HANS LUNDBERG
VICTORY BLDG.
80 RICHMOND ST. WEST
TORONTO 1, ONT.

REPORT ON

THE GEOPHYSICAL SURVEY ON

PROJECT 1 B CLAIMS

KING BAY, STURGEON LAKE,

DISTRICT OF THUNDER BAY, ONTARIO

DIGEST

In the fall of 1945 a program of staking and prospecting was initiated, by Hans Lundberg on behalf of C. J. Ryan, north of King Bay on Sturgeon Lake in the District of Thunder Bay, Ontario.

The area was selected on the strength of reports concerning the presence of a large number of gold-bearing boulders which had been found just south of King Bay. Since these boulders had been found in ground morain, it was apparent that they had been transported to their present location by glacial ice. Studies of the geology of the area and the distribution of the boulders indicated that the veins, from which these gold-bearing boulders were plucked, probably came from some point north of King Bay and south of the granite.

Staking was completed by March 1946 and one block of ground,

I N D E X

belonging to Messrs. Havelock, Butt and Macdonald, lying within the claims staked, was optioned. This option is known as the Butt Option.

During the period from April until September 1946, a geophysical survey was carried out over portions of the area staked and optioned. At the same time the outcrops were mapped and all mineralized showings studied and sampled.

Several methods were used and it was found that the results obtained by the ratiograph survey and the magnetic survey were of greatest value in outlining what appears to be the most favourable structures for ore deposition.

Six conductive zones have been outlined by the ratiograph survey. The gold-bearing quartz vein which occurs in a carbonated shear zone along the contact between two flows lies in the No. 3 conductive zone.

A narrow mineralized shear was observed at one point on No. 2 zone and trenching across No. 1 zone exposed a mineralized shear which carried low gold values near the contact of volcanics with quartz-feldspar porphyry. A drilling program has been outlined which will explore the Nos. 1, 2 and 3 conductive zones.

INTRODUCTION

During the period commencing in March and ending in September 1946 geophysical and geological surveys were made over a group of claims staked and optioned by Hans Lundberg on behalf of C. J. Ryan. This group located north of King Bay on Sturgeon Lake in the Thunder Bay District, Ontario, was acquired because somewhere in this area it was considered most probable to find the source of many gold-bearing boulders which had been found on the south side of the bay.

Geophysical surveys were used in order to limit the exploration of the area by drilling or trenching to the more favourable zones.

LOCATION, AREA, MEANS OF ACCESS

The property consists of a group of claims located in the central part of the Sturgeon Lake map area in the Western portion of Thunder Bay district at about 50° North latitude. They are bounded on the south by the waters of King Bay, and on the northeast by Shore Bay at the south end of the north arm of Sturgeon Lake.

The group comprises 80 claims known as:

TB 33786 to TB 33817 inclusive (32 claims)
TB 32458 to TB 32495 inclusive (38 claims)
TB 30671-2, TB 30674-5, TB 31224-5 and 6, TB 32072, and TB 32139-40 being the 10 claims in the Butt Option.

The total area is approximately 3,320 acres.

The property is about fifteen miles south of the village of Savant Lake on the main line of the Canadian National Railway. A three mile wagon road, which is passable by motor car and trucks, leads from the village to the north end of the North Arm of the lake. The remainder of the route to camp may be travelled either on water or on the ice, depending upon the season. Aircraft may be chartered at Sioux Lookout, 52 miles west of the property, for passenger and freight transport.

SUPPLIES AND TRANSPORTATION

Most supplies for a prospecting camp are available at Savant Lake stores. Additional articles can be ordered directly from Winnipeg, Toronto, or through the Savant Lake stores and will be received by daily express or by a weekly freight service.

During the period of this survey, certain supplies were not available due to the postwar confusion, but the lack did not greatly hinder the progress of the survey.

Transportation of men and equipment from Savant Lake to the property can be arranged locally. During the summer, automobiles or trucks were used over the road from Savant Lake to Trapper's Cabin on the lake, and from here to the camp by boat. In the winter terms or tractor may be used during periods when the ice is safe for carrying loads.

The break-up period usually has a duration of three weeks in the period from April 1st to May 15th while the freeze-up is about the same length of time between November 1st and December 25th. Therefore communication, as a rule, may be had with the camp for all but six weeks of the year.

PREVIOUS GEOLOGICAL WORK

The geology of the Sturgeon Lake basin has been studied by a number of geologists at various times throughout a period of forty-seven years. References to the area are to be found in the following reports.

W. McInnes, Geol. Surv. Can., Sum. Rept., 1893, pp 118-120.
J.K. Davison, Ont. Bur. Mines, Report of the Survey and Exploration of Northern Ontario in 1900, pp 230-249.
A.P. Coleman, Ont. Bur. Mines Vol. XI, 1902, p 148
W.G. Miller, Ont. Bur. Mines Vol. XII, 1903, pp 83-86
W.H. Collins, Geol. Survey Can. Rept No. 1059, 1910, pp 83-86.
E.S. Moore, The Sturgeon Lake Gold Field, Ont. Bur. Mines, Vol. XX, pt 1, 1911, pp 133-157.
T.L. Gledhill, Ont. Dept. Mines, Vol. XXXIII pt. 6, 1924, pp 18-39
A.R. Graham, Ont. Dept Mines Vol. XXXIX, pt 7, 1930, pp 26-50.

HISTORY OF DEVELOPMENT

For a general history of the development of the area, the reader is referred to the reports by E.S. Moore and A.R. Graham. Since their reports were written, the area was rather inactive. About 1940, prospectors working for Northern Canada Mines Ltd located some narrow quartz veins at Aurora Lake which lies to the west of King Bay. Some work was done but discontinued on account of the war. However the company staked 25 claims which they still hold. Northern Canada were in the area in 1946

and located another mineralized zone on a small lake west of King Bay. This is known as the Dan Mick discovery. The company plans to drill this showing.

During the "thirties" a Mr. Anderson did considerable prospecting in the area south of King Bay. He even took in machinery to make a small mill through which a number of the gold-bearing boulders were run and approximately $300.00 in gold recovered.

In 1945 this office was advised of the existence of these boulders and the present prospecting program was inaugurated.

GLACIAL ORIGIN OF THE GOLD-BEARING BOULDERS

A considerable number of gold-bearing boulders were found in the moraine south of King Bay. These boulders in part consisted of almost pure dark quartz with sulphides, in part of quartz-feldspar porphyry cut by quartz veins with some sulphides or in some cases no sulphides. The boulders of quartz with sulphides carry gold and in some examples, were quite high grade. Although it is quite obvious that the boulders had been transported to their present position by glacial ice, there are differences of opinion as to the distance of over which they have moved.

Mr. Anderson is of the opinion that the boulders were derived from a porphyry dyke which occurs along the top of the ridge to the south of King Bay. This belief is based on the fact that many of the boulders are porphyry and that the greater number of the boulders was found to the south of the dyke. However boulders occur north of the bay, some of which probably came from the Butt showing, but at least one of which came from some other source.

The reason most of the boulders occur south of Anderson's dyke is explained by the topography. As the ice moved over the basin of the bay

and up the slope to the south of the bay, it was under pressure and none, or practically none of the boulder load was released. As it rode over the brow of the ridge the pressure was released and melting took place, with the result that boulders were left in their present position.

With this in mind the boulder fan was developed as shown on map 13-232-9. All the glacial striae observed in this area indicate that the movement of the ice was from north to south. The strike of striae varies from South 25° W to slightly east of south. Lines parallel to the extreme directions of the ice movement are laid out on each side of the known position of the boulders. The sector thus obtained widening towards the north includes the probably area harbouring the source of the boulders. To obtain the position of the boulder source, a fan has been constructed using the extreme glacial directions again, but on opposite sides of the boulders so that the sharp point of the fan would indicate the most likely position of the source. The accuracy of this type of diagram depends on whether the outside boundaries of the boulder strewn area has been located; therefore, it is necessary to explore a somewhat greater area than that shown within the confines of the diagram.

STAKING AND OPTIONS

In October, 1945, a block of thirty-eight claims was staked by Ivan Christopher in the area between King Bay and the granite contact.

In December, 1945, ten claims, owned by R. E. Butt and associates, lying to the north and west of the bay and containing a small but interesting gold showing was optioned.

In March, 1946, thirty-two claims were staked by William Sundberg to cover an area to the west of the above mentioned groups.

CAMP

In April, 1946, a tent camp was erected, located on the north side of King Bay. This camp was used from April to September by the geophysical survey party. At the conclusion of the survey, two men were left in the camp to carry out surface prospecting and to keep everything in order until the diamond drillers take over. Drilling is expected to be underway by the end of October.

TOPOGRAPHY

The area has the characteristic lack of relief which is typical of a greater part of the Canadian Shield. There are numerous small lakes, besides Sturgeon Lake, which lies near the height of land at an elevation of 1342 feet above sea level. There are local abrupt changes in elevations of as much as 20 feet and the maximum height of the hills above the lake level is not more than 150 feet. There are numerous islands in Sturgeon Lake and the shore line is quite irregular.

Numerous outcrops are present, generally small and separated by areas of shallow overburden consisting of glacial sand and boulders. Swampy areas with a covering of deep moss are common but usually small in size. The overburden in most places is probably less than 10 feet thick. It may be somewhat heavier on the south side of the outcrops.

BUSH

Jackpine, spruce, birch and poplar are common. In the western part of the area there is much virgin timber, but the eastern portion in which the geophysical detail work was carried out is covered by a very thick second growth of spruce and jack pine. This area had been burnt over about twelve years ago.

GEOLOGY

General Geology

The Sturgeon Lake Area is underlain by Keewatin volcanics and Timiskaming sediments. These formations occupy an irregular shaped area which is over forty-eight miles long and varies from six to sixteen miles in width. The mass is bounded on the north west by granite gneiss and granite and on the south and south east by granite gneiss and syenite. Three masses of younger granite occur in this boundary zone. The North Arm of Sturgeon Lake lies within one of these masses.

Beside the granites and syenites which form the boundaries of the older formations there are a number of smaller masses of diorite and granite and syenite which occur as sill-like and stock-like masses within the volcanics. There are also many quartz-feldspar and feldspar porphyry as well as granoporphyry dykes within the area.

The structure of the area has never been worked out in detail. There are two belts of sediments which give some clue as to the general arrangement of the formation. The first of these has a somewhat south of east trend and crosses Sturgeon Lake just south of Seaton Island.

The second belt of sediments has a north easterly strike. Outcrops of this group occur on the north shore of Sturgeon Narrows and on the islands in East Bay. The second belt merges with the first belt in Sturgeon Lake just west of Seaton Island.

If the sediments are Timiskaming, this arrangement of sedimentary belts indicates the presence of two major synclinal axes, the first crossing Sturgeon Lake just south of Seaton Island and the second extending north easterly from Seaton Island through Sturgeon Narrows across East Bay and

along the south east side of Northeast Arm. It would also mean that a major anticline lies to the east of Seaton Island. The core of this anticline is occupied by the Sesegunaga Lake granite. It is also suggested that the Sturgeon River granite and the younger granite around North Arm occupy the core of a major anticline to the north of Sturgeon Lake. The axes of these anticlines should have an almost east-west strike.

This would mean that the prevailing direction of the regional shears should be almost east-west. The geophysical survey in the vicinity of King Bay indicates that the shears do follow this trend.

The structural pattern formed by the porphyry dykes, especially those in the vicinity of King Bay and North-east Arm appears to have been formed by the intrusion of the North Arm Granite. The dykes are in general parallel or nearly parallel to the granite contact, and it is suggested that the openings were formed by forces set up by the cooling of the granite mass.

GEOLOGY OF THE PROPERTY

The greater portion of the area is underlain by volcanics which are from andesitic to basaltic in composition. These rocks are generally quite massive, and in numerous places pillow structures are well preserved. In places, however, there is considerable fracturing and shearing. Bedding is difficult to find but the alignment of the pillows indicates that the strike varies from a little south of east to somewhat north of east. The tops of the pillows, where accurate determinations can be made, always face to the south. The dips are generally very steep.

Where the rocks are schistose, the strike and dip of the schistosity is similar to that of the bedding. In places strong jointing

is observed with a north-easterly strike. At one place on the Macdonald Group, which lies inside the western group of Project 1 B claims, a strong south-easterly trending shear zone which is the locus of a gold-bearing quartz vein, and some sulphides, was seen.

Near the granite contact the greenstones have been altered to amphibolite but away from the contact they are fairly free from such alteration.

Diorite occurs at several places throughout the property. This appears to be an older diorite and it is difficult to map, especially when it strikes with the volcanics, since it is similar in appearance to the coarser grained portions of the flows. In places, however, it cuts across pillow lavas and could be mapped. This diorite is most abundant to the west of King Bay and to the north and west of Second Lake.

The south end of the North Arm granite extends into the property. The contact roughly follows the southshore of Shore Bay and in places along the contact the rock is a granophyre.

Quartz feldspar porphyry and feldspar porphyry dykes are fairly abundant especially in the vicinity of King Bay. The boulders south of King Bay are in part porphyry cut by quartz stringers. This is an indication that the porphyries are possible host rocks for the gold-bearing veins.

In numerous places there are small narrow quartz veins in slightly carbonated shear zones which cut the andesites. Some of these carry gold. In other places there are streaks of rusty weathering generally near diorite. These streaks do not appear to be gold-bearing.

MINERAL SHOWINGS

For a complete description of some of the Sturgeon Lake mineral occurrences, the reader is referred to E. S. Moore's report on The Sturgeon Lake Gold Field, Ont. Bur. of Mines Vol XX, pt 1, 1911, pp 133-157.

This report does not describe the Butt showing nor the more recently discovered Don Dick showing therefore a brief description of these is included in this report.

THE BUTT SHOWING

The Butt showing is located on claim No. TB-30674 of the Butt option and is about 1200 feet north of King Bay. Trenching has been carried out at intervals along the zone for several hundred feet. One rock trench has a total length of about 100 feet. This trench is along the contact of two flows. This contact zone is slightly sheared and carbonated and is the locus of a blue quartz vein which varies in width from a few inches to about three feet. The vein has a strike of N 75° E over 60 feet, then takes an almost right angle bend and strikes at N 20° W for 40 feet where it disappears under the overburden. At the bend the vein flattens out and dips about 36° to the West. At another place the dip is steep to the south. Some quartz veining occurs at places along the strike. The quartz is commonly dark blue and in places carries sulphides. Free gold was observed. There does not appear to be much sulphide mineralization in the wall rocks.

A few shallow drill holes were put down to explore a short section of the veins but the results of this work are not available.

DON DICK DISCOVERY

The Don Dick discovery on Don Dick lake is some distance to the west of Project 1 B Group. However since it is a new discovery and work is being carried on at the present time, the progress of this work should be followed in the hope that the results obtained may be of use in guiding the prospecting activities in the area as a whole.

In the early part of August, a group of 20 claims was staked by two prospectors, Donald and Richard Hollingsworth, for Northern Canada Mines Limited. The discovery made by them is located on an unnamed lake (now called Don Dick lake) five miles west of the boundary of the Project 1 B area and two miles south of the granite contact. This is just over a mile east of the boundary between the Thunder Bay and Kenora districts.

The showing has been closely examined by Dr. Neal Benton of Northern Canada Mines and he considers it worthy of diamond drilling. The mineralised showing is in a small outcrop on the shore of the lake and is completely surrounded by water and muskeg. It is a mineralised sericite-biotite shear zone having an east west strike. A quartz vein occurs in the shear which is exposed for 16 feet. Unweathered material was assayed. Samples taken across the 10 foot width of the outcrop gave values of $\frac{1}{2}$ ounce of gold per ton.

THE GEOPHYSICAL SURVEY

General

The successful application of geophysical methods in the search for ore deposits and to the solution of geological problems, depends upon the abnormalities caused in naturally occurring, or artificially induced, forces such as electricity, spontaneous earth currents, magnetism, seismic vibrations, gravity, heat and radioactivity, by the differing physical properties of the constituents of the earth's crust.

Naturally, the greatest benefits are derived from geophysical surveys which measure those forces most strongly influenced by the particular type of physical variations present in the rocks which underlie the area under investigation. Therefore, the selection of the most suitable geophysical methods is of the greatest importance, and wherever practicable it is desirable to use at least two methods as a mutual check.

The ultimate choice of the methods to be used in a given survey is decided by the basic geophysical principles actually known to be involved, or which, on the basis of past experience, may reasonably be anticipated in the areas under investigation. It has been found in Ontario, that measurements of electrical conductivity and magnetic intensity differences yield the most useful information and methods employing these principles were used in the survey of this property.

In addition, to allow of a more precise interpretation of the cause of the indications obtained, an electromagnetic and a self-potential method was used where indications were obtained by the principal method used.

The electrical methods of geophysical prospecting are primarily concerned with the relative electrical conductivities of the underlying rock formations.

It is a well known fact that many metalliferous ore minerals, particularly sulphides with a metallic luster, conduct current quite readily, while the essential rock-forming minerals, such as quartz, feldspar, and mica, etc., are non-conductors. However, the resistivity of the common rock formations as they occur in Nature, is determined chiefly by the number, size and orientation of the pore spaces and by the saline content of the water filling these voids. Thus, the conductivity of a porous sedimentary rock is usually considerably greater than that of a

dense, fine-grained igneous rock. Furthermore, saturated zones of shearing, schisting, or fault brecciation will exhibit much higher conductivity than the neighbouring rock.

Some minerals, of which magnetite and frequently pyrrhotite are good examples, possess marked magnetic properties. Concentrations of these minerals cause great local distortions in the normal direction and intensity of the earth's magnetic field and their presence may be detected by observing these magnetic field variations. The differences in the magnetic susceptibilities of various rock formations, as for instance, between dykes of basic igneous rock and lava flows or sediments, may often be sufficiently distinct to permit the mapping of their contacts by magnetic methods. It is also sometimes possible to trace mineralized structural features because of their magnetic reactions.

Areas of mineralization can be outlined if magnetic minerals such as magnetite and pyrrhotite are present, and concentrations of these minerals may be directly located. Magnetic mineralization sometimes occurs along shear zones and contacts and in such cases these features may be outlined.

By following "key" magnetic horizons, folds and faults are indicated.

When conducting minerals such as sulphides with a metallic luster are influenced by an alternating electromagnetic field, potential differences are created and a current is induced. This current in turn creates a secondary electromagnetic field which can be located by suitable equipment. Conducting minerals can thus be found.

Chemical changes such as the oxidation of sulphides in the ground are accompanied by potential variations. The magnitude of these potentials is related to the reaction materials and the concentration of these materials.

Water is necessary for these chemical reactions and a continuous movement however slow is essential. In the earth regional potential differences are found and super-imposed on these differences are local variations due chiefly to the oxidation of sulphides. Shear zones permit oxygen-carrying ground water to circulate more freely and the intensity of the reaction is generally increased.

Personnel

Several members of our organization were delegated to carry out various parts of the program of acquisition of claims on this property, setting up a camp, carrying out the geophysical work and the geological mapping. During October, 1945, Ivan Christopher staked the first group of claims and wrote a brief report of conditions in the area, confirming the existence of quartz boulders with high gold values. In December Christopher also arranged for the option of the ten Butt claims. In March, 1946, William Sundberg staked another group of claims to cover the westward extension of any existing mineralization. Sundberg also selected the campsite and set up the first tent camp which was used over the break-up period. Sundberg also supervised the cutting and taping of the lines to be used for the geophysical survey. Douglas Burton acted as manager for the geophysical survey parties from April until September. Robert Mulligan, Stanley Savage and Lewis Bath carried out the magnetic observations. Roderick MacKenzie and Heinz Zuschlag conducted the Ratiograph Survey. Zuschlag also carried out the electromagnetic survey. Burton made the self-potential measurements. Mulligan and Burton mapped the geology along the cut lines as well as along the shores of King Bay and Shore Bay.

Basil Wilson, our chief geologist, visited the property in July, studied the geology of most of the area and classified the rock types.

Wilson mapped the old showings and exposures on the property and examined the Andersen group of claims to the south. During his examination Mr. Sydney H. Ball, consulting mining engineer and adviser to Mr. C. J. Ryan, studied the property and inspected our work.

Hans Lundberg visited the property during the time of the survey. The line cutters and helpers for the geophysical surveys were locally hired, transported to the property and lodged at the camp.

For the preparatory work and for the geophysical survey on the property 1284 man days were required, time spent for staking and transportation of supplies and equipment not included.

Land Survey

The lines were laid out by compass and continued by means of well marked pickets placed at 50 foot intervals. The origin for the coordinates was established off the property to the southwest.

The lines bear three to four degrees east of astronomic north. In the report and on the maps the lines refer to magnetic north.

An east-west base line was first established from which lines for the first reconnaissance survey were laid out at intervals of 1300 feet, (roughly the width of a claim). These lines were cut from King Bay to the north boundary of the property.

To aid our work aerial photographs covering the property approximately 1 inch = 900 feet were obtained from the Dominion Government at Ottawa. Details of shore lines and creeks on our maps were taken from these photographs.

For the various geophysical detail surveys lines were cut

every 300 feet. Six foot posts were placed at each cross line along the east-west base-line (N3700).

A total of 182550 feet of picket line was cut and prepared for the geophysical surveys.

Methods

Magnetic observations were taken along most of the lines prepared, and before the "break-up" observations were also taken on the King Bay ice, although no complete survey was possible to accomplish. The vertical component of the magnetic intensity was determined with a Smith balance Askania type adjusted to a sensitivity of 26 gamma per scale division. Control stations were established and all observations were properly corrected with relation to each other. The observations were generally taken at 50 ft. intervals, with closer spacings in places where details were required. A total of 155,000 feet of profile line was surveyed magnetically.

For the reconnaissance electrical survey as well as most of the detail work our "Ratiograph" method was employed. This method functions by determining the ratio of the conductivities of successive 50 ft. sections of ground along each profile line. These ratios are not measured directly but are obtained by observing the potential drop ratios and phase changes superimposed upon an artificially created electrical field, by resistive, inductive, and capacitive characteristics of the ground between the points of observation. The artificial electrical field is produced by applying an alternating potential of audible frequency to the ground.

The "Ratiograph" instrument itself consists of a sensitive bridge circuit featuring the maintenance of constant impedance, in which provision is made for the elimination of ground contact resistance. By taking observations, first in one direction along the profile line and then in the other, lateral changes in the conductivity of the surface are obtained, the extremely variable surface effects being eliminated.

Ratiograph observations were taken along 135,650 feet of profile line, each line being surveyed in both directions.

On certain portions of the property where more important indications had been obtained with the above methods, electromagnetic and spontaneous polarization observations were also taken.

The electromagnetic observations were made with our "Two-Frame" method, measuring the distortion produced by a conductive body in an artificially created electromagnetic field. The electromagnetic field is produced by applying an alternating potential of audible frequency to the ground.

The "Two-Frame" apparatus consists of two coils or frames, a diopter and a clinometer. One frame is held with its plane in a horizontal position and the other is used for measuring the various components of the electromagnetic field. The interval between the coils was 33.3 ft. From this survey conductors with high specific conductivity may be traced and outlined. A total of 47,800 ft. of profile lines were surveyed by the electromagnetic method.

Potentials, spontaneously generated by oxidising sulphides and graphite, were measured with a sensitive direct current potentiometer connected to a pair of balanced, non polarising electrodes. The potential of an arbitrarily chosen point is taken as datum with the potential variations calculated with this as reference. A total of 14,600 ft. of profile lines were surveyed by this method with observations at 25 ft. intervals.

DISCUSSION OF GEOPHYSICAL RESULTS

The Maps

Nos. 13-232-3; 13-232-4; 13-232-5; 13-232-6; 13-232-7; 13-232-9; 13-232-10; 13-232-11.

There are seven maps accompanying this report numbering 13-232-3, -4, -5, -6, -7, -9, -10 and 11. Map 13-232-9, drawn to the scale of 875 ft. to 1 in., is a base map of the area showing the general geology and the different properties; also the trend of the geophysical indications is shown.

On the key map in the corner drawn to scale two miles to 1 in., the geology of the northern part of the Sturgeon Lake area is shown together with the location of the area geophysically surveyed in relation to other properties and recent discoveries.

Map No. 13-232-7 drawn to the scale of 200 ft. to 1 in. shows the magnetic results. Iso-dynamic lines connect points of equal vertical magnetic intensity. Intensity values higher than normal are indicated in different shades of blue, while values lower than normal are shown by shades of red. The normal intensity value for the area (between 1100 and 1200 gamma), is left uncolored on the map.

Four maps numbered 13-232-3, -4, -5, and -6, drawn to scale 200 ft. to 1 in. show geology, geophysical results, and recommended locations of drill holes. These four maps together cover the whole property.

Map No. 13-232-10 (scale 200 ft. to 1 in.) shows in detail the interpretation of the results of the geophysical survey. On this map conductive zones are outlined and colored a pale orange. A deeper tint has been used to emphasize the more highly conductive portions of the main zones.

Map No. 13-232-11 (scale 200 ft to 1 in) shows the results of the self-potential survey. The potential values (in millivolts) are shown along each profile. Lines connecting equal potential values outline negative centres which overlie areas of most active oxidation.

The Magnetic Survey

Several zones of high magnetic intensity were outlined. These are narrow and correspond in a general way with the conductive zones which were outlined by the ratiograph survey. The increased magnetic intensity along these zones is likely caused by the presence of magnetite or pyrrhotite in shear zones or by a flow of basic lava. It should be noted that the strikes of two magnetic zones which extends from 375° N line 10900 E to 4100 N line 11800 E and the zone traced from 4500 N line 127E to 4850N line 14300 E are parallel and might represent the formational trend. If this is correct the conducting zones interpreted as shears cut this formational trend at an acute angle thus creating structures that could be favourable for ore deposition. It should be noted that a small magnetic anomaly crosses at a similar angle No. 3 shear zone at the place where the Butt showing is located.

The magnetic zones or trends appear to be interrupted in places but until such time as some drilling has been done it is impossible to determine the importance of such breaks in terms of ore forming structures.

The Ratiograph Survey

The field results were calculated and plotted on cross section sheets on a scale of 200 ft. to 1 in. On these sheets were also plotted the results obtained by the other methods together with topographic and geological data. These cross sections were then used to build up the maps submitted with this report. On maps numbered 13-232-3, -4, -5, -6, are indicated the exact points on each profile where conductors were encountered.

Map numbered 13-232-10 shows the interpretation of the conductive zones.

Study of these maps shows that the conductors are related to shear zones which in places show sulphide mineralization and quartz veins. It would seem most likely that these zones would be the most favourable places to prospect for ore deposits.

There are six major conductive zones and work to date shows that mineralization and low gold values occur near a porphyry dyke along Zone 1, and that the Butt vein occurs at the western end of Zone 3.

Certain lines have been drawn in on Map No. 13-232-10 to indicate the trend of what may be interpreted as faults. This interpretation is based on changes of strike along the zones as well as minor differences in the electrical characteristics as revealed by the ratiograph curves. If drilling proves this interpretation to be correct, a useful guide to the structure of the area has been found.

The Electromagnetic Survey

The results of the electromagnetic survey checked clearly with the ratiograph results, and have been considered in making drilling recommendations.

The Self-Potential Survey

The results of the self-potential survey are shown on Map 13-232-11. Negative centres fall well within the outlines of the conductive zones. Drilling however, is necessary to determine whether these centres could be used as targets for finding mineralization of commercial value in the future prospecting of the area.

SUMMARY AND RECOMMENDATIONS

Six conductive zones were traced and outlined in the geophysical surveys. Zones No. 1, 4, 5 and 6 were not traced throughout the whole of the property on account of the lakes. This, however, could be done on the ice during the winter.

It has been recommended that No. 1, 2 and 3 zones be tested by drilling. The results obtained in this drilling should determine whether drilling and further geophysical work would be warranted along the other zones.

If the drilling results are encouraging, much more geophysical work is justified, especially in the vicinity of line 7600E where good indications were obtained at 6000 N, 8400 N, 9750 N, 10150 N, 11250 N, 11550 N, 11700 N, 12100 N and 11350 N. Also in the vicinity of line 9300 E at 8550 N, 10600 N and 10150 N, on line 10600 E at 8550 N and on line 12400 E at 8200 N and 9300 N.

A contract for 3000 feet of drilling has been signed with Canadian Longyear and the following drill holes should be completed before the end of the year.

DIAMOND DRILL HOLES RECOMMENDED

	Location		Magnetic Bearing	Cross section	Length of holes
	Line	Position			
1.	E10,200	N4100	N 20° W (340)	160	220
2	E10,900	N4290	N 05 W(355)	160	250
3	E11,500	N4300	N 10 W (350)	200	290
4	E10,600	N3780	N 10 W (350)	120	170
5	E11,500	N3850	N 05 W (355)	150	210
6	E 9,600	N3480	N 20 W (340)	220	310
7	E 8,820	N3790	N 47 E (047)	250	350
8	E12,400	N4400	N 05 W (355)	220	310
9	E14,000	N3570	N175 E (175)	160	230
10	E14,600	N3600	N175 E (175)	190	260
11	E13,600	N4580	N10 W (350)	150	250

It is suggested that all holes be drilled at a vertical angle of 45°.

This report is respectfully submitted.

HANS LUNDBERG

Toronto Ont.
November 6th
1946

Basil T. Wilson
Basil T. Wilson
Chief Geologist

(Approved) Hans Lundberg
Hans Lundberg

900 MINING CLAIM NO: TB 32489

Pavel Alexanroff
Val D'Or, Que

K.12690 - Oct 9th, 1945

Sturgeon Lake area and North from King Bay. The number three post is 630 feet due West from No one post BG 171

October 18th,1945 at 10 a.m. by Self
November 3rd, 1945

Cancelled under Section 87
The Mining Act: Oct 17/47

Mining Claim No TB32489.

(Work Done) Days

d Address of ee

and date of e

d Hour king

Recording

y Permit ted

y Permit ed

Record ted

f Work ted

Paul Alexanoff
Val d'Or, Que.

K.12690 — Oct. 9th 1945

Sturgeon Lake Area and North from Kitty Bay. The number three post is 630 feet due west from No. one post B.S.171.

October 18th 1945 at 7.0 a.m by Self

November 5th 1945.

Cancelled under Section 81
The Mining Act
Oct 4/47

MINING CLAIM NO: TB 32488

Pavel Alexanroff
Val D'Or, Que

K.12690 - Oct 9th, 1945

Sturgeon Lake Area North from King's Bay. The number three post is 20 chains due east of the No 2 post BG 171.

Octboer 18th, 1945 at 9 a.m. by Self
November 3rd, 1945

40 Days work (Geo-Phys) OK Nov 28th

Cancelled under Section 87
The Mining Act: Jan 11/50

No. 7

(Work Done) Days

Mining Claim No. TB32486.

[Na]me and Address of Licensee	Pavel. Alexanroff. Val d'Or. Que.
[Nu]mber and date of License	K. 12690 — Oct. 9th 1945.
[Lo]cality	Sturgeon Lake area North from King's Bay. The number three post is 20 chains due east of the No 2 post
[Da]te and Hour of Staking	October 18th 1945 at 9 a.m. by Self
[Da]te of Recording	November 3rd 1945.
[For]estry Permit Granted	
[For]estry Permit Refused	
[Cer]t. of Record Granted	
[Cer]t. of Work Granted	

40 DAYS WORK (EE - 9 4A/S) [illegible]

Cancelled under Section 87
The Mining Act Jan 11/50

MINING CLAIM NO: TB 32464

Wilfred Simard
Malartic, Que

K12687 - Oct 9th 1945

Sturgeon Lake area North of King's Bay. The N.E. Corner less 10 chains ± N. from S. Shore line of little bay west and adjacent to BG 171.

October 17th 1945 at 9 a.m. by Self
November 3rd, 1945

Land and land under waters

40 days work (Geo-Phys) OK Nov 28/46

Cancelled under Section 87
The Mining Act: Jan 11/50

Mining Claim No. TB 32464.

	(Work Done) Days	
... and Address of ...nsee		Wilfred Simard Malartic, Que.
...ber and date of ...ense		K12687 — Oct. 9th 1945.
...ity		Sturgeon Lake area North of King's Bay. The N.E. Corner lies 10 chs. N. from S. Shore line of Little bay Westward to TB 17..
... and Hour ... Staking		October 17 1945 at 9 a.m. by Self.
... of Recording		November 3rd 1945.
...try Permit ...anted		
		Land and ... and under waters
...try Permit ...fused		
... of Record ...anted		
... of Work ...anted		
1946	40	DAYS ... O.K. (GEO-PHYS) ... Nov. 28/46

Cancelled under Section 87 The Mining Act Jan 11/50

MINING CLAIM NO: TB 32465

Wilfred Simard
Malartic, P.Q.

K. 12687 - Oct 9th 1945

Sturgeon Lake area, North from King's Bay, South and adjacent to TB 2464. The number one post is 924' North from S.W. corner BG 171

October 17th 1945 at 10 a.m. by Self
November 3rd, 1945

N. 1700 feet, E 924 Feet, S irregular 1720' W. 1320'

40 Days work (Geo-Phys) OK Nov 28/46

Cancelled under Section 87
The Mining Act: Jan 11/50

Mining Claim No. TB 32465

	(Work Done) Days	
o. 9		
e and Address of censee		Wilfred Simard. Malartic. P.Q.
ber and date of cense		K. 12687 — Oct. 9th 1945.
lity		Sturgeon Lake area. North from King's Bay, South and adjacent to TB 32464. The number one post is 924' North from S. W. Corner B.M.
e and Hour Staking		October 1st 1945 at 10 a.m. by Self
e of Recording		November 2nd 1945.
stry Permit ranted		
Laundries =		N. 1700 ft. : 924 feet ; Irregular 1720' W. 1320'
stry Permit efused		
t. of Record ranted		
t. of Work ranted		
OV 4 1946		40 DAYS (GEO-PHYS) Cert. Jan. 28/46

Granted under Section 87 of the Mining Act Jan 11/50

MINING CLAIM NO: TB 32469

B. Elieff
Malartic, Que

K.12686 - Oct 9th, 1945

Sturgeon Lake are North from King's Bay, East of and contiguous toTB31224 and is immediately North of A.L. 370

October 16th 1945 at 7.30 a.m. by Self
November 3rd 1945

40 Days work (Geo-Phys) OK Nov 28/46

Cancelled under Section 87
The Mining Act: Jan 11/50

Mining Claim No TB32469.

	(Work Done) Days
and Address of nsee	B. Eliesf. Malartic, Que.
er and date of nse	K.12686 — Oct. 9th 1945.
y	Sturgeon Lake area; North of Rowdy's Bay, East of North Contiguous to TB31224 and is immediately North of N.L.370.
nd Hour taking	October 16th 1945 at 7.30 a.m. by Self
f Recording	Malartic. 5th 1945.
ry Permit nted	
ry Permit used	
of Record nted	
of Work nted	
	40 DAYS (GEO-PHYS)

Cancelled under Section 87
m. Mining Act Jan 11/50

MINING CLAIM NO: TB 30671

Robert E. Butt
Savant Lake, Ont

E.12930
King Bay Section of Sturgeon Lake area. North and contigeous to locations A.L. 368

April 18th 1944 at 9 a.m. by Self
April 26th 1944
- June 13/44

30 Days Work
Filed only application TB 32050
Dispute filed by R.A. MacDonald
Dispute dismissed without costs T.E. Eodson 18/1/46
Extension until Sept 30/46 (30671) 3596
Agreement with R.E. Butt and Hans Lundberg (131224)
80 days work (mail Sept 28) (Geo-Physical) OK Nov 28/46

Cancelled under Section 87
The Mining Act: June 14/48

2

Mining Claim No. T.B. 30671.

… and Address of …ensee		Robert E. Butt, Savant Lake, Ont.
…ber and date of …ense		E. 2930 –
…ity		King Bay Section of Sturgeon Lake area; North and Contiguous to Location A.L. 368.
… and Hour …Staking		Ap. 18th 1944 at 9 A.M. by Self.
… of Recording		April 26th 1944.
…try Permit …nted		June 13/44.
…try Permit …fused		
… of Record …anted		
… of Work …anted		
…c 14/44	30	DAYS WORK
…ug 7, 1945		Filed Daly Application T.B. 32030
" 7/45		Dispute filed by L.A. MacDonald
…n. 26/46		DISPUTE-DISMISSED WITHOUT COSTS. T. E. Gorson 18/1/46
…t 14/46		Extension until Sept 30 (30671) 3596
…t 2/46		Agreement with Kg… (3270)
…t 2/46	30	days work (mail Sept 29) (Geophysical) R.K. …

Cancelled under Section 87
The Mining Act June 14/48

MINING CLAIM NO: TB 32477

J.C. Honsberger
Val D'Or, Que

K. 12688 - Oct 9th 1945

Sturgeon Lake area and is North of King's Bay. The number one post is eight (8) chains due South of the number 4 post of surveyed BG 128 (1)

October 16th 1945 at 12.30 p.m. by B. Elieff K12686
November 3rd 1945

40 Days work (Geo-Phys) OK Nov 28/46

Cancelled under Section 87
The Mining Act: Jan 11/50

No. 7

Mining Claim No. TB32477

Name and Address of Licensee	J. C. Honsberger, Val D'Or, Quebec.
Number and date of License	K.12688 — Oct. 9th 1945.
Locality	Sturgeon Lake area and is North of King's Bay, The number one post is eight (8) chains due South of the number 4 post of Surveyed B.F. 128. (P)
Date and Hour of Staking	October 1st 1945 at 12.30 p.m. by B. Eliff K12686
Date of Recording	Nov. 13th 1945.
~~Forestry Permit Granted~~	
Forestry Permit Refused	
Cert. of Record Granted	
Cert. of Work Granted	

40 DAY ... (GEO-PHYS) ...

Cancelled under Section 87 The Mining Act Jan 11/50

MINING CLAIM NO: TB 32487

Pavel Alexanroff
Val D'Or, Que

K.12690 - Oct 9th, 1945

Sturgeon Lake area, North of King's Bay, East of and adjacent to BG 171. Land and Land under waters.
Oct 18th, 1945 at 8 a.m. by Self.
November 3rd 1945

40 Days work (Geo - Phys) OK Nov 28/46

Cancelled under Section 87
The Mining Act: Jan 11/50

No. 9

Mining Claim No. TB 32487.

Name and Address of Licensee		Pawel Alexanroff, Val d'Or Que.
Number and date of License		K.12690 — Oct. 9th 1945.
Locality		Sturgeon Lake area; North of King's Bay, East of and adjacent to B.G.171. Land and Land under waters,
Date and Hour of Staking		October 15th 1945 at 8 a.m. by Self.
Date of Recording		November 3rd 1945.
Entry Permit Granted		
Entry Permit Refused		
Certificate of Record Granted		
Certificate of Work Granted		
		40 DAYS WORK (GEOPHYS) [illegible]

Cancelled under Section 87
The Mining Act Jan 11/50

MINING CLAIM NO: TB 32491

Pavel Alexanroff
Val D'Or. Que

K.12690 - October 9th 1945

Sturgeon Lake area and North of King's Bay. The number two post is 630 feet due West of Number one post BG 177
October 18th 1945 at 4 p.m. by Self
November 3rd, 1945 - Subject to Survey

N.1320 East 1700' S-irregular W-1170'
(Land and Land under waters)

40 Days work (Geo + Phys) OK 0028/46

Cancelled under Section 87
The Mining Act: Jan 11/50

No. 9/

Mining Claim No. TB32491.

	(Work Done) Days	
Name and Address of Licensee		Pavel. Alexanroff, Val d'Or, Que.
Number and date of License		K.12690 — October 9th 1945.
Locality		Sturgeon Lake area and North of King's Bay, The number two post is 630 feet due West of Number one post B.E.M.
Date and Hour of Staking		October 18th 1945 at 1 p.m. by Self
Date of Recording		November 3rd 1945 Subject to Survey.
Forestry Permit Granted		(Land K1320 and under waters) irregular W=1170'
Forestry Permit Refused		
Cert. of Record Granted		
Cert. of Work Granted		
1945		40 DAYS ... (GEO-PHYS) ...

Cancelled under Section 87
The Mining Act Jan 11/50

Ontario

52 J/02 SW(38)

Ministry of
Natural
Resources

November 14, 1974.

Telephone (807) 344-0724

File number

MEMORANDUM TO: A. Speed, Assistant Geologist,
Sioux Lookout, Ontario.

FROM: Mining Recorder, Thunder Bay

RE: Location of 80 Mining Claims
Fourbay Lake Area

We do not have any old claim maps covering this area.

The enclosed photostats show ties to old patents and mining locations.

R. A. Poutanen,
Mining Recorder.

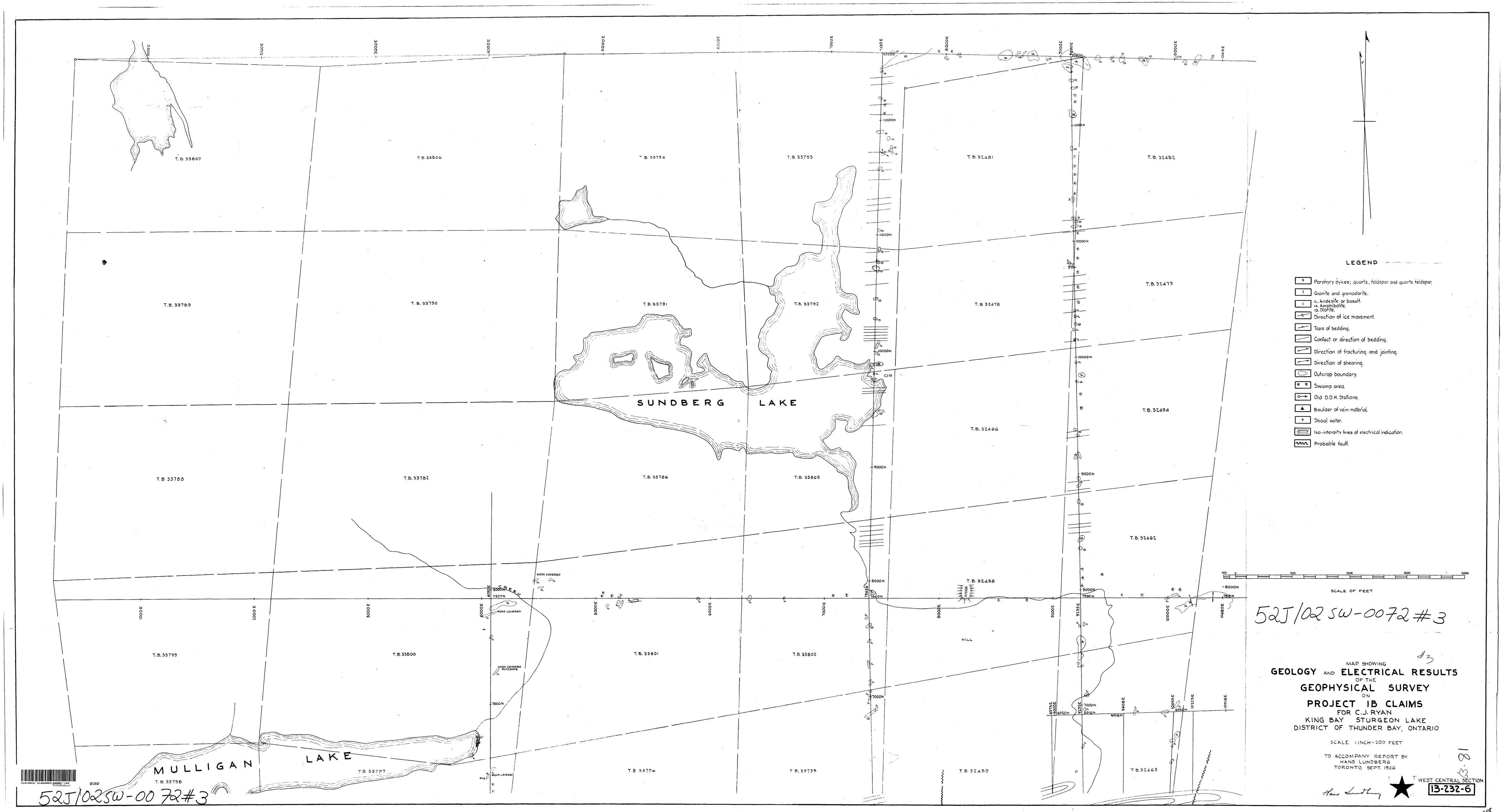
RAP:md
Attach.

FOR ADDITIONAL INFORMATION SEE MAPS:

52J/02SW-0072 #1A-10

DATA REASSESSMENT WORK
HANS LUNDBERG CLAIMS
KING BAY, STURGEON LAKE
DIST. OF THUNDERBAY
ONTARIO
FILE: 63·81

52J/02SW-0072 #1A


T.B. 33807
T.B. 33806
T.B. 33794
T.B. 33793
T.B. 32481
T.B. 32482
T.B. 33789
T.B. 33790
T.B. 33791
T.B. 33792
T.B. 32478
T.B. 32479
SUNDBERG LAKE
T.B. 32494
T.B. 33788
T.B. 33782
T.B. 33786
T.B. 33803
T.B. 32486
T.B. 32462
T.B. 32458
T.B. 33795
T.B. 33800
T.B. 33801
T.B. 33802
T.B. 33797
T.B. 33798
T.B. 33796
T.B. 33795
T.B. 32459
T.B. 32463
MULLIGAN LAKE
MOSS COVERED
MOSS COVERED OUTCROPS
HILL
LEGEND
Porphyry dykes; quartz, feldspar and quartz feldspar.
Granite and granodorite.
1. Andesite or basalt.
1A. Amphibolite.
1B. Diorite.
Direction of ice movement.
Tops of bedding.
Contact or direction of bedding.
Direction of fracturing and jointing.
Direction of shearing.
Outcrop boundary.
Swamp area.
Old D.D.H. Stations.
Boulder of vein material.
Shoal water.
Iso-intensity lines of electrical indication.
Probable fault.
SCALE OF FEET
52J/02SW-0072#3
MAP SHOWING
GEOLOGY AND ELECTRICAL RESULTS
OF THE
GEOPHYSICAL SURVEY
ON
PROJECT IB CLAIMS
FOR C.J. RYAN
KING BAY STURGEON LAKE
DISTRICT OF THUNDER BAY, ONTARIO
SCALE 1 INCH = 200 FEET
TO ACCOMPANY REPORT BY
HANS LUNDBERG
TORONTO, SEPT. 1946
WEST CENTRAL SECTION
13-232-6
52J/02SW-0072#3

N 7000

N 6000

N 5000

N 4000

N 3000

E 76

E 78

E 81

E 84

E 87

E 90

E 93

E 96

E 99

E 102

E 106

E 109

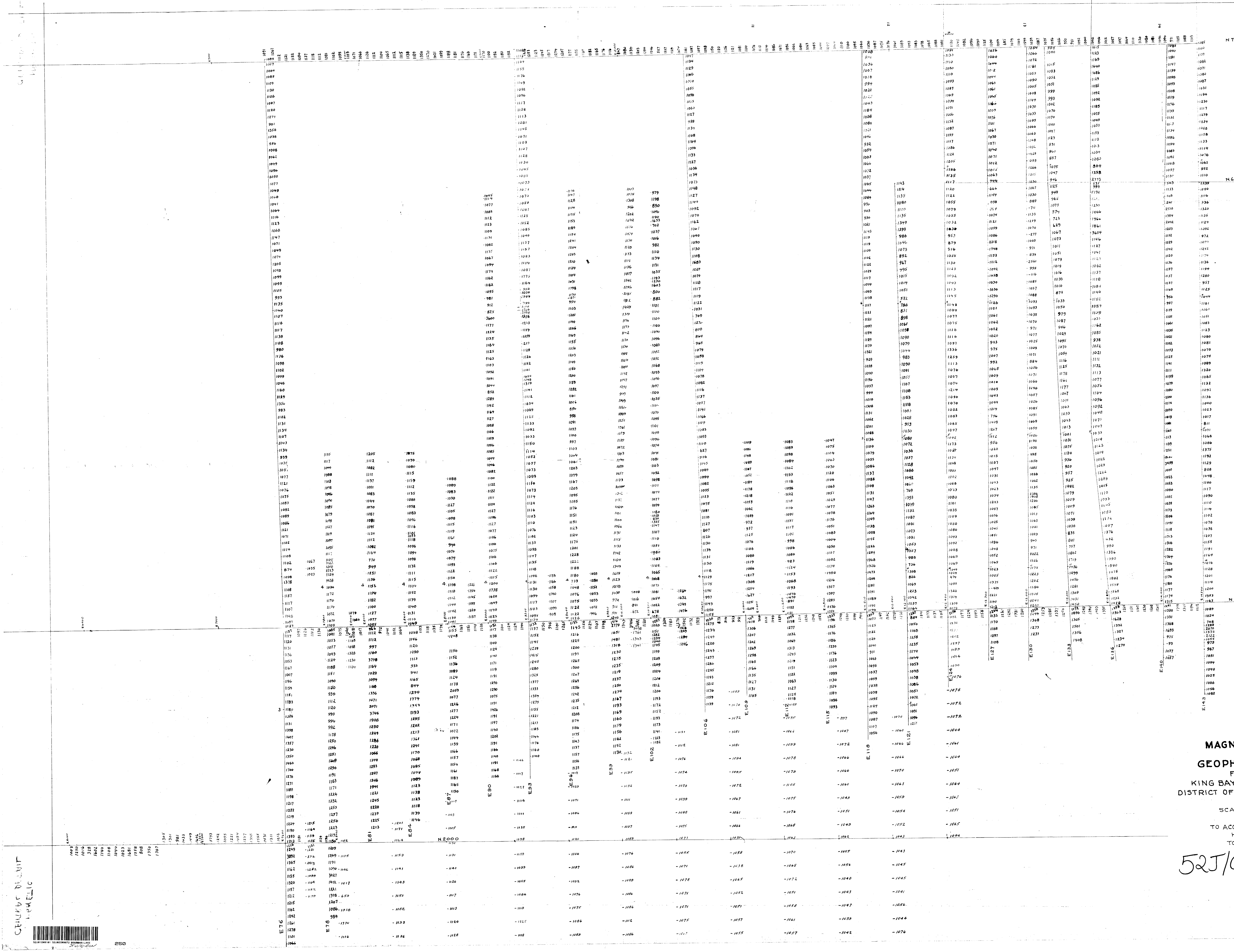
E 112

BEAVER

LAKE

K I N G

B



MAP SHOWING
MAGNETIC RESULTS
OF THE
GEOPHYSICAL SURVEY
FOR C.J. RYAN
KING BAY, STURGEON LAKE
DISTRICT OF THUNDER BAY, ONTARIO

SCALE 1 INCH = 200 FEET

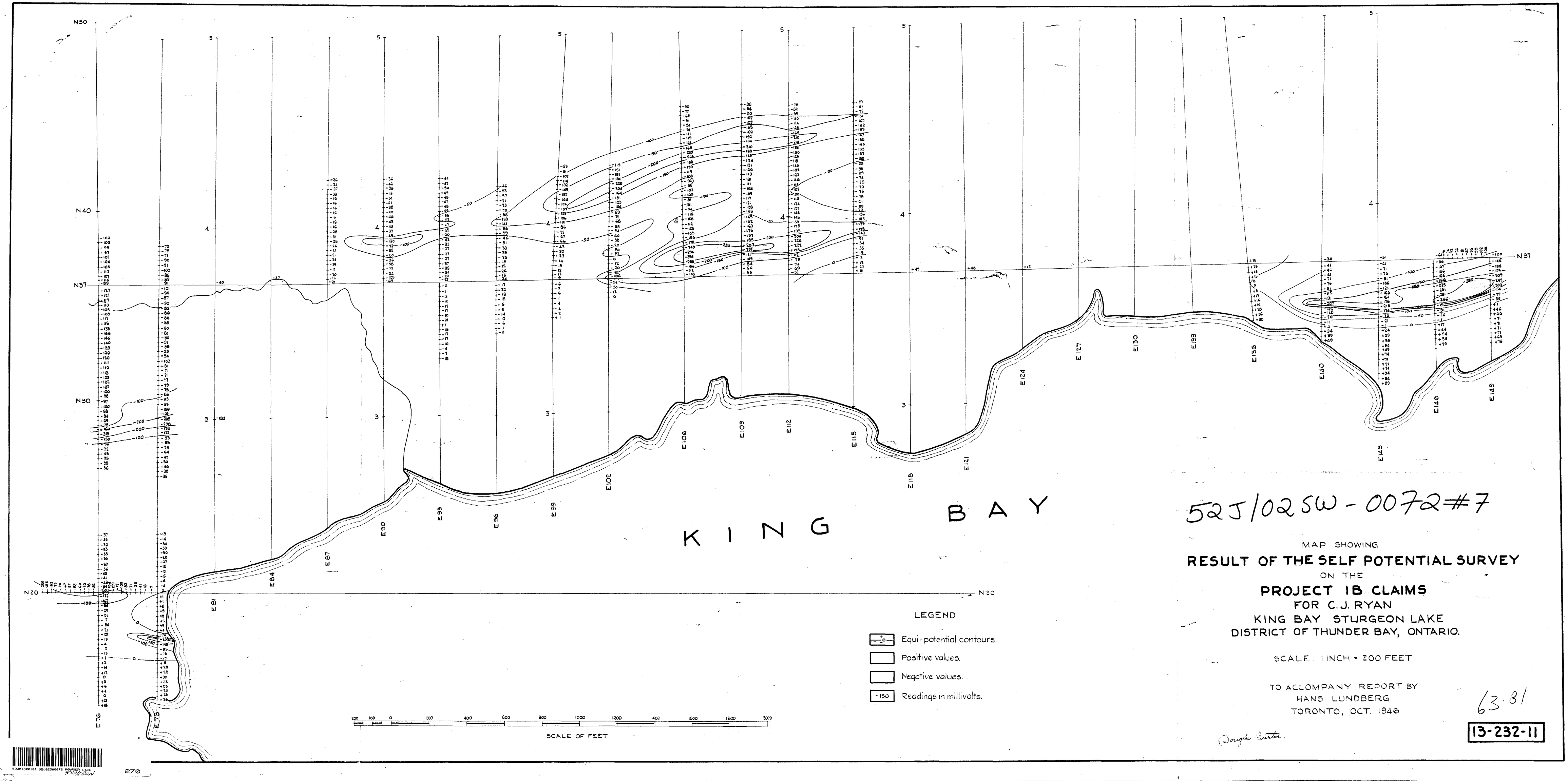
TO ACCOMPANY REPORT BY
HANS LUNDBERG
TORONTO, OCT. 1946

52J/02SW-0072#5

63.81

13-232-8

250



52J/02SW-0072#7

MAP SHOWING

RESULT OF THE SELF POTENTIAL SURVEY

ON THE

PROJECT 1B CLAIMS

FOR C.J. RYAN

KING BAY STURGEON LAKE

DISTRICT OF THUNDER BAY, ONTARIO.

SCALE: 1 INCH = 200 FEET

TO ACCOMPANY REPORT BY

HANS LUNDBERG

TORONTO, OCT. 1946

63.81

13-232-11

Douglas Hunter.

N 79

N 7000

N 69

BEAVER

LAKE

N6000

N 5000

N4000

N 37

CAMP SAVAGE

E 109

E 112

E 115

E 118

E 121

E 124

E 127

E 130

E 133

E 136

E 140

E 143

N20

G B A Y

LEGEND

Iso-dynamic lines of vertical magnetic intensity.

Intensities above normal.

Intensities below normal.

MAP SHOWING

INTERPRETATION

OF THE

MAGNETIC RESULTS

OF THE

GEOPHYSICAL SURVEY

ON

PROJECT 1B

FOR C. J. RYAN

KING BAY, STURGEON LAKE

DISTRICT OF THUNDER BAY, ONTARIO

SCALE 1 INCH = 200 FEET

TO ACCOMPANY REPORT BY
HANS LUNDBERG
TORONTO, OCT. 1946

63.91

52J/02 SW-0072 #4

13-232-7

TSCC 13-232-8