

RP 581(A)

PRELIMINARY REPORT, GEOLOGY OF BRESSANI-CHAMBALON AREA, ABITIBI EAST COUNTY

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GOUVERNEMENT DU QUÉBEC
DEPARTMENT OF NATURAL RESOURCES

Honorable PAUL - E. ALLARD, Minister

MINES BRANCH

GEOLOGICAL EXPLORATION SERVICE

GEOLOGY
of
BRESSANI-CHAMBALON AREA

ABITIBI EAST COUNTY

PRELIMINARY REPORT

by

Jerome H. Remick

QUÉBEC

1970



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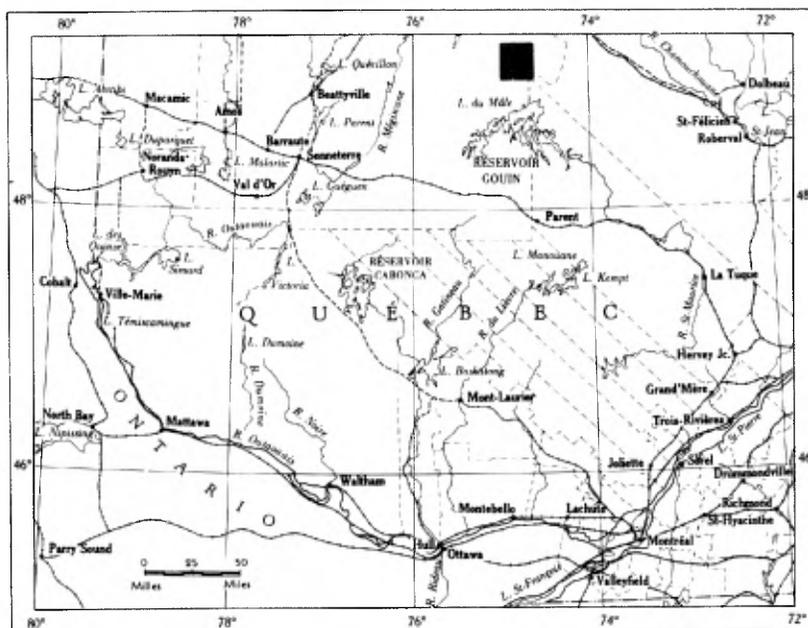
GEOLGY
of
BRESSANI-CHAMBALON AREA

ABITIBI EAST COUNTY

PRELIMINARY REPORT

by

Jerome H. Remick



Preliminary Report

on

Bressani-Chambalon Area

Abitibi-East County

by

Jérôme H. Remick

INTRODUCTION

The Bressani-Chambalon area was geologically mapped during the summer of 1967. It lies between latitudes 49°00' and 49°15' and longitudes 75°00' and 74°40'; its center is approximately 55 miles south-southwest of Chibougamau. The area is 260 square miles in extent and includes parts or all of Langloiserie, Pambrun, Bressani, Chambalon, Marceau and Balète townships. Parts of a few square miles in the eastern section of the area were not mapped.

Access

Fecteau Transport Aérien Ltée, with bases at Chibougamau and Senneterre, provided transportation into the area.

Good landing places for float planes are provided by all the larger lakes except Valreuille (Marie-Louise) lake,

which is very shallow and contains many boulders. Some of the smaller lakes which are about the minimum size for plane landings are either too shallow or contain boulders.

Yvonne river is the only stream large enough for a motor canoe. Every (Rachel) and Roy rivers and Augusta creek are most easily navigable by prospector canoe. The other rivers are shallow and contain so many boulder rapids that it is difficult to impossible to navigate them even by prospector canoe.

Topography

The hills throughout the map-area are geologically controlled. The northern part of the area, underlain by metamorphosed Superior-type rocks, is characterized by several broad and long zones of hills, the largest of which are underlain by amphibolitized lava. The southern third of the area, underlain by gneiss and granite of the Grenville Province, is characterized by small, round, fairly steep hills, in places occurring fairly close together.

Only a very small proportion of the area is underlain by muskeg. The bush, especially in the southeastern part of the area underlain by gneiss and granite, is quite dense.

The elevation of the lakes ranges between 1,250 feet and 1,500 feet. Many of the larger hills are from 350 to 450 feet above lake level.

The drainage in the southern 3 to 5 miles of the map-area is southward; that in the remainder of the map-area is to the north.

Field Work and Mapping Methods

The map-area was traversed at intervals of $\frac{1}{2}$ mile. Outcrops along the shores of most rivers and lakes were examined. Air photos at a scale of $\frac{1}{4}$ mile to the inch taken by Photo Air Laurentides, Québec, in 1965, were used in the field. Traverses were plotted on base maps, at $\frac{1}{4}$ mile to the inch, issued by Photo Air Laurentides, Québec, in 1954. A topographic base map at about one half mile to the inch (Roy lake 32 G/2) was issued in 1965 by the Surveys and Mapping Branch, Department of Mines and Technical Surveys, Ottawa.

Previous Work and Work in Adjoining Areas

A geological reconnaissance map at 4 miles to the inch by Mawdsley and Norman (1938) shows the geology in a few places in the area. It is the only published geological work carried out in the area before the present project.

The area to the north was mapped by Deland (1959) and that to the west, by Deland (1959) and by Freeman (1943). Parts of the area to the south were mapped by Laurin (1965). The area to the east is unmapped except for the reconnaissance map of Mawdsley and Norman (1938).

Resources

Moose are abundant in the area.

Large, straight, and tall spruce, birch, balsam and poplar, some of which have diameters from 18 to 26 inches several feet above their base, occur in the more hilly parts of the area and should provide good lumber. Many excellent stands of spruce for pulp occur throughout the area.

GENERAL GEOLOGY

General Statement

The consolidated rocks of the area are Precambrian. Two easterly trending zones of amphibolitized lava with some included biotite schist and biotite "micro" gneiss separated by a median zone of biotite "micro" gneiss and granite underlie the central part of the map-area. The northern third of the area is underlain by granite, in places with well digested inclusions of biotite gneiss, hornblende gneiss and/or amphibolite; a small area of gneissic hornblende syenite; and an easterly trending zone of pegmatite. The southern third of the area is underlain by mixtures of amphibolite, hornblende gneiss, and/or biotite gneiss intruded by gneissic granite. North-northeasterly trending dikes of gabbro occur in places.

Mixed Gneiss, Amphibolite, and Granite

Amphibolite, hornblende gneiss, hornblende-biotite gneiss, biotite gneiss, granitic biotite gneiss and gneissic granite underlie the southern third of the area. From the western boundary of the area to Lake Augusta, zones of amphibolite, gneissic granite and biotite gneiss to granitic gneiss are separable. The bedrock east of this area is more heterogeneous and consists of various mixtures of gneiss concordantly injected to various degrees by granite.

A thin zone of fairly homogeneous schistose gneissic granite with a few gneissic inclusions outcrops between the zone of mixed gneiss to the south and the amphibolitized lava to the north.

Amphibolitized Lava and Amphibolitized Gabbro

Two easterly trending zones of amphibolitized lava with included biotite schist, biotite-hornblende "micro" gneiss and biotite "micro" gneiss underlie the central part of the area and outcrop on many high, broad hills.

The amphibolitized lava is fine grained and consists of hornblende and feldspar. Up to 25% (but usually under 5%) of the red-brown garnet is disseminated throughout many outcrops. The weathered surface is dark gray to greenish gray and the fresh surface is almost black. Thin lit-par-lit injections of quartz and granite, greatly elongated pillow rims, and/or thin layers of more recrystallized rock (many of which are richer in hornblende) occur in some outcrops and, being more resistant than the amphibolitized lava, give the appearance of layering. The texture, grain size, and garnet content are variable throughout the amphibolitized lava zones. Slightly elongated pillow structures were noted in both zones. Some of the best pillow structures occur just west of Roy lake and near the north part of Vivier (Serge) lake. The pillow rims are usually darker and more resistant than the pillows.

Concordant amphibolitized gabbro sills occur in places in both zones of amphibolitized lava.

Biotite Schist and Biotite "Micro" Gneiss

Biotite schist and biotite "micro" gneiss outcrop between and within the zones of amphibolitized lava. The rock

TABLE OF FORMATIONS

| | | | |
|--------------|-------------------------|---|--|
| CENOZOIC | Holocene Pleistocene | Unconsolidated Sediments | Muskeg, peat Silts, sand, gravel, boulders |
| UNCONFORMITY | | | |
| PRECAMBRIAN | | Basic dikes | Gabbro |
| | | Intrusive Contact | |
| | | | Pegmatite |
| | | Intrusive Contact | |
| | | Acidic igneous rocks | Biotite granite Gneissic hornblende syenite |
| | | Metamorphosed sedimentary rock | Biotite "micro" gneiss Biotite schist |
| | | Metamorphosed volcanic and basic intrusive rocks | Amphibolitized lava, amphiboli- tized gabbro |
| | | Mixed gneiss and granite | Amphibolite, hornblende gneiss, hornblende-biotite gneiss, biotite gneiss, granitic biotite gneiss, gneissic granite |

The order in which the rock formations are listed does not necessarily indicate their relative age.

is slabby and fine grained, and consists of quartz, feldspar, up to 15% (usually about 5%) biotite, and in places as much as 5% garnet. Accessory pyrite occurs in a few outcrops. A few flakes of muscovite 2-3 mm. in diameter occur across the foliation in many outcrops southeast of Oliva lake. Quartz and feldspar occur as fine sugary grains. Biotite is in very fine flakes. The grain size is finer than that in the biotite gneiss in the area of mixed gneiss and granite in the southern third of the area. The rocks are undoubtedly of sedimentary origin, but recrystallization has obliterated all sedimentary structures.

Gneissic Hornblende Syenite

Pink gneissic hornblende syenite with some pegmatite and inclusions of amphibolite underlies a small part of the north-central part of the map-area. The hornblende content is variable from less than 1% north of Yvonne lake to about 20% near Every river. The rock consists of pink feldspar and thin lenses, up to 1½ inches long, made up of hornblende with a little biotite, epidote, and sphene. Inclusions of amphibolite occur in places. Pegmatite, in places with hornblende crystals up to an inch long, cuts the syenite. Epidote-filled fractures cut the pegmatite and syenite.

Biotite Granite

Gray biotite granite with some pegmatite, in many places with inclusions and schlieren of hornblende gneiss and biotite gneiss and lenses and blocks of amphibolite, underlies the northern third of the area. Outcrops are heterogeneous, due to the variation in the amount and form of the well "digested" gneissic inclusions and the variation in the content of biotite and hornblende. Foliation in many outcrops is variable or is weakly defined. It is best defined in outcrops containing gneissic material and, in some cases, is nearly horizontal. The granite is massive to schistose or gneissic. Biotite (in grains usually less than one mm.) is the usual mafic mineral, but hornblende occurs in places. The granite contains feldspar, 25-30% quartz, 2-5% biotite, 1% epidote, and accessory amounts of sphene, magnetite and, in a very few places, pyrite. Quartz veins, pegmatite, and massive leucogranite dikes cut the granite in places. Epidote-filled fractures cut the granite and pegmatite.

Several small plutons of granite, very uniform in appearance and without inclusions, occur in the northern half of the area. The plutons all have about the same composition:

2-5% biotite, 25% quartz and accessory amounts of sphene, epidote, and magnetite, but they differ slightly in grain size, texture, and structure. The granite in and near Oliva lake is characterized by about 5% biotite in grains of 1 to 2 mm. and a pitted weathered surface. Schistose porphyritic biotite granite with up to 25% slightly rounded, 1/4- to 3/4-inch microcline phenocrysts occurs just west of Roy lake. Fairly well oriented, medium-grained, equigranular biotite granite occurs north of Roy lake and along Roy river.

Pegmatite

Pegmatite, in places uranium-bearing, and some granite occur in an easterly trending zone which commences just south of Yvonne lake about half a mile west of the map-area and continues for about 7 miles eastward. The northern and eastern limits of the zone are not known, due to lack of outcrop. Much of the outcrop occurs on the north slope of a high hill of amphibolitized lava.

The pegmatite is massive and broadly jointed (two vertical sets and one horizontal set of joints), and contains patches of graphic granite. Pink hematitic alteration occurs along fractures. The rock consists of quartz and microcline. Booklets of biotite up to 3 inches long and about 4 mm. thick occur in a few places. Single grains and small patches of magnetite, in places with small amounts of uranium (reported to be uraninite and gumite) and sphene, occur here and there, especially in the outcrops south of Yvonne lake (see Economic Geology section for details). Accessory amounts of red-brown garnet occur in a few places. A cluster of black tourmaline crystals was seen in an outcrop near the south shore of Yvonne lake.

Small masses and dikes of quartz-feldspar pegmatite occur in many outcrops of granite and gneissic hornblende syenite in the north part of the map-area. Muscovite pegmatite with pseudo hexagonal crystals of muscovite up to 1½ inches in diameter and ½ inch thick underlies much of the crest of Mount Cessna.

Very little pegmatite was noted in the area of mixed gneiss and granite in the southern third of the area.

Gabbro Dikes

Several gabbro dikes trending north-northeast to nearly north occur in the area and are similar to the gabbro dikes that outcrop throughout the Superior Province. They consist of pyroxene and plagioclase with accessory magnetite and, in places, a few grains of biotite and blue quartz. They have chilled margins and are medium grained in their centers. They form small, rounded hills up to 50 feet high and are probably not more than a few hundred feet thick. The rock is homogeneous, massive, and diabasic in texture. Small schistose zones and red-brown garnet (up to 20%) occur in gabbro outcropping in the zone of gneiss and granite in the southern third of the area. Garnet is not present and there is a general lack of schistose zones in the gabbro in the northern part of the area.

PLEISTOCENE

Much of the area is covered by a moderate thickness of glacial and fluvio-glacial sediments. Eskers, kames, drumlins, sand plains, and a few recessional moraines are the main depositional features. Most of them rise 10 to 50 feet above the general level; they rarely exceed 100 feet. Narrow, winding, short eskers occur in a number of places and are usually well shown on air photos. Kame and kettle topography (in places with sand plains) is very common throughout the map-area. The kames and eskers consist of gravel with round boulders up to about a foot in diameter in a yellow sandy silt matrix.

The direction of the last ice sheet was from north-northeast to south-southwest. Glacial striae range between S.10°W. and S.25°W.

STRUCTURAL GEOLOGY

The formations trend east-northeasterly. Dips are steeply southward throughout much of the map-area but are steeply northward in the western part of the northern amphibolitized lava zone. A northeastern trend is prevalent in much

of the eastern and southern quarter of the map-area. The structural trend at Oliva lake and for several miles southward is variable and complex.

ECONOMIC GEOLOGY

Molybdenite, uraninite, chalcopyrite and several narrow zones of pyrrhotite and/or pyrite (in one place reported to contain small amounts of gold) occur within the map-area. Molybdenite appears to be the most favorable for prospecting.

Molybdenum

Molybdenite was noted in two places, 3 miles apart, south of the map-area.

Molybdenite (2-10%) in flakes about 1 mm. in diameter occurs in a zone 2 feet wide in altered pyroxenite on the shore in the southeast corner of Augusta lake (for location, see M-1 on the accompanying geological map). The mineralized zone is on a small point of outcrop about 30 feet across strike and 60 feet along strike. Its extension is cut off by water on three sides and by amphibolite which occurs a few feet south on the fourth side. Several other mineralized zones within this outcrop contain some pyrite, pyrrhotite, and/or chalcopyrite. The mineralized outcrop occurs at the western end of the pyroxenite which continues eastward for about 400 feet with a little disseminated pyrite and/or chalcopyrite in a few places.

Molybdenite flakes (about $\frac{1}{2}\%$ to 1%) were noted in a few small lenses within a light, rusty zone about 5 feet wide and 15 feet long in biotite gneiss near the south boundary of the map-area (see M-2 on map). Several barren lit-par-lit layers of coarse-grained granite occur in the outcrop.

The Grenville gneissic rocks may be a favorable area for prospecting for molybdenite.

Uranium

Very small crystals of uraninite associated with a few small erratic concentrations of magnetite occur in pegmatite south of Yvonne lake. Five mineralized areas, all within half a mile of one another (see M-3, M-4, M-5 and M-10 on the map; the 4th zone is 400 feet west of M-5), were discovered by Barnat Mines Ltd. in 1955.

Each mineralized zone consists of magnetite in grains or clusters of grains up to $2\frac{1}{2}$ inches across in several patches up to several feet long and a foot wide. According to a report by Barnat Mines Ltd., uraninite crystals occur around the magnetite grains, and gumite crystals up to 1 inch were noted in one mineralized area. Small amounts of autunite, samarskite and torbernite were reported by Canadore Mining and Development Corp. Uranium was not noted in areas lacking magnetite. Yellow uranium oxide stain was noted in a few places in the mineralized areas. Drilling of three of the zones by Barnat Mines Ltd. failed to indicate any depth or lateral extent of the uranium mineralization.

Gold

Small amounts of gold were noted by Barnat Mines Ltd. south of Yvonne lake and at the western boundary of the map-area in an easterly trending sulfide zone in granite about 300 feet north of the northern zone of amphibolitized lava. The sulfide zone was picked up on a magnetometer survey.

Copper

About 1% chalcopyrite with minor pyrite was noted in a heavily epidotized fracture 2 inches wide in granite on the east shore of Every river (see M-6 on the map). A few grains of chalcopyrite were noted in a nearby outcrop. A northerly trending shear zone occurs near the mineralized zone.

A few grains of chalcopyrite and a little pyrite were noted in an outcrop of amphibolite near the eastern margin of the area (see M-7 on the map).

A very narrow zone of massive pyrrhotite with tiny fractures of chalcopyrite was noted in biotite "micro"

gneiss south of Oliva lake (see M-8 on the map).

EXPLORATION WORK WITHIN THE MAP-AREA

Barnat Mines Ltd.

In 1955, Barnat Mines Ltd. drilled 16 holes totalling 2,990.5 feet on the south shore of Yvonne lake in Bressani township to investigate the extent of uranium in pegmatite in three mineralized showings. The drill core was left at the campsite on the south shore of Yvonne lake (see M-9 on the map). The drill logs, two plans of the drill holes, and an index map at 960 feet to the inch showing the location of the showings (GM-3435) are in the open files of the Mineral Deposits Service of the Quebec Department of Natural Resources. A detailed geological report of the showings and an airborne scintillometer survey is held by Barnat Mines Ltd. Barnat Mines Ltd. allowed its claims to expire.

J.R. Beauchemin Claims

Ground electromagnetic and magnetic surveys were made in 1960 in the south part of Bressani twp. and the adjoining north part of Marceau township covering an area roughly between Mile-posts 93 and 95 on the common east-west township line. The trends of several conductors are outlined, but they were not traced along their entire length. The results of the survey are given on seven maps at 200 feet to the inch, a location map at 1,000 feet to the inch, and a one-page report (GM-9881), all of which are in the open files of the Mineral Deposits Service, Quebec Department of Natural Resources.

Canadore Mining & Development Corp.

Canadore Mining & Development Corp. staked 80 claims in August, 1966, to cover the uranium showings on the property formerly owned by Barnat Mines Ltd. on the south shore of Yvonne lake in Bressani township. During 1967, Canadore carried out ground scintillometer and magnetometer surveys and geological mapping on some of its claims.

The results of these surveys are shown on three maps at 300 feet to the inch, and details are given in a report (GM-22569) dated January 24, 1968, and also on maps at 100 feet to the inch and a report (GM-20716) dated August 17, 1967.

Nine holes totalling 1,000 feet were drilled in some of the showings containing uranium south of Yvonne lake in August 1968 (GM-23008). The calculated percentage of U₃O₈ and ThO₂ is given.

A resumé of each showing containing uranium is given in a geological report (GM-20883) dated June 3, 1967.

All the above-mentioned documents are confidential at the time of writing (January, 1969), but they will eventually be available for public inspection.

East Malartic Mines Ltd.

East Malartic Mines Ltd. geologically mapped the south shore of Melesan (Annette) lake in the central part of Bressani township in 1955 at a scale of 400 feet to the inch in order to investigate the possibility of uranium in pegmatite. The geological map and a two-page geological report (GM-3457) are in the open files of the Mineral Deposits Service of the Quebec Department of Natural Resources.

MAGNETIC ANOMALIES

A few small, but strong, magnetic anomalies were indicated during traversing in areas of overburden by abrupt and very strong deviations of the compass needle. Most of these were in the biotite "micro" gneiss but a few were in the northern zone of amphibolitized lava. They are believed to be caused by narrow zones of pyrrhotite or possibly magnetite.

No precise definition can be given for most of the magnetic anomalies shown on airborne geophysical map 1841G (1964), owing to lack of rock outcrop. The north-northeasterly trending anomaly at the east end of Oliya lake and the one about a mile east of Roy river in the north of the map-area are probably caused by the magnetite content of the gabbro dikes.

GEOCHEMICAL SAMPLING

Stream-sediment samples for geochemical analyses were taken from 225 localities within the area. These have been analysed by the Department's laboratories for copper, zinc, lead, molybdenum, nickel and uranium. The results are shown on the following geochemical record and accompanying map.

| Sample No. on the map | Code No. of sample in files of Dept. | RESULTS OF ANALYSES IN P.P.M. | | | | | | | | | | | |
|-----------------------|--------------------------------------|-------------------------------|-----|----|-----|----|-----|----|---|----|----|----|----|
| | | Cu | Zn | Pb | Mo | Ni | U | Co | W | Mn | Sn | Au | Ag |
| 1 | 2048 | 2 | 5 | 2 | 0 | 13 | 0.5 | | | | | | |
| 2 | 1093 | 2 | 15 | 6 | 0 | 18 | 1 | | | | | | |
| 3 | 1094 | 4 | 20 | 8 | - | 13 | - | | | | | | |
| 4 | 1095 | 6 | 60 | 4 | 3 | 45 | 1 | | | | | | |
| 5 | 1098 | 2 | 15 | 6 | 0 | 23 | - | | | | | | |
| 6 | 1097 | 4 | 25 | 2 | - | 20 | - | | | | | | |
| 7 | 1096 | 4 | 20 | 6 | 0 | - | - | | | | | | |
| 8 | 3020 | 2 | 40 | 2 | 0 | 5 | 1 | | | | | | |
| 9 | 1110 | 2 | 15 | 4 | 0 | 23 | 0.5 | | | | | | |
| 10 | 1103 | 4 | 15 | 6 | 0 | 8 | - | | | | | | |
| 11 | 1104 | 2 | 10 | 2 | 0 | 20 | 0.5 | | | | | | |
| 12 | 3019 | 16 | 140 | 16 | 0.8 | 58 | 2 | | | | | | |
| 13 | 3018 | 16 | 100 | 10 | 0 | 58 | 2 | | | | | | |
| 14 | 1092 | 2 | 15 | 2 | 0.8 | 20 | 5 | | | | | | |
| 15 | 1091 | 4 | 20 | 4 | 0.8 | 23 | 1 | | | | | | |
| 16 | 1100 | 4 | 20 | 4 | 0 | 20 | - | | | | | | |
| 17 | 1101 | 6 | 40 | 60 | 1 | 23 | - | | | | | | |
| 18 | 1099 | 10 | 20 | 4 | 0 | 33 | - | | | | | | |
| 19 | 1090 | 2 | 15 | 8 | 0 | 18 | 0.5 | | | | | | |
| 20 | 1089 | 4 | 20 | 10 | 0 | 20 | - | | | | | | |
| 21 | 1088 | 2 | 20 | 6 | 0 | 30 | 1 | | | | | | |
| 22 | 2046 | 4 | 25 | 4 | 2 | 23 | 2 | | | | | | |
| 23 | 3022 | 6 | 50 | 2 | - | 18 | - | | | | | | |
| 24 | 3023 | 4 | 40 | 2 | 0 | 5 | 2 | | | | | | |
| 25 | 3024 | 20 | 75 | 4 | 2 | 33 | - | | | | | | |
| 26 | 2053 | 4 | 15 | 8 | - | 10 | - | | | | | | |
| 27 | 2052 | 2 | 25 | 6 | 0.4 | 13 | - | | | | | | |
| 28 | 1082 | 2 | 30 | 10 | 0 | - | - | | | | | | |
| 29 | 2047 | 2 | 40 | 6 | 1 | 33 | 0.5 | | | | | | |
| 30 | 2049 | 4 | 15 | 2 | - | 8 | - | | | | | | |
| 31 | 2050 | 4 | 20 | 6 | - | 10 | - | | | | | | |
| 32 | 2051 | 2 | 15 | 4 | - | 13 | - | | | | | | |
| 33 | 1132 | 2 | 10 | 4 | 0 | 8 | 1 | | | | | | |
| 34 | 1131 | 10 | 15 | 2 | 0 | 20 | - | | | | | | |
| 34A | 1130 | 2 | 10 | 4 | 0.4 | 15 | 2 | | | | | | |

| Sample No. on the map | Code No. of sample in files of Dept. | RESULTS OF ANALYSES IN P.P.M. | | | | | | | | | | | |
|-----------------------|--------------------------------------|-------------------------------|----|----|-----|----|-----|----|---|----|----|----|----|
| | | Cu | Zn | Pb | Mo | Ni | U | Co | W | Mn | Sn | Au | Ag |
| 35 | 1133 | 2 | 10 | 6 | - | 13 | - | | | | | | |
| 36 | 1081 | 4 | 40 | 10 | 1 | 33 | 1 | | | | | | |
| 37 | 1083 | 10 | 20 | 2 | - | 8 | - | | | | | | |
| 38 | 1073 | 6 | 80 | 10 | 0 | 45 | 2 | | | | | | |
| 39 | 1072 | 10 | 40 | 16 | 0 | 33 | 1 | | | | | | |
| 40 | 1070 | 6 | 40 | 20 | - | 13 | - | | | | | | |
| 41 | 1076 | 2 | 75 | 10 | 0 | 23 | 1 | | | | | | |
| 42 | 1077 | 6 | 25 | 10 | 0 | - | - | | | | | | |
| 43 | 1084 | 2 | 15 | 4 | 0.8 | 15 | 0.5 | | | | | | |
| 44 | 1051 | 2 | 60 | 20 | 0 | - | - | | | | | | |
| 45 | 1046 | 6 | 60 | 16 | 0 | 15 | 5 | | | | | | |
| 46 | 3017 | 0 | 60 | 2 | 0 | 18 | 1 | | | | | | |
| 47 | 1080 | 6 | 40 | 10 | 2 | - | - | | | | | | |
| 48 | 1085 | 2 | 10 | 6 | 0 | 15 | 0.5 | | | | | | |
| 49 | 1079 | 8 | 70 | 20 | 0 | - | - | | | | | | |
| 50 | 1078 | 10 | 40 | 16 | 1 | 20 | - | | | | | | |
| 51 | 1050 | 4 | 50 | 90 | 0 | 33 | 1 | | | | | | |
| 52 | 1045 | 4 | 50 | 16 | 0 | 20 | 0.5 | | | | | | |
| 53 | 3016 | 2 | 40 | 4 | 0 | 8 | - | | | | | | |
| 54 | 3021 | 6 | 75 | 4 | - | 18 | - | | | | | | |
| 55 | 1129 | 4 | 25 | 20 | 0 | 15 | 0.5 | | | | | | |
| 56 | 3032 | 10 | 40 | 50 | 0 | 8 | 0.5 | | | | | | |
| 57 | 1134 | 4 | 5 | 4 | 0 | - | - | | | | | | |
| 58 | 1135 | 2 | 5 | 2 | 0 | 5 | 1 | | | | | | |
| 59 | 3015 | 4 | 50 | 4 | 0 | 13 | 0.5 | | | | | | |
| 60 | 1052 | 6 | 75 | 16 | 0 | 18 | 2 | | | | | | |
| 61 | 1003 | 6 | 40 | 20 | 0 | 15 | 0.5 | | | | | | |
| 62 | 1004 | 10 | 50 | 20 | - | 9 | - | | | | | | |
| 63 | 1005 | 10 | 50 | 44 | 0 | 15 | - | | | | | | |
| 64 | 1002 | 20 | 50 | 16 | 0 | - | - | | | | | | |
| 65 | 1006 | 16 | 25 | 10 | 0 | 18 | 1 | | | | | | |
| 66 | 1007 | 10 | 40 | 20 | 0 | 23 | 5 | | | | | | |
| 67 | 1087 | 10 | 15 | 10 | 0 | - | - | | | | | | |
| 68 | 1086 | 6 | 50 | 70 | 1 | 43 | 3 | | | | | | |
| 69 | 1075 | 6 | 25 | 20 | 0 | 15 | - | | | | | | |
| 70 | 1122 | 4 | 15 | 4 | 0 | 20 | 0.5 | | | | | | |
| 71 | 3040 | 20 | 25 | 10 | 0 | 8 | - | | | | | | |
| 72 | 2074 | 0 | 15 | 4 | 0 | 25 | - | | | | | | |
| 73 | 1123 | 2 | 15 | 2 | 0 | 15 | 16 | | | | | | |
| 74 | 2073 | 0 | 40 | 10 | 0.8 | 20 | 5 | | | | | | |
| 75 | 1121 | 2 | 20 | 2 | 0 | 15 | - | | | | | | |
| 76 | 1124 | 2 | 10 | 4 | 0 | 15 | 2 | | | | | | |
| 77 | 2075 | 2 | 60 | 16 | 6 | 20 | 4 | | | | | | |
| 78 | 2066 | 4 | 25 | 16 | 0 | 18 | 0 | | | | | | |
| 79 | 2065 | 16 | 60 | 20 | - | 13 | 0 | | | | | | |
| 80 | 1011 | 16 | 40 | 24 | 0 | - | - | | | | | | |
| 81 | 1012 | 10 | 60 | 20 | 2 | 20 | 1 | | | | | | |

| Sample No. on the map | Code No. of sample in files of Dept. | RESULTS OF ANALYSES IN P.P.M. | | | | | | | | | | | |
|-----------------------|--------------------------------------|-------------------------------|----|----|-----|----|-----|----|---|----|----|----|----|
| | | Cu | Zn | Pb | Mo | Ni | U | Co | W | Mn | Sn | Au | Ag |
| 82 | 1009 | 30 | 60 | 10 | 0 | 45 | 2 | | | | | | |
| 83 | 1008 | 16 | 75 | 20 | 0 | 18 | - | | | | | | |
| 84 | 1010 | 50 | 90 | 20 | 0 | 58 | - | | | | | | |
| 85 | 2002 | 8 | 40 | 2 | 0 | 8 | - | | | | | | |
| 86 | 2001 | 10 | 60 | 60 | 3 | 20 | - | | | | | | |
| 87 | 2006 | 10 | 25 | 30 | 0.4 | 30 | 0.5 | | | | | | |
| 88 | 2004 | 6 | 15 | 4 | 0 | 25 | 1 | | | | | | |
| 89 | 1044 | 4 | 50 | 10 | 0 | 18 | - | | | | | | |
| 90 | 2037 | 0 | 5 | 4 | - | 13 | - | | | | | | |
| 91 | 2036 | 0 | 5 | 6 | 0 | 13 | 1 | | | | | | |
| 92 | 2035 | 0 | 10 | 8 | 0 | 18 | 1 | | | | | | |
| 93 | 2034 | 0 | 5 | 4 | 0 | 13 | 1 | | | | | | |
| 94 | 2033 | 0 | 5 | 4 | 0 | 10 | 0.5 | | | | | | |
| 95 | 2031 | 4 | 15 | 10 | 0 | 13 | 0.5 | | | | | | |
| 96 | 2032 | 2 | 10 | 8 | 0 | 15 | 0.5 | | | | | | |
| 97 | 1125 | 4 | 15 | 4 | - | 13 | - | | | | | | |
| 98 | 1128 | 2 | 15 | 6 | 0 | 13 | 0.5 | | | | | | |
| 99 | 2007 | 6 | 25 | 40 | 0 | 13 | - | | | | | | |
| 100 | 2003 | 6 | 20 | 2 | 0 | 23 | 2 | | | | | | |
| 101 | 1054 | 8 | 60 | 16 | 2 | 35 | - | | | | | | |
| 101A | 2030 | 2 | 10 | 4 | - | 13 | - | | | | | | |
| 102 | 3014 | 2 | 50 | 2 | 0 | 15 | 0.5 | | | | | | |
| 103 | 3013 | 10 | 60 | 40 | - | 15 | - | | | | | | |
| 104 | 1059 | 6 | 25 | 16 | 0 | 13 | - | | | | | | |
| 105 | 3012 | 4 | 25 | 20 | 0 | 8 | 0 | | | | | | |
| 106 | 1068 | 6 | 60 | 16 | 0 | 33 | 3 | | | | | | |
| 107 | 2045 | 6 | 15 | 6 | 3 | - | - | | | | | | |
| 108 | 2042 | 4 | 10 | 10 | 0 | 15 | - | | | | | | |
| 109 | 1060 | 6 | 25 | 24 | 0 | 13 | - | | | | | | |
| 110 | 1067 | 2 | 25 | 16 | 0 | 13 | 0.5 | | | | | | |
| 111 | 2018 | 2 | 15 | 4 | 0 | 8 | - | | | | | | |
| 112 | 1058 | 10 | 60 | 20 | 2 | 23 | 1 | | | | | | |
| 113 | 1057 | 4 | 60 | 16 | 1 | 43 | 1 | | | | | | |
| 114 | 1056 | 6 | 60 | 20 | 1 | 30 | 0.5 | | | | | | |
| 115 | 3036 | 76 | 60 | 6 | 0 | - | - | | | | | | |
| 116 | 1108 | 2 | 15 | 2 | 0 | 18 | 0.5 | | | | | | |
| 117 | 1105 | 10 | 15 | 4 | - | - | - | | | | | | |
| 118 | 3035 | 16 | 25 | 16 | - | 10 | - | | | | | | |
| 119 | 2021 | 2 | 60 | 10 | - | 18 | - | | | | | | |
| 120 | 1053 | 4 | 25 | 10 | 0 | 20 | 1 | | | | | | |
| 121 | 1035 | 6 | 60 | 10 | 0 | 30 | 0.5 | | | | | | |
| 122 | 2040 | - | - | - | - | - | - | | | | | | |
| 123 | 2041 | 0 | 15 | 6 | 0 | 13 | 0 | | | | | | |
| 124 | 2039 | 0 | 10 | 2 | 0 | 10 | 0 | | | | | | |
| 125 | 1037 | 2 | 15 | 16 | 0 | 18 | 0.5 | | | | | | |
| 126 | 1066 | 4 | 40 | 10 | 0 | 18 | 1 | | | | | | |
| 127 | 1061 | 4 | 60 | 20 | 1 | 45 | 0.5 | | | | | | |

| Sample No. on the map | Code No. of sample in files of Dept. | RESULTS OF ANALYSES IN P.P.M. | | | | | | | | | | | |
|-----------------------|--------------------------------------|-------------------------------|-----|----|----|-----|-----|----|---|----|----|----|----|
| | | Cu | Zn | Pb | Mo | Ni | U | Co | W | Mn | Sn | Au | Ag |
| 128 | 2044 | 6 | 60 | 6 | 0 | 58 | 0.5 | | | | | | |
| 129 | 2043 | 2 | 125 | 8 | 1 | - | - | | | | | | |
| 130 | 1062 | 2 | 25 | 10 | 0 | 15 | 0.5 | | | | | | |
| 131 | 1065 | 4 | 25 | 16 | 1 | 13 | 1 | | | | | | |
| 132 | 1064 | 6 | 40 | 20 | 1 | 20 | 1 | | | | | | |
| 133 | 1038 | 2 | 25 | 10 | 0 | 8 | 0 | | | | | | |
| 134 | 1034 | 2 | 25 | 10 | 0 | 5 | - | | | | | | |
| 135 | 2028 | 16 | 500 | 6 | 8 | 138 | 1 | | | | | | |
| 136 | 2027 | 2 | 5 | 10 | 0 | 18 | 0.5 | | | | | | |
| 137 | 2029 | 4 | 15 | 6 | 0 | 18 | 0.5 | | | | | | |
| 138 | 1054 | 8 | 60 | 16 | 2 | 35 | - | | | | | | |
| 139 | 2022 | 2 | 60 | 10 | 0 | 23 | 0.5 | | | | | | |
| 140 | 1107 | 4 | 20 | 4 | 0 | 20 | 0.5 | | | | | | |
| 141 | 2023 | 4 | 40 | 8 | 0 | 8 | - | | | | | | |
| 142 | 1040 | 2 | 15 | 10 | 0 | 15 | 0 | | | | | | |
| 143 | 1042 | 20 | 60 | 20 | - | 13 | - | | | | | | |
| 144 | 2026 | 4 | 15 | 6 | - | 13 | - | | | | | | |
| 145 | 1032 | 6 | 40 | 16 | 0 | 23 | 0.5 | | | | | | |
| 146 | 1039 | 4 | 25 | 8 | 0 | 20 | 0.5 | | | | | | |
| 147 | 1028 | 10 | 50 | 24 | 0 | 28 | - | | | | | | |
| 148 | 1063 | 2 | 15 | 10 | 0 | 18 | 1 | | | | | | |
| 149 | 1016 | 10 | 25 | 10 | 0 | 15 | 0.5 | | | | | | |
| 150 | 1015 | 4 | 15 | 16 | 0 | 15 | 0 | | | | | | |
| 151 | 1025 | 6 | 25 | 16 | 0 | 18 | 1 | | | | | | |
| 152 | 1024 | 10 | 60 | 40 | - | 15 | - | | | | | | |
| 153 | 1023 | 8 | 60 | 16 | 0 | - | - | | | | | | |
| 154 | 1022 | 10 | 110 | 30 | - | 9 | - | | | | | | |
| 155 | 1027 | 16 | 125 | 20 | 16 | 312 | 1 | | | | | | |
| 156 | 1031 | 30 | 100 | 10 | 0 | 57 | 2 | | | | | | |
| 157 | 1030 | 6 | 25 | 16 | 0 | 33 | 0.5 | | | | | | |
| 158 | 1029 | 2 | 15 | 10 | 0 | 13 | 0.5 | | | | | | |
| 159 | 1043 | 10 | 60 | 50 | - | 20 | - | | | | | | |
| 160 | 2020 | 2 | 40 | 2 | - | 13 | - | | | | | | |
| 161 | 2024 | 2 | 25 | 10 | 0 | 5 | - | | | | | | |
| 162 | 2057 | 2 | 15 | 4 | 0 | 15 | 0 | | | | | | |
| 163 | 2016 | 4 | 75 | 6 | 1 | 55 | 0.5 | | | | | | |
| 164 | 2017 | 2 | 20 | 6 | 0 | 18 | 0.5 | | | | | | |
| 165 | 1021 | 60 | 140 | 10 | 0 | 50 | - | | | | | | |
| 166 | 1020 | 24 | 200 | 6 | 0 | 62 | 1 | | | | | | |
| 167 | 1019 | 10 | 180 | 6 | 1 | 62 | 1 | | | | | | |
| 168 | 1018 | 10 | 60 | 20 | 6 | 28 | - | | | | | | |
| 169 | 1017 | 6 | 50 | 24 | 6 | 20 | 1 | | | | | | |
| 170 | 2025 | 2 | 10 | 8 | - | 10 | - | | | | | | |
| 171 | 2056 | 4 | 25 | 4 | - | - | - | | | | | | |
| 172 | 2055 | 4 | 40 | 20 | - | 10 | - | | | | | | |
| 173 | 2054 | 2 | 20 | 10 | 0 | 13 | 1 | | | | | | |
| 174 | 3006 | 0 | 15 | 6 | 0 | 15 | 8 | | | | | | |

| Sample No. on the map | Code No. of sample in files of Dept. | RESULTS OF ANALYSES IN P.P.M. | | | | | | | | | | | |
|-----------------------|--------------------------------------|-------------------------------|-----|----|----|------|-----|----|---|----|----|----|----|
| | | Cu | Zn | Pb | Mo | Ni | U | Co | W | Mn | Sn | Au | Ag |
| 175 | 3005 | 0 | 5 | 4 | 0 | 13 | 2 | | | | | | |
| 176 | 3004 | 0 | 5 | 6 | 0 | 8 | 2 | | | | | | |
| 177 | 2008 | 4 | 20 | 2 | - | 8 | - | | | | | | |
| 178 | 2013 | 4 | 25 | 4 | 0 | 23 | 1 | | | | | | |
| 179 | 2015 | 2 | 15 | 2 | 0 | 10 | 0.5 | | | | | | |
| 180 | 2014 | 2 | 15 | 4 | 0 | 10 | - | | | | | | |
| 181 | 1014 | 10 | 60 | 40 | 0 | - | - | | | | | | |
| 182 | 1013 | 6 | 40 | 36 | 0 | 8 | - | | | | | | |
| 183 | 2012 | 6 | 40 | 40 | 3 | 23 | 0.5 | | | | | | |
| 184 | 2011 | 10 | 50 | 40 | - | 13 | - | | | | | | |
| 185 | 2009 | 10 | 40 | 4 | 0 | 13 | 1 | | | | | | |
| 186 | 2010 | 6 | 25 | 2 | 3 | 20 | 2 | | | | | | |
| 187 | 3008 | 0 | 15 | 4 | 0 | 10 | 0 | | | | | | |
| 188 | 3007 | 0 | 20 | 2 | 0 | 15 | 0.5 | | | | | | |
| 189 | 3010 | 0 | 15 | 10 | 0 | 10 | 0.5 | | | | | | |
| 190 | 3011 | 6 | 40 | 16 | 0 | 13 | - | | | | | | |
| 191 | 3003 | 16 | 140 | 70 | - | 23 | - | | | | | | |
| 192 | 3002 | 2 | 40 | 10 | - | 5 | - | | | | | | |
| 193 | 3001 | 4 | 75 | 16 | - | 15 | - | | | | | | |
| 194 | 3009 | 0 | 10 | 2 | 0 | 13 | 0 | | | | | | |
| 195 | 1115 | 4 | 20 | 2 | 0 | 13 | - | | | | | | |
| 196 | 1117A | 2 | 10 | 6 | 0 | 13 | 0.5 | | | | | | |
| 197 | 1114 | 4 | 20 | 40 | 0 | 23 | - | | | | | | |
| 198 | 1119 | 2 | 20 | 20 | 0 | 23 | 0.5 | | | | | | |
| 199 | 1118 | 4 | 15 | 4 | 0 | 18 | 0.5 | | | | | | |
| 200 | 1117B | 4 | 15 | 4 | 0 | 13 | 1 | | | | | | |
| 201 | 2061 | 4 | 20 | 20 | - | 10 | - | | | | | | |
| 202 | 2062 | 16 | 20 | 16 | - | 15 | - | | | | | | |
| 203 | 2063 | 2 | 15 | 4 | 0 | 13 | 0 | | | | | | |
| 204 | 2064 | 4 | 15 | 2 | 0 | 13 | 0 | | | | | | |
| 205 | 3041 | 76 | 60 | 10 | - | - | - | | | | | | |
| 206 | 1126 | 2 | 15 | 2 | 0 | 13 | 0 | | | | | | |
| 207 | 3034 | 16 | 60 | 10 | - | 10 | - | | | | | | |
| 208 | 3033 | 24 | 40 | 56 | - | 8 | - | | | | | | |
| 209 | 2067 | 4 | 10 | 10 | 0 | 20 | 0.5 | | | | | | |
| 210 | 2068 | 2 | 10 | 10 | 0 | 10 | - | | | | | | |
| 211 | 2072 | 2 | 15 | 16 | 0 | 8 | - | | | | | | |
| 212 | 2069 | 4 | 15 | 6 | 0 | 8 | 2 | | | | | | |
| 213 | 2070 | 2 | 25 | 4 | 0 | 13 | - | | | | | | |
| 214 | 2071 | 4 | 40 | 20 | - | 1250 | - | | | | | | |
| 215 | 3031 | 4 | 25 | 16 | - | 10 | 0.5 | | | | | | |
| 216 | 3029 | 16 | 60 | 10 | - | 10 | - | | | | | | |
| 217 | 3030 | 4 | 25 | 8 | 0 | 13 | 1 | | | | | | |
| 218 | 3025 | 0 | 50 | 4 | 0 | - | - | | | | | | |
| 219 | 3028 | 16 | 40 | 10 | 0 | 18 | 2 | | | | | | |
| 220 | 3026 | 30 | 60 | 40 | - | 13 | - | | | | | | |
| 221 | 3027 | 50 | 125 | 40 | - | 8 | - | | | | | | |

| Sample No. on the map | Code No. of sample in files of Dept. | RESULTS OF ANALYSES IN P.P.M. | | | | | | | | | | | |
|---|--------------------------------------|-------------------------------|----|----|-----|----|-----|----|---|----|----|----|----|
| | | Cu | Zn | Pb | Mo | Ni | U | Co | W | Mn | Sn | Au | Ag |
| 222 | 1109 | 2 | 20 | 20 | 0 | 23 | 0.5 | | | | | | |
| 223 | 1111 | 6 | 20 | 2 | 0.8 | 25 | 0.5 | | | | | | |
| 224 | 2058 | 2 | 5 | 10 | 0 | - | - | | | | | | |
| 225 | 2059 | 2 | 15 | 40 | 0 | 45 | 0 | | | | | | |
| N.B.: A dash in the listing indicates the absence of a determination. | | | | | | | | | | | | | |

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