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RESUMÉ OF GEOLOGY AND MINERALIZATION IN THE AREA OF THE "E" ZONE, FIRE LAKE, Y.T.

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CONFIDENTIAL

SCOPE

This represents a brief description of the geology and structure of the cirque containing the "E" zone mineralization and of possible relationships between geology, structure, and the mineralization.

Only a brief period of time was spent doing regional geologic mapping. Complex structure and geology and a lack of distinctive marker horizons tend to make mapping and interpretation difficult. As a result, the structure and geology were not solved and the following resumé consists mostly of impressions and ideas gathered throughout the course of the summer's work.

GEOLOGY

The main rocks within the area of the showing have been grouped into a chlorite schist, a series of phyllites and sericite-biotite schists, and a gneiss.

The chlorite schist (Unit 1) is a medium-grained, green, highly schistose rock which occurs at the showing and also makes up the north ridge of the cirque. The schistosity is highly contorted and small, tight folds are common throughout the formation.

The phyllite, sericite-biotite schist series (Unit 2) consists of dark grey to black phyllites and light to dark grey sericite-biotite schists. Brown iron staining is common on weathered surfaces. Small, tight crenulations and folds are also found in this formation. The east and south ridges of the cirque are made up of these rocks.

The gneiss (Unit 3) is a medium to coarse-grained rock consisting mostly of quartz, biotite, and some muscovite. It crops out in the western part of the cirque and appears to be in contact with both the chlorite schist and the phyllite, sericite-biotite schist unit.

The rock unit shown on the map as number 7 appears to conformably overlie unit 2 and is most likely a part of the same series. The lithology is somewhat different however, and the small part examined on the east ridge top consists of quartz-rich schists and argillite.

Unit 8 also appears to overlie unit 2 and may actually be continuous with unit 7. Where examined however, unit 8 was seen to consist of greenstone or a fine-grained, green argillaceous rock with some interbeds of fine-grained schist.

The other rock units mapped in the area are a granite to the north (Unit 5), a pyroxenite to the northeast (Unit 4), a small outcrop of altered schist (Unit 9) in contact with the ultrabasic, and several thin beds of limestone (Unit 6) to the east and north.

The relationships between the various formations are not known. The phyllite, sericite-biotite schist series (Unit 2) seems to overlie the chlorite schist except for a small outcrop of chlorite schist on the ridge top in the southwest part of the cirque. The upper part of Unit 2 as mapped is defined by the limestone band on the east ridge top. Overlying the limestone are the quartz-rich schists and argillites of Unit 7. Unit 8 also appears to overlie Unit 2 but here the limestone band is missing and it is obvious that there is some complexity, possibly caused by faulting, which has not been solved.

The gneiss appears to be in contact with both Unit 1 and Unit 2. The contact relationship, however, is not definite, and in some areas there seems to be somewhat of a gradation, the schists becoming more quartz-rich and coarser grained near the outcrop of gneiss. The gneiss-schist contact as shown on the map is therefore approximate and generalized.

The granite and ultrabasic are most likely the youngest rocks in the area, having intruded the schist.

STRUCTURE

The attitudes as shown on the map are of the schistosity in the schists and of the foliation in the gneiss. It is not known whether or not these planar structures represent original bedding.

On the ridge to the south of the showing the dips are gentle and show no distinct structural trend. To the east, along this ridge, the dips become steeper and have a pronounced easterly to northeasterly trend. On the cliff face to the immediate southeast of the showing this change from gentle to steep dips is sharp and distinctive, whereas at the head of the valley in the southeast part of the cirque this change is more gradual. Whether or not faulting has produced this feature is not known.

On the northern ridge of the cirque the dips are in general moderate and show no distinct trend. To the east along this same ridge the dips become steeper with a definite easterly trend.

Much of the wide variation in attitude of the schistosity as mapped is no doubt due to crenulations and tight, isoclinal folding which probably are present throughout the schists but which are not apparent in most outcrops.

Several flat lying isoclinal folds can be seen in the cliff face immediately south of the main showing. These can best be seen where they contain thin seams of quartz which outline the fold (Figure A). The crenulations in the quartz give evidence for a considerable amount of flowage along flow cleavages parallel to the axial planes, and this flowage may have obliterated the original folds in some instances.

Small, tight folds can be observed in quartz seams in some of the schist (Figure B) and in other cases quartz lenses occur parallel to schistosity (Figure C) and probably represent once continuous bands which have been pulled apart into individual pods during deformation.

Whether or not these crenulations and small folds represent slippages and drag folding along the flanks of larger scale folds, and are therefore structurally related to them is not known. In any case, the schists have been intensely deformed and large scale folding and overturning would not be surprising.

A number of well defined fractures or faults occur in the area and several intersect in the cirque basin near the showing. What movement there has been along these and whether or not these have in any way controlled the mineralisation is not known. They can be seen on the aerial photographs and can be recognised on the ground by linear depressions, sometimes accompanied by springs.

MINERALIZATION

Anomaly I

The mineralization at the main showing (Anomaly I) consists of massive sulphide and mineralized schist which occur as a flat-lying body apparently parallel to the schistosity of the surrounding chlorite schists. The upper part of the deposit contains the massive sulphide (pyrite with varying amounts of quartz, chalcopyrite, pyrrhotite, sphalerite). Mineralized schist underlies the massive sulphide and appears to represent a less intense phase of mineralisation. In general the mineralised schist does however, contain more quartz and in some cases more chalcopyrite. The richer concentrations of chalcopyrite seem to be associated with the quartz, whether in the schist or in the more massive pyrite. Magnetite occurs in the mineralised schist, both as fine-grained masses and as individual euhedral crystals.

A peculiar vuggy, opaque-white, sugary-textured quartz is sometimes associated with the massive sulphide and may represent a variation in the character of the mineralisation. One zone of this material was found in trench A, and it appears that the sulphide (mostly a granular pyrite) has been completely leached or washed out by the washing action of water.

From all appearances the mineralization represents a replacement of the chlorite schist. A somewhat contorted foliation is found in the above mentioned vuggy quartz and appears to be schistosity preserved during replacement of schist. The mineralised schist also gives some evidence for replacement. Thin bands of chlorite schist are found in the more heavily mineralized part. These bands of schist increase in size and quantity with depth until there has been a gradual change to completely mineralized schist.

A very small amount of disseminated pyrite and some chalcopyrite occur throughout the chlorite schist and there is therefore a good possibility that the iron and perhaps the copper were original constituents in the schist.

The mineralised zone on Anomaly I is relatively flat lying for the most part but the northeast part plunges to the northeast, possibly in accordance with the increasing dips in the schists towards the northeast.

To the south only a small section of mineralized schist was found in DDH "G" and nothing was found in DDH "H". The mineralisation must therefore either pinch out, plunge steeply, or is faulted off in this direction. It is unlikely that the mineralization plunges to the south because there is no such plunge in the surrounding schists.

A fair amount of mineralisation was intersected in DDH "F" but nothing was found in DDH "M". Again there is a possibility of a plunge, a fault, or a pinching out of the mineralisation.

No deep holes were drilled to the west of the anomaly but the E.M. survey did not indicate any sulphides in this area. Drag folds and fractures exposed in the nearby creek indicate that there has been some faulting near the western margin of the sulphides and perhaps the sulphides have been faulted off to the west.

Because there is evidence for some flat-lying isoclinal folds in the vicinity, there is a possibility that the sulphides occur along the limb of a similar fold and that they continue across the nose and along the opposite limb. If the sulphides already drilled are on the upper limb of such a fold then more might be expected at depth. One deep hole (500') in the centre of the anomaly is perhaps warranted here to test for a lower mineralised limb.

Anomaly 3

The surface indications of Anomaly 3 are a small amount of quartz and barren pyrite exposed in trenches C and D, heavy iron capping at trench B, and a large quantity of porous, vuggy quartz talus on the hillside above trench B. This quartz is similar to that found in trench A. The iron in the capping has apparently been carried downhill by ground water and has formed several zones of limonite cement and capping over barren schist near the creek.

The E.M. survey indicated a conductor somewhere in the vicinity of station 2 plus 00 and 3 plus 00 and there is a magnetic high running from station 2 plus 00 to station 3 - 01.

A drill hole to test this anomaly should therefore be located somewhere between these two stations. The hillside in this area is somewhat level in spots and a set up should not be too difficult. Overburden may be a problem but the talus here is mostly in large pieces, and on a vertical hole there should be no trouble in getting casing down to at least 60 feet if it should be necessary.

The hole should be a deep one (500'), even though one zone of mineralisation is passed through at a relatively shallow depth. This would test for a lower limb of a fold with similar mineralisation. More holes may be required, depending on the nature of the sulphides in the first hole.

Anomaly 2

Anomaly 2 gives no surface indications but is sharply defined by both the E.M. and magnetometer surveys.

The two best holes (19 and P) on this anomaly indicate an upper zone of quartz, pyrite, chalcopyrite, pyrrhotite, and sphalerite, passing into magnetite with disseminated pyrite and chalcopyrite at depth. Some bands of mineralised chlorite schist also occur in the drilled section. Fair concentrations of chalcopyrite were obtained at a depth of about 64 feet in DDH "P" and further drilling is warranted.

The attitude of the mineralization is not known; however, if it parallels the schistosity in the area, it dips at 60-70°. The attitude can be determined by drilling three vertical holes (at least 100' deep) across the strike of the anomaly. Then appropriate angle holes can be drilled to determine thickness of mineralisation.

The magnetic anomaly at station 26 - 02 shows some phyllite with magnetite and a small amount of disseminated chalcopyrite in an exposure along the creek. This could be a continuation of anomaly 2 which has been faulted off. It is also possible that the blank zone between these two anomalies represents an area which has been gouged or eroded to a greater depth by the glacier so that deeper overburden has obscured the anomaly in the central part.

Depending on the values obtained on the additional drilling on anomaly 2, more holes along the strike, up to and including the anomaly at station 26 - 02 may be necessary.

The drilling program for Fire Lake in 1962 should be set up for a minimum of 2000 feet. This amount of drilling should complete anomaly 1, give an indication of the character of mineralization in anomaly 3, and furnish more information as to the thickness and grade of copper in anomaly 2. Depending on these results, more drilling may be warranted.

Figure A

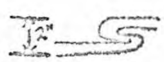

Figure B

Figure C