42A03SE8461 63.335 BARTLETT

Geology of Bartlett Township Claims Group 1

INTRODUCTION

During the month of July and part of August, 1952, geological mapping operations were carried out on the group consisting of twelve claims located in the southwest corner of Bartlett Township. This group is bounded on the south by the Bartlett-English township line and has its south-west corner at the one-mile post on this line. From this point the property extends two claims east and six claims north, parallel to and including a portion of the Redstone River.

The purpose of this mapping was to investigate a roughly circular magnetic anomaly situated in a mass of known talc carbonate rock, and especially to determine whether this mass could have been derived from an ultrabasic rock similar to the one further north in which significant nickel values have been found.

The mapping was done at a scale of 400' = 1" using East-west picket lines cut at 200-foot intervals as mapping control. The completed geological map was then enlarged to 200' = 1" in order to allow better detailing. In conjunction with the geological mapping a stripping program was carried out and a ground magnetometer survey run.

CONCLUSIONS AND RECOMMENDATIONS

The detailed work on this property has indicated that the talc carbonate mass is a hydrothermally altered formation, possibly a basaltic lava, rather than an intrusive peridotite or even an altered peridotite. Such being the case, then this is not a favourable area in which to seek a nickel ore body. Further, since no appreciable mineralisation was found during the mapping it does not seem probable that any significant amount exists in this area - therefore further work cannot be recommended.

GENERAL GEOLOGY

Table of Formations

Recent:	Sand and Sandy Clay
Precambrian:	Diabase and Gabbro Dikes
Algoman:	Syenite
Post Keewatin:	Ultrabasic Intrusive Older Diorite
Keewatin:	Basic Pillow Lava Iron Formation Agglomerate and Tuff Rhyolite Porphyry

In general this area is underlain by a series of narrow north-south trending formations, the oldest of which is the rhyolite porphyry which outcrops in the western part of the claim group. Overlying this and probably quite closely related to it in age is the iron formation, tuff and agglomerate series; overlying this series and exhibiting a possible intrusive relationship to it is a fairly extensive mass of talc carbonate rock which is in turn overlain by a basic pillowed flow. The youngest rocks in the area are diabase and gabbro dikes which cut all of the above-mentioned formations.

Keweenawan Diabase and Gabbro Dikes

Several diabase dikes and one dike of quite fresh gabbro were found on the property. The diabase dikes all trend in a north-south direction and are generally not more than 50 feet wide. The rock in these dikes is generally medium-grained with a well-developed ophitic texture and is similar in general appearance to the Matachewan diabase found in the surrounding area.

The single gabbro dike encountered is quite distinct from the diabase dike in that 1) it strikes at 70° 2) it is much coarser grained and does not exhibit a marked diabasic texture. The rock itself is quite fresh looking and could be correlated with the later Keweenawan gabbro dikes except that this dike is discontinuous and reconnaissance to the east has shown that it occurs in an irregular-shaped body. Neither of these features are at all characteristic of the Keweenawan dikes.

Algoman

Syenite. Only one outcrop of this rock was found on the property and that occurs in the extreme northeast corner of the group. The rock itself is coarse-grained, grey in colour, quite acidic, and is very probably an offshot of the Geikie granite which outcrops further to the east.

Post Keewatin

Talc Carbonate Rock. This rock is very abundant in this area, underlying over half of the property. The best exposures of this rock occur on the east side of the Redstone River between the Bartlett-English township line and picket line 56+00N.

The rock itself is grey to brown weathering and, considered as a whole, is quite uniform throughout, both in appearance and in texture. Coarse-grained facies do exist and appear to be more abundant near the west contact; for the most part, however, the rock is medium to fine-grained. The rock is quite soft especially where it has been serpentinized. Serpentinization is not particularly heavy however and is generally heavier toward the west contact. Some asbestos fibre was found in the more highly serpentinized zones.

Of particular interest is the unusual fracturing found in this mass. There are three main types which are delineated on the map as "C.F." (coarse fracturing), "F.F." (fine fracturing) and "F.Z." (fracture zones). These various types of fracturing could not be outlined separately since they are usually quite intimately associated. The coarse fracturing resembles columnar jointing in that roughly hexagonal blocks have been formed. These blocks may be anything from one to 2 1/2 feet in diameter. It is hardly likely however that columnar jointing is the cause of this fracturing since the fracture planes are parallel to the bottom of the mass rather than at right angles to it.

The fine fracturing, on a weathered surface resembles a breccia or agglomerate with rounded and angular fragments vaguely aligned in a north-south direction. The fragments are fairly uniform in size but a gradation from fine to coarse fracturing can often be found. The fracture zones are merely defined bands of fine fracturing, generally striking north south. These zones vary in width a good deal, from a few inches to several feet.

All of this fracturing appears to have taken place at the time of formation of the talc carbonate mass since all of the fractures and fragment interstices are now filled with the same material as is in the fragments. There is no evidence of any significant later fracturing.

In places in this talc carbonate mass there is a well developed linear structure which resembles flow lines. Where found these lines strike north-south and occur in the brown weathering,moderately well serpentinized phase of this rock.

Some alteration is present in the talc carbonate especially near the east and west contacts. This alteration is characterized by a lighter colour, slightly coarser texture and the development of acicular actinolite (?) crystals.

Talc, carbonate, chlorite and amphibole are the main constituents of this rock, serpentine occurring only locally.

Older Diorite. Two outcrops of this so-called older diorite were found - one at 150 east on line 16+00N and the other at 400' West on line 4+00N.

The rock itself is dark green in colour,rather variable in texture, and exhibits a high degree of chlorite alteration. In places it carries a good deal of coarse brassy pyrite.

The only definite age relationship found shows this diorite cutting basic lava but in appearance it resembles the older diorites as mapped in the surrounding area.

Keewatin

Basic Pillow Lava. A number of outcrops of this rock were found in the southeast corner of the property and to the east of the eastern boundary.

The rock itself is quite basic and in a hand specimen greatly resembles the finer-grained facies of the talc carbonate mass. However there are well developed pillows in this horizon which serve to differentiate it from the talc carbonate. Also the talc carbonate mass does not contain quartz, while this horizon carries numerous small quartz veins as well as some primary quartz.

Determinations of flow top were made at three different locations and in each case the result was the same. Thus it can safely be assumed that the top of this flow is to the east and that the strike of the flows is roughly north-south.

Iron Formation. Iron formation outcrops are not too plentiful but several were found in the central and northern portion of the block. This iron formation is not well exposed and the western band as shown on the accompanying map was inferred solely from magnetic evidence.

The iron formation itself is the black chert banded magnetite variety

interbedded with white siliceous sediments. None of the jasper type of iron formation was seen. Fairly heavy sulphides, predominantly pyrite, occur in the iron formation and the weathering of these sulphides gives the iron formation a rusty appearance nearly everywhere it is seen. These sulphides do not contain economic amounts of either gold, silver, copper or nickel.

Agglomerate and Tuff. Several outcrops of agglomerate and tuff were found in the northern and western parts of the area. One very good exposure of the agglomerate occurs at 1200' feet east on line 76+00N. To the east this agglomerate is in contact with the iron formation and to the west with the rhyolite porphyry. The actual rock is a good, easily distinguished agglomerate with both angular and rounded fragments in it. The fragments are predominantly of the rhyolite porphyry which immediately underlies it. And in some places the agglomerate seems to grade into the porphyry, passing through what is probably a tuffaceous phase.

Rhyolite Porphyry. Outcrops of this rock are found in the western and northern part of the group. The rock itself is rather variable in texture and in places resembles a true intrusive porphyry while in others a decided tuffaceous appearance is evident. The rock is fairly hard, weathers a brownish buff colour and is made up of white feldspar crystals in a dark-green chloritic ground mass. Some carbonatization is present and small white quartz veins are often found.

STRUCTURAL GEOLOGY

The sediments and volcanic horizons in this area all have a north-south strike as determined from shearing, bedding plane and pillow strike determinations as well as from the actual disposition of the outcrops. The top of these formations is to the east as determined from pillows in the basic lava; thus the relative age of these extrusive and sedimentary horizons is - oldest to the west, youngest to the east. This succession is in agreement with other determinations made outside of this area.

Broadly speaking, this area lies on the south limb of an anticlinal structure which trends north through Bartlett and Geikie townships and then swings westward through McArthur township.

Shearing and fracturing is nowhere pronounced nor widespread. Some east-west shearing was found in the talc-carbonate mass and in the basic lava in the southwest corner of the property. The shearing here is only moderate and strikes in an east-west direction in both the talc carbonate and the basic lavas roughly at right angles to the strike of the pillows.

No direct evidence of faulting was seen but a quite pronounced topographic lineation exists which might possibly be the surface expression of a fault. This lineament is a narrow gulley which strikes slightly west of south across lines 28+00N, 30+00W, 32+00N and 34+00N at approximately 250 feet west of the east boundary. This valley is not continuous for any appreciable length and the fact that no shearing or evidence of faulting is found in the outcrops on either side of it rather detracts from the possibility that a fault may underlie it.

Similarly the steep cliffs along the east shore of the Redstone River may indicate a major fault underlying the river bed. Such a fault, if present, could also be used to explain the presence of the talc carbonate mass if one assumes that this mass is an altered flow rock. That is, aqueous solutions coming up along

this fault and spreading east and west from it could conceivably have altered a pre-existing flow rock and formed the talc carbonate mass which is now present.

As is the case for faulting, so it is with minor folding - no direct evidence exists. There is however a possibility of a drag fold in the iron formation at approximately 1100 feet east on line 56+00N. Here an iron formation outcrop occurs which appears to be displaced slightly to the east. A drag fold here would account for the position of this outcrop and could also account for the apparent embayment of the iron formation by the talc carbonate mass immediately north of this point. Thus the cutting relationship between the talc carbonate mass and the iron formation exhibited here may in reality be only the expression of drag-folding.

MAGNETIC CORRELATION

Magnetically this area is quite complex and it is difficult to determine structural or stratigraphic trends from the results obtained since diagnostic features are not easily recognizable. The large oval-shaped magnetic high originally plotted from the airborne magnetometer work breaks down into a complex series of highs and lows after further detailing with a ground magnetometer. And it is difficult to separate those highs associated with the iron formation and those due to magnetite in the talc-carbonate rock since outcrop is lacking in the crucial spots and since these two formations are generally in contact with one another. It seems apparent however that the cumulative magnetic effect is due to the talc carbonate mass.

Three distinct types of high magnetite rock were found:

1) Agglomerate carrying considerable magnetite
2) Banded iron formation
3) Magnetite-rich talc carbonate rock.

The iron formation and the agglomerate do occur along linear magnetic zones parallel to the regional strike. However these zones are discontinuous and spotty making it impossible to delineate the actual outline of these formations, magnetically.

The magnetic relief of the talc carbonate mass is characteristically spotty and erratic, many small highs and lows being found. These zones generally have a north-south strike and are scattered helter-skelter throughout the mass. A slight increase in magnetic relief is evident over the larger outcrop areas. This peculiar magnetic relief is certainly not characteristic of either a basic flow or a basic intrusive mass, but perhaps it is a characteristic of alteration.

ORIGIN OF THE TALC CARBONATE MASS

A number of suggestions have been made as to the origin of this unusual formation. These are -

1) A basic sill-like intrusive derived from a peridotite magma
2) A basic extrusive laid down on top of the iron formation
3) Alteration of a previously existing lava, probably basalt.

The first hypothesis, namely that the talc carbonate mass is an intrusive sill-like

body, is not well supported since definite cutting relationships are not visible. There is however some support for this idea in the unusual fracture patterns found in the mass. Such patterns would hardly be expected in an extrusive rock, except possibly in a very thick flow. However these fracture patterns are not typically intrusive either and could conceivably have resulted from alteration. And it seems evident from the nature of the rock that alteration has taken place and that the body, if it is an intrusive, is an altered one.

The second theory, namely that of a basic extrusive, also suffers from lack of direct evidence. There are no typically volcanic features in this mass and the texture and general appearance certainly do not directly suggest an extrusive origin.

The third hypothesis seems at this time to be most reasonable, namely the alteration of an existing formation, probably a basic lava. This theory seems to best account for the nature and distribution of this rock. Also the erratic nature of the ground magnetics may also be accounted for by alteration - that is, different degrees of alteration throughout the mass may have produced the numerous small highs and lows that are found. One of the drawbacks to this hypothesis is the apparent lack of structural control; however if a major fault or zone of weakness is assumed to underlie the Redstone River, then the source of the altering solutions and also the linear nature of the body can readily be explained.

MINERALIZATION

No significant amount of mineralization was found anywhere on the property and samples of some of the best mineralization returned values of only 0.17% nickel. The talc carbonate mass is generally unmineralized and where sulphides were found these occurred in rather small amounts. Dimethyl glyoxime texts on various specimens of this rock gave at best only weakly positive results.

Fairly heavy sulphide mineralization was seen in places in the iron formation. For the most part these sulphides consisted of pyrite, with some pyrrhotite and very minor chalcopyrite. This mineralisation gave a negative nickel test and is similar to other iron formation mineralisation in the surrounding area which does not contain significant amounts of any commercial element.

"J. M. Allen"

Attach: Map "Detail Geology Bartlett Twp. Claims Group I Scale 1"=200' Nov. 24/52

:C

Nov. 10, 1952

42A03SE8461 63.335 BARTLETT

INTRODUCTION

Twelve claims were staked for the Dominion Gulf Company in the southern part of Bartlett Township, Porcupine Mining Division, Province of Ontario, during the latter part of November, 1951. Previous work in the northern portion of the same township had indicated the presence of interesting base metal mineralization in the general area. From available geological information, and aeromagnetic data, this claim group appears to be on the southern extension of the mineralized zone.

Geological mapping of the property has revealed the presence of interbedded basic pillow lavas, iron formation, tuff and agglomerate and some rhyolite porphyry. Intrusive rocks found were diorite, ultrabasics, syenite, diabase and gabbro. While a fair amount of rock outcrops within the claim group boundaries, it was believed desirable to conduct a ground magnetometer survey over the property. The purposes of this survey were to map geological horizon markers, and thus to determine the structural conditions which had been operative on the property.

An Askania Schmidt-type magnetic balance having a sensitivity of about 24 gammas per scale division, was used in the survey. Readings were taken on picket lines 200 feet apart, using a station interval of 100 feet. In highly anomalous zones intermediate stations were added. In all, a total of 1,540 stations were observed on 23.04 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 200 feet accompanying this report.

INTERPRETATION

An extremely complicated picture is presented by the contoured magnetic data. Many very local magnetic anomalies, located at random throughout the area, are shown. Only two limited areas of uniform magnetics are evident, in the northwestern and southwestern corners of the claim group. The magnetic anomalies do not appear to differentiate between rock types, but do indicate the regional strike directions quite faithfully. In general, the magnetic trend

direction, established from both local and regional anomalies is north-south. This corresponds to the strike of the geological formations.

Geological mapping in the area has shown that the eastern half of the claim group is underlain by a "Talc-Carbonate" rock. Particularly extreme magnetic fields appear to be associated with this formation. A band of iron formation lies along the western contact of the "Talc-Carbonate" zone in the north central portion of the claim group. Curiously, very little magnetic relief is associated with this horizon, despite the presence in at least one case of a band of magnetite 2 feet wide. Of three stations read directly on iron formation outcrop two were less than 2000 gammas above base level, while the third represented a slight magnetic trough between two highs. There are a number of local magnetic anomalies in the vicinity, but none of them can be directly correlated with the iron formation.

West of the iron formation lies the agglomerate-tuff series. In at least one case, a strong magnetic anomaly was obtained on an agglomerate-tuff outcrop. However, several outcrops of the same material were found associated with broad zones of non-anomalous magnetics. A series of discontinuous magnetic highs may be caused by a highly magnetic horizon interbanded in the agglomerate-tuff series. No rock outcrops were found in association with this horizon.

It may therefore be seen that very little direct correlation exists between the magnetic data and geological units or horizons. The primary reason for the lack of correlation is the inhomogeneous distribution of magnetite in the various rock types. No sharp dividing line exists between the percent magnetite in the "Talc-Carbonate" rock, and the agglomerate-tuff series, for example. In addition, although the "Talc-Carbonate" rock has been described as being "quite uniform throughout", it is quite apparent from the magnetic response, that a number of individual magnetic horizons have been formed. These are represented by distinct bands of magnetic highs and lows, following thegeological strike from south to north, across the entire map area.

It is believed that these magnetic horizons are of sufficient importance to indicate them on the interpretation map. It should be realized that the horizons indicated do not refer to geological contacts. They are indicative only of the magnetic properties of the underlying rocks. It is rather remarkable that the magnetic horizons so completely disregard the geological formations within which theyoccur

Five individual, continuous zones of high magnetic intensity have been indicated on the map sheet. The three largest and most outstanding of these occur entirely within the "Talc-Carbonate" zone. The two remaining zones of high magnetic intensity are found within the agglomerate-tuff series. There is a slim possibility that one of these may be related to a band of iron formation, in part.

Separating the bands of magnetic high, and also following the formational trend are four zones of magnetic low. Three of these are well-defined, and are associated with the zone of "Talc-Carbonate", while the fourth is relatively weakly-defined and occupies a zone partly in the agglomerates and partly in the "Talc-Carbonate" zone. Two of the three well-defined magnetic low zones are intimately associated with sharp topographic lineaments, one of which follows the course of the Redstone River. It is therefore quite possible that these low axes represent fault traces. In several cases, low magnetic readings were obtained near the foot of steep cliffs having an elevation of 45 feet or more above the valley floor. Such an occurrence is not unusual and may be explained as a spacial error. However, similar readings were obtained both at great distances from the foot of the cliff, and on the rock outcrop at the top of the cliff. Therefore, the spacial error cannot be blamed for the entire low. The low magnetic anomalies therefore appear to be real, their source must be considered to contain less magnetite than the surrounding rocks. It is therefore suggested that the magnetic low zones represent faults, and that any magnetite that previously occurred in the fault zones has been leached out or entirely replaced, materially reducing the magnetic effect along these lines of weakness.

Two east-west faults have also been interpreted. One of these faults, near line 22N, terminates an extensive magnetic high quite abruptly, and has been interpreted on this basis alone. A second east-west fault, near line 42N, is indicated by an apparent offsetting of magnetic horizons. The relative movement appears to be north side west 300 feet.

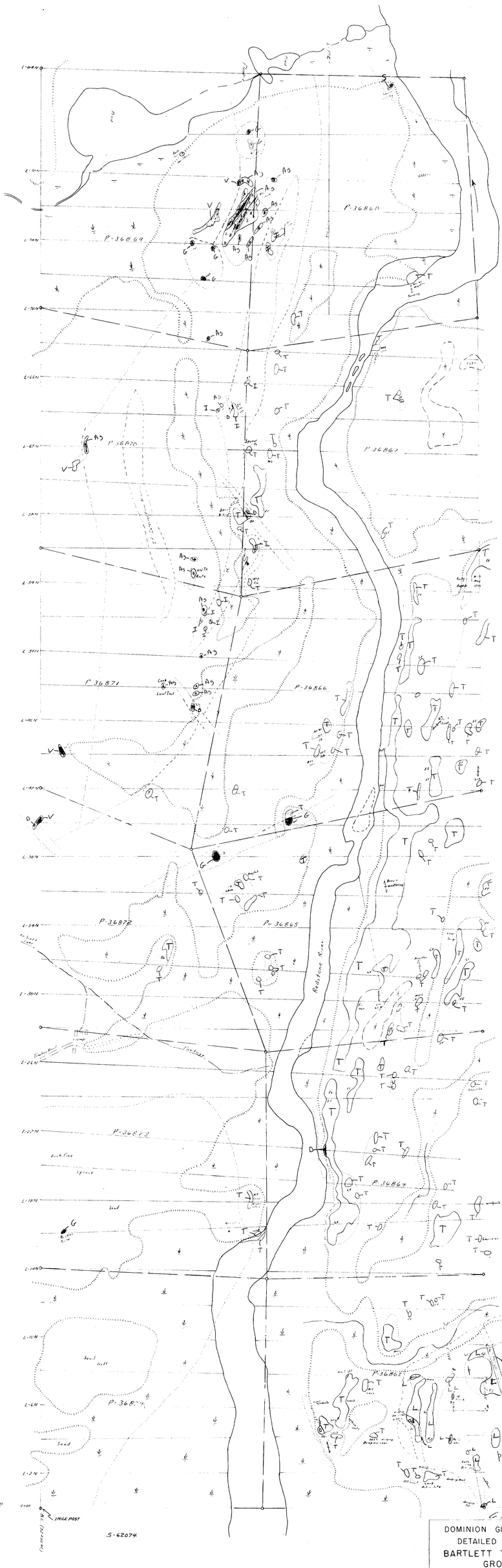
It may be seen that the foregoing interpretation is based entirely upon the magnetic data, and cannot be correlated with the geological evidence. Some attempt should therefore be made to tie the magnetic data to geological facts. It is suggested that the "Talc-Carbonate" zone is the metamorphosed remnant of a volcanic series, composed of alternate bands of acid and basic lavas, interbanded with volcanic sediments. Strike faults cutting the volcanic series opened channellways for hydrothermal solutions. In at least one case, the fault was probably later sealed by a Matachewan diabase dyke.

It is very difficult to recommend further work on this property from the geophysical point of view. No interesting structural conditions with which economic mineralization might be expected, were found. It is therefore recommended that no further work on this property be undertaken.

"J. H. Ratcliffe"

Encl. - Map

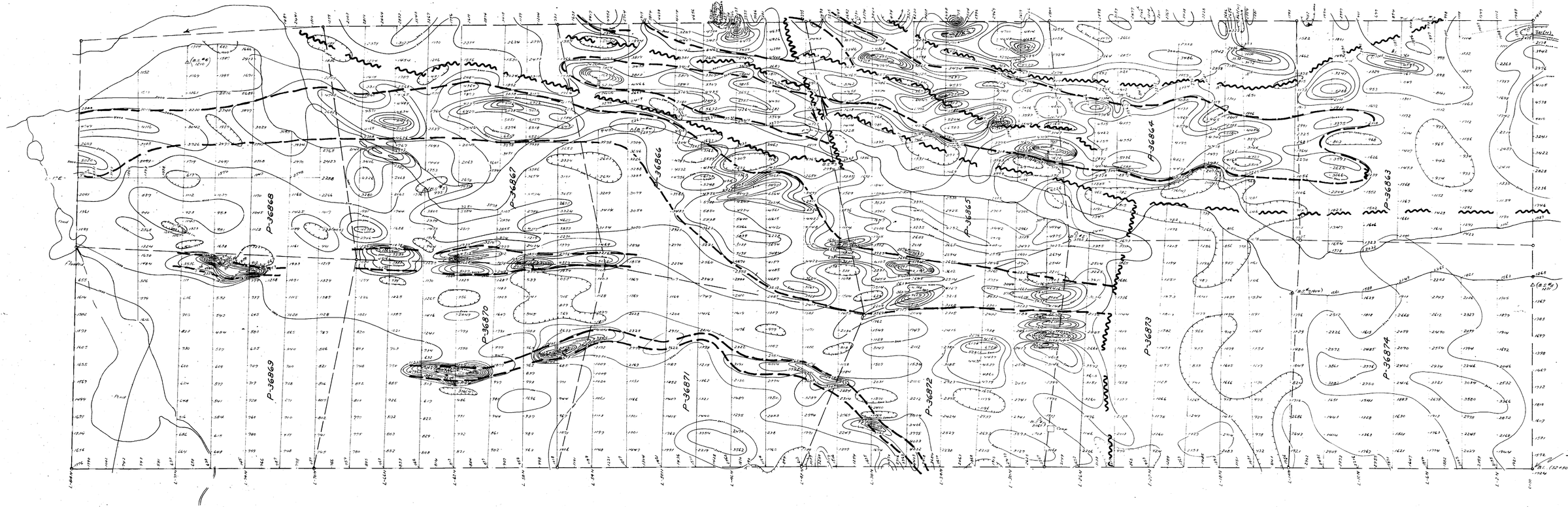
jm



DOMINION GULF COMPANY
DETAILED GEOLOGY
BARTLETT TWP. CLAIMS
GROUP I
BARTLETT TWP. PROV OF ONT.
SCALE - 1" = 200' NOV. 24 1952

63.335

42A80SE0461 63.335 BARTLETT
200



LEGEND

— CONTACT (MAGNETICS)

FAULT

DOMINION GULF COMPANY

GROUND MAGNETOMETER SURVEY

BARTLETT TWP. CLAIMS

GROUP I

BARTLETT TWP. PROV. or ONT.

CONTOUR INTERVAL 1000 GAMMAS

Scale 1" = 200' Sept. 2, 1952.

42A83BM41 83.305 BARTLETT