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Dominion Gulf Company  
Geological Report  
Matheson Township Claims, Group I  
Porcupine Mining Division, Ontario



42A10SW0095 63.387 MATHESON

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1. LOCATION, ACCESS

The claims in this group are located in Lots 5,7,8,9,10,11 and 12, Concessions 5 and 6, Matheson Township.

They are readily accessible from a settlers road that extends north from Dugwal and a branching road, to the west, that follows the north boundary of Concession 4. The claims in the west part of the group are also accessible from the Porcupine River, which is navigable by canoe above the Ontario Northland Railway.

2. OWNERSHIP, CLAIM NUMBERS

The claims are owned by the Dominion Gulf Company, 203 Bay Street, Toronto, Ontario.

There are thirty one claims numbered as follows: P-37136, P-37137, P-37138, P-37139, P-37140, P-37141, P-37142, P-37143, P-37144, P-37145, P-37146, P-37147, P-37148, P-37149, P-37150, P-37151, P-37152, P-37153, P-37154, P-37155, P-37156, P-37157, P-37158, P-37159, P-37160, P-37161, P-37162, P-37163, P-37164, P-37165, and P-37166.

3. SURVEY PERSONNEL, DATES

The claims were traversed by T. Parks and P. Nash between July 9th and July 19th, 1952. Ten days were spent on the claims by C. G. MacIntosh between September 15th and October 11, 1952. Initial survey control, during the search for outcrops was based on aerial photographs and township survey lines. Later, picket lines were cut at 400 ft. intervals.

4. SURVEY DATA

A thorough search failed to reveal any rock exposures within the claim boundaries.

The relief of the terrain is either flat or gently rolling.

Most of the area covered by the claims in Lots 8 and 9 is occupied by spruce and alder swamp. The remainder of the claim areas are occupied chiefly by low broad ridges of gravel or clay.

The probable rock types and structure occurring within the claim group area, may be deduced from observations of outlying rock exposures by Dominion Gulf Company personnel during earlier reconnaissance surveys.

An outcrop area of highly carbonatized lava lies immediately south of No. 3 post, claim P-37159.

Stratified greywacke, in the north part of Lot 6, Concession 6, Matheson Township, dips south at  $85^{\circ}$  and the tops of the beds face north.

Stratified greywacke, and slate in Lot 2, Concession 4, Hoyle Township, dips steeply north and the tops of the beds face south.

An outcrop of quartz porphyry occurs on the East show of Frederick House River, in Lot 1, Concession 5, Matheson Township.

From these observations it may be inferred that an anti-clinal axis, striking approximately east, lies within or close to the claim group and that the rock formations along this axis are Keewatin volcanics.

Intense carbonatization of the lava outcrop in Lot 5, Concession 5, Matheson Township, indicates probable shearing, followed by hydrothermal activity. Also, the carbonatization may be related to acid intrusive bodies, similar to the quartz porphyry outcropping in Lot 1, Concession 5, Matheson Township.

All of the outcrops mentioned above, with the exception of the carbonatized exposure in Lot 5, Concession 5, Matheson Township, are shown on Ontario Department of Mines Map 48n.

"C. G. MacIntosh"  
December 18, 1952.

Dominion Gulf Company  
Interpretation of Ground Magnetometer Survey  
Matheson Township Claims  
Province of Ontario.



42A10SW0095 63.387 MATHESON

February 10, 1953.

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INTRODUCTION

Thirty-one claims in Matheson Township, Porcupine Mining Division, Province of Ontario, were staked for the Dominion Gulf Company, in the month of April, 1952. Interest in the area was derived from a magnetic anomaly outlined by an aeromagnetometer survey. This anomaly, located 4 miles north and 2 miles east of the easternmost producing mines in the Porcupine gold mining camp, was interpreted from the aeromagnetic data, as being indicative of an alteration zone along the north side of the Pipestone Fault, a basic to ultrabasic intrusive, or an anticlinal axis in folded Keewatin lavas. Of the three alternative interpretations the last is preferable from an economic viewpoint, due to its similarity with the conditions present in the Porcupine camp. Regional geological investigations have provided a few clues which are consistent with the anticlinal theory. However the area is heavily drift-covered, and rock outcrops very scarce. On the claim group proper, no rock exposures have been found. Immediately south of the easternmost claim, an outcrop was observed. The rock was so highly carbonatized that its origin could not be deduced.

Based on the interpretation of the aeromagnetic data, and the available geological evidence, further investigation was believed warranted. Since no rock exposures occurred on the property a geophysical program followed by diamond drilling if interesting conditions were encountered was proposed. A ground magnetometer survey was the obvious selection for the geophysical program since a magnetic discontinuity was known to exist.

An Askania Schmidt-type magnetic balance having a sensitivity of about 23 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 anomalous zones intermediate stations were added. In all, a total of 1,761 stations were observed on 32.8 miles of picket line.

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 400 feet, accompanying this report.

SUMMARY

The magnetic anomaly has been outlined in detail. Two possible causes of the anomaly still exist. Of these, a cross-folded anticlinal

structure in an intermediate to basic lava flow is preferred. However the possibility of a multiple basic to ultrabasic intrusive has not been entirely negated. Diamond drilling to determine the cause of the anomaly is warranted.

### INTERPRETATION

In general, the claim group is characterized by a magnetic anomaly trending N 72° W, cut off at the eastern end by a fault, but open on the west. Surrounding this anomaly, the magnetic fields grade off to zones of rather uniform magnetic intensity. The minor trend directions indicated in the flanking zones do not follow the major axis of the magnetic anomaly but appear to diverge from it. In the western part of the claims group the minor trend direction appears to be about N 45° W, while in the eastern section the trends vary from N 70° W to E-W to N 45° E.

The major magnetic anomaly is of somewhat unusual composition. As it approaches its eastern termination, it tapers considerably and reaches a minimum width at its sharp eastern termination. Profiles across the anomaly indicate that it is a multiple anomaly, being composed of two superimposed anomalies. Throughout the entire length of the major anomaly, the northern segment is the strongest, the southern segment being superimposed to form a shoulder on the northern anomaly. The resultant magnetic anomaly cannot be interpreted by conventional potential theory due to the superposition, and also to the apparent attitude of the causative bodies. The broad flanks of the resultant anomaly suggest that the north segment dips north and that the south segment dips south. Alternatively, the same effect could be caused by alteration grading off from the source of the anomaly to the enclosing rocks.

Near the west end of the major anomaly, a flexure in the magnetic axis is indicated. On the eastern portion however, the magnetic axis appears quite uniform. In claims P-37157, P-37166, P-37165, and P-37149, near the centre of the claim group, bulges on either side of the major magnetic anomaly are apparent. In addition, several single value high-low combinations may be seen toward the eastern end of the anomalous horizon.

At the eastern end of the major magnetic anomaly, a sharp cut-off is evident. All the magnetic trends both east and west of a north-south line through this point are discontinuous. East of this zone two persistent magnetic horizons have been defined, although they are much weaker than the major anomaly to the west. These anomalies are arcuate in form as contrasted to the linear western anomaly. While the western anomaly shows a magnetic relief in excess of 3000 gammas above base level, these anomalies have a maximum relief of 700 gammas. Again, however, the northern anomaly is stronger than the southern.

Several magnetic profiles were studied in an attempt to determine the depth of overburden in the area. The depth determination calculations are based on potential theory, and should therefore be used only when the shape of the magnetic anomalies suggest that potential theory is applicable. Due to the superposition of two or more magnetic anomalies, and the apparent dip of the causative bodies the necessary conditions for potential theory are not met. However it was believed that some value might be obtained from such calculations. The depth of overburden so indicated, varied from 60 feet to over 200 feet. While insufficient data was available to determine the depth indications of the small local anomalies, it is quite apparent that these anomalies are caused by material under much less than 100 feet of overburden. Any outcrops exposed throughout the area appear in the stream beds. It has been suggested that the entire area was at one time, the bed of a large lake, and that the bedrock surface is relatively smooth. It is believed that overburden in the vicinity of the claim group is less than 100 feet over most of the area, and possibly less than 50 feet over a fair proportion of the ground.

In order to assess the economic possibilities of the claim group it is necessary to translate the geophysical evidence into geological concepts. The ground magnetometer survey was proposed to test three separate concepts. Of the three, one appears to have been eliminated. There is no evidence that the magnetic anomalies could be associated with the Pipestone fault. It is however difficult to eliminate the anticlinal theory or the basic intrusive possibilities.

In the anticlinal theory, the magnetic anomaly is supposed to represent a tight anticlinal fold in the Keewatin lavas plunging to the east. The axial plane of the fold is vertical and the limbs dip steeply outwards. The superposition of the two magnetic anomalies suggest that this is quite possible, the north limb being thicker or more highly altered (and consequently containing more magnetite) than the south limb. The outward dips of the two limbs are demonstrated by the broad flanks on the magnetic anomalies. Following the formation of the anticline, whose axis strikes N 72° W, cross folding and faulting occurred. The axis of one cross anticline is shown passing through claims P-37157 and P-37166, near the centre of the claim group, accounting for the bulges on either side of the major magnetic anomaly. The function of the cross anticline was to bring a broader portion of the folded Keewatin lavas closer to the present surface.

Traces of the axial planes of two other folds cutting across the main anticline are shown near the eastern and western ends of the claim group. These folds caused warping of the axis of the folded Keewatin lavas. Following the folding, a north-south fault with a horizontal component of east side north 1000 feet, and a vertical component of east side up an unknown distance caused a disruption at the eastern end of the major magnetic anomaly. The north and south limbs of the major fold became widely separated at the present plane of observation. It will be noticed that east of the postulated fault, two persistent magnetic anomalies retain parallelism, despite an arcuate form, and that the northern

anomaly is much stronger than the southern as was the case over the major anomaly.

Some slight geological evidence is available to provide corroborative support for the anticlinal theory. Two top determinations north of the claim group in the sediments showed tops facing north, while several top determinations in the pillow lavas some distance south of the claim group indicated tops facing south.

An alternative interpretation of the geophysical data may be postulated. A multiple basic intrusive having a northern phase of peridotite with a southern zone of pyroxenite intruded the sedimentary series. The bulges are caused by swellings in the intrusive. The intrusive may pinch out near the zone of disruption. The fault may become unnecessary, while the arcuate anomalies east of the disrupted zone may be caused by parallel dikes. The broad flanks on the major magnetic anomaly would then be caused by either a sloping contact in the intrusive or a gradational alteration zone.

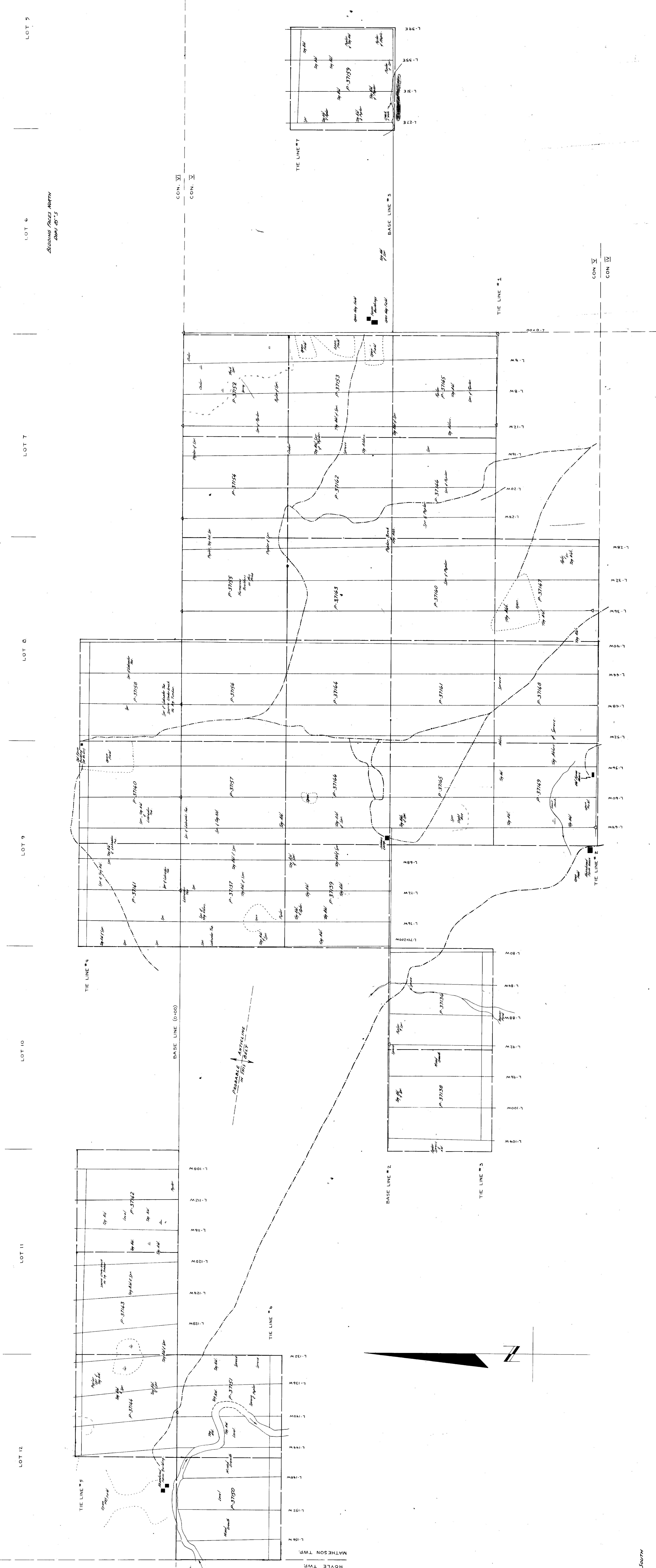
It is believed that the anticlinal theory fits the geophysical data more closely than the basic intrusive postulation. Further, due to the similarity with the Porcupine camp, the economic significance of the anticlinal theory is more favorable than that of the basic intrusive.

In order to adequately sample the magnetic hypothesis a diamond drilling program will be required. It is suggested that the alternative theories be tested in such favorable locations as the intersections of the interpreted major anticlinal axis with the axes of the three cross anticlines.

  
"J. H. Ratcliffe"

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Attach: Map of Ground Magnetometer Survey  
Matheson Twp. Claims  
Scale 1" = 400' Nov. 1952.



LOT 12      LOT 11      LOT 10      LOT 9      LOT 8      LOT 7      LOT 6      LOT 5

BEDDING FRACES NORTH  
Dist 85'-1"

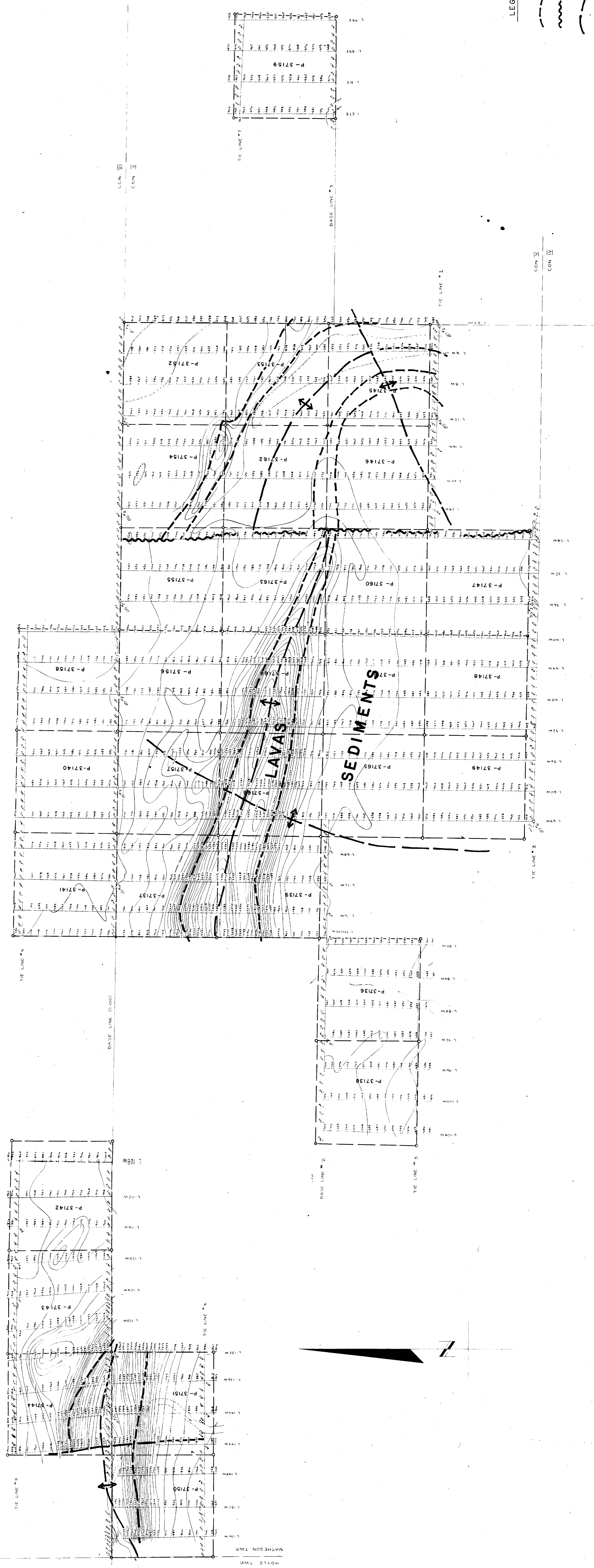
BEDDING FRACES SOUTH  
Dist 85'-1"

DOMINION GULF COMPANY  
 TO RECOMPANY  
 C. G. MATHESON REPORT - DEC. 18, 1952.  
 MATHESON TWP. CLAIMS - GROUP I  
 MATHESON TWP.      PROV. OF ONTARIO  
 SCALE - 1" = 400'  
 DATE - DEC. 18, 1952



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LOT 12      LOT 11      LOT 10      LOT 9      LOT 8      LOT 7      LOT 6      LOT 5



**LEGEND**  
 --- CONTACT  
 ~~~~~ FAULT  
 - - - FOLD AXIS

