



41014SE0025 63.3370 LACKNER

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DOMINION GULF COMPANY

INTERPRETATION REPORT

ON

GROUND MAGNETOMETER SURVEY

LACKNER TOWNSHIP CLAIMS GROUP "I"

SUDBURY MINING DIVISION

PROVINCE OF ONTARIO

J. H. Ratcliffe

December 1, 1952

Interpretation Report  
on  
Ground Magnetometer Survey  
Lackner Township Claims Group  
Sudbury Mining Division  
Province of Ontario

INTRODUCTION

Thirty claims were staked for the Dominion Gulf Company in Lackner Township, Sudbury Mining Division, Province of Ontario, during the month of September, 1951. Interest in the area stemmed from the location of magnetic and radioactivity anomalies by means of airborne magnetometer and scintillometer surveys. Reconnaissance geological mapping indicated that the anomalies were derived from injections of magnetite and apatite into a syenite intrusive. The area appeared to have sufficient economic possibilities to warrant staking.

The airborne magnetic data had indicated the possibility that the ore zones might be directly indicated by magnetic methods. The ore material, apatite, appeared to be intimately associated with another possible ore mineral, magnetite, which could be directly located by magnetic methods. Since very little bedrock outcrops on the claim group, a ground magnetometer survey of the property was proposed. The purposes of the survey were two-fold - to outline the structural geology of the claim group, and to locate directly any deposits of magnetite, or magnetite-apatite ore.

An Askania Schmidt-type magnetic balance, having a sensitivity of about 25 gammas per scale division, was used in the survey. Readings were taken on picket lines 400 feet apart, using a station interval of 100 feet. In highly anomalous areas, intermediate stations were added. In all, a total of 2206 stations were observed on 37.4 miles of picket line. An attempt was made to lay out a picket line system at right angles to the magnetic trend direction as determined from the aeromagnetic profiles. Consequently, the east-west picket lines form the basic grid, except in the southwestern portion of the group where north-south lines predominate.

The magnetic data were observed and reduced by a Dominion Gulf Company magnetometer crew, and then transmitted to the Toronto office of the Dominion Gulf Company for further processing and interpretation. The basic data, together with isomagnetic contours and interpretation, are presented on a map at a scale of 1 inch equals 200 feet, accompanying this report.

INTERPRETATION

In an area such as this, where rock outcrops are at a premium, free rein may be given to the interpreter's imagination. With the exception of outcrop areas in the central and northeastern sections, the claim group is entirely covered by overburden. There may, however, be some indication of the existing geological structure given by the topographical relief exhibited on the property. Essentially this relief consists of a circular hill located in the west central portion of the claim group, rising some 380 feet above the surrounding valley floor. It is on the brow of this hill that the outcrop areas in the central

portion of the claim group occurs.

The magnetic data for the most part is remarkably uniform. Only in the west central portion do highly anomalous conditions occur. This zone coincides with the brow of the hill previously mentioned. Magnetic lineaments along the flanks of the hill follow the contour of the hillside very closely. Consequently the two physical properties, magnetic effect, and resistance (from erosion), are possibly related in the individual geological horizons. Below the brow of the hill, no anomalies in excess of 3,000 gammas were found, while above the brow anomalies in excess of 3,000 gammas are common, and several anomalies in excess of 10,000 gammas occur.

Due to the linearity of the magnetic horizons, it may be possible to extrapolate geological contacts, with reasonable accuracy. An attempt has therefore been made to separate the various geological horizons. It should be understood however, that, due to the magnetic uniformity of the rocks on the lower slopes of the hill, large errors may be expected. The interpreted contacts have been indicated on the accompanying map. The various zones beginning from the foot of the hill appear in order as lava (indeterminate width), granite (average width 1000 feet), gneissic syenite (varying from 600 feet to an indeterminate width), phosphatic syenite (average width at least 400 feet), and a central core possibly consisting of phosphatic syenite with pods of titaniferous magnetite.

The lavas are represented by a zone of remarkably uniform magnetic relief, occurring in the southeastern corner of the claim group. The magnetic level of this zone averages about 650 gammas. The granite zone is represented by a magnetic high-low combination, the magnetic level of the zone being in excess of 1200 gammas. The gneissic syenite is also represented by a magnetic high-low combination, but the variation between high and low is at least twice that indicated for the granitic zone. The phosphatic syenite horizon is characterized by a magnetic level in excess of 2000 gammas, while the addition of pods of titaniferous magnetite produces a zone of highly irregularly magnetic anomalies.

It may be suggested that terrain and overburden effects could substantially alter the measured magnetic field, and that breaking down the individual magnetic horizons into their geological counterparts is invalid, particularly when the topographic relief is so great. While there is no doubt that these factors introduce difficulties to the interpretation, it is believed that both the sharp change in average magnetic level, and the individual character of the magnetic horizon tend to differentiate it from its neighbour, by an amount far greater than the errors introduced by terrain. Consequently it is believed that the two zones of primary ore interest have been defined - that is, the phosphatic syenite zone, and the zone of introduced magnetite.

Perhaps the apparent structural controls may best be explained by considering a possible geological history of the area. It is believed that a circular acid intrusive, about three miles in diameter, intruded a lava series. Contact metamorphic effects, assimilation, magnetic differentiation, and perhaps recurrent intrusions caused an apparent banding around the intrusive. The outside rim consisted of a granitic rock, while the interior was composed of syenitic material. On cooling, veins of fractures formed in the interior.

syenitic material, and additional fractures caused by exterior forces opened passageways to the deep-seated magma. A titanium-rich magnetite differentiated from the magma filled the openings. A second quiescent period followed by further fracturing and differentiation permitted the magnetite-apatite mineralization to become emplaced. From the aeromagnetic data the Dominion Gulf Company claims are located on the southeastern quadrant of the intrusive mass.

Only one fault has been interpreted from the magnetic data. This fault, striking north-south, has an apparent offset of west-side-north about 700 feet. This fault is probably late in age, and contributed little to the ore deposition. It is believed that the random orientation of the large magnetic anomalies in the titanium-rich magnetite zone indicates that a number of minor faults were active in this area at one time.

The phosphatic syenite has been sampled in four places only. The results are therefore far from conclusive and only indicate that mineralizing solutions have been active. Two separate zones of phosphatic syenite have been outlined. A third zone apparently indicative of phosphatic syenite with titaniferous magnetite injections has also been interpreted. It is believed that further work is warranted on all three zones. Geological mapping has been completed. More detailed magnetometer coverage probably will not add sufficient information to justify the survey. It would therefore appear that diamond drilling would provide the maximum information on the possible ore zones. It is therefore suggested that at least three holes be drilled, each one to test a different phosphatic syenite horizon. Continued work on the property should be based on the results of these exploratory holes.



J. H. Ratcliffe

December 1, 1952

JHR:C

Attachments: Ground Magnetic Survey  
Lackan Township Claims



41014SE0025 63.3370 LACKNER

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DOMINION GULF COMPANY

GEOLOGY LACKNER TOWNSHIP - FIRE TOWER AREA (SCOTT CLAIMS)

BASE MAP 410/14S

SWAYZE AREA

ONTARIO

G. E. Parsons

January 7, 1955

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## INTRODUCTION

The area is in the northwest part of Lackner Township, Sudbury Mining Division, Ontario. It lies around the Fire Tower and for over one mile to the east. It includes all or parts of Claims S-54097-98, S-54101, S-53643-45, S-58584-85 and S-73533. The area is accessible via Jeep from Nemegos, a station on the main C.P.R. line from Sudbury to Winnipeg. The distance from this station is about 8 miles.

This area, in conjunction with other sections of the township, was investigated by Gulf personnel in 1951 following an aeromagnetic survey (Swayze Area). All the rocks at that time were mapped as one uniform type, namely, syenite. No geological reason is indicated on these maps for the anomaly in this Fire Tower Area, or was any evidence of radioactivity noted.

The present investigation was first initiated by the writer in July of this year to

- (1) obtain more firsthand data on the rocks of the Lackner area, beyond that obtainable in the small outcrops area on Gulf's Lackner I claims.
- (2) re-investigate the magnetically anomalous area that appeared to be a continuation of the anomalous conditions on the Multi-Minerals property to the southwest. Here, apatite, titaniferous magnetite and columbium mineralization are present in interesting quantities. This "Fire Tower" anomaly, here investigated, appeared from the aeromagnetic evidence to be the most promising, outside of those on the Multi-Minerals claims.

The writer started the investigation alone late in July. Due to the effect of the scintillometer on both the compass and dip needle, systematic traversing had to be abandoned, and general prospecting and geological investigation without accurate control was proceeded with. Later, assistants - as Sprague, Crossley and Elver - became available, and a more detailed investigation, including a dip needle and a

scintillometer survey, was conducted using old picket lines. These picket lines were badly overgrown and difficult to follow. As the claims did not belong to Gulf, we had to content ourselves with getting our distances by pacing rather than chaining. A preliminary geological map based on this work was prepared at a scale of 1 inch to 400 feet. The information on this map is incorporated in Attachment (1).

Sufficient evidence of columbium and cerium mineralization was obtained in this initial investigation, during July and the first part of August, to warrant investigating the possibilities of optioning the claims involved. The owner (Scott) indicated in preliminary talks that an option on favourable terms was possible. Permission was obtained from his attorney to make a detail investigation of the property. The writer, W. E. Rainboth and R. Boulanger returned to the area about the first of October for the Lackner I drilling. The study of this Fire Tower area was continued in more detail and expanded. The old picket lines were cleaned out and chained. By this time, Dr. E. G. Robinson had made a petrographic study of some 11 type rock specimens from here. His report made it possible for us to describe more accurately the mineralogy of the rock types. This latest mapping was done at 1 inch to 100 feet. A scintillometer was used in the field, and an ultraviolet mineral used to check specimens in camp. This investigation was terminated by a fall of snow in the middle of October.

This report brings together most of the known field data.

### CONCLUSIONS

From the indications at hand, the chief value of the area lies in its indication of columbium. However, there are so many "ifs" with columbium that it is not possible to draw concrete conclusions as to the value of these claims. The chief questions that are not directly answerable are:



What will be the future demand for and price of columbium concentrates of the pyrochlore type?

What will be the extraction costs for this type of ore?

How does this Lackner type of deposit stand up to others of similar type now being developed, as Oka Area, Quebec, and Beaucage Mine in Lake Nipissing, Ontario?

I believe that the indications along these lines are sufficiently encouraging not to deter the development of this type of deposit. The geological setting and indications of columbium are encouraging enough to warrant the serious investigation of this area by drilling, initially, at least, to the order of 2,500 feet. An x-ray drill is capable of doing this investigation satisfactorily. It is doubtful if the claims should be optioned except on a long term basis, with the vendors receiving only an interest in production. It may be some time before the value of pyrochlore mineralization of this type is indicated.

#### TOPOGRAPHY

This area is one of rather extreme relief, varying as much as 400 feet (estimated). In fact, this nepheline syenite area of Lackner Township stands up above surrounding areas as a unique topographical high, with a central basin occupied in part by Lackner Lake.

In the Fire Tower area, two canyons with sheer walls as much as 150 feet high are present. They trend slightly west of north.

Mountain Lake in the centre of this area is a marked depression. The west part is a continuation of the west canyon, which is likely caused by a fault, but the east part is paralleling the formations, and there is no indication from the surrounding rocks why this part should be such a marked depression. Generally speaking, areas of the black hybrid rocks cut by syenite dikes appear to be weathering down. These are present in outcrops east of the lake and may also underlie the lake.

It could also possibly be explained by weathering out of a carbonate zone or apatite-rich zone.

## GEOLOGY

### Regional

A rough circular plug of coarse nepheline syenite some 2 miles in diameter is surrounded for the most part by a nepheline-bearing ferromagnesian-rich zone (the mafic zone). This zone is, in turn, followed by masses of nepheline syenite identical to the inner mass. These masses may not occur continuously around the mafic zone, but be isolated masses. This nepheline-bearing area lies in an area of quartz-felspar hornblende and biotite gneiss cut by some granites. These gneisses trend northeasterly and are steeply dipping.

The area is of economic interest because of presence of apatite, magnetite, columbium, cerium, thorium and possibly also nepheline syenite for the glass and ceramic trade.

The apatite-magnetite occurs as pods and bodies both in the nepheline syenite and in the mafic zone and, normally, near the contact of those types.

Columbium as pyrochlore occurs in these apatite-magnetite masses, in brecciated mafics surrounding these zones, in mafic rocks mapped as sediments by Multi-Minerals geologists, and in the nepheline syenites, especially the dike-like masses.

Multi-Minerals, who pioneered the area, has outlined by an extensive drill program a number of zones of possible ore as

No. 6 Zone - 800 ft. long, 220 ft. wide to a depth of 300 ft., estimated to contain 3,270,000 tons running 69.96% magnetite and 21.88% apatite. The magnetite assays 65.07% iron, 0.41% silica and 7.54% titanium.

3 Zone - (3,700 ft. southeast of No. 6 Zone) - a 700-foot section of a possible 1,200 ft. length, drilled to a depth of 200 ft., is estimated to contain 2,166,000 tons running lower in iron but higher in apatite. Average columbium oxide content of this zone is 0.252%.

Other Zones - In addition to this, they have outlined 30 million tons in columbium zones, averaging better than 0.25%  $\text{Cb}_2\text{O}_5$ .

Detail (Fire Tower Area)

This area lies on the north flank of the nepheline syenite plug described under Regional Geology. An area here, some 6,000 feet long and up to 1,500 feet wide, has been mapped at 1 inch to 100 feet, see Attachment (2).

Here, a zone of mafic rocks up to 1,500 feet wide is flanked by nepheline syenite. This mafic zone trends in a slightly north of east direction in the west and central part of the area mapped, and turns sharply due south in the east part of the mapped area.

Mineralogically, the rocks are closely related in that they are high in soda-rich minerals. The rocks differ essentially in their textural characteristics and the proportions of these soda-rich minerals present. The major rock forming minerals are nepheline, orthoclase, anorthoclase, albite, augite, aegirine-augite and biotite. Magnetite and apatite are normal accessories, and may reach as high as 10% of the volume. Garnets, varying in colour from yellow to dark green, are locally common. Carbonates, with or without yellow garnets and magnetite, are also quite common. Pyrochlore, monazite, zircon and fluorite have also been identified.

We have broken the rocks into five main types for mapping; however, except for the nepheline syenites (Type 1), there is complete gradation between all types. This gradation and the characteristics of each type are illustrated on the legend for map, Attachment (2). The basis for this classification is first mineralogical, and

second structural and textural characteristics observed in the field. At one end of the classification, we have the granitoid nepheline-felspar-rich rocks, and at the other end, gneissic mafic-rich rocks.

### Description of Rock Types

#### Type 1 Nepheline Syenites

These appear to be true intrusive rocks occurring as large masses or as distinct dikes or dikelets. They are mostly coarsely granitoid in texture. On the exposed weathered surface, the nepheline weathers a pale blue colour, giving the rock a very distinct appearance. It weathers below the feldspars. On the moss covered outcrops, the nepheline weathers a buff brown colour. The nepheline content is as high as 30% at least, and might easily average 20% over rather extensive areas. The ferromagnesian (augite and biotite) content is variable from nil up to 25%. Magnetite is locally present.

#### Type 2 Porphyritic Nepheline Syenite

This rock is characterized by long feldspar crystals in a fine to medium grained ground mass. It usually occurs adjacent to areas of Type (1), and may simply be a border phase of this type. Locally, it may be rather heavily dusted with fine magnetite. There is no marked gneissic lineation.

#### Type 3 Porphyritic Syenitic Hybrids

This type contains the more feldspar- and nepheline-rich gneissic types. It normally has isolated long feldspar phenocrysts or narrow bands of these crystals interbanded with more mafic-rich bands. It normally has abundant angular "fragments", rich in ferromagnesian and magnetite. These are lined up giving the rock a lineated appearance. The weathered surface is generally pitted due to the weathering out of nepheline.

Type 4 Hybrids

This type is normally lineated, but may be massive. Nepheline crystals normally developed in them give the rock a porphyritic texture. Felspar phenocrysts are not microscopically visible in contrast to Type (3). They normally weather smooth and are dark in colour. They are fine to medium textured.

Type 5 Mafic Hybrids

This type includes the most mafic rocks found. They are massive to finely lineated, dark basic rocks. Nepheline syenite phenocrysts are quite often developed. In some of the phases, biotite is quite distinct, but normally they are too fine grained to identify the minerals microscopically.

Economic

Minerals of possible economic significance found to date are pyrochlore (columbium), monazite (cerium and thorium), apatite, magnetite and fluorite. Other cerium and rare earth minerals are also indicated. The only one occurring in possible economic quantities is columbium, although cerium minerals may be significant by-products.

The columbium mineral pyrochlore is primarily occurring in or adjacent to syenite dikes, dikelets and migmatite zones.

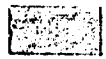

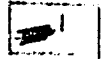
The areas where this mineral is occurring in encouraging quantities are (see sketch Page 8)

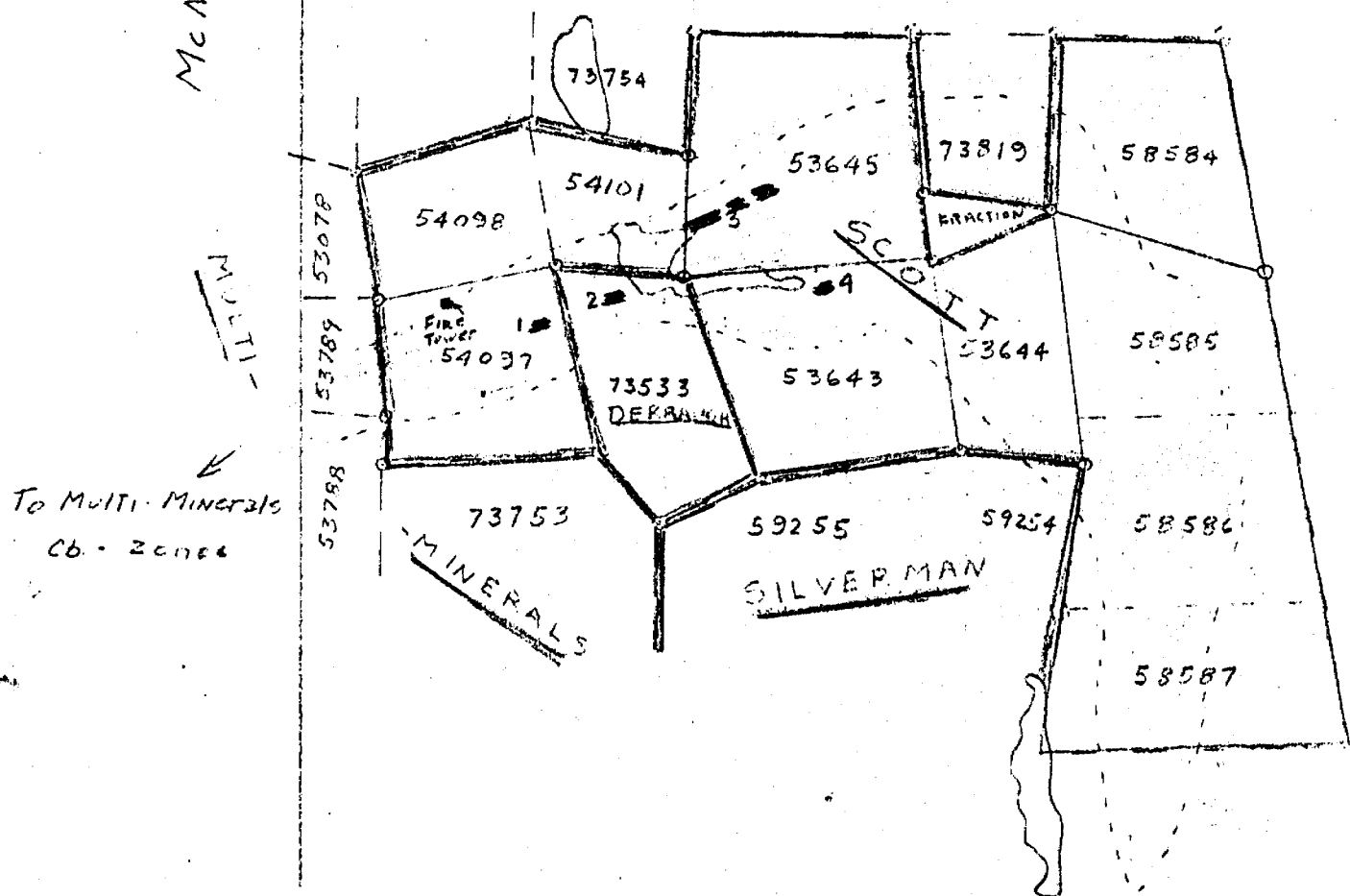
Area 1 Claim 54097

A nepheline syenite migmatite zone from which chip samples gave 0.23%  $Cb_2O_5$ /11 feet, followed by 0.17%  $Cb_2O_5$ /12 feet (Samples #655 and #656). This is the only outcrop located in the zone, the nearest outcrop on strike being 500 feet to the east.

McNAUGHT  
Twp

LACKNER  
Twp

-  Nepheline zone
-  Metasomatic dykes
-  Known Zones of  
Columbian Migration



To Multi-Minerals  
Cb. zones

To Gulf  
Lackner I

Dominion Gulf Co  
LACKNER TWP  
SCOTT CLAIMS  
110 = 132.4 FT  
30 OCT 94 68

To accompany memo GEP - GWW ddt-1 3/27/94

Area 2 Claim 73533

Here syenite dikelets cutting dark hybrids plus a few small patches of apatite are quite radioactive over 10-15-foot widths along a 100-foot length on a cliff face. The more radioactive apatite-rich patches assayed 0.79%  $Cb_2O_5$  and 1.33%  $Cb_2O_5$  (Samples #288 and #290). The closest outcrops to the west are those in Area (1) and to the east on strike, Area (4) at a 1,500-foot distance.

Area 3 Claim 53645

This zone has an indicated width of 100 feet and length of 500 feet, with both ends open. The exposures are limited to a few small outcrops in and on the north side of a marked topographical depression. Pyrochlore is visible in a number of these dikes, and its presence is confirmed by assay grab Samples #659 and #660, giving 0.68%  $Cb_2O_5$  and 0.64%  $Cb_2O_5$ , respectively.

Area 4 Claim 53643

A syenite dike on the north side of an outcrop assayed 0.44%  $Cb_2O_5$ . Pyrochlore, monazite and zircon are visible in specimens from here. No outcrops exist for 200 feet to the north of this outcrop, for 1,500 feet to the west on strike and 1,000 feet to the east on strike. Mountain Lake occupies a marked depression between this and Area (2).

In addition to these indications, radioactive boulders are quite common and readings as high as 375 c/s have been obtained in overburden.

There does appear to be a distinct possibility that the columbium mineralization over mineable widths (10-100 feet wide) grading 0.25%  $Cb_2O_5$  does exist. The rocks are a continuation of similarly grading columbium-bearing rocks over widths of 200 feet on the Multi-Minerals property to the southwest.

GEOPHYSICS

A ground magnetic survey was run by the owners of the claims, but it is not available.

A dip needle survey was run in our preliminary survey along the picket lines. This revealed no highs of sufficient strength to indicate a magnetite deposit. It clearly defined as magnetic lows the areas of nepheline syenite, and the interpretation on map, Attachment (1), is based on this survey.

RADIOACTIVITY

A scintillometer, CAE Model 963, was carried on all the preliminary mapping at 1 inch to 400 feet. A systematic survey was run on all lines shown in that map, Attachment (1). The abnormally high readings are recorded on that map. In the detail mapping, a scintillometer was carried in all mapping, except that from Lines M, N, O and P east of the East Base Line. The readings are recorded on the geology map at 1 inch to 100 feet, Attachment (2). The background reading of this instrument is around 25 c/s.

The area is abnormally radioactive. The radioactivity is, from indications to date, due to thorium-bearing minerals, as monazite. This mineral and/or apatite are generally always visible in the areas of high (plus 10X background) radioactivity.

Radioactivity generally accompanies the mineralization associated with pyrochlore; however, there is not correlation between its strength and the percent of columbium present. The nepheline syenite dikes that are radioactive (several times background) are generally always columbium-bearing. In this respect, it is a valuable guide.

Readings as high as 15X background were obtained over overburden. In one of these cases on the south boundary of Claim S-73819, the bedrock does not appear to be close to surface either.



OTHER CONSIDERATIONS

Other considerations having bearing on the economic possibilities of the area are:

- (1) The claims are readily accessible for exploration and development.
- (2) The topographic relief is extreme enough to permit tunnelling and underground work for bulk samples and pilot mill tests.
- (3) Geological research and extraction tests that might be necessary on Lackner I would apply equally here.
- (4) The outcrops are sufficiently plentiful in vicinity of the known areas of columbium mineralization that initial tests could be made with the x-ray drill.
- (5) The claim block is ready for drill testing - i.e., most of the picket lines are cleaned out and chained, geology of the important portion is done in detail, and a magnetometer survey was completed previously and can be obtained.
- (6) There are indications from recent finds that columbium mineralization may be rather common and that stiff competition may be encountered in marketing the product. Nevertheless, increased supply may create a wider market and increased consumption.
- (7) The costs of recovering and percentage recovery are unknown quantities for this ore. Since the mineral is visible and has a specific gravity of 4 to 5, it does not seem that recovery should be possible by simple mechanical processes.
- (8) The price of columbium is presently set by the U. S. stockpile procurement agencies, namely, \$2.80 U. S. a pound for contained columbium for 35% concentrates. This is for columbite and tantalite, not pyrochlore.

G. E. Parsons

GEP:bh  
Duplicate - Mr. Wyckoff

ATTACHMENTS

1. DGC Geology of Lackner Township (Fire Tower Area) - Base Map 410/14S - Scale 1" = 400' - G. E. Parsons - January 7, 1955.
2. DGC Geology of Lackner Township (Fire Tower Area) - Base Map 410/14S - Scale 1" = 100' - G. E. Parsons & W. Rainboth - January 7, 1955.

A P P E N D I X I

APPENDIX I

D-106 A

DOMINION GULF COMPANY

SAMPLE RECORD

Property Name **Lackner Township**  
 Area **410/14S**  
 Collected By **GEP and Assistants, 1953**  
 Submitted By

State reason(s) for any special laboratory work requested at bottom of last page.

~~xxxx~~ Report: "Geology of Lackner Twp., Fire Tower Area,"  
~~xxxxxxxxxxxx~~ dated January 7, 1955, by GEP.

Map ~~xxxx~~ Title: "Geology of Lackner Twp., Fire Tower Area", Scale 1"=400', dated August 20, 1954, by GEP

Central File No.	Field No.	Location	Rock Type (Field)	<del>xxxxxx</del> Radioactivity	<del>xxxxxxxx</del> (Agency <del>xxxx</del> )
9146	S-GP-1	2+25W of No. 1 Post of S-73753	Dark hybrid		
9147	-2	15+00'E, 3+00'S Fire Tower, W side of canyon	Apatite brg dike.	Area up to 1000 c/s. Spec.150 c/s	#282 (0.025% $Cb_2O_5$ 1.4% $CeO_2$ 0.05% $U_3O_8$ (equiv. - spectr. indicates all thorium
9148	-3	14+00E, 2+00S of Fire Tower or 200'S of Lake in West Wall of Canyon.	Apatite-neph.-biotite brg	Up to 1200 c/s.	#283 (0.070% $Cb_2O_5$ 0.78% $CeO_2$ 0.05% $U_3O_8$ (equiv. - spectr. indicates all thorium
9149	-4A	14+00E, 1+50S of Fire Tower or 2+50'S of Lake in Canyon.	Neph-biotite brg boulder.	Up to 1500 c/s.	#284 (0.09% $Cb_2O_5$ 0.62% $CeO_2$ 0.070% $U_3O_8$ (equiv.- spectr. indicates all thorium
9150	-4B	As for 9149	As for 9149	Less than 9149.	
9151	-5	13+00E of Fire Tower 50'S of Lake.	Mafic.		<b>NOTE:</b> S-GP-5,-7,-8 & -9 are all from same gneissic mafic; -5 and -9 show most nepheline.
9152	-6	19+00E, 6+00S of Fire Tower	Neph. Syn.		
9153	-7	13+00E, 1+50N of Fire Tower	Mafic		
9154	-8	As for 9153.			

APPENDIX I

D-100 A

DOMINION GULF COMPANY

SARINE FIELD

Property Name    Lackner Township  
 Area            410/14S  
 Collected By    GEP and Assistants, 1953  
 Submitted By

State reason(s) for  
 any special laboratory  
 work requested at bottom  
 of last page.

~~Report~~ Report: "Geology of Lackner Twp., Fire Tower Area",  
~~dated~~ dated January 7, 1955, by GEP.

Map ~~title~~ Title: "Geology of Lackner Twp., Fire Tower Area", Scale 1"=400', dated  
 August 20, 1954, by GEP.

Central File No.	Field No.	Location	Rock Type (Field)	<del>Radioactive</del> Radioactiv- ity	<del>Assay</del> (Assay <del>data</del> )
9155	S-QP-9	13+00E, OS of Fire Tower.			
9156	-10	14+00E, 150S of Fire Tower, west wall of canyon.	Biotite-nepheline brg rock.	6' wide area 1000 c/s, & #285 up to 2500 c/s.	(0.063% $Cb_2O_5$ (1.3% $CeO_2$ (0.11% $U_3O_8$ (equiv. - thor- (ium.
9157	-11	31+00E, 2+00S of Fire Tower; east wall of east canyon.	Dark red phase of syn.		
9293	-12	1+00S, 2+00E of east Base Line, Claim 53644.	Syn. (2a-2b); quite magnetic.		
9294	-13	2+00E on Line "M", Claim 53644.	Mica Syn.		
9295	-14	5+45W of No. 3 Post of Claim 73819.	Black micaceous hybrid Type 5a.		
9296	-15	6+65W of No. 3 Post of Claim 73819.	Carb. + magnetite.	Area up to 190 c/s.	
9297	-16	6+65W of #2 Post on S Cl. Line on Claim 53645.	Olive green garnet.		

APPENDIX I

B-106 1

DOMINION GULF COMPANY

SAMPLE RECORD:

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 Area 410/14S  
 Collected By GEP and Assistants, 1953  
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Map ~~xx~~ Title: "Geology of Lackner Twp., Fire Tower Area", Scale 1"=400', dated  
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Central File No.	Field No.	Location	Rock Type (Field)	<del>xxxxxx</del> <del>xxxxxx</del> Radioactivity	<del>xxxxxx</del> (Assay <del>xxxx</del> )
9298	S-GP-17	90'E of Mountain L., on P.L. M, Claim 53643.	Magnetic, dark dull green, dense type 5c. Out by rad. feldspathic dikes.		
9299	-18	10+40E of Mountain L. on P.L. M, Claim 53644.	Black micaceous, magnetic, vitreous, Type 5a posphatic.		#294 (0.042% $Cb_2O_5$ (0.19% $CeO_2$ )
9300	-19	11+50S, 50W of East B.L.; Claim 53644.	Rather dark, magnet- ic pitted surface; Type 4?		
9301	-20	5+00N, 50W of East B.L.; Claim 53644.	Dark porph., syen., fine magnetite (2a)		
9302	-21	1+75W of East B.L. 50N of P.L. N.	As above, but quite magnetic & lineated (3A)		
9303	-22	3+60W of East B.L.; 40N of P.L. N.	As above, (3a)		
9304	-24	10+35W of East B.L. on P.L. N, Claim 53643	Granular carb., magnetite & amber mineral.		Zone 1' wide #286 (0.075% $Cb_2O_5$ up to 200 #296 (0.094% $Cb_2O_5$ c/s

APPENDIX I

D-106 A

DOMINION GULF COMPANY

SAMPLE RECORD

Property Name      Lackner Township  
 Area                410/14S  
 Collected By      GEP and Assistants, 1953

State reason(s) for  
 any special laboratory  
 work requested at bottom  
 of last page.

~~Index Report:~~ "Geology of Lackner Twp., Fire Tower Area",  
~~dated January 7, 1955, by GEP.~~  
 Map ~~no.~~ Title: "Geology of Lackner Twp., Fire Tower Area", Scale 1"=400', dated  
 August 20, 1954, by GEP.

Central File No.	Field No.	Location	Rock Type (Field)	<del>Radioactive</del> Radioactiv- ity	<del>Assay</del> (Assay <del>no.</del> )
9305	S-GP-25	As for 9304; Claim 53643.	Feldspathic magnetite borders to above carb. zone.	Up to 550 c/s.	#287 (0.30% $Cb_2O_5$ )
9306	-26	28+00W of East B.L.; P.L. N; cliff face Claim 73533.	Black, olive green garnet from zone 10 ft. wide.	Radioactive area $\pm$ 100 c/s.	
9307	-27	28+00W of East B.L.; P.L. N; cliff face Claim 73533.	Patch of magnetite, amber mineral	Area 450-1000 c/s.	#288 (0.79% $Cb_2O_5$ )
9308	-28	28+00W of East B.L.; 25's of P.L. N; Claim 73533.	Garnets? Magnetite feldspathic.	Area 100c/s	#289 (.055% $Cb_2O_5$ )
9309	-29	28+00W of East B.L.; 20N of P.L. N. Claim 73533 halfway up cliff.	Garnets? Magnetite, amber mineral.	Small area 600 c/s; General area 300-500 c/s.	#290 (1.33% $Cb_2O_5$ )
9310	-30	27+00W of East B.L.; P.L. N, Claim 73533.	Black micaceous magnetic, Type 5a.		
9311	-31	6+75E of Fire Tower; 100'S of P.L. N; Claim 54097.	Contact between Types 3a, 3b.		

APPENDIX I

D-106 A

DOMINION GULF COMPANY

SAMPLE LOGS

Property Name: Lackner Township  
 Area: 410/14S  
 Collected By: GEP and Assistants, 1953.  
 Submitted By:  
~~xxxx~~ Report: "Geology of Lackner Twp., Fire Tower Area",  
~~xxxx~~ dated January 7, 1955, by GEP.  
 Map ~~xxxx~~ Title: "Geology of Lackner Twp., Fire Tower Area", Scale 1"=400', dated August 20, 1954, by GEP.

State reason(s) for any special laboratory work requested at bottom of last page.

Central File No.	Field No.	Location	Rock Type (Field)	<del>xxxx</del> <del>xxxx</del> Radioactivity	<del>xxxx</del> <del>xxxx</del> (Assay <del>xxxx</del> )
9312	S-OP-32	7+00E of Fire Tower; 150'S of P.L. N; Claim 54097.	Lineated hybrid Type 4.		
9313	-33	18+25E of Fire Tower Trail on P.L. R; Claim 73533.	Syenitic, Type (d).		
9314	-34	11+95E of Fire Tower on PL N on cliff face; Claim 73533.	Type 5c cut by la.	Area 100- 250 c/s.	
9315	-35	28+00W of East B.L.; 30N of P.L. N; Claim 73533.	Feldspathic dike in black mafic;	General area 300-500 c/s.	
9316	-36	10+30E of P.L. Q; Claim 73533.	Rad. syn.	Up to 250 c/s. In over- burden 100 c/s.	
9317	-37	7+00E of Fire Tower; 1+50S of P.L. N; Claim 54097.	Part of chip sample #291.	Radioactive #291 150-250 c/s per 30 ft.	(0.21% $Cb_2O_5$ )
9318	-38	8+60W of East B.L.; on P.L. O.	Med. texture syn. Dark porph.		
9319	-39	8+60W of East B.L.; on P.L. O.		Area up to 120 c/s.	



APPENDIX I

D-100 A

INDIAN GULF COMPANY

FIELD RECORD

Property Name Lackner Township.  
 Area 410/14S.  
 Collected by GEP and Assistants, 1953.  
 Submitted by

State reason(s) for  
 any special laboratory  
 work requested at bottom  
 of last page.

~~State~~ Report: "Geology of Lackner Twp., Fire Tower Area",  
~~xxxxxxx~~ dated January 7, 1955, by GEP.

Map ~~xxx~~ Title: "Geology of Lackner Twp., Fire Tower Area", Scale 1"=400', dated  
 August 20, 1954, by GEP.

Central File No.	Field No.	Location	Rock Type (Field)	<del>xxxxxx</del> Radioactiv- ity	<del>xxxxxxx</del> (Agency <del>xxxx</del> )
9320	S-GP-40	9+60W of East B.L. on P.L. O.	Type 1c.		
9321	-41	1000W of East B.L. on P.L. O.	Porph. granitoid base. Type 2b.	Area up to 130 c/s.	
9322	-42	13+60W of East B.L. on P.L. O.	Type 1c; granitoid	Area up to 220 c/s.	
9323	-43	15+00W of East B.L. on P.L. O.	Type 3; micaceous feldspathic.		
9324	-44	17+50W of East B.L. on P.L. O.	Type 3; micaceous feldspathic.		
9325	-45	18+00W of East B.L. on P.L. O.	Type 3; micaceous feldspathic.		
9326	-46	19+00W of East B.L. on P.L. O.	Type 3; micaceous feldspathic.		
9327	-47	21+50W of East B.L. on P.L. O.	Type 2		
9328	-48	23+00W on East B.L. on p.L. O.	Type 2 or 1c.		
9329	-49	24+00W on East B.L. on P.L. O.	Diabase?		

APPENDIX I

9-106 A

CONTINUED FROM PREVIOUS PAGE

SAMPLING RECORD

Property Name      Lackner Township.  
 Area                410/14S.  
 Collected By      GEP and Assistants, 1953.

State reason(s) for -  
 any special laboratory  
 work requested at bottom  
 of last page.

~~Report~~ Report: "Geology of Lackner Twp., Fire Tower Area",  
~~dated~~ dated January 7, 1955, by GEP.

Map ~~title~~ Title: "Geology of Lackner Twp., Fire Tower Area", Scale 1"=400', dated  
 August 20, 1954, by GEP.

Central File No.	Field No.	Location (Approx)	Rock Type (Field)	<del>Sample</del> <del>Number</del> Radioactiv- ity	<del>Agency</del> <del>Number</del>
9330	S-GP-50	5+35W of East B.L. on P.L. L.	Type 5b.		
9331	-51	17+50W of East B.L. on P.L. L.	Type 5a.		
9332	-52	20+00W of East B.L. on P.L. L.	Type 4a.		
9333	-53	23+00W of East B.L. on P.L. L, shore of lake.	Type 4b.		
9334	-54	Line L; East shore, Mountain Lake.	Type 4a.		
9335	-58	5+30E of Fire Tower on P.L. N, Claim 54097.	Syn. dike.		
9336	-59	5+30E of Fire Tower on P.L. N, Claim 54097.	Black host rock.		
9337	-60	5+30E of Fire Tower on P.L. N, Claim 54097.	Syn. dikelets; radioactive.		

APPENDIX I

D-106 A

DOMINION GULF COMPANY.

SAMPLE RECORD

Property Name Lackner Township.  
 Area 410/14S.  
 Collected By GEP  
 Submitted By GEP

State reason(s) for any special laboratory work requested at bottom of last page.

~~Rock Report:~~ "Geology of Lackner Twp., Fire Tower Area", dated January 7, 1955, by GEP.

~~Map Title:~~ "Geology of Lackner Twp., Fire Tower Area", Scale 1"=100', dated January 7, 1955, by GEP.

Radioactivity

Central File No.	Field No.	Location	Rock Type (Field)	<del>Sample</del>	<del>Radioactivity</del> (Assay data)
9606	S-GP-62	30 <sup>+</sup> W of 9 <sup>+</sup> 00N on East B.L.	Porph. Syn.		
9607	-63	10 <sup>+</sup> 35W on P.L. N.	Granular; carb. + magnetite and patches of brown mineral.		#296 (0.094% $Cb_2O_5$ ) (1.34% $CoO_2$ )
9608	-64	12 <sup>+</sup> 65W and 0 <sup>+</sup> 65N of P. L. M.	Neph. syn. dikes; magnetite + yellow mineral.		#297 (0.44% $Cb_2O_5$ )
9609	-65	As for 9608.	Dark fine hybrid; amyg.-like clots of mica.		
9610	-66	17 <sup>+</sup> 00W, 0 <sup>+</sup> 20S of Line K.	Red feldspathic? Fine texture.	Area 150 c/s	#298 (0.12% $Cb_2O_5$ ) (0.92% $CoO_2$ )
9611	-67	10 <sup>+</sup> 14W, 0 <sup>+</sup> 10S of Line K.	Boulder; dark hybrid.	Up to 100 c/s.	
9612	-68	6 <sup>+</sup> 37N, 0 <sup>+</sup> 10W of East B.L.	Coarse syenite; ferromag.-rich.		
9613	-69	2 <sup>+</sup> 37W on Line J.	Carbonate-fluorite.	Area up to 150 c/s.	#299 (0.069% $Cb_2O_5$ ) (0.025% $CoO_2$ )
9614	-70	7 <sup>+</sup> 00W, 0 <sup>+</sup> 45N of Line K.	Carb.-garnet bldr.; 2 tons.	40 c/s	#300 (0.061% $Cb_2O_5$ )

APPENDIX I

DOMINION MINING COMPANY

MINING RECORD

Property Name Lackner Township.

Area 410/14S.

Collected by GEP

Submitted by GEP

~~Report~~ Report: "Geology of Lackner Twp., Fire Tower Area",  
~~dated January 7, 1955, by GEP.~~

Map ~~xxx~~ Title: "Geology of Lackner Twp., Fire Tower Area", Scale 1"=100',  
dated January 7, 1955, by GEP. Radioactivity

State reason(s) for  
any special laboratory  
work requested at bottom  
of last page.

Central File No.	Field No.	Location	Rock Type (Field)	<del>xxxxxx</del> <del>xxxxxx</del>	<del>xxxxxx</del> (Ac. by <del>xxxx</del> )
9615	S-GP-71	7+12W, 0+10S of Line K.	Carb. bldr.		
9616	-72	7+00W, 0+05N of Line K.	Carb. bldr.		
9617	-73	15+15W on Line J.	Carb + garnets	Area 50 c/s.	
9618	-74	16+90W, 0+75S of Line J.	Carb. + brown garnets.	Area 50 c/s.	
9619	-75	18+00W, 0+60N of Line K.	Felspathic?garnets	Area 50 C/s.	
9620	-76	22+35W, 0+25N on Line K	Black hybrid + syn. dike.	Area 250c/s #659 (0.68% $Cb_2O_5$ )	
9621	-77	22+00W, Line K.	Neph. syn. + pyrochlore.	Spec. 75c/s #660 (0.64% $Cb_2O_5$ )	
9622	-78	22+20W, Line K.	Bldr.; as for 9621.		
9623	-79	2+45W, Line J.	Similar to 9613 with less fluorite.		
9624	-80	24+20W, 0+40N, L. J.	Syn.; no nepheline.		
9625	-81	21+85W, 0+10N, L. K	Syn.; apatite-hrg.	Area 150- 200 c/s.	

APPENDIX I

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DOMINION GULF COMPANY

SAMPLE RECORD

D-106 A

Property Name    Lackner Township.  
Area                410/14S.

Collected By    GEP  
Submitted By     GEP

State reason(s) for  
any special laboratory  
work requested at bottom  
of last page.

~~Rock Report:~~ "Geology of Lackner Twp., Fire Tower Area",  
~~XXXXXXXXXX~~ dated January 7, 1955, by GEP.

Map ~~xx~~ Title: "Geology of Lackner Twp., Fire Tower Area", Scale 1"=100',  
dated January 7, 1955, by GEP.

Radioactivity

General File No.	Field No.	Location	Rock Type (Field)	<del>XXXXXX</del> <del>XXXXXX</del>	<del>XXXXXXXXXX</del> (Assay <del>data</del> )
9626	S-GP-82	18+30W, 0+25N, L. J	Syn.; pyrochlore.	Area 50-	
				150 c/s.	
9627	-83	17+25W, 0+75N, L. J	Syn. dike, brown mineral.	Area 100-	
				150 c/s.	
9628	-84	5+75W, line I.	Syn. bldr.	175 c/s.	
9629	-85	10+25W, 0+25S, L. I	Hard, vitreous dark well lined.	50-75 c/s.	
9630	-86	9+65W, 0+15N, L. I	Carb. + magnetite.	50 c/s.	
9631	-87	11+90W, 0+35S, L. I	Syn. dike, garnet- brg.	Area up to 150 c/s.	
9632	-88	13+13W, 0+60N, L. I	Narrow syn. dike.	Area up to 150 c/s.	

APPENDIX II

A P P E N D I X I I

Page 1

ASSAY SAMPLE RECORD SHEET

LACKNER TOWNSHIP, "FIRE TOWER" AREA

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Assay No.	Spec.No. S-GP	Location	Rock Type, Etc.	Radioactivity	Percent		
					Nb <sub>2</sub> O <sub>5</sub>	CeO <sub>2</sub>	ThO <sub>2</sub>
282	-2	West wall of west canyon; approx.	Grab; apatite-brg. syn. dike.	Area up to 1000 c/s.	0.025	1.4	0.05
283	-3		Grab; biotite-felspar-neph.-apatite gneiss.	Radioactive bldr.	0.070	0.78	0.05
284	-4A		Grab; biotite-felspar-neph. gneiss; brown mineral.	Radioactive bldr.	0.090	0.62	0.07
285	-10		Grab; as for 284.	Area 1000-2500 c/s over 6 feet.	0.063	1.3	0.11
286	-24	Picket Line N 10+35W (paced).	Grab; granular magnetite & carbonates 1' wide.	Area up to 200 c/s.	0.075	-	-
287	-25	As for 286.	Grab; syn. dike on border of above.	Area up to 550 c/s.	0.30	-	-
288	-27	Picket Line N 28+00W at base of cliff.	Grab; magnetite + apatite.	Area 450-1000 c/s.	0.79	-	-
289	-28	25'S of 288.	Grab; magnetite, black garnets +	Area 100 c/s.	0.055	-	-
290	-39	20'N of 289 up cliff face.	Grab; magnetite, garnets, apatite +	Small area 600 c/s; general area 300-500 c/s.	1.33	-	-
291	-37	Picket Line N 7+50E of Fire Tower (paced).	Chip/2 ft; felspathic hybrid.	Area 150-250 c/30'.	0.21	-	-

A P P E N D I X I I

Page 2

ASSAY SAMPLE RECORD SHEET

LACKNER TOWNSHIP, "FIRE TOWER" AREA

Assay No.	Spec.No. S-GP	Location	Rock Type, Etc.	Radioactivity	Percent		
					Nb <sub>2</sub> O <sub>5</sub>	CeO <sub>2</sub>	ThO <sub>2</sub>
294	-18	Picket Line M 3+00W.	Grab; dark granular hybrid.	Area 50 c/s.	0.042	0.15	-
295	-10	As for 285.	Picked; high in grains of brown mineral.	Area 250 c/s.	0.059	2.29	-
296	-63	As for 286.	Grab; granular carbonate + magnetite, high in yellow garnets?	Area 400 c/s.	0.094	1.34	-
297	-64	Picket Line M 12+65W & 65N.	Grab; neph. syn. dike + brown mineral.	Area 100 c/s.	0.44	N.D.	-
298	-66	Picket Line K 17+00W & 20S.	Grab; red felspathic.	Area 150 c/s.	0.12	0.92	-
299	-69	Picket Line J 2+37W.	Grab; fine granular fluorite + carb.	Area up to 150 c/s.	0.069	0.20	-
300	-70	Picket Line K	Grab; 2-ton carb. bldr., + abundant yellow & brown garnets.	Area 30-50 c/s.	0.061	N.D.	-
653	-	Line N, 10+05E 0-10S.	Chip sample; dark hybrid + syn. dikes.	Area up to 300 c/s.	0.14	0.10	-
654	-	Line N, 10+05E 23-39S.	Chip sample; as for 653, + few dikes.	Area 50 c/s.	0.067	0.10	-
655	-	Line N, 10+05E 130-141S.	Chip sample; felspathic zoned hybrids.	Area 50 c/s.	0.027	N.D.	-
656	-	Line N, 11+08E 141-152S.	As for 655.	Area 75-150 c/s.	0.23	0.10	-



A P P E N D I X I I

Page 3

ASSAY SAMPLE RECORD SHEET

LACKNER TOWNSHIP, "FIRE TOWER" AREA

<u>Assay No.</u>	<u>Spec.No. S-GP</u>	<u>Location</u>	<u>Rock Type, Etc.</u>	<u>Radioactivity</u>	<u>Percent</u>		
					<u>Nb<sub>2</sub>O<sub>5</sub></u>	<u>CeO<sub>2</sub></u>	<u>ThO<sub>2</sub></u>
657	-	Line N, 11+08E 152-164S.	As for 655.	Area 75-150c/s.	0.17	N.D.	-
658	-	Line N, 11+08E 164-181S.	As for 655.	Area 50 c/s.	0.050	N.D.	-
659	-76	Line K, 22+35W 25N.	Grab; black hybrid + syn. dike.	Area 250 c/s.	0.68	-	-
660	-77	Line K, 22+00W.	Grab; neph. syn. + pyrochore?	Spec. 75 c/s.	0.64	-	-

APPENDIX III

APPENDIX IV

## LABORATORY REPORT

Report on Investigations Requested by: G. E. Parsons  
Property or Area: Fire Tower Area, Lackner Township  
Base Map 410/14S  
Investigated by: E. G. Robinson  
Date: September 29, 1954  
Subject: Petrographic Study of a Suite of  
Eleven Specimens.

### INTRODUCTION

One group of seven specimens forms a suite characteristic of the major rock types as mapped in the Fire Tower area of Lackner Township. The remaining four specimens are representative of significant variations of the major types.

### PETROGRAPHY

The outstanding feature, common to all the specimens examined, is the absence of quartz. This is all the more remarkable when it is noted that certain specimens are considered to have been formed from gneissic country rock, which presumably contained quartz.

The high percentage of soda-rich minerals and soda feldspathoids (nepheline) is also notable. Zoning in the orthoclase is very common, and the outer zone is generally more sodic than the core. For example, anorthoclase, and sometimes even soda plagioclase, form the outer zone or periphery of the grains. Such zoning and replacement is indicative of a distinct, and possibly sudden, change in composition during the later stages of crystallization of the truly igneous rocks, or of a very soda-rich, silica-poor type of metasomatism. Since the latter is thought to have been active in the formation of the hybrid and truly metasomatic types, it is probable that this soda-rich late phase produced the modification of all types.

The nepheline, and soda-rich, dikelet (Specimen 9337) was reported as being radioactive in the field. No radioactive minerals were definitely determined in thin section, although a tentative determination of tiny grains of monazite is submitted. In this specimen, a few small grains of pyrochlore were noted. It is possible that this may prove to be significant in the problem of columbium transportation and deposition (It was the nepheline-rich cementing material that carried the pyrochlore in the breccia zone at Milti Minerals.).

Specimen 9329 (S-GP-49) proved to be a very fine-grained and slightly porphyritic olivine basalt. Alteration, especially scapolitization, is marked. It is possible that this basic dike may correspond to the slightly coarser grained olivine basalt exposed on the Lackner I claims.

DOMINION GULF COMPANY  
~~XXXXX~~. PETROGRAPHIC ANALYSIS

C.F.

~~XXXXX~~. NO. 9298

DATE September 29, 1954

FIELD OR IDENTIFICATION MARK S-GP-17 - Fire Tower Area - Lackner Township

1. REASONS FOR SPECIMEN Petrographic examination

2. MEGASCOPIIC DESCRIPTION Dense dark grey, massive rock. Generally finely grained with occasional larger inclusions of pink feldspar.

3. MICROSCOPIC DESCRIPTION

Texture: Fine-grained mosaic with few larger pyroxenes

Original Structure:

Secondary Structure: Alteration of original pyroxene grains

(a) Mineralogy

The matrix of this specimen is very similar to that of Spec. 9299, consisting of a fine, even-grained mosaic of orthoclase, nepheline, aegirine-augite and magnetite. Areas and zones of cloudy alteration cut the thin section. The presence of larger tabular pyroxenes are a feature of this rock and distinguish it from Spec. 9299. These were originally augite and show peripheral alteration to the granular type of aegirine-augite and biotite. This type of alteration points to soda metasomatism.

Carbonate frequently replaces feldspar.

Apatite is a common accessory.

(b) Mode:

Primary	Secondary	Metamorphic	
Aegirine-augite 45	(Alteration products)	(Recrystallization)	
Augite 10 %	%	%	
Orthoclase ) 30			
Nepheline )			
Magnetite 5			
Biotite 2			
Accessory	Nature of matrix	Introduced	Enrichment
Apatite 2 %	or groundmass	mineralization	effects
		Carbonate 6	

(c) Indices:

Mineral	Mineral variety

CLASSIFICATION Syenitized country rock with residual augite or mafic hybrid  
 Type 5c. PETROGRAPHER E. G. Robinson

DOMINION GULF COMPANY  
**XXXXXX** PETROGRAPHIC ANALYSIS

C. F.  
**XXXXXX** NO. 9299

DATE September 29, 1954

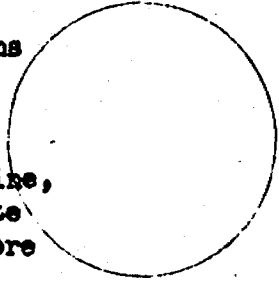
FIELD OR IDENTIFICATION MARK S-GP-18 - Fire Tower Area - Lackner Township

1. REASONS FOR SPECIMEN Petrographic examination

2. MEGASCOPIC DESCRIPTION Dark grey, fine-grained rock with a lineation due to alignment of biotite flakes.

3. MICROSCOPIC DESCRIPTION

Texture: Fine-grained mosaic  
 Original Structure:  
 Secondary Structure: Development of porphyroblastic aggregations of feldspars.  
 (a) Mineralogy



This specimen consists of a fine-grained mosaic of rounded, anhedral grains of orthoclase, nepheline, aegirine-augite, magnetite and biotite. Dark brown garnet calcite and apatite are common accessories. Sphene and possibly pyrochlore are present as small grains and in small amounts.

Orthoclase forms both porphyroblasts and aggregations. In such cases, inclusions of apatite and replacement by carbonate are common.

The general textures indicate a metamorphic origin.

(b) Mode:

Primary		Secondary	Metamorphic	
		(Alteration products)	(Recrystallization)	
Orthoclase				
Nepheline	25%	%	%	
Pyroxene	35			
Magnetite	10			
Garnet	5			
Biotite	15			
Accessory		Nature of matrix or groundmass	Introduced mineralization	Enrichment effects
Apatite	5%		Carbonate	5
Sphene	Tr.			
Pyrochlore	Tr.			

(c) Indices:

Mineral					Mineral variety

CLASSIFICATION Syenitized country rock or mafic hybrid Type 5a PETROGRAPHER E. G. Robinson

DOMINION GULF COMPANY  
~~XXXXXXXX~~ PETROGRAPHIC ANALYSIS

C. F.  
 INDEX NO. 9301

DATE September 29, 1954

FIELD OR IDENTIFICATION MARK S-QP-20 - Fire Tower Area - Lackner Township

1. REASONS FOR SPECIMEN Character sample

2. MEGASCOPIIC DESCRIPTION Dark grey, medium-grained granular rock. The specimen is slightly inequigranular with tabular feldspar present.

3. MICROSCOPIC DESCRIPTION

Texture: Holocrystalline inequigranular.  
 Original Structure: Granitoid.  
 Secondary Structure: Possible crushing of feldspars followed  
 (a) Mineralogy by oriented soda-rich overgrowths.

The rock consists essentially of a medium-grained mosaic of irregular grains of orthoclase, anorthoclase and nepheline. Larger tabular grains of all three minerals occur. The orthoclase developing larger grains which frequently forms subhedral elongated tabular phenocrysts. Inclusions are common, especially rounded grains of pyroxene. In many instances these inclusions form a zone within the feldspar and parallel to the border. Compositional zoning is common as is marked cracking of the core of larger grains. The outer zones are invariably more sodic than the cores. This indicates a regrowth or overgrowth after cracking, and in a soda-rich medium, possibly of deuteric origin.

Anhedral and interstitial pyroxenes are common. Augite is noted altering to aegirine-augite and some biotite, magnetite and apatite are common accessories.

(b) Mode:

Primary	Secondary	Metamorphic	
Orthoclase )	(Alteration products)	(Recrystallization)	
Anorthoclase ) %	Aegirine-augite 15%	%	
Nepheline ) 60	Biotite 3		
Albite ? )			
Augite 10			
Accessory	Nature of matrix	Introduced	Enrichment
Magnetite 5 %	or groundmass	mineralization	effects
Apatite 7			

(c) Indices:

Mineral				Mineral variety

CLASSIFICATION Porphyritic syenite possibly contaminated and deuteroically altered - Type 2a. PETROGRAPHER E. G. Robinson

DOMINION GULF COMPANY  
~~XXXXX~~ PETROGRAPHIC ANALYSIS

O. F.  
~~XXXXX~~ NO. 9302

DATE September 29, 1954

FIELD OR IDENTIFICATION MARK S-GP-21 - Fire Tower Area - Lackner Township

1. REASONS FOR SPECIMEN Petrographic examination

2. MEGASCOPIIC DESCRIPTION Medium-grained, grey, crystalline, rock. Roughly tabular light grey feldspars are noticeably larger in grain-size.

3. MICROSCOPIC DESCRIPTION

Texture: Holocrystalline, inequigranular  
 Original Structure: Generally even-grained with larger tabular orthoclase grains.  
 Secondary Structure: Feldspar grains strongly cracked.

(a) Mineralogy

Tabular, subhedral orthoclase grains from the bulk of the rock. These vary considerably in grain-size and the medium to small grains are distinctly elongated. Cloudy alteration occurs near the many cracks, and rounded grains of apatite and pyroxene are commonly included. Nepheline is present and is often difficult to distinguish from the orthoclase.

Pyroxene, between augite and aegirine-augite in composition, is common and forms small irregularly shaped grains.

Magnetite forms large, irregular grains which generally have a sieve texture.

Apatite and a few flakes of highly pleochroic biotite form accessory minerals.

(b) Mode:

Primary	Secondary	Metamorphic	
Orthoclase 55-60	(Alteration products)	(Recrystallization)	
Nepheline 5-10%	%	%	
Aegirine-augite 15			
Magnetite 10			
Accessory	Nature of matrix	Introduced	Enrichment
Apatite 5 %	or groundmass	mineralization	effects
Biotite Tr.			

(c) Indices:

Mineral				Mineral variety

CLASSIFICATION Nepheline syenite (Medium-grained- tabular) Type 3a PETROGRAPHER E. G. Robinson



DOMINION GULF COMPANY  
~~Report~~ PETROGRAPHIC ANALYSIS

C. F.

~~XXXXX~~ NO. 9306

DATE September 29, 1954

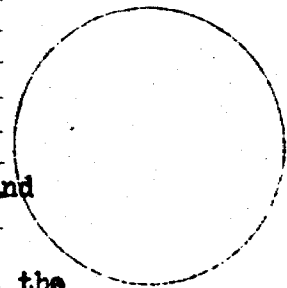
FIELD OR IDENTIFICATION MARK S-GP-26 - Fire Tower Area - Lackner Township

1. REASONS FOR SPECIMEN Petrographic examination

2. MEGASCOPIC DESCRIPTION The specimen has a mottled appearance and consists of granular pink feldspar and dark green rounded garnets.

3. MICROSCOPIC DESCRIPTION

Texture: Highly inequigranular  
 Original Structure: \_\_\_\_\_  
 Secondary Structure: Mosaic of feldspars and large poikiloblasts of garnet.  
 (a) Mineralogy \_\_\_\_\_



The matrix of the rock is a medium- and even-grained mosaic of rounded poikiloblasts of orthoclase and nepheline. Inclusions of magnetite are invariably present and are generally formed in the core of the grain. Alteration by carbonate is common. The most noticeable feature of the rock is the large amount of garnet present. It takes the form of highly irregularly shaped porphyroblasts of a light yellow-brown colour. Small amounts of pyroxene are associated with the garnet, generally at or near the border. This association is not usual and its significance is not known.

Apatite is accessory.

(b) Mode:

Primary	Secondary (Alteration products)	Metamorphic (Recrystallization)	Metamorphic (Recrystallization)
%	%	Tr%	
		Magnetite	
		Garnet	50
		Orthoclase)	40
		Nepheline )	
		Apatite	2
Accessory	Nature of matrix or groundmass	Introduced mineralization	Pyroxene 5% Enrichment effects
%		Carbonate	3

(c) Indices:

Mineral				Mineral variety

CLASSIFICATION Garnetiferous syenite hybrid PETROGRAPHER E. G. Robinson

DOMINION GULF COMPANY  
~~XXXXXX~~ PETROGRAPHIC ANALYSIS

C. F.

~~XXXXXX~~ NO. 9307

DATE September 29, 1954.

FIELD OR IDENTIFICATION MARK S-QP-27 - Fire Tower Area, Lackner Township

1. REASONS FOR SPECIMEN Petrographic examination

2. MEGASCOPIC DESCRIPTION The specimen is a granular aggregate of yellow apatite, magnetite, brown-black garnet and black pyroxene.

3. MICROSCOPIC DESCRIPTION

Texture: Granular

Original Structure:

Secondary Structure: Irregular, brown garnets are developed

(a) Mineralogy

The rock is essentially comprised of an even-grained, granular aggregation of apatite, magnetite and augite. The apatite is generally cracked and this has facilitated a slight amount of iron staining. The augite probably grades into aegirine-augite and in places has become altered to a brown biotite. The magnetite and pyroxene frequently form intimate intergrowths.

Large, ragged brown garnets are common. These frequently have magnetite, apatite and pyroxene included producing a poikiloblastic texture. Very small subhedral to euhedral grains of pyrochlore are disseminated throughout the mass. These are the only minerals that were noted which are capable of explaining the radioactive character and the columbium content of the rock.

(b) Mode:

Primary	Secondary (Alteration products)	Metamorphic (Recrystallization)	
Apatite 30 %	Biotite Tr. %	Garnet 10 %	
Magnetite 30			
Pyroxene 30			
Accessory %	Nature of matrix or groundmass	Introduced mineralization Pyrochlore Tr.	Enrichment effects

(c) Indices:

Mineral				Mineral variety

CLASSIFICATION Garnetiferous apatite magnetite rock. PETROGRAPHER E. G. Robinson

DOMINION GULF COMPANY  
~~XXXXX~~. PETROGRAPHIC ANALYSIS

C. F.  
~~XXXXX~~ NO. 9312

DATE September 29, 1954

FIELD OR IDENTIFICATION MARK

S-GP-32 - Fire Tower Area - Lackner Township

1. REASONS FOR SPECIMEN

Character sample

2. MEGASCOPIIC DESCRIPTION

Grey, granular rock with distinct lineation produced by ferromagnesian and oriented tabular feldspars.

3. MICROSCOPIC DESCRIPTION

Texture: Holocrystalline inequigranular  
 Original Structure: Unknown  
 Secondary Structure: Gneissic - this could be relict.

(a) Mineralogy

The thin section of this specimen has been cut in the less gneissic phase of the rock and consequently it does not show its hybrid character to the fullest. The section is similar to Spec. 9201, but differs in certain textural relationships. There is a much greater range in grain-size. Zoning is more marked and larger soda-rich peripheral zones are noted around the larger tabular feldspars. Lenticular, fine-grained mosaic aggregations are common. These are considered indicative of metamorphism. The lenticular, fine-grained mosaic aggregations consist of nepheline, anorthoclase and aegirine. The aegirine-augite is either poikiloblastic or occurs as smaller grains in rough aggregations.

Magnetite and apatite are accessory.

The presence of mixed textures, although not strongly developed, probably indicate a hybrid character.

(b) Mode:

Primary	Secondary (Alteration products)	Metamorphic (Recrystallization)	
%	%	%	
Accessory	Nature of matrix or groundmass	Introduced mineralization	Enrichment effects
%			

(c) Indices:

Mineral				Mineral variety

CLASSIFICATION Lineated feldspar-rich syenitic PETROGRAPHER E. G. Robinson  
 hybrid - Type 4b.

DOMINION GULF COMPANY  
~~XXXXX~~ PETROGRAPHIC ANALYSIS

G. F.

~~XXXXX~~ NO. 9316

DATE September 29, 1954

FIELD OR IDENTIFICATION MARK S-GP-36 - Fire Tower Area - Lackner Township

1. REASONS FOR SPECIMEN

2. MEGASCOPIIC DESCRIPTION Medium-grained granular rock with pink to red colour. It consists of clear grey tabular feldspars, and pink to red coloured cloudy and altered feldspar and magnetite.

3. MICROSCOPIC DESCRIPTION

Texture: Holoocrystalline, granular

Original Structure: Aggregation of subhedral tabular grains

Secondary Structure: Sharply defined preferential alteration.

(a) Mineralogy

The rock consists essentially of feldspars. Large subhedral perthite is generally clear to slightly cloudy. Albite, with a composition of about An<sub>5</sub>, is comparatively plentiful and by its reaction with the orthoclase had produced the replacement type perthite noted above.

The high degree of apparent alteration of feldspars is one of the notable features of the rock. In certain instances, this heavy alteration to sericite, kaolin and possibly chlorite, is definitely that of orthoclase. In others, it appears that such dense light brown aggregations could result from the feldspathitization of biotite. In support of such an idea is the presence of relict pleochroic haloes surrounding inclusions of pyrochlore. Biotite and possible arfvedsonite are generally associated, and pyrochlore produces pleochroic haloes.

Magnetite is an accessory.

(b) Mode:

Primary	Secondary (Alteration products)	Metamorphic (Recrystallization)	
Perthite 45%	Quartz Tr.%	%	
Andesine 5	Alteration	} 35	
Biotite 5	Products (cloudy)		
Arfvedsonite 7			
Accessory	Nature of matrix or groundmass	Introduced mineralization	Enrichment effects
Pyrochlore %			
Magnetite 3			

(c) Indices:

Mineral				Mineral variety

CLASSIFICATION Metasomatized (?) Syenite

PETROGRAPHER E. G. Robinson

DOMINION GULF COMPANY  
~~XXXXX~~ PETROGRAPHIC ANALYSIS

G. F.

~~XXXXX~~ NO. 9320

DATE September 29, 1954

FIELD OR IDENTIFICATION MARK S-GP-40 - Fire Tower Area - Lackner Township

1. REASONS FOR SPECIMEN

2. MEGASCOPIIC DESCRIPTION Medium-grained, pink-grey crystalline rock with a granular texture.

3. MICROSCOPIC DESCRIPTION

Texture: Holocrystalline granular. Average grain-size 1.5 mm.

Original Structure: Granitoid. Zoning in feldspars common.

Secondary Structure:

(a) Mineralogy This specimen consists chiefly of orthoclase, anorthoclase, nepheline and possibly untwinned albite. Zoning is common in these minerals. The outer zones are generally more sodic. The zonal arrangement of small augite inclusions is a notable feature. The general optical similarities of the feldspars and feldspathoids make the determinations of percentages inaccurate.

Aegirine-augite forms poikilitic grains and also occurs as an interstitial phase. Alteration to biotite is common. Apatite and magnetite form normal accessories.

(b) Mode:

Primary	Secondary	Metamorphic	
	(Alteration products)	(Recrystallization)	
Orthoclase )	Biotite		
Anorthoclase ) 80%	5%	%	
Nepheline )			
Aegirine-augite 10			
Accessory	Nature of matrix	Introduced	Enrichment
Magnetite 2%	or groundmass	mineralization	effects
Apatite 3			

(c) Indices:

Mineral				Mineral variety

CLASSIFICATION Medium-grained nepheline syenite PETROGRAPHER E. G. Robinson  
 Type 1c.

DOMINION GULF COMPANY  
~~XXXXXX~~ PETROGRAPHIC ANALYSIS

DATE September 29, 1954.

~~XXXXXX~~ NO. 9329

FIELD OR IDENTIFICATION MARK S-GP-49 - Fire Tower Area - Lackner Township

1. REASONS FOR SPECIMEN Character

2. MEGASCOPIIC DESCRIPTION Black dense very fine-grained rock with tiny light coloured flecks

3. MICROSCOPIC DESCRIPTION

Texture: Very fine-grained with some coarser aggregations.  
 Original Structure: Fine ophitic base with larger, tabular pyroxene and feldspar.  
 Secondary Structure: and feldspar.

(a) Mineralogy

The matrix is very fine and evenly grained and consists of unoriented tabular biotite and weakly developed feldspar grains. Alteration, especially to carbonate and some scapolite, is shown but not markedly so.

Roughly tabular pyroxenes up to twice the size of the matrix are common. These are considered to be augite and show only minor alteration to biotite.

Zoning and twinning are not common.

Small rounded grains - possibly olivine - are strongly altered to magnetite and possibly iddingsite.

Lenticular aggregations of highly altered feldspar, secondary sodic plagioclase, nepheline, scapolite and carbonate are considered to represent the alteration products of a previous feldspar.

(b) Mode:

Primary	Secondary (Alteration products)	Metamorphic (Recrystallization)	
Augite 25%	Scapolite 10%		%
Feldspar 20	Na plagioclase 5		
Biotite 25	Chlorite 5		
Olivine (?) 2	Iddingsite Tr.		
	Magnetite 3		
Accessory %	Nature of matrix or groundmass	Introduced mineralization	Enrichment effects
	Fine tabular ophitic	Carbonate 5	

(c) Indices:

Mineral				Mineral variety

CLASSIFICATION Fine-grained olivine basalt

PETROGRAPHER E. G. Robinson

DOMINION GULF COMPANY  
~~XXXXXX~~ PETROGRAPHIC ANALYSIS

C. F.

~~XXXXXX~~ NO. 9337

DATE September 29, 1954

FIELD OR IDENTIFICATION MARK S-GP-60 - Fire Tower Area - Lackner Township

1. REASONS FOR SPECIMEN Character

2. MEGASCOPIC DESCRIPTION Medium-grained pink-gray crystalline rock with a granular texture

3. MICROSCOPIC DESCRIPTION

Texture: Holocrystalline, even-grained

Original Structure: Granitoid

Secondary Structure: Slight cracking and alteration of feldspars

(a) Mineralogy

This rock consists of subhedral crystals of orthoclase, anorthoclase, nepheline and albite with a granitic texture. Twinning in the orthoclase is common and alteration in places is marked. Cloudy aggregations are typical alteration products; consist of tiny epidote grains and kaolin. Clear plates of scapolite are also common.

Biotite after aegirine-augite is plentiful. A semi-opaque variety is noted. Magnetite and apatite are common accessories.

A very few grains of pyrochlore were noted. Radioactive minerals could not be positively identified, but certain unidentified grains may be monazite.

(b) Mode:

Primary	Secondary	Metamorphic	
	(Alteration products)	(Recrystallization)	
Orthoclase ) Anorthoclase ) 80%	Biotite 5%	%	
Nepheline ) Albite )			
Aegirine-Augite 10			
Accessory	Nature of matrix	Introduced	Enrichment
Magnetite 2%	or groundmass	mineralization	effects
Apatite 3			
Pyrochlore Tr.			
Monazite Tr.			

(c) Indices:

Mineral				Mineral variety

CLASSIFICATION Nepheline syenite dikelet contain- PETROGRAPHER E. G. Robinson  
 ing pyrochlore.

A P P E N D I X V



## A P P E N D I X V

### NOTES ON COLUMBIUM

Price Columbite and tantalite ores - \$2.80 a pound for contained  $Cb_2O_5 + Ta_2O_5$  for concentrates with not less than 35%  $Cb_2O_5 + Ta_2O_5$ .

Uses 25% as ferrotantalum - columbium in steel.  
25% electronic uses.  
16% in tantalum carbide.  
15% in chemical equipment.  
12% in synthetic rubber industry.  
4% in surgical, dental and other purposes.

Reserves More than 90% of the world production of columbite-tantalite ores comes from Nigeria and the Belgian Congo. Estimates of these reserves are:

Nigeria	30 million pounds
Belgian Congo	50 million pounds low grade.

#### Consumption

U. S. A. 1953 - 750,000 lbs. (1% from domestic production).

Lack of supplies, coupled with metallurgical problems, has restricted its use in the past. These are indications that its consumption will materially increase.

The U. S. stockpile agencies want to buy 15,000,000 lbs. of combined pentoxides ( $Cb_2O_5 + Ta_2O_5$ ) by December 31, 1953. To June 1954, they had received 4,666,271 lbs.



Ontario



41014SE0025 63.3370 LACKNER

900

*62-5510*

Ministry of  
Natural  
Resources

Room 2303, Whitney Block  
Parliament Buildings  
Queen's Park  
Toronto, Ont.

*drill  
see file # 28 LACKNER  
TWP.*

Our file number  
Your file number

April 27, 1976

Gulf Minerals Canada Ltd.  
Suite 1400  
110 Yonge St.  
Toronto, Ontario  
M5C 1T4

Attn: Mr. W.H. Thompson

Dear Mr. Thompson:

In reference to our conversation of April 12 concerning the report by Mr. G.E. Parsons prepared for your company about its former property on the Lackner Lake alkalic rock intrusion I'm enclosing the original letter from Mr. Parsons indicating no objection for placing this document on public file. This letter will eliminate the concern expressed by yourself over the release of the report and any possible objections by Mr. Parsons and I will now proceed as agreed in our conversation to allow others to examine and copy the document as they wish.

I'm also taking the liberty of enclosing duplicate copies of some complete rock analysis that were done on a suite of samples collected along the shore of Nemegosenda Lake in 1970 during operation Chapleau.

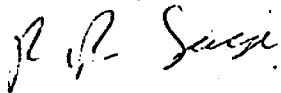
. . . 2

Page 2  
April 27, 1976  
Mr. W.H. Thompson

While these data are on Open File most people are unaware of their existence and they may be of benefit to you. The sample collected from the island in the centre of the lake has the best phosphate content and the area would warrant additional examination if it was not in such a inopportune spot. I hope you find these data of value to you.

Best of luck for the coming field season.

Sincerely yours,



R.P. Sage, Geologist  
Geological Branch  
Telephone 965-1697

RPS/am  
Encl.

G. E. PARSONS  
GEOLOGIST

TELEPHONE  
483-5155

20th April, 1976

136 CHATSWORTH DRIVE  
TORONTO 12  
ONTARIO  
M4R 1S2

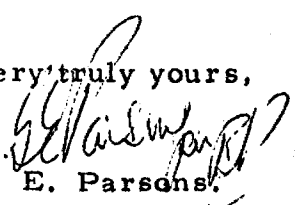
Mr. Ron Sage,  
Geologist,  
Ontario Department of Mines,  
Ministry of Natural Resources,  
Queens Park, Toronto, Ont.

Dear Ron,

This is to confirm that I have no objection to  
your placing in public file a report released to you by Gulf  
Minerals and entitled:

Geology Lackner Township  
Fire Tower Area (Scott Claims)  
Base Map 410/14S  
G. E. Parsons - January 7, 1955

Very truly yours,

  
G. E. Parsons.

GEP:BP



Ontario

Ministry of  
Natural  
Resources

Room 2303, Whitney Block  
Parliament Buildings  
Queen's Park, Toronto  
M7A 1W3

Our file number

Your file number

April 2, 1976

Gulf Minerals Canada Ltd.  
Suite 1400  
1100 Yonge Street  
Toronto, Ontario  
M5C 1T4

ATTENTION: Mr. W.H. Thompson

Dear Mr. Thompson:

Please find enclosed your file regarding your work on the Lackner Lake alkalic intrusion. I wish to thank you for letting me examine and copy its contents. The report and work will be of value to us. On the basis of our earlier correspondence and the fact that this is an old report and your company is no longer interested in the area, I assume it is of a nonconfidential nature and anyone desiring to read it can do so.

Thanks for permission to examine and sample the Nemogosenda core. I've had several contacts with INCO geologists and I was informed that a part of the core rack had collapsed making a portion of it unusable. That was the basis of my earlier statement to you that I understood part of the core as unusable.

I'll endeavour to limit sampling and understand your desire to keep the core intact. I'll forward you a list of samples taken.

Thanks against for your help.

Sincerely yours,

R.P. Sage, Geologist  
Precambrian Geology Section  
Geological Branch  
Telephone: 965-1697

# Gulf Minerals Canada Limited

SUITE 1400, 110 YONGE STREET, TORONTO, ONTARIO M5C 1T4. (416) 362-6825

F. C. PERRY  
Manager Exploration

March 19, 1976

R. P. Sage, Geologist  
Precambrian Geology Section  
Ministry of Natural Resources  
Province of Ontario  
Room 2303, Whitney Block  
Queen's Park  
Toronto, Ontario, M7A 1W3

Dear Mr. Sage:

Please find enclosed copies of drill logs of holes 208-55-6, 7 and 8, and 208-56-23, 28, 47 and 48. These are copies for your files and are from our Nemogosenda reports. With regard to sampling the core in our core shack, we would like to preserve this core in as complete a state as possible. The core has been examined recently and most is in a usable state. If your needs would be satisfied by obtaining small representative pieces of core from each lithologic unit, then by all means do so. There have been many studies done on this deposit, some of which have been published. We would appreciate obtaining the results of your work.

With regard to the Lackner Complex, Mr. Parsons has written papers, published by the ODM with locations of core holes. I believe Falconbridge did some drilling subsequent to that done by Dominion Gulf. I am enclosing a copy of a report from our files containing a map, which may be of some use to you. The report - GEOLOGY OF LACKNER TOWNSHIP, G. E. PARSONS, JANUARY 7, 1955, is from our files and I would ask you to return a copy of this letter as receipt. Please return the report to my attention when you have copied it.

Yours very truly,

*Walter H. Thompson*

W. H. Thompson

/hb  
encl.

Received Report - GEOLOGY OF LACKNER TOWNSHIP - FIRE TOWER AREA  
(SCOTT CLAIMS) G. E. PARSONS, JANUARY 7, 1955.

*R. P. Sage*

R. P. Sage, Geologist  
Precambrian Geology Section  
Ministry of Natural Resources



*Returned  
April 2, 1976*



Ontario

Ministry of  
Natural  
Resources

Room 2303, Whitney Block  
Queen's Park  
Toronto, Ontario  
M7A 1W3

Our file number

Your file number

March 9, 1976

Gulf Minerals Canada Ltd.  
1400, 110 Yonge Street  
Toronto, Ontario  
M5C 1T4

Attn: Mr. F.C. Perry, Manager Exploration

Dear Mr. Perry:

In reference to my earlier letter regarding your property at Nemogosenda Lake I have just recently located the thesis work done on the property and have made arrangements to obtain a copy of this document.

I would still desire receiving copies of the diamond drill logs noted in my previous letter so that I can complete my set of logs on this complex.

I understand that Mr. G.E. Parsons, consulting geologist has records of most of the work completed on this complex and if it would be more convenient to your company, I could contact Mr. Parsons for the desired diamond drill and geologic data upon receipt of your authorization to him for its release to us.

In regards to my request to sample the core at Nemogosenda I will be a little more specific in what I need. I plan to leave the core as intact as possible and remove several representative samples of each lithologic unit. The core samples will be no longer than 6 inches in length. I understand that part of

....2

Page 2

March 9, 1976

Gulf Minerals Canada Ltd.

the core rack has collapsed making some of the core unsuitable for sampling. I'll forward to your office a list of the samples I take upon completion of the sampling.

In regards to my request concerning data on the Lackner Lake complex, I'm still in need of it. Any help in locating any geological maps, diamond drill logs, or geological reports regarding the work by your company on this complex would be appreciated and of considerable benefit to our project. Is there a possibility that copies of the work on the Lackner Lake complex existing in your archives at Harmonville, Pennsylvania?

As I mentioned in my previous letter if a significant volume of data is available I would be willing to undertake the cost of duplication provided I can borrow the files. If you have any questions, write or call.

Sincerely yours



R.P. Sage, Geologist  
Precambrian Geology Section  
Geological Branch  
Telephone 416-965-1697

RPS/tmb





Ontario

Ministry of  
Natural  
Resources

Parliament Buildings  
Room 2303, Whitney Block  
Toronto, Ontario  
M7A 1W3

Our file number

Your file number

January 22, 1976

Gulf Minerals Canada Ltd.  
1300, 10 King Street E.  
Toronto, Ontario  
M5C 1C3

ATTENTION: Mr. F. C. Perry, Manager Exploration

Dear Mr. Perry:

The Ontario Division of Mines, Ministry of Natural Resources is currently undertaking a province-wide program of mapping and evaluating the alkali rock-carbonatite complexes of Ontario.

I've examined the data within our files concerning the Nemo-gosenda complex in which Gulf Minerals Canada Ltd. has an interest. While a considerable volume of data is presently within our files concerning this complex I'm interested in obtaining additional data pertinent to the geology of the complex. If you have data of a geologic nature which you could release I would appreciate hearing from you.

I understand the company completed at least 48 diamond drill holes on the complex in 1955-1956 and I have the logs of most of the holes with the exception of numbers 208-55-6,7,8; 208-56-23,28,47, and 48. Would it be possible to obtain copies of these logs?

If, hopefully, the core shack is still standing and the core is in reasonable order I would like permission to examine

.....2

Page 2  
January 22, 1976  
Mr. F. C. Perry

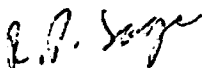
some sections of the core. I'm interested in obtaining material for thin section examination; complete rock chemistry, including trace elements and rare earths; and possibly an Rb-Sr isochron. Analytical data obtained on samples supplied by your company would be forwarded to you upon completion of the analysis.

I understand a thesis has been written on the complex? Could you give me a reference to this document?

In 1954, the former Dominion Gulf Company drilled at least two holes on the Lackner Lake complex. Would it be possible to get a copy of the grid map on which these holes are located so that I can more precisely locate the work? I would be interested in learning if the company has completed drilling on this complex in addition to the two holes of which I have records.

If a significant volume of data is available I would be willing to undertake the cost of duplication provided I can borrow the files. If you have any questions write or call.

Sincerely yours

  
R. P. Sage, Geologist  
Precambrian Geology Section  
Telephone 965-1697



Ontario

63-3370

Ministry of  
Natural  
Resources

Room 2303, Whitney Block  
Parliament Buildings  
Queen's Park, Toronto  
M7A 1W3

Our file number

Your file number

April 2, 1976

Gulf Minerals Canada Ltd.  
Suite 1400  
1100 Yonge Street  
Toronto, Ontario  
M5C 1T4

Geological Branch ODM  
ASSESSMENT FILES  
RESEARCH OFFICE

APR 2 1976

RECEIVED

ATTENTION: Mr. W.H. Thompson

Dear Mr. Thompson:

Please find enclosed your file regarding your work on the Lackner Lake alkalic intrusion. I wish to thank you for letting me examine and copy its contents. The report and work will be of value to us. On the basis of our earlier correspondence and the fact that this is an old report and your company is no longer interested in the area, I assume it is of a nonconfidential nature and anyone desiring to read it can do so.

Thanks for permission to examine and sample the Nemogosenda core. I've had several contacts with INCO geologists and I was informed that a part of the core rack had collapsed making a portion of it unusable. That was the basis of my earlier statement to you that I understood part of the core as unusable.

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Thanks against for your help.

Sincerely yours,

R.P. Sage, Geologist  
Precambrian Geology Section  
Geological Branch  
Telephone: 965-1697

# Gulf Minerals Canada Limited

SUITE 1400, 110 YONGE STREET, TORONTO, ONTARIO M5C 1T4. (416) 362-6825

F. C. PERRY  
Manager Exploration

March 19, 1976

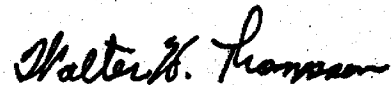
R. P. Sage, Geologist  
Precambrian Geology Section  
Ministry of Natural Resources  
Province of Ontario  
Room 2303, Whitney Block  
Queen's Park  
Toronto, Ontario, M7A 1W3

Dear Mr. Sage:

Please find enclosed copies of drill logs of holes 208-55-6, 7 and 8, and 208-56-23, 28, 47 and 48. These are copies for your files and are from our Nemogosenda reports. With regard to sampling the core in our core shack, we would like to preserve this core in as complete a state as possible. The core has been examined recently and most is in a usable state. If your needs would be satisfied by obtaining small representative pieces of core from each lithologic unit, then by all means do so. There have been many studies done on this deposit, some of which have been published. We would appreciate obtaining the results of your work.

With regard to the Lackner Complex, Mr. Parsons has written papers, published by the ODM with locations of core holes. I believe Falconbridge did some drilling subsequent to that done by Dominion Gulf. I am enclosing a copy of a report from our files containing a map, which may be of some use to you. The report - GEOLOGY OF LACKNER TOWNSHIP, G. E. PARSONS, JANUARY 7, 1955, is from our files and I would ask you to return a copy of this letter as receipt. Please return the report to my attention when you have copied it.

Yours very truly,



W. H. Thompson

/hb  
encl.

Received Report - GEOLOGY OF LACKNER TOWNSHIP - FIRE TOWER AREA  
(SCOTT CLAIMS) G. E. PARSONS, JANUARY 7, 1955.

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R. P. Sage, Geologist  
Precambrian Geology Section  
Ministry of Natural Resources



6555  
S. 59164  
JAN 1959

See Duplis  
16 Dec 1957  
17 Dec 1957  
18 Dec 1957

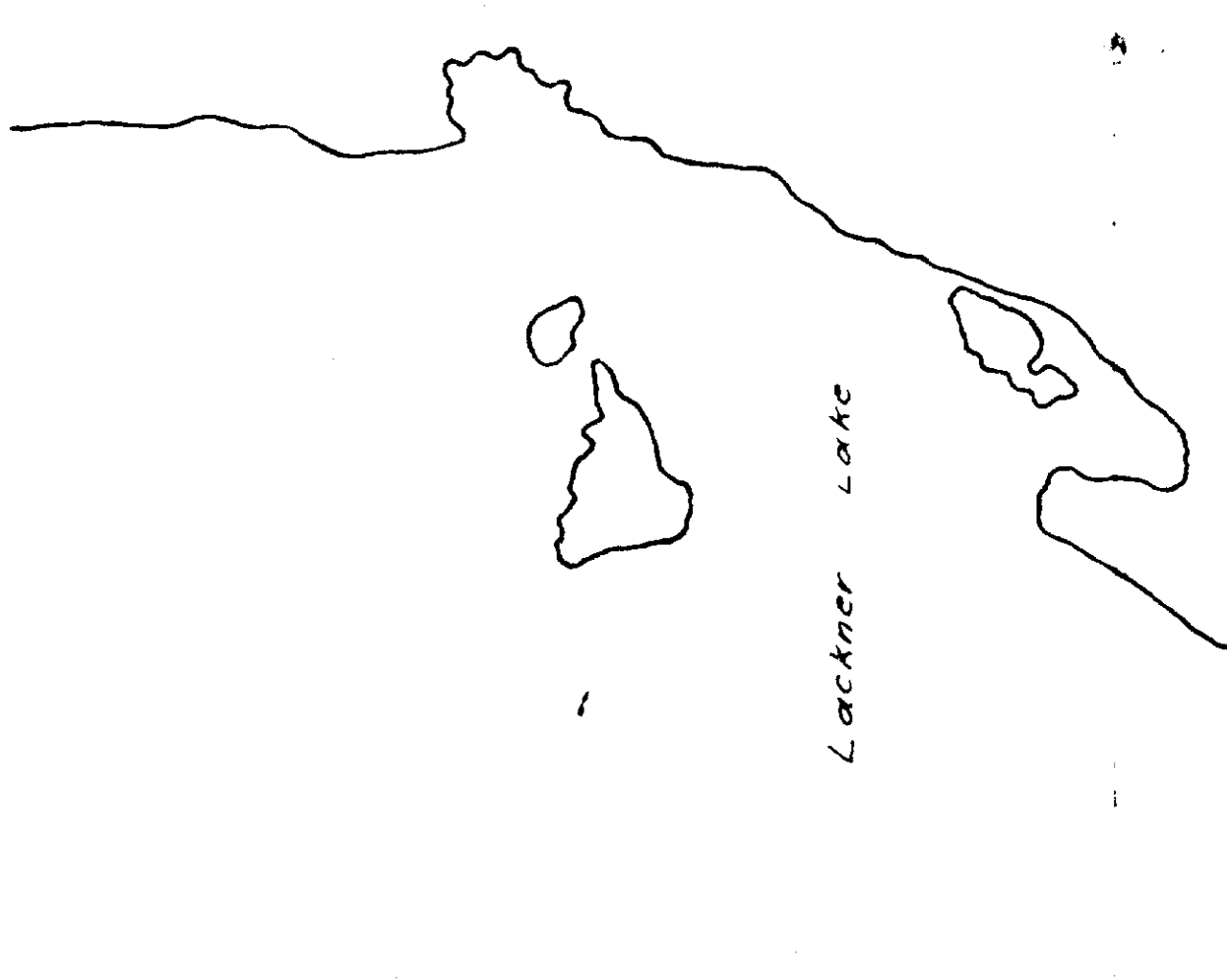
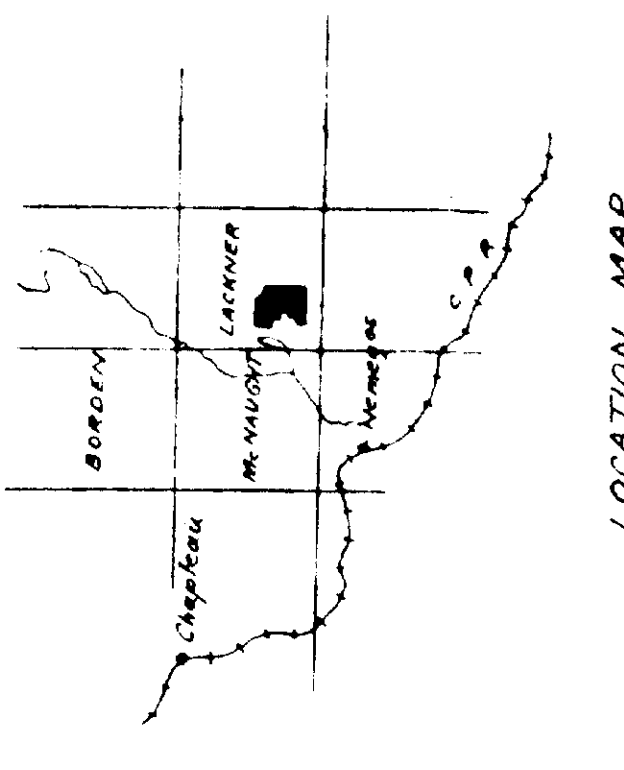
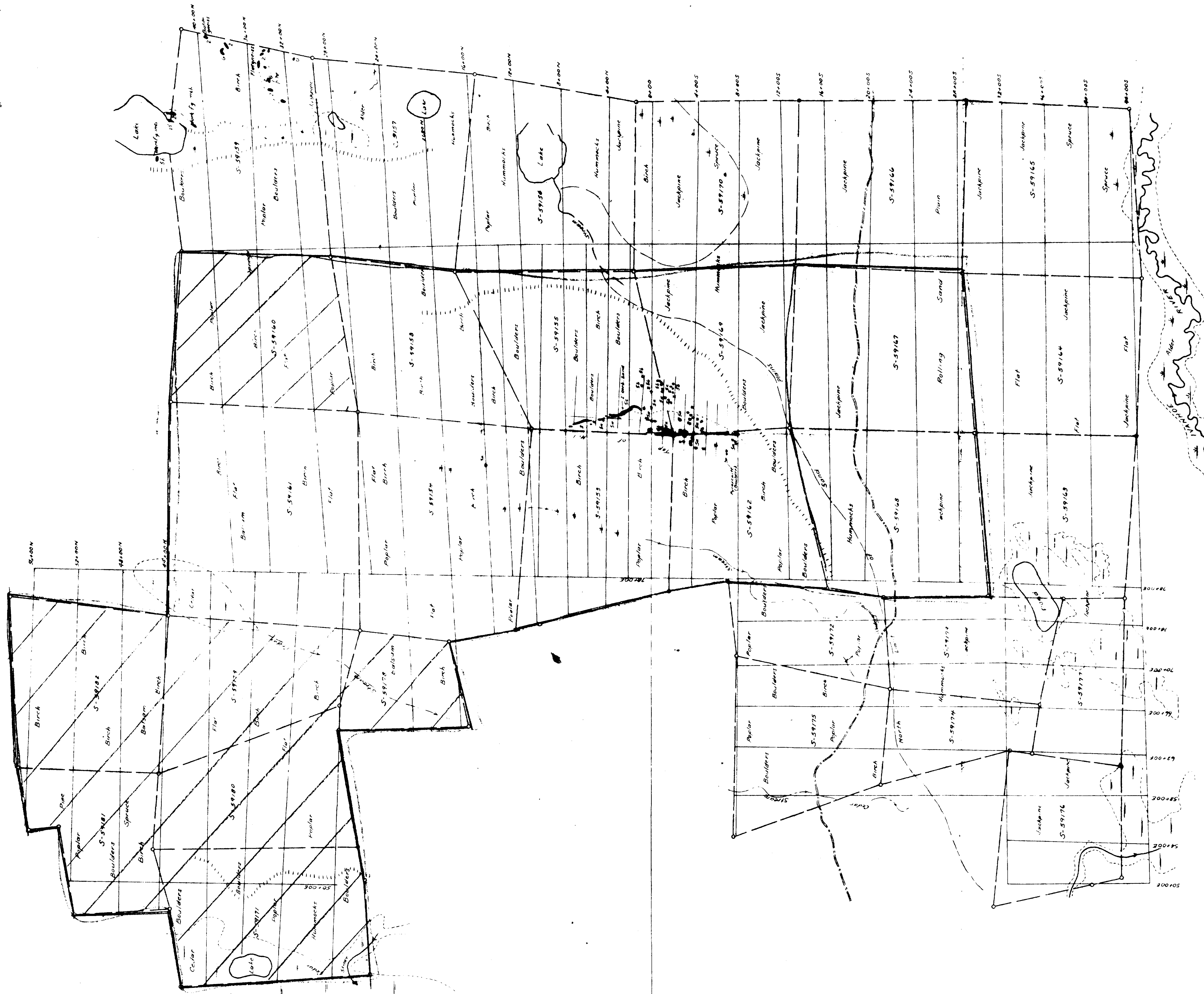
Note: Some small outcrops shown to occur in blocks  
nearby to boundary.

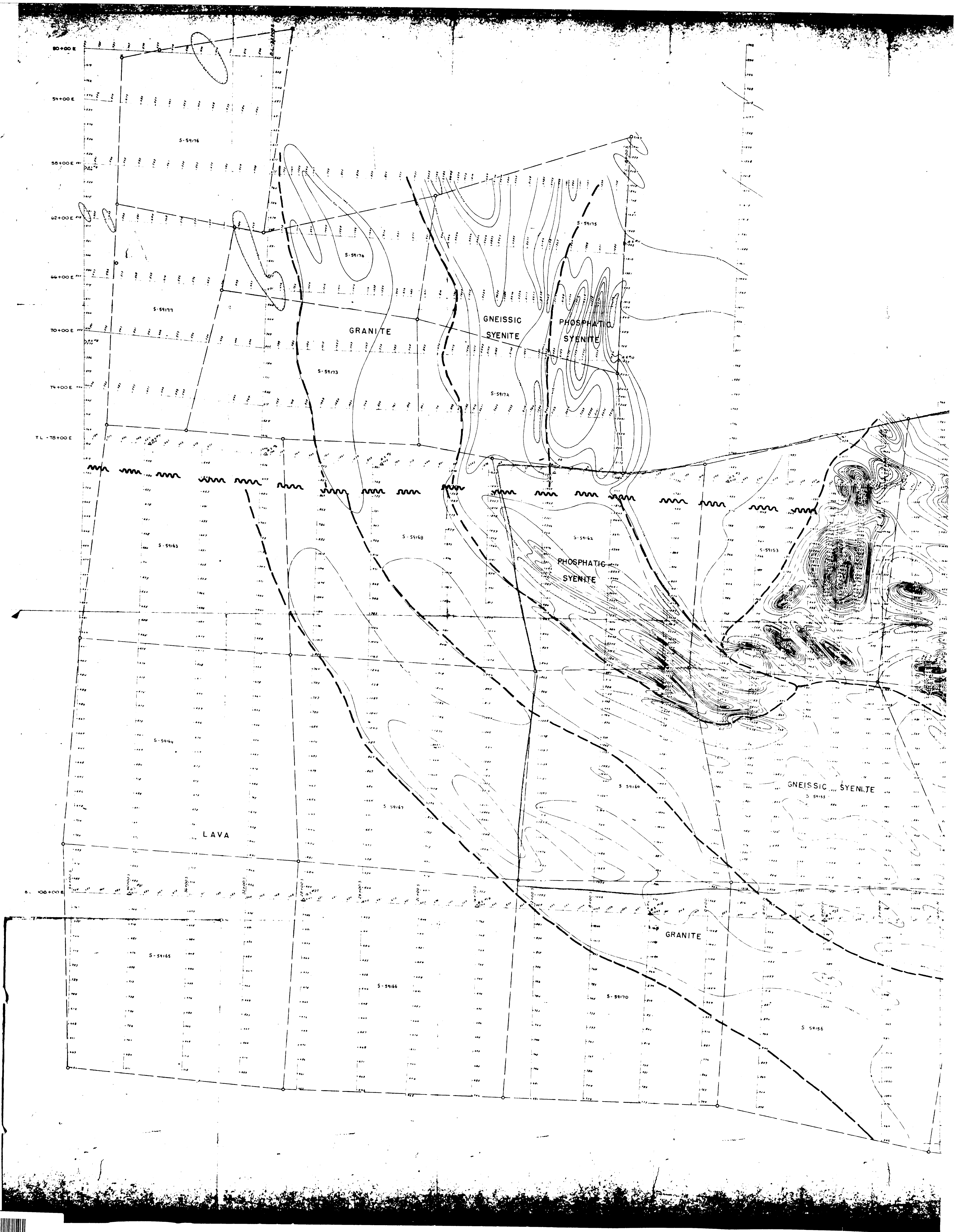
**LEGEND**

- Granite
- Spindle Rock or Amalite
- Sandstone
- Sandstone with shale
- Sandstone with shale and siltstone
- Shale
- Shale with siltstone
- Shale with sandstone
- Shale with sandstone and siltstone
- Shale with sandstone and siltstone and mica
- Shale with sandstone and siltstone and mica and iron pyrite
- Shale with sandstone and siltstone and mica and iron pyrite and fossiliferous
- Shale with sandstone and siltstone and mica and iron pyrite and fossiliferous and fossiliferous

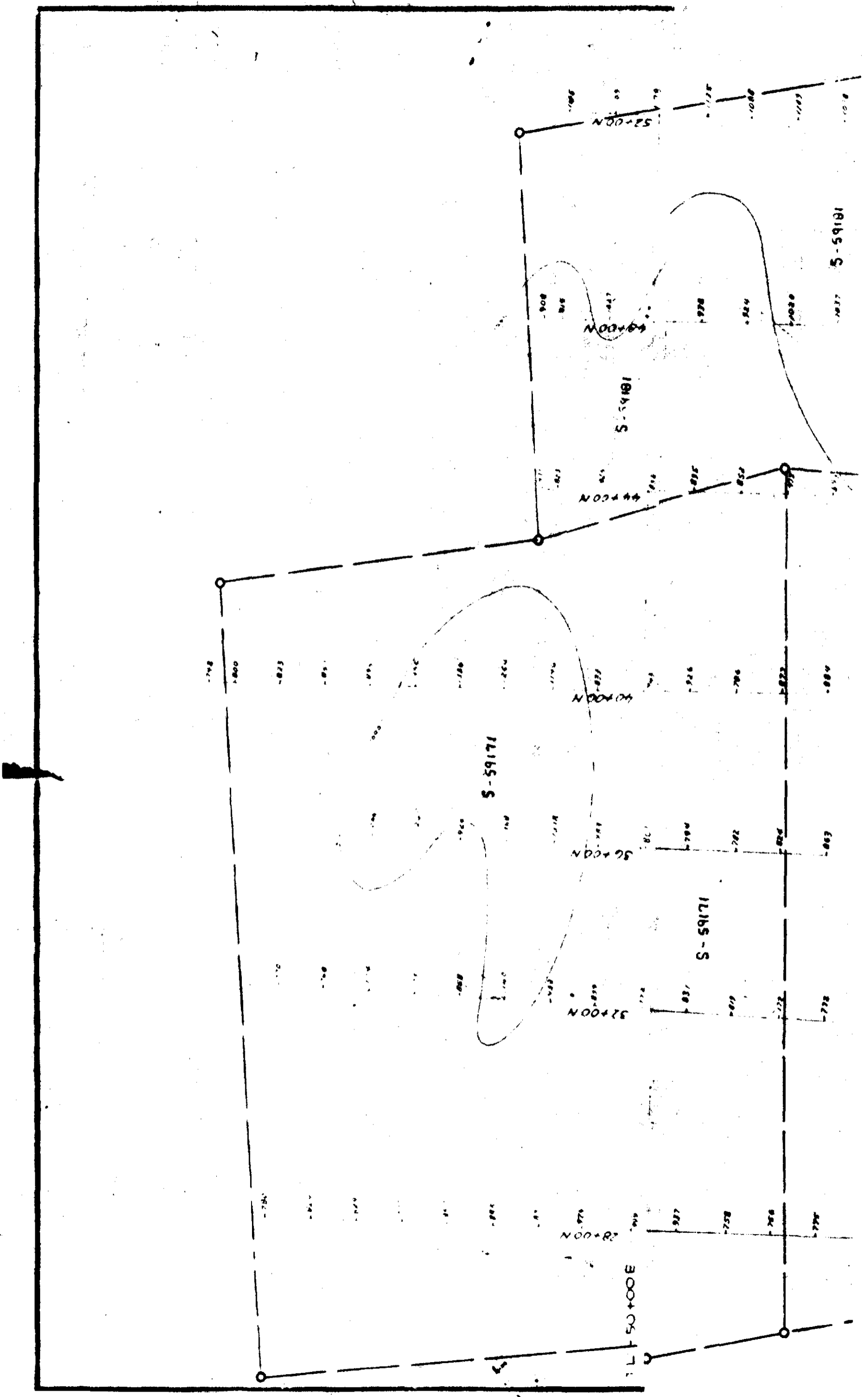
**SYMBOLS**

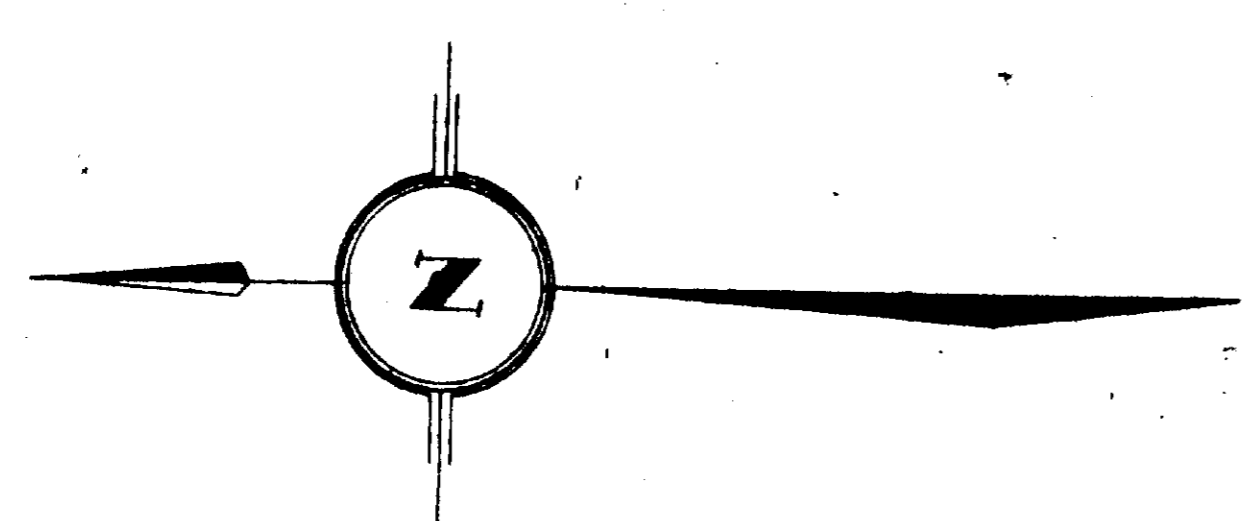
- Strike slip
- Normal
- Thrust
- Anticline
- Syncline
- Unconformity
- Exposure boundary
- Stratigraphic boundary
- Geological boundary
- Claim boundary
- Property boundary
- Right of way
- Old road
- Stream
- Well
- Specimen
- Well casing
- Well head
- Well platform
- Well foundation
- Well



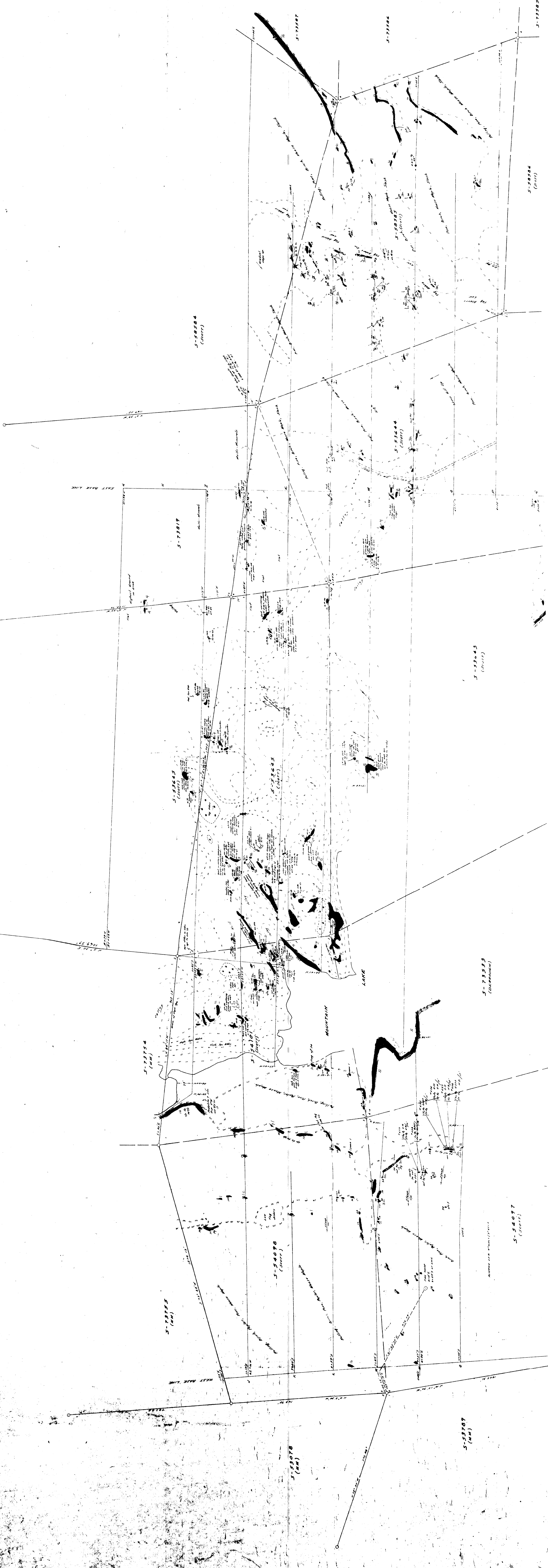


Dominion Gulf  
N. EXT. To Map





- LEGEND**
- 1 **NEIGHBORING TERRITORY**  
Area immediately adjacent to the territory being mapped.
  - 2 **ADJACENT TERRITORY - FOREIGN**  
Area immediately adjacent to the territory being mapped, but outside the limits of the territory being mapped.
  - 3 **ADJACENT TERRITORY - DOMESTIC**  
Area immediately adjacent to the territory being mapped, but within the limits of the territory being mapped.
  - 4 **ADJACENT TERRITORY - UNDEVELOPED**  
Area immediately adjacent to the territory being mapped, but within the limits of the territory being mapped, and not yet developed.
  - 5 **ADJACENT TERRITORY - UNDEVELOPED - FOREIGN**  
Area immediately adjacent to the territory being mapped, but outside the limits of the territory being mapped, and not yet developed.
- UNDEVELOPED AREAS**  
Areas not yet developed.



5-50284  
(cont)

5-53819

5-53443  
(cont)

5-53443  
(cont)

5-53444  
(cont)

5-53443  
(cont)

5-53533  
(cont)

5-53754  
(cont)

5-54098  
(cont)

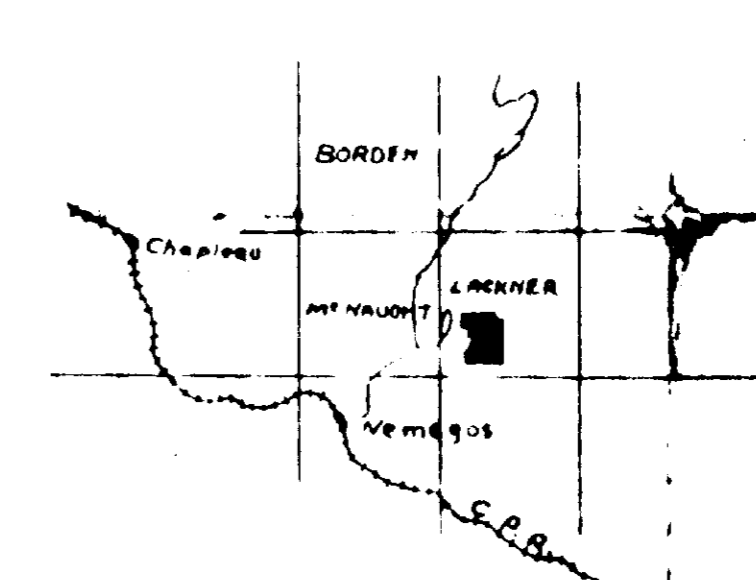
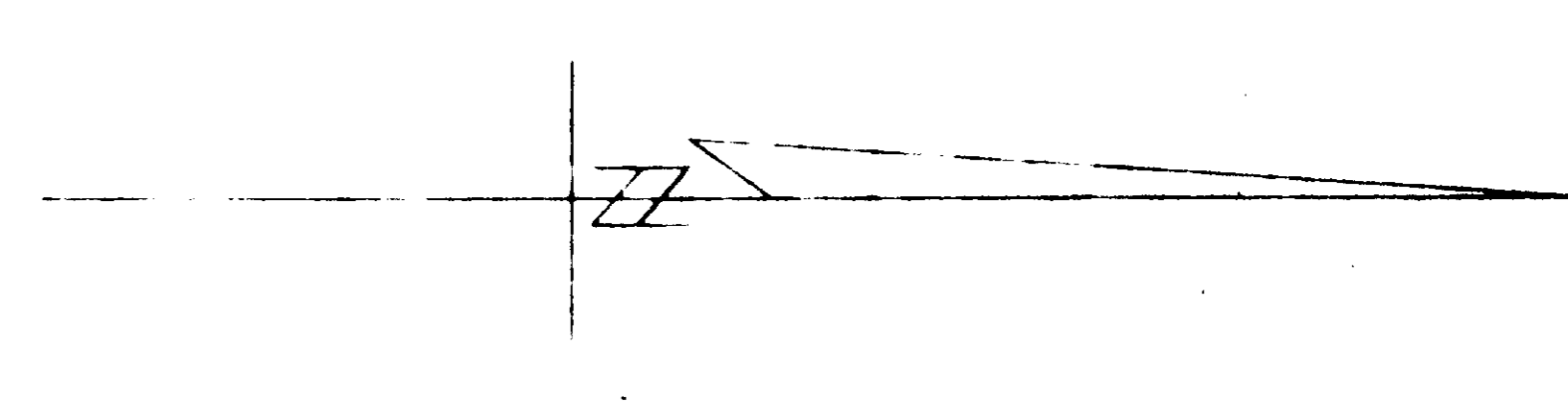
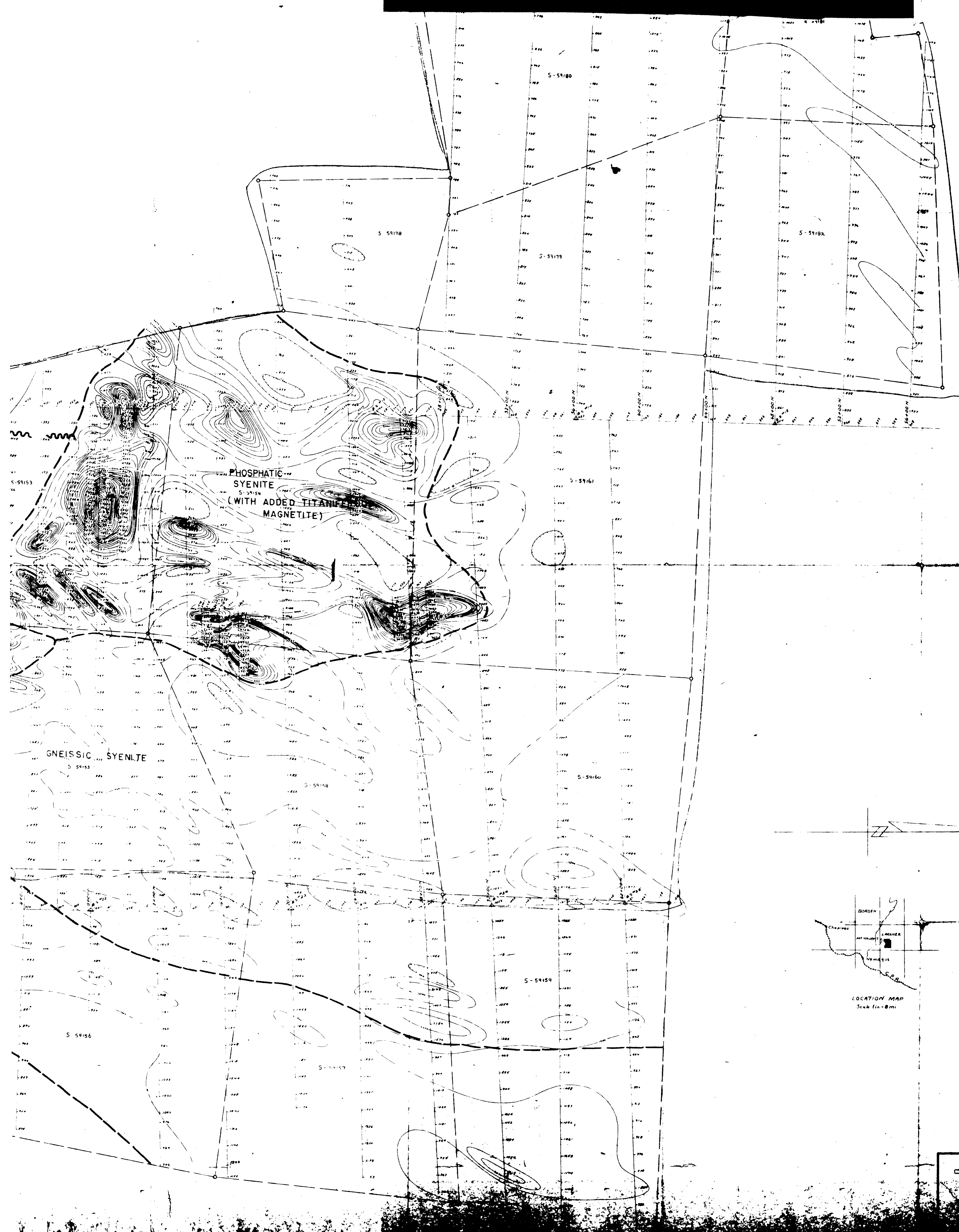
5-54097  
(cont)

5-53789  
(cont)

5-50284  
(cont)

5-53583





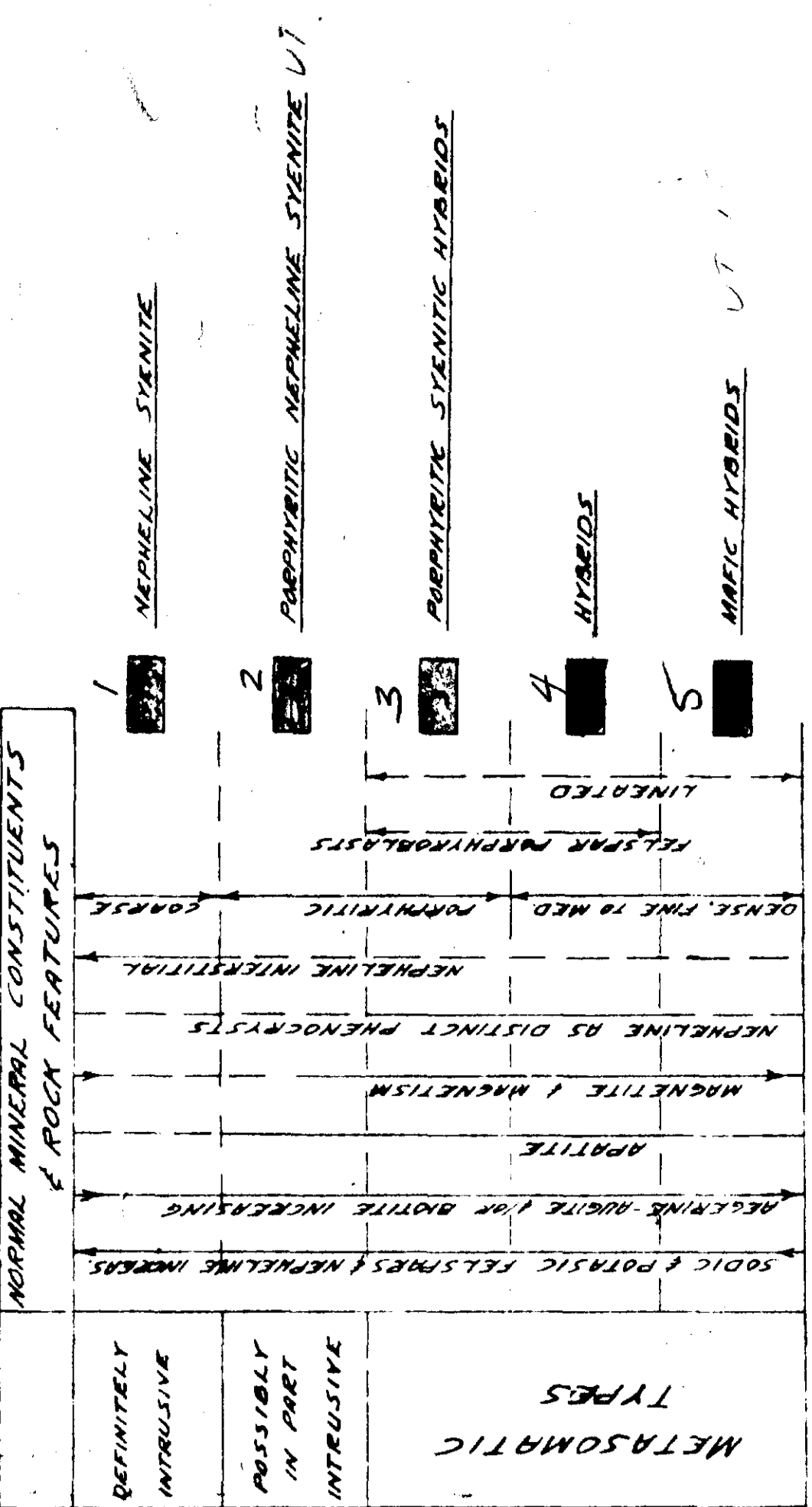
**LEGEND**  
 --- CONTACT  
 ~~~~~ FAULT

*See Dupls  
 to this Contact  
 APP 1995*

63-333  
 DOMINION QUARRY COMPANY

- 1** **ABNORMAL MINERAL ENRICHMENT**  
 All mineral grains larger than 0.25 mm  
 are analyzed and reported in form of  
 weight percent. Rocks with significant  
 enrichment are marked with a star.
- 2** **ABNORMAL MINERAL ENRICHMENT**  
 All mineral grains larger than 0.25 mm  
 are analyzed and reported in form of  
 weight percent. Rocks with significant  
 enrichment are marked with a star.
- 3** **ABNORMAL MINERAL ENRICHMENT**  
 All mineral grains larger than 0.25 mm  
 are analyzed and reported in form of  
 weight percent. Rocks with significant  
 enrichment are marked with a star.
- 4** **METASOMATISM**  
 Metasomatism is defined as a change  
 in the composition of a rock, or  
 in the relative proportions of its  
 constituent minerals, due to the  
 addition or subtraction of matter,  
 or to a change in the physical  
 conditions of the rock, or to a  
 combination of these factors.  
 Metasomatism is marked with a  
 star.
- 5** **METASOMATISM**  
 Metasomatism is defined as a change  
 in the composition of a rock, or  
 in the relative proportions of its  
 constituent minerals, due to the  
 addition or subtraction of matter,  
 or to a change in the physical  
 conditions of the rock, or to a  
 combination of these factors.  
 Metasomatism is marked with a  
 star.

**MUSCOWITIC LAMINAE**  
 Muscovitic laminae are defined as  
 thin, alternating layers of  
 muscovite and quartz, or  
 muscovite and feldspar, or  
 muscovite and other minerals,  
 which are characteristic of  
 certain metamorphic rocks.  
 Muscovitic laminae are marked  
 with a star.



**NORMAL MINERAL CONSTITUENTS & ROCKY FEATURES**

- 1 **MUSCOWITIC LAMINAE**
- 2 **ABNORMAL MINERAL ENRICHMENT** U
- 3 **ABNORMAL MINERAL ENRICHMENT**
- 4 **METASOMATISM**
- 5 **METASOMATISM** U

**METASOMATIC TYPES**

- 1 **Quartzite**
- 2 **Schist**
- 3 **Gneiss**
- 4 **Amphibolite**
- 5 **Marble**
- 6 **Quartzite**
- 7 **Schist**
- 8 **Gneiss**
- 9 **Amphibolite**
- 10 **Marble**
- 11 **Quartzite**
- 12 **Schist**
- 13 **Gneiss**
- 14 **Amphibolite**
- 15 **Marble**

**DOMINION GEOLOGICAL SURVEY**  
**LACAPPAE TOWNSHIP**  
 (PART OF THE 1000 ACRES)  
 SHEET 1 OF 2  
 SCALE - 1" = 400'

