GEOLOG
GODFREY TOWNSHIP, P
HOLLINGER

42A12SE0426 63.2361 GODFREY

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Introduction

During the period May to September, 1968, a geological survey of 81 claims was performed. The following 73 claims are recorded in the name of Hollinger Mines Limited, Timmins, Ontario:

P-94730
P-95999 - P-96008 incl.
P-96057
P-96100 - P-96109 incl.
P-96111 - P-96115 incl.
P-96142 - P-96151 incl.
P-96179 - P-96188 incl.
P-96137 - P-96141 incl.
P-96174 - P-96175 incl.
P-96847 - P-96860 incl.
P-97099
P-98485 - P-98487 incl.
P-98609

The following 8 unpatented mining claims:

P-91320 - P-91327

held under option from Dr. Paul Boutin, are included in the survey.

Location and Access

The claim group is located in Godfrey Township, Porcupine Mining Division, about ten miles west of Timmins. The property is bisected by a paved highway that extends to the Kam Kotia Mine in Robb Township. Numerous old logging roads are suitable for walking only. In the north part of the property, a gravelled road to the Genex Mine traverses the group.

Personnel Employed on the Survey

A four man party was employed in the geological mapping. R.F. Hayduk and E. Chartre were assistant field geologists responsible for the mapping. D. Tremblay and K. Clark, technical students at Cambrian College, Sault Ste. Marie, were employed as helpers. B.I. MacDonald, field geologist, made several visits to the property and assisted in the geological mapping.

Topography and Drainage

The topography of the claim group can be divided into two parts. In the northwest part, numerous outcrops of rock rise from the swamps to a height of not more than one hundred feet. The rest of the group has low relief and few rock outcrops. Most of this part is covered with silt and clay (swampy areas). Low hills of sand and gravel are present. Twenty-three Mile Creek and Little Waterhen Creek are the major drainage channels and flow northeast to the Mattagami River. Also, numerous streams drain the area.

Results of the Survey

The results of the geological survey are shown on the accompanying maps (Godfrey Group No. 2, Sheets 1-6) at a scale of 1" = 200'. Traverses were run on picket lines cut at 400 foot intervals off a base line cut at 321°30' with chainage pickets at 100 foot intervals.

Previous Work

Early prospectors performed some trenching and test pitting on quartz veins and mineralization where claims P-95999, 96057, 96001, 94730, 96848, 96853 and 96857 are now located. In 1937 Mineral Estates drilled six holes on and adjacent to the present location of claims P-96174, 96175. In 1964, the present property formed part of a group held by Mespi Mines Ltd. (Cu-Kam Copper). Six holes were drilled in the area. Four holes, EG 6,7,8, 9, were drilled on the present claim group and are plotted on the accompanying maps. No significant mineralization was intersected. Mespi Mines also performed airborne and ground geophysical surveys. In 1965, Conwest performed an airborne electromagnetic survey and ground electromagnetic and magnetic survey on a block of claims in lots 3-4, concession 3, Godfrey Township. In 1964, Harry Leblanc drilled a hole on the present claim P-91322 and it is plotted on sheet 2.

Godfrey Township was geologically mapped for Ontario Department of Mines during the period 1949-52 by Nelson Hogg.

General Geology

All the consolidated rocks in the area are Precambrian. Bedrock is well exposed in the northwest quarter of Godfrey Township, decreasing in exposure to the southeast.

The geological map accompanying O.D.M. Report LXIII, Part 7, 1954, indicates a series of northwesterly trending, folded andesitic and rhyolitic lava flows intruded by granitic and gabbroic rocks in the western half of the township. Northerly trending diabase dykes cut all of the rocks in the area. Sediments were observed in drill holes in the south half of lot 4, concession 2.

Table of Formations

Cenozoic

Recent and Pleistocene

Clay, silt, sand and gravel.

Great unconformity.

Precambrian

Matachewan

Quartz diabase.

Intrusive contact.

Keewatin

Rhyolite: massive, spherulitic, quartz porphyry, agglomerate, tuff.

Andesite: massive, pillowed, tuff.

Distribution

The area mapped is occupied by volcanic rocks and intrusive diabase dykes. They consist of basic and acid lavas with agglomeratic and tuffaceous sections.

Precambrian

Keewatin

The volcanic rocks belong lithologically to two groups: (1) rocks of andesitic composition, and (2) rocks of rhyolitic composition. The exposed rock on the property is over 90% of rhyolitic composition.

Basic Volcanics

There are basically two types of andesitic rocks in the area mapped, pillowed andesite and andesite tuff.

The pillowed andesite outcrops in only one place, between cross-lines 108N and 116N at 25W to 29W. It is intruded by a diabase dyke striking north. The pillows are poorly developed but are defined by one to six inch wide rusty weathered depressions. Pillow elongation of 340° was the only attitude determined. On fresh surface, the andesite is fine grained and dark green with yellowish sericitic pillow margins. The andesite is moderately silicified. At the southwest end of the outcrop the andesite contains some pyrite cubes and traces of pyrrhotite and chalcopyrite. On the northeast side of the outcrop a pit was sunk east of the diabase. There is a considerable amount of pyrite and some pyrrhotite and magnetite resulting in a rusty weathered surface. In contact with the diabase in the northeast part is a five foot zone containing numerous north striking quartz-carbonate veins.

The second area of andesite outcrop is on cross-lines 56N and 36N between 14W and 20W. This rock is classified as intrusive diorite on Map 1954-4 issued by the Ontario Department of Mines. These exposures were mapped in this survey as highly carbonatized andesite. The weathered surface is rust coloured. (The fresh surface is granular textured and green in colour with numerous crystals of carbonate (ankerite).) On the southwest part of the outcrop on cross-line 56N, the rock becomes less carbonatized, finer grained, and more chloritic and schistose. The schistosity strikes 70°-80° with a dip of 60-70° N-W. This rock bears a greater resemblance to an andesitic flow as does the andesite on cross-line 40N at 14W which contains about 10% leucoxene crystals. Any original structure has been obliterated by the intense carbonatisation. A stockwork of quartz-tourmaline veins intrudes the andesite at the north end of the outcrop on cross-line 56N at 17W. One set strikes at 60° and dipping 75° SE and a second irregular set cuts flatly across the first. The surrounding andesite contains up to 8% pyrite.

On cross-line 40N at 14W, the andesite contains a small amount of disseminated magnetite.

The andesite tuff outcrops at one place; on cross-line 36N at 20E. It is in fairly sharp contact with the carbonatised andesite. It is a paledark green and fine grained rock. There is a definite banding at 290°; the dip was not observed. The contact with the andesite is shown on sheet 6 as striking north but there is very little evidence for this as it was observed in only one place.

An andesite dyke (?) intrudes massive rhyolite in an outcrop at the north boundary of the group (sheet 4).

Acid Volcanics

Rhyolitic volcanics constitute the majority of rock exposures on the property mapped. They include massive rhyolite with spherulitic phases, quartz porphyry rhyolite, and rhyolite agglomerate and tuff.

Massive Rhyolite

The bulk of the rhyolite is of this type. It presents a white to light grey weathered surface. In many places, the surface is blocky due to numerous closely spaced fractures. Throughout a considerable part of the area, the rock has minute pits on its weathered surface resulting from the weathering out of small phenocrysts of feldspar. The fresh surface is light to dark grey except where sericitization, chloritization, and carbonatization give the rock a yellow, green, or pink colour. It is aphanitic to finely crystalline. North of cross-line 220N and west of the paved highway, a siliceous variety was observed but no attempt was made to map it. The massive rhyolite is porphyritic with 3% to 5% quartz "eyes". In places it is finely laminated (flow banding) with faint spherulitic outlines. These zones are narrow and cannot be traced on strike for more than one hundred feet. The strike west and the dip appears vertical. In some places, the laminae are extremely contorted but remain within a west striking zone. Bands of spherulitic rhyolite (Dls), up to 2 feet wide, are present. The spherulites, quartz-feldspar intergrowths, weather as small round protuberances reaching a size of 3/8 of an inch in diameter. These zones strike west and no dip was obtained. One spherulitic zone was traced west, from cross-line 208N at 18W to cross-line 216N at 30W, giving a strike length of about 2000 feet.

Another structure, columnar jointing, is well developed in the northern part of the outcrop area. The individual columns are 5 inches to 1 foot in diameter. They strike west and have a flat east dip. Cross-line 220N provides an arbitrary southern limit to the area of columnar jointing.

If the columnar jointing had originally a vertical attitude, as in a flow, then the present attitude of the columns indicate the dip of the rhyolite; dipping steeply to the west. Cross-line 240N at 6W, is a good location to examine the columnar jointing.

There are numerous discontinuous brecciated zones within the rhyolite. They are usually narrow and of limited length but on cross-lines 224N to 228N at 15E, it reaches a width of three hundred feet. The fragments range from 1/8 to 3 inches in size and are surrounded by a fine grained moderately carbonatized matrix. The matrix, with its ankerite content, weathers a dark red colour. Small amounts of pyrite are associated with these zones.

The alteration in the rhyolite is of three types: sericitization, carbonatization, and chloritization.

Sericitization is the most abundant. In the southwest part of the outcrop area, there are numerous wide shear zones, defined of sericitization, that strike west and dip steeply to the south. Countless small zones are also present. In places, curving greenish yellow weathering zones of schistosity strike westerly. The highly sericitized rocks have a yellowish waxy appearance both on the weathered and fresh surfaces.

Most of the rhyolite has a trace of carbonate (ankerite) and in a few places the rock is moderately carbonatized.

Chloritic alteration is also present in local unmappable zones.

On the western part of the outcrop area, extending from cross-line 220N to cross-line 256N, is a rhyolite similar to the massive rhyolite described previously. However, it has a reddish brown colour due to alteration and masses of chlorite in places. A contact was not obtained but it extends into the property for two hundred feet to one thousand feet from the west boundary of the group. Along the western boundary, finely disseminated magnetite is associated with the reddish brown alteration.

All of the rhyolite rocks contain quartz and quartz-carbonate veins and stringers.

Quartz Porphyry Rhyolite

A porphyritic flow (?) can be traced along the eastern edge of the outcrop area. It presents a smooth weathered surface that is medium grey in colour. On fresh surface it is light grey to dark green grey. The quartz phenocrysts form up to 30% of the rock and reach a size of 1/10 of an inch in diameter. As in the massive rhyolite, it is sheared, sericitized and slightly chloritized and carbonatized. On cross-line 190N at 18W, one to two foot wide quartz veins follow joints at 345°. Also, there are a few quartz-carbonate veins and stringers. On cross-line 264N at 23W, the porphyry is in contact with the massive rhyolite and a twenty foot pink alteration zone extends into the massive rhyolite. The contact, striking north, is transitional but can be located within five feet. On cross-line 220N, near the base line, two small exposures of this rock occur in contact with rhyolite tuff.

Agglomerate

Between cross-lines 167N and 184, a pyroclastic rock is intruded by a northerly trending 100 foot wide diabase dyke. Whitish weathering, rounded to angular fragments of rhyolite are surrounded by a fine grained tuffaceous matrix. The fragments, some of which are feldspar porphyry, fine grained rhyolite, and siliceous graphitic sediments, range in size from a fraction of an inch up to 5 feet. The fragments are closely packed in some places and more widely spaced in others and show an elongation of 290° to 310°. The bedding and schistosity, elongation of the pebbles, appear to be coincident and dip steeply to the northeast.

On cross-line 181N at 18E, large quartz veins form a stockwork. Associated with the veins are numerous masses of pyrrhotite and disseminated pyrite. Smaller quartz veins and stringers are distributed throughout the outcrop area. A trench 30 feet north of cross-line 172N at 17E contains numerous quartz stringers. On the wall rock there are lens shaped to rounded patches of black chlorite. Grains and veinlets of pyrite are distributed around the margins of the chlorite and tiny grains of chalcopyrite occur within the chlorite areas. Two trenches on cross-line 169N at 13E exposed quartz-carbonate veins and stringers. Associated with these veins is pyrite, sphalerite, and traces of galena and chalcopyrite.

Pyrrhotite is present as grains and lens shaped replacements in all of the exposed agglomerate.

Rhyolite Tuffs

Outcrops of rhyolite tuff are present between cross-lines 220N and 224N, east of the base line, on cross-line 212N at 21E, and on cross-line 160N at 23E. They are bluish grey to dark greyish green, aphanitic to fine grained, and vary in composition from band to band. They are porphyroblastic with large quartz metacrysts. It is foliated and banded in the same direction giving a northwesterly strike. The bedding or foliation next to the exposed west contact with the massive rhyolite is erratic, being warped around the rhyolite.

On cross-line 219N at 1W to 2W some pyrite and traces of chalcopyrite and sphalerite are present in the tuff.

Matachewan

Northerly trending dykes of quartz diabase intrude all of the consolidated rocks on the property mapped. Most of the dykes mapped range from a few feet to 150 feet in width. Some are irregular in their strike but trend generally north. With the assistance of magnetometer survey results, many diabase dykes have been traced the full length of the property.

Structural Geology

The Ontario Department of Mines Map 1954-4 indicates fold axes trending southeasterly, immediately northwest of the property. The schistosity parallels the fold axes in this area. The anticlinal axis can be extended southeasterly into the Hollinger property. The evidence for this is the exposure of rhyolite tuff, on cross-lines 220N to 224N at the base line, in contact with the massive rhyolite. All of the exposed rocks are schistose in varying degrees. The schistosity, in the large outcrop area on the northwest part of the property, strikes westerly and dips steeply north or south. On cross-lines 192N to 200N at 20W there are three, 100 foot wide, shear zones that are highly sericitised. No displacement was observed in the surrounding rocks. The remainder of the shear zones in this area are one to ten feet wide. Most of the larger shear zones cross the northerly striking contact of quartz porphyry and massive rhyolite. Also striking westerly are discontinuous bands of laminated rhyolite and zones of spherulitic rhyolite. Paralleling the schistosity, in the northwest part of the outcrop area, is well developed columnar jointing, dipping 0° to 30° east, indicating that the massive rhyolite is striking northerly and dipping steeply to the west.

The foliation changes to a northwesterly trend in the rhyolite agglomerate, the pillowed andesite, and the carbonated andesite. In the area between cross-lines 8N and 96N, detailed geomagnetic surveys are being performed. The resulting pattern plus the presence of magnetite in the andesite on cross-line 40N at 14W, indicate a westerly trend in the southwest corner of the property and changing to a northwesterly trend to the northwest. These trends appear to be formational attitudes.

The faulting on the property is shown on the accompanying geological maps. Little direct geological field evidence supports the existence of these faults. Therefore, the location and extent of these faults is based on geomagnetic and electromagnetic surveys. The offset of the magnetic pattern of the quartz diabase dykes is the evidence used for the westerly trending faults. In the outcrop area, they may be supported by the westerly trend of the shear zones and brecciated zones. The fault crossing at cross-line 187N at 21E is further evidenced, in drill hole EG 6, by a wide brecciated zone. A southeasterly fault, projected east from off the map area from Ontario Department of Mines Map 1954-4, passes through the outcrop of pillowed andesite. Detailed geomagnetic work in the area indicates that such a projection may be valid. It is not drawn on the maps. There is a northerly trending fault following Twenty-three Mile Creek. It is indicated by the topographic expression and the electromagnetic survey. The southern extension of the Mattagami River Fault, from Ontario Department of Mines Map P-425, "The Timmins Area", passes through the southeast corner of the claim group.

Economic Geology

There are three areas of mineralization on the property that are of interest. They are: pyrite, pyrrhotite, chalcopyrite and sphalerite mineralization in the agglomerate; pyrite, pyrrhotite and chalcopyrite mineralization in the pillowed andesite; and pyrite, chalcopyrite and sphalerite mineralization in the rhyolite tuff on cross-line 219N west of the base line. The mineralization is discussed more thoroughly in the lithological description of the various rock types.

Respectfully submitted,

Richard Hayduk.

SEPT. 27/68

R. F. Hayduk,
Assistant Field Geologist.

GEOPHYSICA

GODFREY GROUP #2

HOLLINGER M

Location and Area Surveyed

A magnetometer survey was carried out over the following 81 claims; located in Godfrey Twp., Porcupine Mining Division, Ontario:

P-91320 - P-91327 inclusive,
P-94730,
P-95999 - P-96008 inclusive,
P-96100 - P-96109 inclusive,
P-96111 - P-96115 inclusive,
P-96137 - P-96151 inclusive,
P-96174, P-96175,
P-96179 - P-96860 inclusive,
P-97099,
P-98485 - P-98487 inclusive,
P-98609.

The above claims are registered in the name of Hollinger Mines Limited.

The claims can be reached by paved road, a distance of approximately ten miles west of the town of Timmins.

Personnel Employed on the Survey

R.C. Humphrey was the instrument operator for the survey.

Results of the Magnetometer Survey

During the period April 1/68 to July 31/68, a magnetometer survey was carried out. The magnetometer used was the ABEM MZ-4 having a sensitivity of 10.4 gammas per scale division.

Base stations were established at the intersection of the picket lines and the No. 1 base line. The main base stations were located on XL 124N at 12+00 E and on XL 116N at 12+00 E.

A total of 6,010 stations were read. Stations were read at 100 foot intervals with local 50 foot stations in anomalous areas.

Results of the survey are shown on the accompanying maps, a total of six sheets, on a scale of 1" = 200' and designated by the sheet number and the map title, "Godfrey, Group #2, Godfrey Township".

The contour interval is 100 gammas up to the 2000 gamma range, from the 2000 gamma range on the contour interval is 1000 gammas.

The magnetometer survey was useful in defining the north south trending diabases in the survey area.

The magnetic anomalies are designated on the maps by letters of the alphabet. And, where possible, are traced from sheet to adjoining sheet by the same "letter" symbol.

Faulting appears to have offset or terminated local dikes in some areas and these faults are shown on the maps using the normal fault symbol.

Sheet No. 4 covers the northern part of the 81 claim group.

On sheet No. 4 magnetic anomalies B, C, D, E and F are thought to represent diabase dikes trending in a northerly direction through the claim group. Linear magnetic "lows" locally follow the diabase dike contacts.

Anomalies B, C, D, E and F continue on the adjoining sheet #3 with the addition of E1, G, H, I, J1 and A. All except anomaly A appear to be caused by the presence of diabase dikes.

Anomaly A, trending along the west boundary of the claim group and not fully covered by the magnetometer survey, appears to be caused by fine disseminated magnetite in the rhyolite found outcropping west of anomaly B.

The rhyolite outcrops, west of anomaly B, show an abrupt colour change and exhibit well developed columnar jointing over to and beyond the west boundary of the claim group. The trend of the magnetic highs would suggest a north south strike. The columnar jointing show the "columns" to be nearly horizontal with a 10 degree dip to the west.

Sheet No. 2 shows anomalies D, E, I, G, H, J, K and K1 outlining the diabase dikes striking north south through the claim group. Anomalies H1 and H2 are caused by concentrations of pyrrhotite in rhyolite agglomerate. These anomalies are local and of short strike length. Associated pyrite, sphalerite and minor chalcopyrite have been observed in outcrop in this vicinity.

Sheet #1 adjoining to the south shows the following anomalies: I, I2, G, H, J and H3, all of which are explained by the presence of diabase. An interesting feature is the apparent disruption of all the dikes with the possible exception of E along an east west fault zone.

One possible explanation is the presence of an old fault zone striking east west that the north south diabases tended to warp into and later movement may have broken up the portions of the dikes that managed to penetrate into the fault zone. This theory would account for the varying distances between the north and south portions of the dikes in question and the apparent lack of disruption observed in mapping west of the claim group.

I2, G2 and H3 appear to be broken portions or segments of dikes left in the pre-diabase? fault zone.

G1 appears to be a small local anomaly due to pyrrhotite and magnetite mineralization in andesite outcrop in close proximity to a diabase dike.

Sheet No. 5 adjoining sheet No. 1 to the south shows the extension to the south of the following "diabase" anomalies: I, G, H and J.

R is also thought to be caused by the presence of diabase. M, M1 and L are interesting magnetic features that appear to be intersected by the large "J" diabase.

The actual cause of these anomalies are speculative, they could represent concentrations of mineralization or a more basic rock type or both.

Anomaly P may represent a diabase or diabases intersecting the "J" diabase at L. P2, because of its limited size and strike, could represent sulphide mineralization containing pyrrhotite and/or magnetite in a rhyolite agglomerate formation similar to the outcrops to the north on sheet No. 2.

Anomaly N is also highly speculative as to the exact cause because of the deep overburden in the vicinity.

Sheet No. 6 adjoining sheet No. 5 to the south shows the extension of the diabase anomalies H and J, and the speculative anomaly P. Anomaly R, thought to be a narrow diabase dike, intersects the east west striking anomaly Q on XL 32N and XL 36N.

Q has intriquing possibilities because of its size and strike and proximity to an old drill hole, collared just south of Q and known to have intersected well mineralized agglomerate in an area of low magnetics. The presence of pyrrhotite and chalcopyrite was noted in the log.

An increase in this type of mineralization could explain at least a partial reason for high magnetics in this area.. The overburden is approximately 150 feet deep in the vicinity of anomaly Q.

Further elaboration on anomalies P and Q will be found in the report on the electromagnetic survey.

This report is being filed for assessment work.

C D MacKenzie

C. D. MacKenzie,
Exploration Geologist.

GEOPHYSICAL SURVEY

GODFREY GROUP #2 GODFREY TOWNSHIP

HOLLINGER

030

Location and Area Surveyed

An electromagnetic survey was carried out over the following 81 claims, located in Godfrey Twp., Porcupine Mining Division, Ontario, and registered in the name of Hollinger Mines Ltd.:

P-91320 - P-91327 inclusive,
P-94730,
P-95999 - P-96008 inclusive,
P-96100 - P-96109 inclusive,
P-96111 - P-96115 inclusive,
P-96137 - P-96151 inclusive,
P-96174, P-96175,
P-96179 - P-96188 inclusive,
P-96847 - P-96860 inclusive,
P-97099,
P-98485 - P-98487 inclusive,
and P-98609.

The claims are accessible by paved road from the town of Timmins, a distance of approximately ten miles west of the town.

Personnel Employed on the Survey

W.H. King and H.Z. Tittley were the instrument operators during the survey.

Results of the Electromagnetic Survey

During the period April 1/68 to July 31/68 an electromagnetic survey was carried out. 85 miles of line were cut; 4,163 stations read.

Results of the survey are shown on six map sheets, numbered from North to South in the following order, Sheet #4, 3, 2, 1, 5 and 6.

The survey was carried out with lines cut at 400' intervals and readings were taken at 100' intervals with local additional 50' stations.

Maps are plotted on a scale of 1" = 200'. Readings were taken using the south station NSS, FREQ. 21.4 KHZ, operator facing East. The instrument is described in Appendix 1 and 2 of this report.

The northern portion of the 81 claim group is covered by sheet No. 4. Two hydro lines and a telephone line are outlined by the survey and these "conductors" are not numbered.

Conductor No. 1 appears to be a weak conductor that may be following the contact of a diabase dyke. 1A is a conductive zone between areas of outcrop and partially caused by proximity to the hydro lines. On XL 268N it appears to be due to conductive overburden on a sloping bedrock interface.

Conductor No. 2 appears to be also of this type. The large negatives plotted on the west boundary indicate a conductor axis located west of the claim group.

Sheet No. 3 adjoining to the south of sheet No. 4 shows numerous weak one line responses as well as the numbered "conductors". The unmarked anomalies are considered to be overburden effects caused by local buried bedrock ridges. These anomalies are distinguished by the slow change in readings from station to station and usually without rapid quadrature change at the axis of the "conductor". XL 236N is repeated on sheet #3 and conductor #2 is already described in this report.

Conductor No. 3 is located in an overburden area between outcrops of rhyolite. The response on No. 3 is fairly sharp and may be due to the presence of mineralization. Also, it is possible that part of #5 anomaly should be interpolated as belonging to the No. 3 zone causing a strike variation that would conform to the east west strike of the rhyolite formations mapped in this area. Detail work on additional lines will have to be carried out in the near future to determine the continuity of these anomalies.

No. 4 anomaly located near the east boundary of the claim group has a sharp response on XL 228N that may indicate sulphides and/or graphite.

Anomalies 6, 7, 8, 9 and 10 appear to "contact" and/or overburden "slope" effects.

Anomaly 8A on the boundary appears to be a somewhat better response with a good quadrature change and may be a "sulphide" response.

On sheet No. 2, adjoining sheet No. 3 to the south, anomaly No. 9 continues as a typical "slope" response: i.e. "Conductive overburden against a steep dipping bedrock surface is known to give a certain type response and will be referred to in this report as a 'slope' response."

Anomaly 11 appears to be a response due to the nearby power line.

Anomaly 12 appears to be a "slope" response just east of rhyolite agglomerate outcrop.

Anomaly 13 because of its length and close association with the parallel conductor No. 15 may outline the contacts of a wide fault zone following the present day creek designated on the map sheet as twenty-three mile creek.

Anomaly 14 may be a legitimate bedrock conductor located between agglomerate outcrops.

Anomaly 16 is a very weak conductive zone near the west boundary of the claim group. The conductor appears to outline a possible fault zone or buried "slope".

Anomaly 17 requires further detail work because of the sharp response on XL 160N on the edge of a dark rhyolite outcrop. The remainder of the anomaly and the short parallel anomaly 17A give very weak responses and appear to be buried "slope" responses.

Anomaly 18 is very broad and weak and appears to be causedby a diabase contact.

On sheet No. 1, adjoining to the south of No. 2 sheet, anomaly 19 appears to be the probable extension of anomaly 13 and may indicate a continuation of a fault zone "blinded out" by crossing the two hydro lines.

Anomalies 20, 20A, 21, 23, 25, 26 and 27 are very weak and may only indicate the so called "slope" conductors.

Anomaly 24 is a sharp typical sulphide response and from observing the mineralized andesite in the vicinity of the conductor axis, anomaly 24 appears to be caused by sulphide mineralization containing pyrrhotite and magnetite.

Anomalies 17 and 18 have been previously described on the preceding map sheet No. 2.

On sheet No. 5, adjoining sheet No. 1 to the south, there are numerous single line overburden conductors. These have not been numbered.

Anomaly 28 appears to outline the contact of a diabase dike. Anomalies 29, 30 and 31 appear as typical "slope" conductors. Anomaly 32 may indicate a fault zone and Anomaly 33 appears to be picking up a diabase contact.

Anomalies 34, 34A and 35A give fairly sharp responses and these conductors may be outlining mineralized zones.

Anomalies 36 and 37 appear as weak buried "slope" conductors.

Continuing on sheet No. 6, adjoining sheet No. 5 to the south, the following electromagnetic anomalies continue: 32, 34A, 35, 35A and 37. Line 40N has been repeated as an overlap from sheet No. 5. Anomalies 32 and 33 are likely "slope" effects.

On sheet No. 6 anomalies 35 and 37 closely follow the trend of the magnetic anomaly P and may be outlining contacts. On sheet No. 6 anomaly 35A, in an area of low magnetics, gives a response that is very similar to a typical "sulphide" response.

Anomaly 38 appears to outline a buried outcrop ridge.

On sheet No. 6 the hydro lines are outlined but are not marked in as conductors.

Conclusions and Recommendations

The EM-16 survey appears to have supplied useful information on near surface conductive zones. Hydro lines "blind out" the survey over short distances and deep conductive clay over much of the property is felt to have sharply limited the instrument as to depth of penetration.

It is recommended that a vertical loop survey be carried out to confirm conductive zones outlined and possibly to reveal conductive zones in the deep overburden areas.

This report is being filed for assessment credits.

C D MacKenzie

C. D. MacKenzie,
Exploration Geologist.

TYPE OF INSTRUMENT USED - EM-16

The survey was performed using an EM-16 (electromagnetometer) receiver. The instrument has two receiving coils built into it (one coil has normally vertical axis and the other has normally horizontal axis). The signal from the vertical axis coil is read on an "in phase" inclinometer and the signal from the horizontal axis coil is read from a "quadrature" dial. The range of measurements are $\pm$ 150% on the "in phase" inclinometer and $\pm$ 40% on the "quadrature" dial.

Principle of Operation

The EM-16 uses very low frequency transmitting stations operating for communication with submarines for the transmitted signal. These V.L.F. stations have a vertical antenna which creates a concentric horizontal magnetic field around them. When these magnetic fields meet conductive bodies, there are secondary fields set up around these bodies. The EM-16 measures the vertical component of these secondary fields ("in phase" measures the vertical real component and the "quadrature" measures the vertical component shifted through 90°).

Three transmitting stations are used in performing surveys in central Canada. These stations are NAA Cutler, Maine, NPG Seattle, Washington, and NSS Annapolis, Maryland, with frequencies of 17.8 kc, 18.6 kc and 21.4 kc respectfully.

The station selected should be the station whose direction is parallel to the strike of geological structure in the area being surveyed.

The station used in this survey was **Station NSS, FREQ. 21.4 KHZ.**

Operation

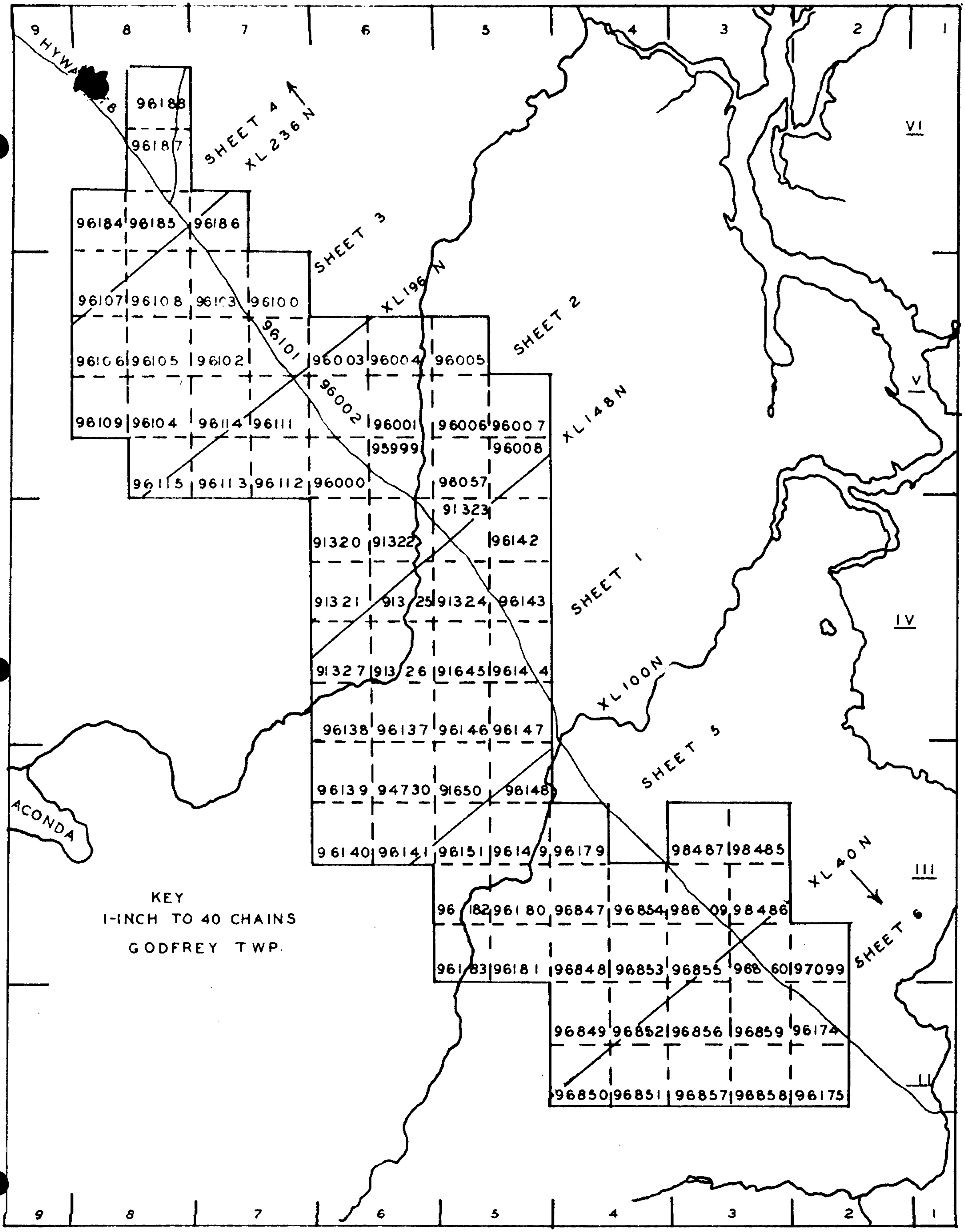
When the selection of the station to be used in a survey is made the proper selector unit is plugged in and the instrument is turned until the signal is minimum (this will occur when the instrument is pointing towards the station) and then the instrument is turned 90° (instrument is now oriented along the lines of the primary magnetic field).

To take a reading the instrument is swung back and forth in a vertical plane to obtain minimum signal (sound) intensity in the earphone. When this position is obtained the "quadrature" dial is adjusted to obtain the minimum signal strength (null point). The readings on the inclinometer and the "quadrature" dial are recorded. Readings are normally taken at 100' stations with intermediate readings in conductive areas. The readings should always be taken with the instrument oriented in the same direction for one survey.

Interpretation

A conductor occurs when a cross-over from positive in phase to negative in phase occurs (or when in phase increases above background to a maximum and decreases below background to a minimum). The instrument is so constructed that in general the lower end of the vertical axis coil will point towards conductor. The axis of a conductor occurs at a point half way between the maximum and minimum points on the in phase measured along the profile line. The depth from ground surface to a point close to the upper edge of the conductive body is determined by measuring the horizontal distance between the maximum and minimum point on the in phase.

The quadrature profile is used in determining the characteristics of the conductive body. A quadrature profile which follows the in phase profile (relatively) indicates a poor conductor. A quadrature profile which follows the in phase profile with a small change in absolute values indicates a good conductor. A quadrature component which shows a reverse polarity indicates conductive overburden on top of a deeper (better) conductor.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