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### INTRODUCTION

Ten contiguous claims, located in Lots 10 and 11, Conc. III, Pense township, Timiskaming Mining Division are held by the Dominion Gulf Company. Five of these claims, T-34054 to T-34058 were staked in July, 1953, while the other five, T-34284 to T-34288 were staked in October, 1953. The claim group occupies all of Lots 10 and 11, Conc. III, Pense township except the south half of the north half of Lot 11 and the southeast quarter of the north half of Lot 10.

The claim group was staked to cover several old sulphide showings occurring in graphitic schists near contacts between Keewatin sediments and basic to ultrabasic intrusives of Haileyburian age. Pyrrhotite is the most prominent sulphide mineral found, with pyrite next in abundance. Minor amounts of chalcopyrite and sphalerite are also found. Sub-commercial values of nickel, copper and zinc have been obtained in assays. The sulphide zones appear to be quite narrow and are always found associated with the graphitic schist, amphibolite or amphibolite schist.

Because pyrrhotite is second only to magnetite in its ability to become magnetized, it was believed that a ground magnetometer survey could outline the sulphide occurrences thus eliminating large portions of unfavourable ground from further prospecting. Accordingly a ground magnetometer survey of the property was carried out during the months of June and July, 1954.

An Askania, Schmidt-type magnetic balance, having a sensitivity of 20 gammas per scale division was used on the survey. Basic coverage consisted of stations 50 feet apart on picket lines 200 feet apart on the 6 southern claims, and 50 foot stations on 400 foot picket lines on the 4 northern claims. In all, a total of 1912 stations were observed on 18.4 miles of picket line.

The magnetic data were observed and reduced by a Dominion Gulf Company magnetometer crew under the direction of R. Hodgins. On completion of the survey, the basic field data were transmitted to the Toronto office of the Dominion Gulf

Company for further processing and interpretation. These data, together with isomagnetic contours and interpretation are presented on a map at a scale of 1 inch equals 200 feet accompanying this report.

### SUMMARY

A ground magnetometer survey was carried out over a group of 10 claims in Fense township. The purpose of the survey was to outline known occurrences of sulphide-bearing sediments, in which pyrrhotite, a magnetic mineral, formed a major constituent. Before the survey began, there was some doubt as to whether the magnetic survey could distinguish between the sulphide occurrences and an intrusive peridotite body. The results of this survey clearly show the difference between the two types of anomalies, and permit identification of the pyrrhotite anomalies with a reasonable degree of assurance.

Further work consisting of stripping, trenching and sampling, on those anomalies interpreted as being caused by pyrrhotite mineralization, has been recommended.

### INTERPRETATION

Two definite varieties of magnetic anomalies are indicated by this survey. The first type of anomaly is best described as a sharp, strong, local effect, rarely exceeding 50 feet in width, and usually less than 600 feet in strike length. These anomalies often exceed 5000 gammas above base intensity and often have negative anomalies associated with them on their northern flanks. Two typical anomalies of this type may be seen on picket lines 28+00W and 30+00W near their junction with Tie Line #1. Four other anomalies of the same type, although less well defined due to lack of picket line control, may be seen in the northern tier of claims, on picket lines 8+00W, 12+00W and 16+00W near Tie Line #2, on 16+00W and 20+00W, 200 feet south of Base Line #2, and on picket line 32+00W, 100 feet south of Base Line #2. Three of the anomalies described above are directly associated with sulphide

mineralization in either amphibolite, amphibolite schist or graphitic schist. No rock has been observed on the other anomalies in this group.

The second type of anomaly occupies the central portion of the 6 southernmost claims. It appears to have a width of about 1400 feet, and extends beyond both the eastern and western boundaries of the claim group in the strike direction. A secondary nose of the same type extends northeasterly from the northwestern corner of the 6 southernmost claims, and envelopes the course of Otter Creek up to the centre of the northernmost tier of claims.

This type of anomaly may be described as broad and generally uniform in character. Although the magnetic relief associated with it may reach as high as 3000 gammas, over most of the area the maximum relief is less than 2000 gammas. The causative body appears to be intrusive by nature, perhaps having sloping contacts on both the north and south edges. Along the Interprovincial Boundary, this type of anomaly has been directly associated with outcrops of serpentized peridotite. A sample of similar rock taken from a short distance to the east, in Montreuil township contained 1/8 inch vein of asbestos fibre.

From reconnaissance geological evidence it appears that the geological succession consists of the following formations.

TABLE OF FORMATIONS

Matachewan	Quartz Diabase
Algoman	Aplite Granite Syenite Diorite
Haileyburian	Amphibolite Pyroxenite Peridotite (serpentine)
Keewatin	Graywacke (mica schist) Graphitic schist.

A total of 55 hand specimens of the various rock types, supposedly typical of the outcropping rocks, were tested for magnetic effect by checking their reaction on a magnetized needle. Of the 55 samples, 18 gave a visible reaction to the pivoted needle. Of the 18 samples which were found to have magnetic material present, 10 were caused by visible sulphides, while 8 were due to fine grained disseminated magnetite. A table showing the rock types tested, is given below:

ROCK MAGNETISM

<u>Rock Type</u>	<u>No of Samples Tested</u>	<u>No. Exhibiting Magnetism</u>	<u>Cause of Magnetism</u>	
			<u>Sulphides</u>	<u>Magnetite</u>
Aplite	1	1	1	0
Granite	6	0	0	0
Syenite	1	0	0	0
Diorite	6	0	0	0
Amphibolite	11	4	3	1
Amphibolite Schist	3	3	3	0
Pyroxenite	2	0	0	0
Peridotite (serpentinized)	6	5	0	5
Peridotite (carbonated)	3	2	0	2
Greywacke Schist	12	0	0	0
Graphitic Schist	<u>4</u>	<u>3</u>	<u>3</u>	<u>0</u>
TOTAL	55	18	10	8

From the above table, it may easily be seen that the sulphide mineralization (pyrrhotite) is responsible for the magnetic attraction exhibited by the graphitic schist, the amphibolite schist, the aplite and in 3 out of 4 cases, the amphibolite. The contained magnetite is responsible for the magnetic attraction exhibited by the peridotite suite.

Thus, by comparing the rock types found in reconnaissance geological mapping, with the magnetic anomaly map, it should be possible to predict which anomalies are indicative of sulphide mineralization, and which are indicative of ultrabasic intrusives. On the accompanying map, anomalies which are considered to be representative of pyrrhotite mineralization rather than magnetite are definitely marked, with the exception of a large anomalous area in the northern tier of claims. This area is marked "Pyrrhotite in Graphitic Schist and Greywacke." The individual pyrrhotite

anomalies have not been outlined, as they are elsewhere, due to the fact that there is insufficient magnetic coverage to define the anomalies. It is believed that outlining the anomalies as they are contoured from the available data would be completely misleading. From geological evidence the strike of the formations in this area is North 45° West. The indicated magnetic trend from the present data is about North 80° West. It will be noted however that the long axis of the anomalous zone follows the geological trend quite closely.

As may be deduced from the tests made on the various samples it is impossible to differentiate between the amphibolite and the greywacke. Only those samples of these rocks containing pyrrhotite show any magnetic effect, with one exception.

It is also apparent from the field data, and from the samples that the serpentized peridotite is more highly magnetic than any other rock type present, omitting of course, the mineralized zones, which cannot be classified as rock types.

Two Matashewan diabase dikes have been mapped during reconnaissance field work. These are indicated by minor anomalies on the east-west traverses only.

The structural relationships between the various rock types are quite puzzling. The oldest rocks in the area are the greywacke and the graphitic schist. In the southern part of the claim group, these sediments strike easterly. In the northern tier of claims however the sediments strike northeasterly west of Otter creek, and northwesterly east of Otter creek. This suggests major folding with an axis running more or less parallel to the general trend of Otter creek. It is interesting to note that the largest concentration of sulphide mineralization is apparently on the flanks of this fold.

The peridotite has intruded the sediments and is generally concordant with the sediments, even in the vicinity of Otter creek, where there is an indication that the peridotite follows along the axial plane of the fold. While there are

sharp contacts between the peridotite and the amphibolite, it would appear that the amphibolite is either an early or a border phase of the peridotite, since it occurs outside of the peridotite in all cases. Undoubtedly the ultrabasic intrusive is of the multiple variety. There is evidence that some later diorite has intruded the the peridotite, along the same line of weakness.

No faulting can be determined from the magnetic data. Topographically, a major fault has been suggested along the southern contact of the peridotite intrusive. However this contact appears to be too ragged from the magnetic evidence to be considered a fault contact.

#### CONCLUSIONS

The purpose of this survey was to determine the extent of the pyrrhotite mineralisation on the property, and to outline zones for intensive prospecting. Any further information obtained was subordinate to this end. In this respect the survey has been entirely successful. The sulphide zones have been clearly marked on the accompanying map. From the magnetic evidence, it is suggested that the sulphide occurrences are lens-like, and of quite small dimensions, although several lenses may be found in the same geological horizon. Overburden is apparently quite shallow over most of the sulphide bodies, and it is believed that most of the occurrences could be checked by intensive stripping and trenching. Whether the mineralisation is of commercial value or not, will depend on the amount of chalcopyrite and sphalerite associated with the pyrrhotite. The magnetic data are of no use in determining this aspect of the problem.

Although some 1/8 inch asbestos fibre has been found in the serpentinized peridotite, it is extremely doubtful that asbestos in commercial grade occurs on the property. In general, peridotite bodies containing commercial or near-commercial fibre are highly magnetic, due to the emergence of seams of magnetite genetically related to the formation of the asbestos fibre veins.

It is therefore recommended that further work on the property, consisting

of examination of the interpreted sulphide occurrences, by surface investigations, stripping and trenching be carried out. Further exploration will depend on assay results obtained from surface sampling.

Consideration should be given to acquiring the two claims in the middle of the present claim group, and the south half of the south half of Lot 10, Conc. IV, in order to cover the ends of the sulphide-bearing horizon.

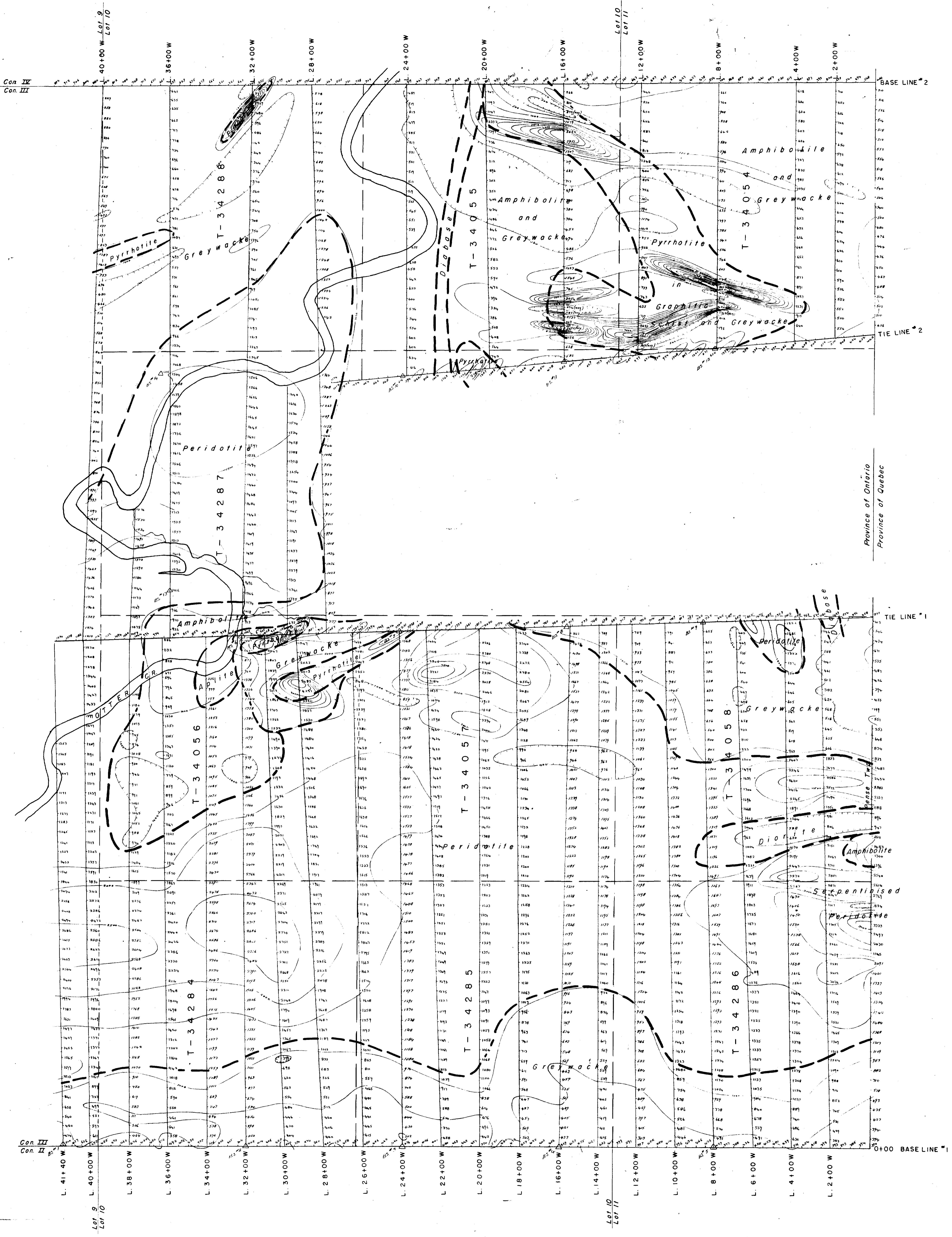
REFERENCES

1. Dominion Gulf Company Geological Report by C.O. MacIntosh "Reconnaissance Geology - Pense township including Pense I, Base Map 314/135, Cobalt-Karleton Area, Ontario" Dated January 13, 1954, with accompanying maps.

ATTACHMENTS

1. Dominion Gulf Company Map "Ground Magnetometer Survey, Pense I, Pense township, Province of Ontario" scale 1 inch equals 200 feet, dated July 5, 1954.

J. H. Ratcliffe



Province of Ontario  
Province of Quebec

--- CONTACT

DOMINION GULF COMPANY  
GROUND MAGNETOMETER SURVEY  
PENSE I  
PENSE TOWNSHIP  
PROVINCE OF ONTARIO  
Scale: 1" = 200' Date: July 5, 1954  
Contour Interval - 500 Gammas.

