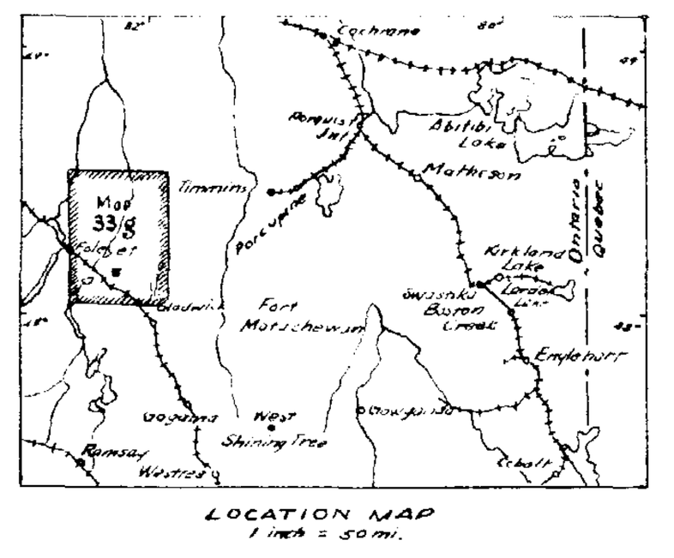
DIABASE

MAGNETOMETER SURVEY BY: P. BROUGHTON
G. [illegible]
J. BLACK.





ORIGINAL



LEGEND

Outcrop

Cedar swamp

Creek

High ground

TTT Rock scarp

Bush road

Geology & Topography by J. MASON & F.J. EVELEGH

GEOLOGICAL LEGEND

2 SERPENTINIZED PERIDOTITE

VOLCANICS

4 GRANITE, PORPHYRY

CANADIAN JOHNS-MANVILLE COMPANY LTD.
EXPLORATION DIVISION
ASBESTOS — QUEBEC — CANADA

GEOLOGIC & TOPOGRAPHIC PLAN

EAST CENTRAL PENHORWOOD TWP CLAIMS

SUDBURY MINING DIVISION

ONTARIO

SCALE	DATE	DRAWN
1 inch = 200 ft	JULY 22 1954	APP.
		TRACED:

ORIGINAL

N

67754

67753

75581

67752

67751

67747

67755

75578

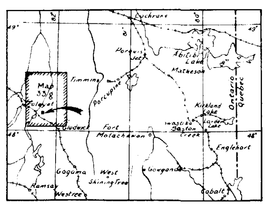
67750

67749

67748

75579

75580

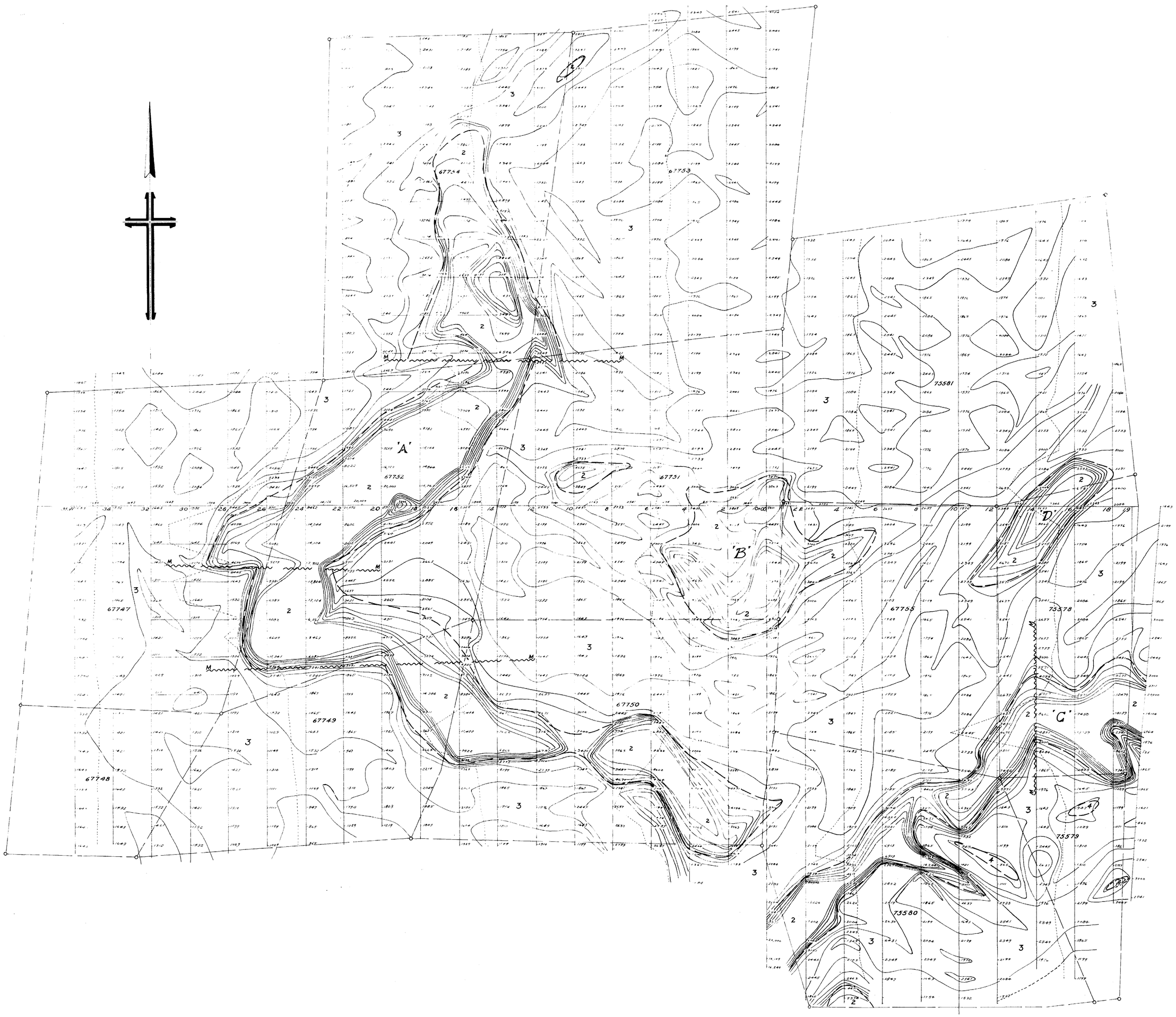


CANADIAN JOHNS-MANVILLE COMPANY LTD.
EXPLORATION DIVISION
ASBESTOS — QUEBEC — CANADA

DIP NEEDLE SURVEY

BY D. DOAL & J. MASON
EAST CENTRAL PENHORWOOD TWP CLAIMS
SUDBURY MINING DIVISION
ONTARIO

SCALE	DATE	DRAWN
1 inch = 200 ft.	23 JULY, 1954	APP. TRACED



LEGEND

- 2 SERPENTINIZED PERIDOTITE
- 3 VOLCANICS
- 4 GRANITE, PORPHYRY

SYMBOLS

- Contacts (T - Topographic; M - Magnetic; G - Geological)
- Faults and shear zones
- Magnetic values in gammas along picket lines
- Magnetic contours
- Magnetic base and control stations

MAGNETOMETER SURVEY by J. MASON & P.J. EVELEIGH

INTERPRETATION by P.J. EVELEIGH

PROFILE INT: 1"=200ft

LOCATION MAP

CANADIAN JOHNS-MANVILLE COMPANY L.
EXPLORATION DIVISION
ASBESTOS — QUEBEC

MAGNETOMETER CONTOUR PLAN
EAST CENTRAL PENHORWOOD TWP. CLAIMS
SUDBURY MINING DIVISION
ONTARIO

SCALE	DRAWN
1 inch = 200 feet	JULY 9, 1954

ORIGINAL

R-14 R-13 R-12 R-11

R-9 R-8 R-7 R-6

R-4 R-3 R-2 R-1

P-4 P-3 P-2 P-1

P-9 P-8 P-7 P-6

HIGHWAY 101

MAT RIVER

CLAY ROAD

McLINTON CREEK

ELMER ROAD

TIMMINS

REEVES TOWNSHIP

PENHORWOOD TOWNSHIP

SEWELL TOWNSHIP

CHUB LAKE

REEVES FIRE ZONE

883 884 893 784

881 882 782

393 394 393 294 293

391 392 291

383 384 393 284 283

381 382 381 282 281

5M 4M 3M 2M 1M

A B C D

KEY MAP

COCHRANE

ALGOMA

Scale 1 inch to 2 miles

CANADIAN JOHNS-MANVILLE CO. LTD.
MATHESON MUNRO MINE ONTARIO
KEY.
MAP LOCATION SHEET
REEVES - PENHORWOOD TWPS.
SCALE 1" = 1320' JAN. 1966
DRAWN R.P.K.
TRACED
APPROVED A.J.C.

42B01NE0600 63.469 PENHORWOOD

390

SEWELL TOWNSHIP

NAT RIVER CAMP

WARREN LAKE ROAD- KUKATUSH TO TIMMINS - 52 MILES

TO FOLEYET

NORTH NAT RIVER GROUP

NORTH JEHANN GROUP

WEST JEHANN GROUP

JEHANN PIPE ZONE

EAST JEHANN GROUP "A"

EAST JEHANN GROUP "B"

REEVES GROUP

REEVES PIPE ZONE

NORTH PRIMOS GROUP "B"

EAST FRINGE GROUP "B"

EAST FRINGE GROUP "A"

CHUB LAKE

REEVES TWP.
PENHORWOOD TWP.

1-M 2-M 3-M 4-M 5-M

JEHANN LAKE

JEHANN S. EXT. GR.

EAST NAT RIVER GROUP

SOUTH NAT RIVER GROUP

MONTGOMERY LAKE NORTH GROUPS

MONTGOMERY LAKE GROUP

MONTGOMERY LAKE

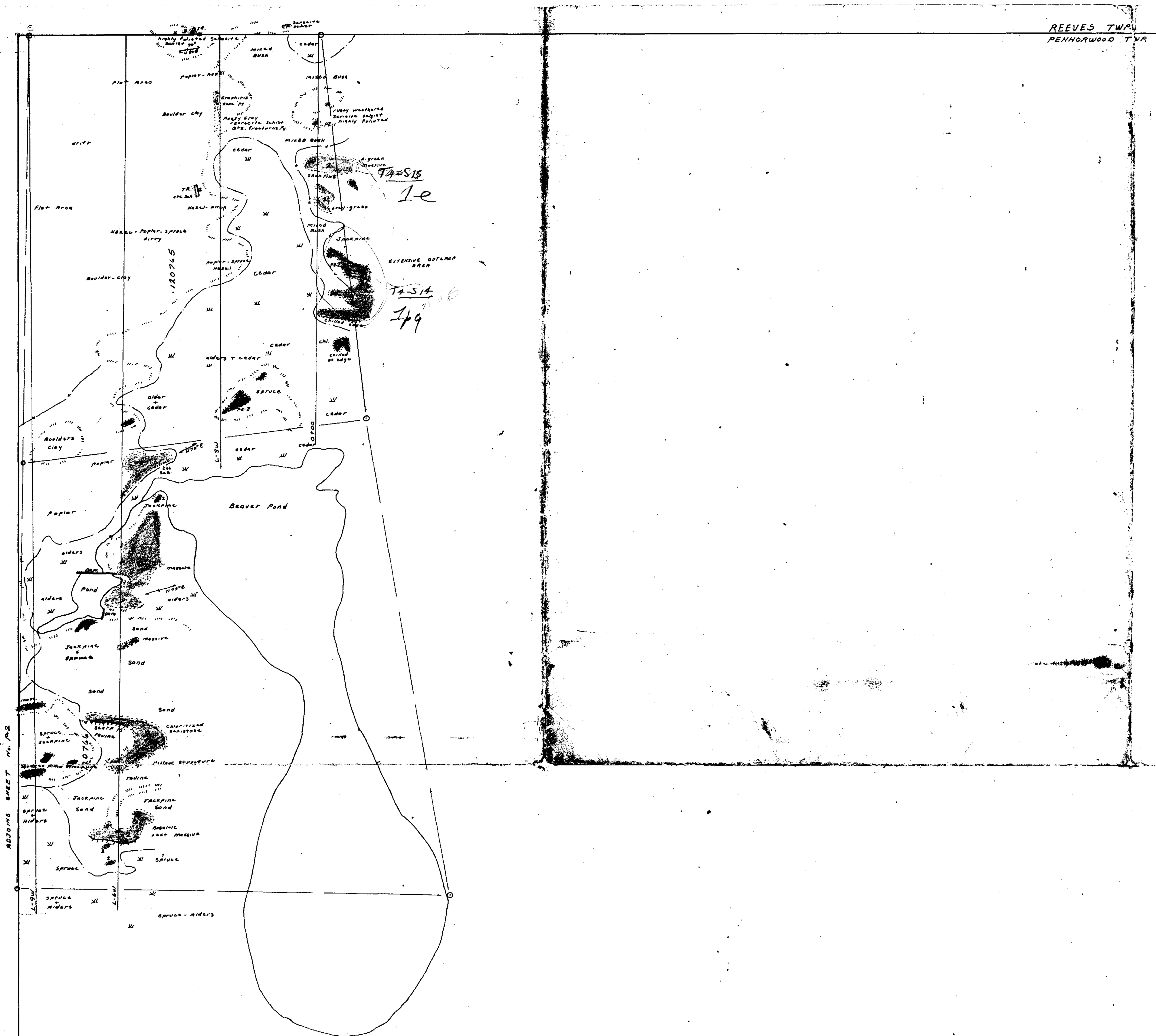
TO MONTGOMERY LAKE

TOWNSHIP CENTRE LINE

KENOGAMING TOWNSHIP

CANADIAN JOHNS-MANVILLE CO. LTD.
MATHESON MUNRO MINE ONTARIO
PROPERTY PLAN
REEVES - PENHORWOOD TWPS.
SCALE - 1" = 1320 FT. DATE - SEPT. 1965
DRAWN
TRACED - MB
APPROVED: F.T.E.

42B01NE2600 63.469 PENHORWOOD



GEOLOGICAL AND TOPOGRAPHIC PLAN
CHUB LAKE GROUP
SCALE 1" = 200' DATE Jan. 7, 66
DRAWN
TRACED MB.
APPROVED F.J.
SHEET P-1

410

PENHORWOOD TWP P-1

420

PENHORWOOD - TWP. P-2

ADJOINS SHEET No. R-3

REEVES TOWNSHIP
PENHORWOOD TOWNSHIP

T61-5

T61-7

S-63911

S-63914

S-63912

S-63913

S-59017

94199

S-80442

82721

82802

82804

JEHZ

L-20OOE

L-3E

L-6E

L-9E

L-12E

L-15E

ADJOINS SHEET No. P-4

ADJOINS SHEET No. P-2

CANADIAN JOHNS-MANVILLE CO. LTD.
MATHESON MUNRO MINE ONTARIO
GEOLOGICAL AND TOPOGRAPHIC PLAN
WEST JEHANN GROUP
SCALE 1" = 200' DATE JAN. 7, 66
DRAWN
TRACED MS.
APPROVED P.G.E.

PENHORWOOD TWP SHEET No. P-3

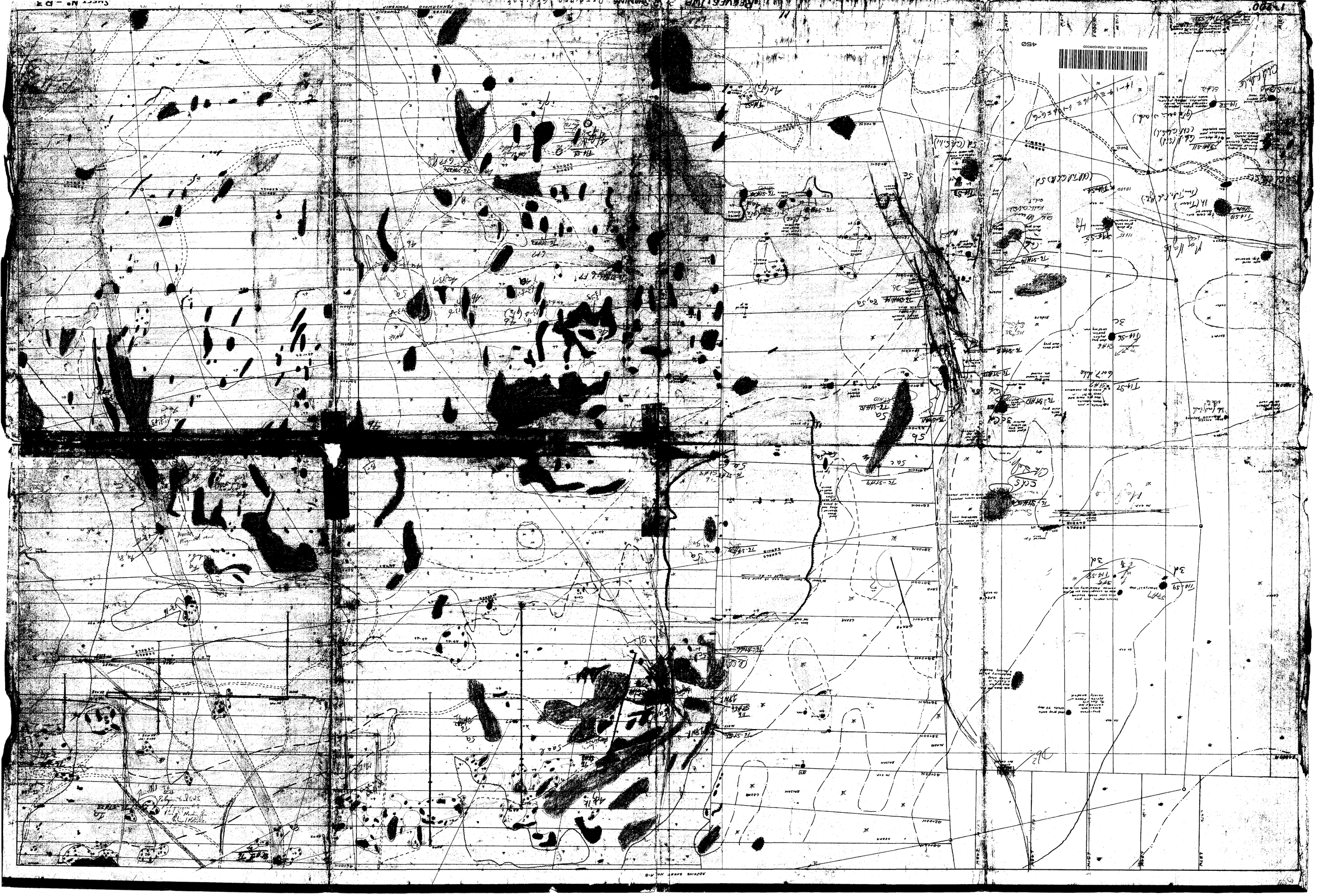
REEVES TWP PLAN SHOWING DETAILED GEOLOGY

REEVES
PENMORWOOD
TOWNSHIP

1"=200'

SHEET N° - R2.

AZIMUTHS GRAPH NO. A-7



Reeves Twp. Plan Showing Detailed Geology

Sheet No. - R8

1" = 200'

1" = 200'

REEVES TWP. PLAN SHOWING DETAILED GEOLOGY

SHEET No. R12.

470


62000 N
60000 N
16000 E
18000 E
20000 E
BASELINE
HYWAY
SPRUCE
ALDERS
CEDAR
MIXED BUSH
TAMARACK
Mixed Bush and Alders
Glacial Till
GLACIAL TILL
META-VOLCANICS
poplar
balsam
Spruce
ADJOINS SHEET NO. A-8
ADJOINS SHEET NO. A-12
1"-200'
480
42B01NE0600 63.469 PENHORWOOD


REEVES
PENHORWOOD
59738
59798
59799
59802
59803
59017
59946
59947
59948
59949
59950
59952
59953
59954
60019
60024
60025
60026
60027
60028
60029
60030
60031
60032
60442
60443
TRACTOR ROAD
TRAIL
BASE LINE No1
No 2 - Base Line
length 1650
N
GEOLOGY
OF THE
ARKELL OPTION
PENHORWOOD TOWNSHIP
ONTARIO
LEGEND
Township Line
Arkell Boundary
Arkell Claim Lines
Other Claim Lines
Trail
Tractor Road
Serpentine
Diorite
Diabase
Gabbro
Outcrops
Assumed Contact
G. Montambeault Ing. P.
Canadian Johns-Manville Co ltd.
Exploration Division
Ontario. 10/7/52.

S-90148

S-90144

S-90145

S-90113

BASE LINE No 5 N

N

SYMBOLS

75° — DIP AND STRIKE

LEGEND

2 — PARTIALLY TO HIGHLY SERPENTINIZED AMPHIBOLE(?) ROCKS (2A), SERPENTINITE (2B), SERPENTINITE WITH FIBRE (2c), SERPENTINITE WITH BRITTLE FIBRE (2D)

1 — CHLORITE - AMPHIBOLE ROCKS (IN PARTS CARBONATED) MAY PARTIALLY BE SERPENTINIZED IN PARTS.

"PINE NEEDLE ROCK" A VARIETY OF SERPENTINITE

GEOLOGIC - and TOPOGRAPHIC PLAN

DUPONT FIBRE ZONE

1" = 100'

SEPT. 37

P.E.E.

H.J.R.

F.J.E.

PENHORWOOD

T.W.P.

ALDER

SWAMP

NAT RIVER

OLD ROAD

SWAMP

SWAMP

ALDER

SWAMP

ALDER

SWAMP

ALDER

SWAMP

CEDAR

SWAMP

TAMARAC SWAMP

float

T47-1

T47-2

T47-3

T47-4

T47-5

T47-6

SYMBOLS

FAULT ZONE { G = geologic, M = magnetic, T = topographic

70° DIP and STRIKE

LEGEND

- DIABASE & GABBRO
- BIOTITE LEUCOGRANITE
- SERPENTINITE WITH FIBRE
- LIGHT TO RUSTY WEATHERING MOD.-HI SERPENTINIZED ROCK
- HORNBLENDE DIORITE, GNEISS, GRANODIORITE
- CHLORITE-AMPHIBOLE ROCK AND SCHIST PARTIALLY SERPENTINIZED IN PARTS

N

GEOLOGIC-and TOPOGRAPHIC PLAN

NAT RIVER FIBRE GROUP

1" = 100'

P.V.F.

H.J.R.

F.J.E.

AUG. 57

PENHORWOOD

T.W.P.

JEHANN LAKE

NIPIT RIVER

T-BONE LAKE

TENTCAMP LAKE

REGIONAL FAULT ZONE

93748

93750

91650

90101 90102 90103 90104 90105 90106 90107 90108 90109 90110 90111 90112 90113 90114 90115 90116 90117 90118 90119 90120 90121 90122 90123 90124 90125 90126 90127 90128 90129 90130 90139 90143 90145 90146 90147 90148 90758 90759 90760 92761

LOCATION SKETCH

Scale: 1" = 50 miles

Magnetometer Survey by: F. J. EVELEGH, L. ALLISON, J. BLA

Interpretation by: F. J. EVELEGH, E. ROWLEY

S-82792

S-82796

S-82797

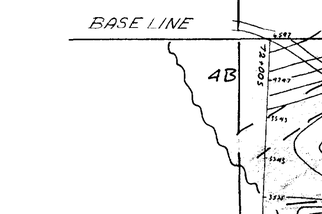
S-82793

S-82787

S-82788

BASE LINE

NAT RIVER



LOCATION SKETCH

SCALE- 1" - 50 MILES

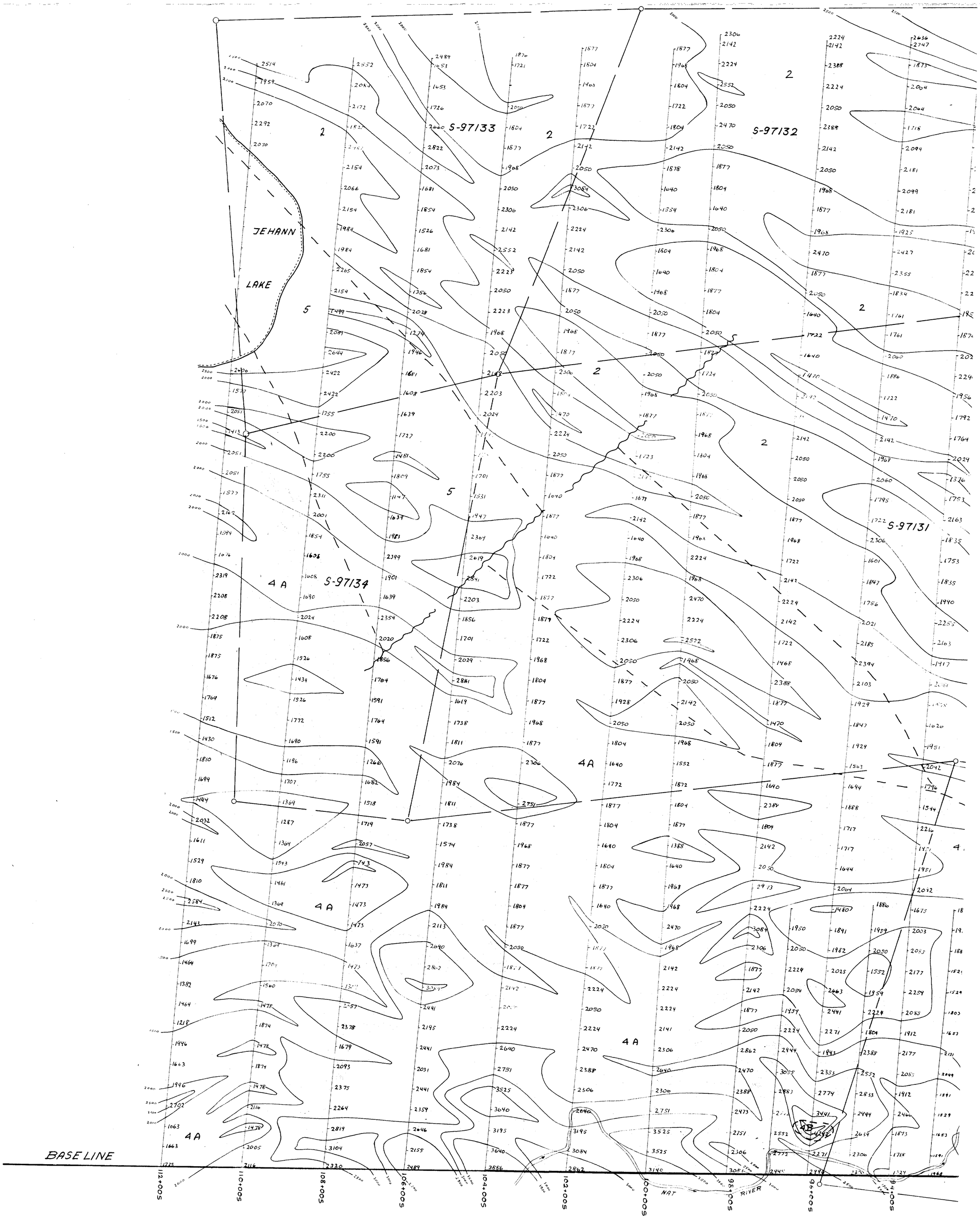
SYMBOLS

- BCS-01 — MAGNETIC BASE CONTROL STATION
- GEOLOGIC CONTACT
- FAULT ZONE — G-GEOLOGIC, M-MAGNETIC, T-TOPOGRAPHIC
- MAGNETIC CONTOUR LINES, CONTOUR INTERVAL-500 GAMMAS

LEGEND

- 1 — SEDIMENTS - GRAPHITIC
- INTERMEDIATE - BASIC VOLCANICS
- GABBRO - DIORITE COMPLEX
- 4B — SERPENTINIZED PERIDOTITE
- C — CARBONATE ROCK
- 5 — GRANITE AND ALLIED ROCKS
- DIABASE

MAGNETOMETER SURVEY



LOCATION SKETCH

Scale: 1" = 50 miles

SYMBOLS

- MAGNETIC BASE CONTROL STATION
- GEOLOGIC CONTACT
- FAULT ZONE — G - GEOLOGIC, M - MAGNETIC, T - TOPOGRAPHIC
- MAGNETIC CONTOUR LINES, CONTOUR INTERVAL: 500 GAMMAS

LEGEND

- 1 — SEDIMENTS - GRAPHITIC
- 2 — INTERMEDIATE - BASIC VOLCANICS
- GABBRO - DIORITE COMPLEX.
- 4B — SERPENTINIZED PERIDOTITE
- C — CARBONATE ROCK
- 5 — GRANITE AND ALLIED ROCKS
- DIABASE

MAGNET

GEOLOGIC & TOPOGRAPHIC PLAN of MONTGOMERY LAKE, MONT L. NORTHEAST EXTENTION & MONT. L FRINGE GROUPS

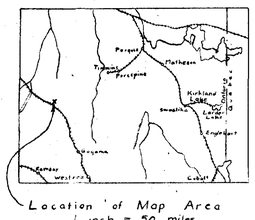
DATE OCT 26 56

DRAWN E.R. & R.T.

TRACED J.Y.

APPROVED F. J. E.

PEN-HORWOOD TWP



Location of Map Area
1 inch = 50 miles

T-BONE LAKE

MATURE JACKPINE

90135

90134

LOGGED OVER SPRUCE AND POPLAR

90133

90131

90132

89525

89524

89522

89523

BASE LINE

89521

89519

89520

89516

89515

89514

89510

89509

89512

89511

89513

MIXED POPLAR AND BIRCH

PINE

89506

MIXED BIRCH AND POPLAR

67754

67753

89507

Cedar Swamp

75581

89499

67752

67751

Cedar Swamp

SPRUCE

NAT RIVER

TENT CAMP LAKE

JEEP ROAD

90138

BASE LINE

67747

MIXED POPLAR AND BIRCH

67755

75578

89497

89498

67750

CEDAR SWAMP

90137

67748

67749

75579

89495

89496

SWAMP

89490

89491

75580

BASE LINE

89492

89493

PINE

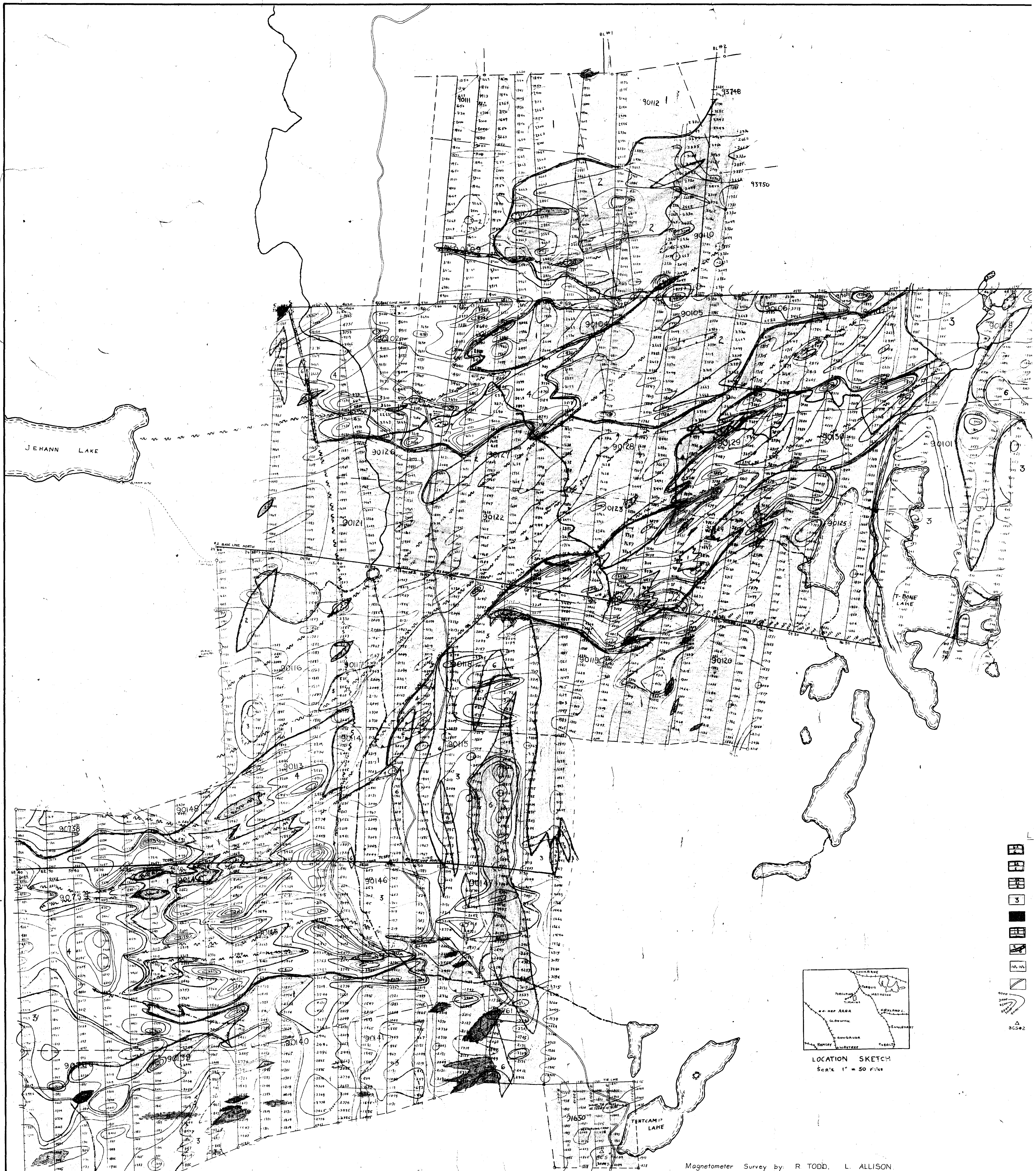
89494

CEDAR SWAMP

CLAIM GRO
Montgomery Lo
Northeast Ex
Fringe Group

LEGEND
OUTCROP
HIGH GROUND
ESKER
STRIKE & DIP OF SCHISTOSITY
STRIKE & DIP OF JOINTS

Geology by. E Rowley, R Todd & H. Gebhardt.



42B01NE0600 63.469 PENHORWOOD

270

REEVES TOWNSHIP

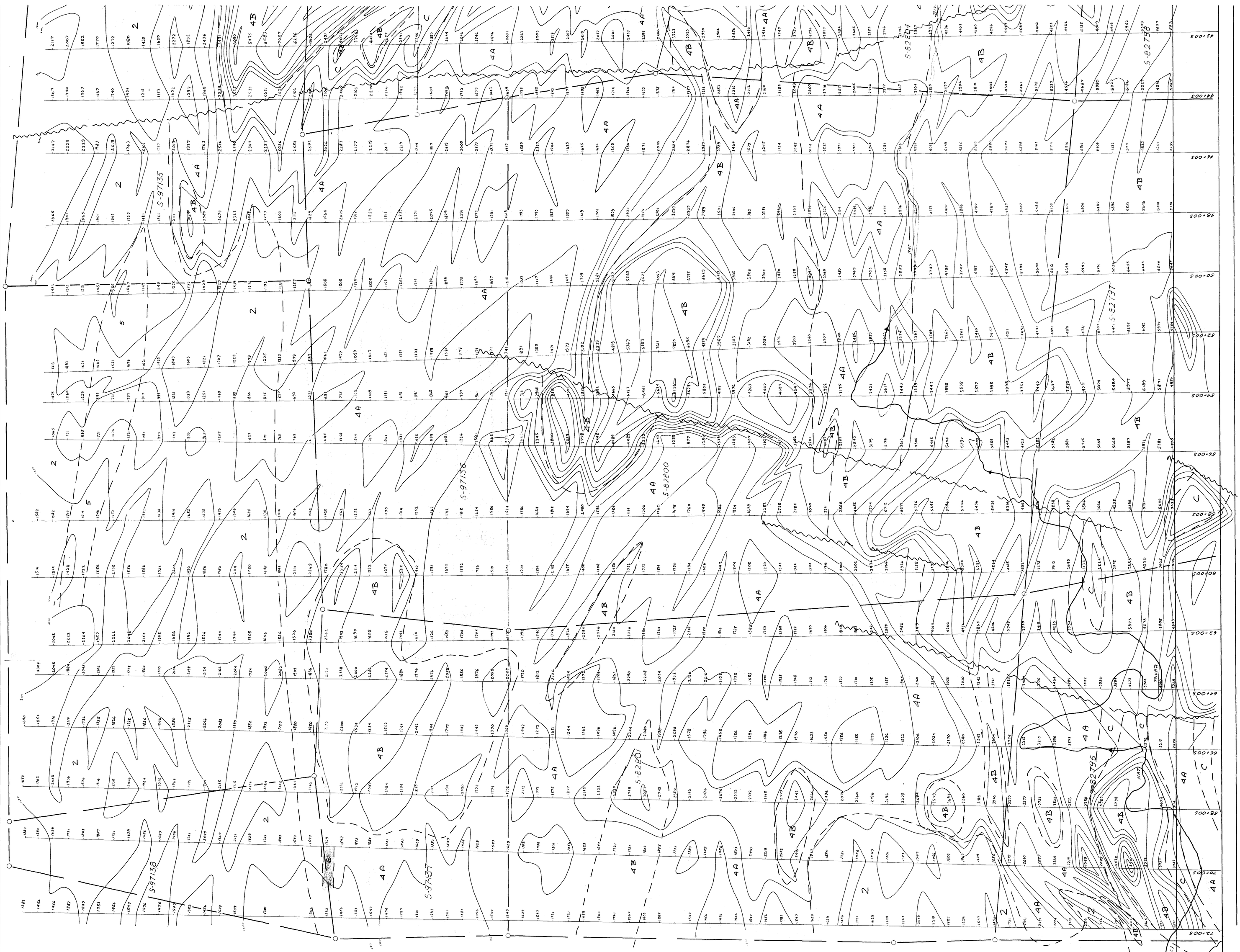
PENHORWOOD TOWNSHIP

BASE LINE No 1

2+00S
4+00S
6+00S
8+00S
10+00S
12+00S
14+00S
16+00S
18+00S
20+00S
22+00S
24+00S
26+00S
28+00S
30+00S
32+00S
34+00S
36+00S
38+00S
40+00S

B.C.S. #1
B.C.S. #2
B.C.S. #3

S-63914
S-63911
S-63913
S-63912
S-82791
S-82799
S-82790
S-82789
S-82798


S-97135
S-97136
S-97137
S-97138
S-82200
S-82201
S-82796
S-82797
S-82798
S-82799
4A
4B
C
2
5
6
POWER

(2)

REEVES TOWNSHIP

PENHORWOOD TOWNSHIP

CANADIAN JOHNS-MANVILLE COMPANY LTD.
MATHESON MUNRO MINE ONTARIO
GEO-MAGNETIC CONTOUR PLAN
JEHANN GROUP
SHEET 8
SCALE 1" = 100' DATE FEB. 1958
DRAWN H.J.R.
TRACED
APPROVED F. J. E.
Penhorwood Twp.

SYMBOLS

B.C.S.#1 — BASE CONTROL STATION

FAULT ZONE G - GEOLOGIC M - MAGNETIC T - TOPOGRAPHIC

GEOLOGIC CONTACT

2000 2500 2500 0 — MAGNETIC CONTOURLINES
CONTOUR INTERVAL: 500 GAMMAS

LOCATION SKETCH
Scale: 1" = 50 miles

LEGEND

1 — SEDIMENTS - GRAPHITIC
2 — INTERMEDIATE - BASIC VOLCANICS
3 — GABBRO - DIORITE COMPLEX.
4B — SERPENTINIZED PERIDOTITE
C — CARBONATE ROCK
5 — GRANITE AND ALLIED ROCKS
6 — DIABASE

MAGNETOMETER SURVEY BY: P. BROUGHTON
G. H. [illegible]
J. B. [illegible]

S-82802
S-82803
S-97107
S-64064
S-82805
S-82804
S-97135
S-64063
NAT RIVER

REEVES
PENHORWOOD
59738
59796
59797
59798
59799
59801
59802
59803
59946
60020
60019
59954
59947
BASE LINE No.1
60021
NAT RIVER
60026
59953
59948
60022
60025
59952
59949
60023
60024
59950
60033
60032
60031
60027
No.2 Base Line
60030
60029
60028

490

S-90758

S-90148

S-90759

S-90144

S-90145

S-90113

BASE LINE No 3 N.

SYMBOLS

75° DIP AND STRIKE

LEGEND

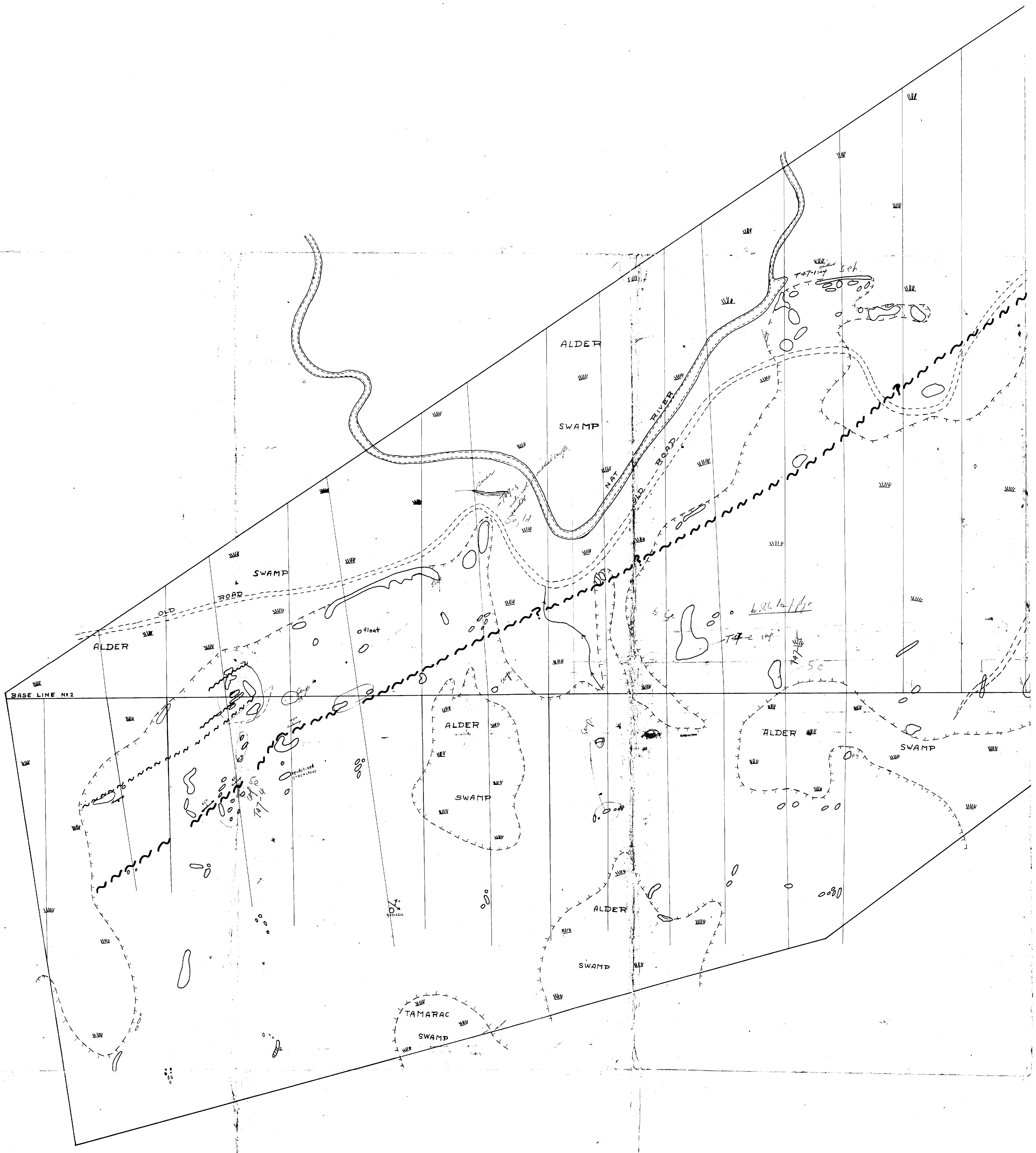
2 PARTIALLY TO HIGHLY SERPENTINIZED AMPHIBOLE(?) ROCKS (2A), SERPENTINITE (2B), SERPENTINITE WITH FIBRE (2C), SERPENTINITE WITH BRITTLE FIBRE (2D)

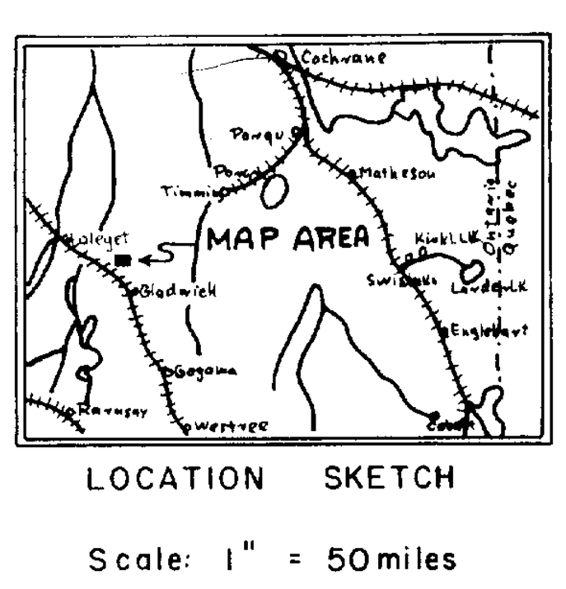
CHLORITE - AMPHIBOLE ROCKS (IN PARTS CARBONATED) MAY PARTIALLY BE SERPENTINIZED IN PARTS

PINE NEEDLE ROCK - A VARIETY OF SERPENTINITE

LOCATION SKETCH

Scale: 1" = 50 miles





LOCATION SKETCH

Scale: 1" = 50 miles

SYMBOLS

FAULT ZONE { G = geologic, M = magnetic, T = topographic }

70° DIP and STRIKE

LEGEND

- DIABASE & GABBRO
- BIOTITE LEUCOGRANITE
- SERPENTINITE WITH FIBRE
- LIGHT TO RUSTY WEATHERING MOD.-HI SERPENTINIZED ROCK
- HORNBLENDE DIORITE, GNEISS, GRANODIORITE
- CHLORITE-AMPHIBOLE ROCK AND SCHIST PARTIALLY SERPENTINIZED IN PARTS