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DOMINION GULF COMPANY

INTERPRETATION OF GROUND MAGNETOMETER DATA

PART OF JAMIESON I, CONCESSION III

(Claims P-40020 to P-40032; P-40038 to P-40041)

BASE MAP 42 A/12 S

Porcupine Mining Division

Ontario.

C. W. Faessler

August 16, 1956.



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SUMMARY

The interpretation of the ground magnetometer data from a group of 17 claims of Jamieson I claim group held by Dominion Gulf Company, is presented in this report.

Several north-northwesterly trending diabase dykes are interpreted. Jogs, changes in trends and protuberances in these dykes suggest a large number of fault segments which appear rather discontinuous. It is concluded that these individual faults are part of a wide shear-zone trending north-westerly through the area.

A small number of oval shaped, weak magnetic anomalies are suggested to be caused by metamorphism, probably related to the shearing. The magnetic survey cannot distinguish between the magnetite and pyrrhotite, which could both be present.

It is concluded that the only recommendation possible is to study these results in conjunction with those of ground electromagnetic and detailed geologic surveys now under way.

INTRODUCTION

A ground magnetometer survey was made over a group of 17 contiguous claims which are part of the Jamieson I claim group held by Dominion Gulf Company. These 17 claims are numbered P-40020 to P-40032 incl., and P-40036 to P-40041 incl. They are all located in Concession III, Jamieson Township, Porcupine Mining Division, Ontario, and occupy the following lot fractions:

- (1) All of Lot 8.
- (2) in Lot 9: all of the north half; and the northeast, northwest and southeast quarters of the south half.
- (3) in Lot 10: the northeast and southeast quarters of the north half.

● A rectangular grid system of chained picket lines was established over this claim group, the base line and the three tie lines running E-W and the lines N-S. The basic coverage consisted of 100-foot readings on 200 foot lines. Intermediate 50-foot readings were obtained over strong magnetic gradients. A few short pace and compass traverses were made between some lines to further clarify the magnetic data.

The survey was made during the months of March, April and May, 1956, and was tied-in both topographically and magnetically to the rest of the Jamieson I claim group. The instrument used is an Askania Schmidt type vertical component magnetic balance having a sensitivity of approximately 20 gammas per scale division. A total of 1872 stations were read over 29.09 miles of chained picket lines and an additional 128 stations on 6000 feet of pace and compass traverses. The grand total is therefore 2000 stations read over 30.23 miles of picket lines and traverses or an average of 67 stations per line-mile.

Tie-line "3" and that part of line 80E tying in claim P-40026, are not included in the above summation of work done. They are part of the previous survey and were added to the attached map to complete the magnetic picture and to facilitate the tying-in of the present and past work.

The survey was made by D.H. Peters, assisted by D. Lemire. A preliminary draft was made in the field, and the data were later checked, re-processed and interpreted by the Dominion Gulf Company staff in Toronto.

The results of this survey and the interpretation of the data are presented on the attached map, at a scale of 1 inch to 200 feet, and with contour intervals of 100 gammas.

No previous work had been done on this group of claims. However, two ground magnetometer surveys are contiguous, the one to the west having been interpreted by J. H. Ratcliffe (Interpretation of Ground Magnetometer Survey Data, Jamieson I, November 12, 1954) and the one to the east by G. W. Faessler (Interpretation of Ground Magnetometer Data, Jamieson II, September 9, 1955).

L. W. Berry and S. A. Ferguson indicate, on their O. D. N. Map No. 530 (Robb-Jamieson Area, 1 inch to 1/2 mile), that a large outcrop area trends north-westerly through claim P-40021 into claim P-40025. The rocks, as reported, are rhyolitic lavas cut by a north-northwest trending diabase dyke.

INTERPRETATION

The magnetometer survey of this claim group is mainly characterized by a group of continuous, narrow anomalies trending roughly north of northwest. These anomalies have been numbered with the prefix D- on the attached map. They are interpreted as diabase dykes on the basis of their continuity and trend. One dyke D-5, is reported by Berry and Ferguson on their O. D. N. map 530.

These diabase dykes are not considered to be of economic interest, but they are quite useful in indicating the presence of pre-diabase structural features, such as contacts or faults and shear zones. The remarkably reliefless magnetic base level of this area strongly suggests that no major contact exists in this area. Changes in trend and aspect of the diabase dykes are therefore assumed to be caused by faulting and/or shearing which are usually pre-diabase. Post-diabase movement may have occurred along some or all of these breaks without being distinguishable from mere deflections of the dykes by some pre-existing structural features; such movements, if any, would be post-ore, and therefore of no immediate interest.

Another feature of the anomalies produced by the dykes, are short magnetic protuberances trending parallel to the direction of faulting. These protuberances are often found with a change in trend of the dykes and are therefore assumed to be related to the faulting. Although included in the diabase dykes on the accompanying map, they are not necessarily directly related to diabasitic material, as they could be explained in the following ways:

- (1) actual protuberance of diabasic material along a fault plane, or
- (2) alteration of the country rock by solutions either accompanying the the diabase or following it, the transverse fault acting as channel.

The north-south direction of the picket lines is a poor choice as it almost parallels the main magnetic features of the area. As a consequence, where no east-west traverses were made, the dykes are poorly defined magnetically, and the interpreter must explain the observed gaps to the best of his ability. This is well demonstrated on Line 106E at fault F-11; a wide gap in diabase dyke D-12 is strongly suggested by the mechanical contouring. Such a gap would be very difficult to explain. But it is believed that the interpreted swing of D-12 to between L 104E and L 106E and then back onto L 106E satisfies the observed data. Similar procedures have been applied whenever advisable. However, it is felt possible, and even probable, that a number of such structural indications have been overlooked because of insufficiently detailed data.

Two diabase dykes, D-1 and D-2, parallel each other, very close to the western boundary of this claim group. D-1 is the extension of the diabase dyke interpreted by Ratcliffe and labelled by him, Anomaly 17. D-2 can be traced some 1300 feet southward from the southern boundary of claim P-40028. A change in trend in D-1 and D-2, and a protuberance on D-1 (as discussed above) suggested fault F-3. A change in trend in both dykes, a protuberance on D-2, and a coalescence of the magnetic values over both dykes suggest fault F-2. Finally, fault F-1 is weakly indicated by a change in trend in D-2 but is not confirmed by a similar feature in D-1, possibly due to the lack of data to the north.

A second group of diabase dykes is interpreted some 1500 feet to the east of the one just discussed. Dykes D-3 and D-4 are roughly parallel to each other. Changes in trend in D-4, and D-3 and D-4, indicate faults F-9 and F-8 respectively. A few hundred feet north of F-8, D-3 and D-4 join to form D-5. A fault, F-7 is shown at this point with question marks, as joining of diabase dykes does not necessarily occur at a structural feature. Two protuberances on D-5 suggest faults F-5 and F-6, the latter being also accompanied by a slight but definite change in trend in the dyke. About 300 feet north of F-5, D-5 swings sharply to a northwesterly direction and then fingers out into a protuberance with the same trend, a dyke D-6 to the north-northwest, and D-7 to the north. These phenomena clearly suggest fault F-4.

A third group of diabase dykes lie some 1300 feet to the east of those just discussed. Four segments of dykes are seen to meet in west-central claim P-40024. These are D-8 and D-17 to the south, and D-9 and D-13 to the north. Dyke D-8 has been mapped by Berry and Ferguson. The strong magnetic relief observed over it is clearly due to the small "depth to body from instrument" encountered over the outcrop area. D-17 shows an unexpected trend to the southeast. However, some 900 feet to the southeast of the southeastern corner of the area, this dyke is known to change trend to the south where it is labelled D-5 (Jamieson II, Ground Magnetometer Survey). Its calculated susceptibility of 0.0026 o.g.s. is in the order of that expected for diabase in this area. Similar abnormal northwesterly trends over relatively long-distances have been observed in the case of other diabase dykes in the Jamieson area and they are thought to be controlled by the trend of the country rock.

Two short segments of narrow diabase dykes are interpreted between D-8 and D-17, and are labelled D-14, and D-15 and D-16, the latter two being possibly the same dyke.

The age relationship between D-8 and D-17 should be indicated at the point where they meet. However, the magnetic data, although fairly well detailed, are still very ambiguous and this question must be left unanswered at the present time. To the north, D-13 is indicated for approximately 1800 feet and disappears while D-9 fingers out into a protuberance to the northwest, and dykes D-10 and D-12 which are followed to the northern limit of the area. A short segment of diabase dyke D-11 is suggested between D-10 and D-12.

Six faults, labelled F-10 to F-15, and the extension of fault F-4, are interpreted on the basis of the observed sharp changes in trend of these diabase dykes.

A short segment of diabase dyke, D-18, is interpreted in the northeasternmost corner of the area. It is the extension of a dyke labelled D-6 in the neighbouring Jamieson II ground magnetometer survey.

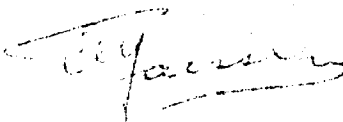
Seven oval-shaped, usually weak magnetic anomalies have been labelled A-1 to A-7 inclusive. Their trends are generally poorly indicated but are roughly northwesterly. They are usually located near interpreted faulting. It is suggested therefore that they are inhomogeneities of the country rock, probably produced by metamorphism. The primary cause is most probably magnetite although it could be pyrrhotite. The magnetic method does not distinguish between the two in these cases.

A large number of short fault segments have been interpreted. Their apparent lack of continuity may be partially explained by the unfortunate parallelism between the dykes and the lines along which the data have been observed and it is quite probable that a number of fault indications have been overlooked because of this. Also, diabase dykes are not always affected by pre-

existing faults. The great number of individual faults interpreted suggests that the area is at least partially underlain by a wide shear-zone trending west-northwesterly. If such is the case, the individually interpreted faults may represent sections of concentrated breakage which could be relatively limited in length and located "en echelon" in the shear-zone. The width of such a shear-zone is difficult to obtain, especially in this case where a limited area is considered. It is felt however, that a minimum width must include the area between F-8 and F-11, or approximately 3000 feet.

RECOMMENDATION

The wide shear-zone interpreted in this area offers some possibilities for mineralization which is not expected to be recognizable magnetically. Ground electromagnetic and detailed geologic surveys are being made over this area. The results of these surveys should be studied in conjunction with the magnetometer data in deciding any future plans. More specific recommendations cannot be made on the basis of the magnetometer survey alone.



O. W. Fassler.

ATTACHMENTSMap:

Dominion Gulf Company - Ground Magnetometer Survey - Jamieson I, Concession III, 17 claims; Scale 1" to 200', Contour Interval 100 gaussas, August 16, 1956.

REFERENCESReports:

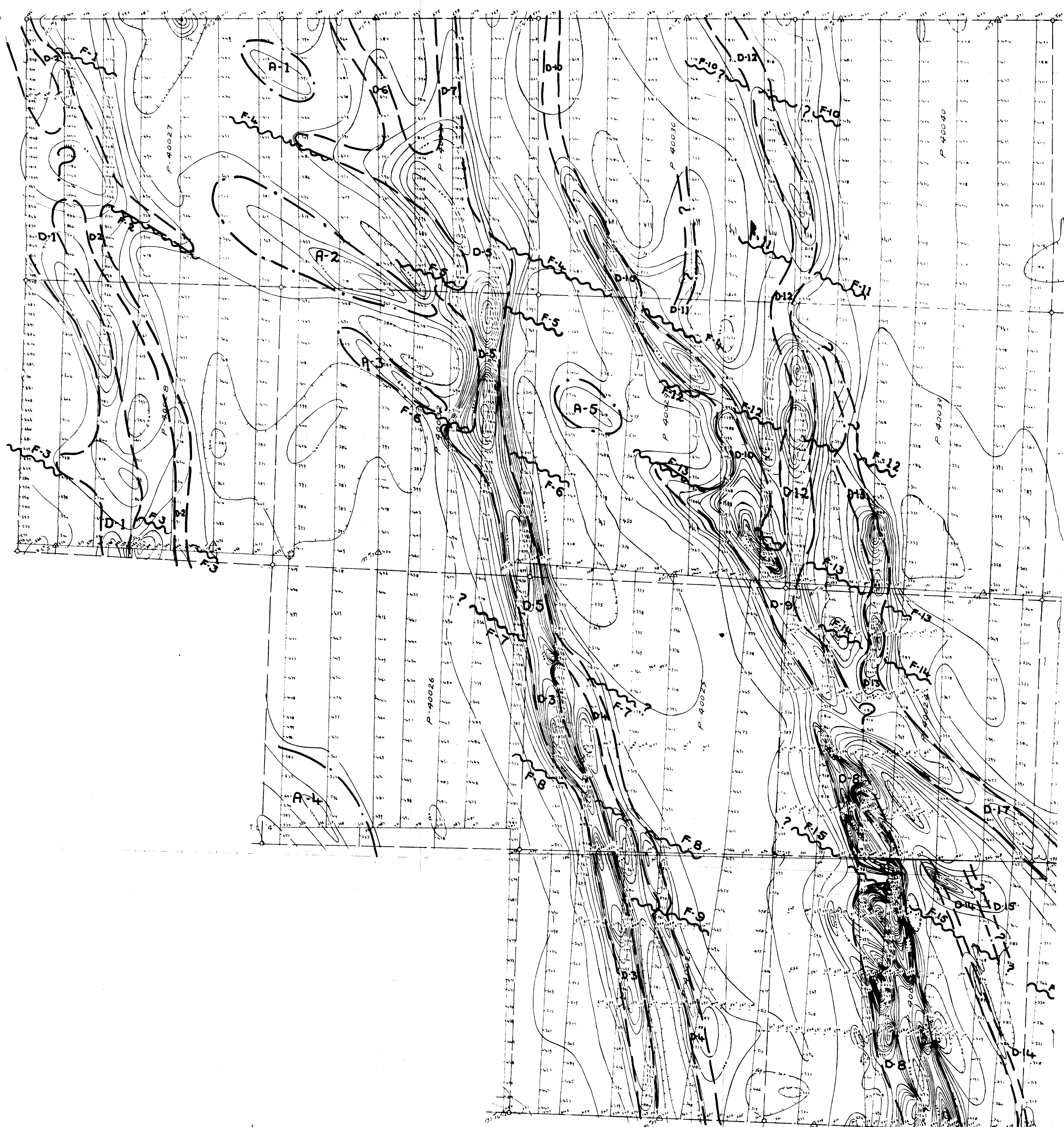
Dominion Gulf Company - Interpretation of Ground Magnetometer Survey - Jamieson I, Porcupine-Kirkland Area, Ontario, by J. H. Ratcliffe, November 12, 1954.

Dominion Gulf Company - Interpretation of Ground Magnetometer Data - Jamieson II, Base Map 42 A/12 S, Porcupine Mining Division, Ontario, by C. W. Faessler, September 9, 1955.

Map:

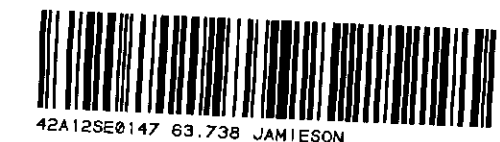
Robb-Jamieson Area, District of Cochrane, Ontario. - O. D. M. Map No. 530, Scale 1 inch to 1/2 mile; Geology by L. G. Berry and S. A. Ferguson.

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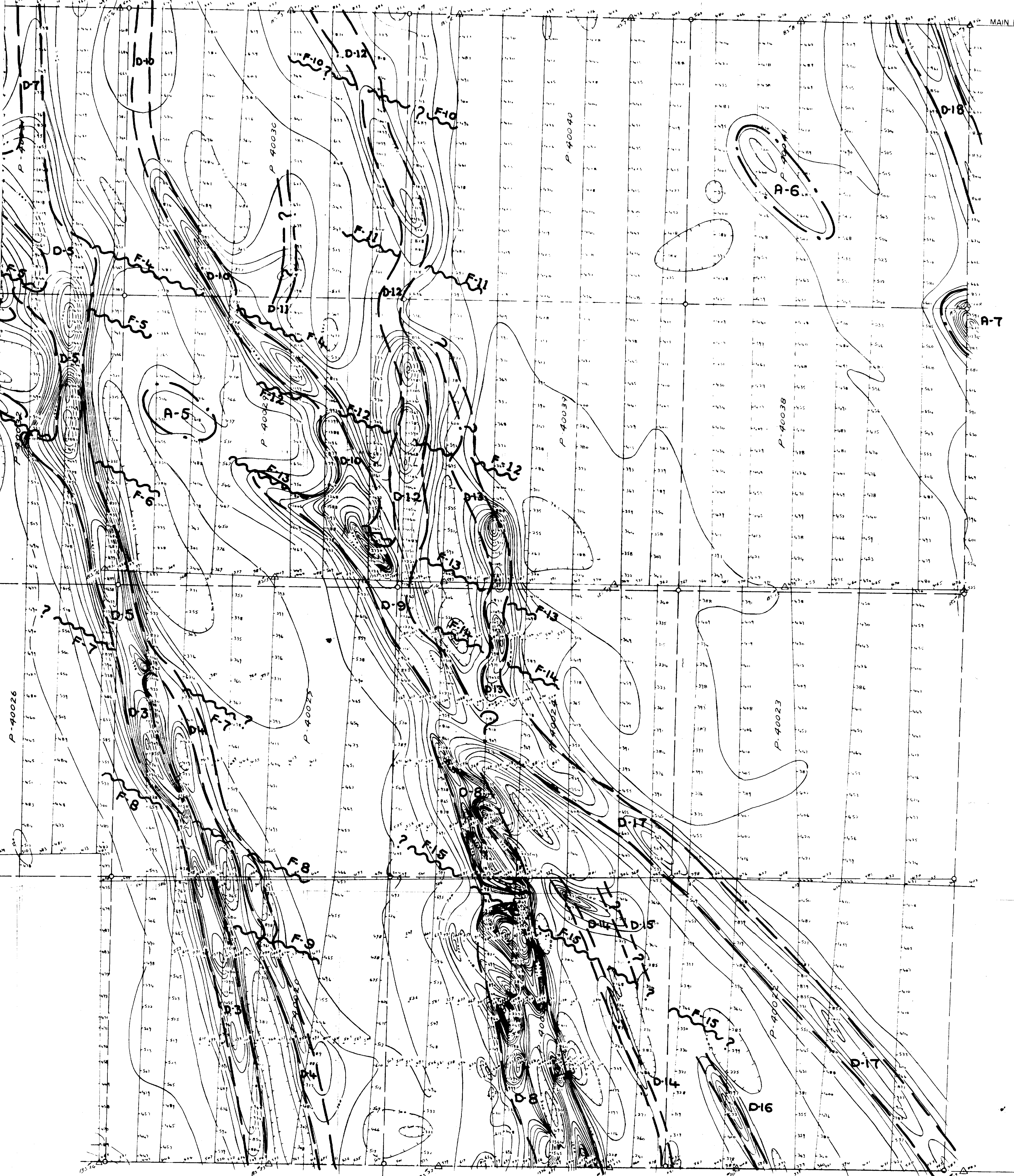
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MAIN BASE LINE CON IV
CON III



P-38191

P-38190

P-38201

CON III
CON II

LEGEND
 / Interpreted Contact
 () Anomaly Outline
 ~ Fault

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To accompany interpretation report by C.W.F., dated Aug. 16, 1956.
 DOMINION GULF COMPANY
 GROUND MAGNETOMETER SURVEY
 JAMIESON I
 BASE MAP 42A/125 PROV. OF ONT.
 CONCESSION III 17 CLAIMS
 Scale: 1" = 200' AUG. 16, 1956
 CONTOUR INTERVAL = 100 GAMMAS

L-92+00E L-94+00E L-96+00E L-98+00E L-100+00E L-104+00E L-106+00E L-108+00E L-110+00E L-112+00E L-114+00E L-116+00E L-118+00E L-120+00E L-122+00E L-124+00E L-128+00E L-130+00E L-132+00E
 LOT 9
 LOT 8
 LOT 8