S.N.C.

REPORT ON
TURNAGAIN COPPER - NICKEL PROSPECT
1970

Vancouver, B. C.
January, 1971

J. J. McDougall
G. Harper

N.T.S. 104-I-9

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C O N T E N T S

ILLUSTRATIONS (In pocket)

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INTRODUCTION

A moderate programme of geophysics and exploratory diamond drilling was conducted on the Turnagain Property during the year as a follow-up of earlier work. Supplies were taken in by Cat train during March. Late melting snow and a delay in the arrival of S. Presunka prevented an early start but work on the property was underway by May. Comprehensive surface geophysical surveys included E.M. 16 (17.8 and 18.6), Mark IV and Magnetometer. Widely spaced diamond drill holes were positioned to intersect the "outcropping upper nickel zone", E.M. 16 and Mark IV anomalies. This drilling contracted by Schussler and Holtz using an AQ wireline machine was all on the west side of the Turnagain River. Eleven short packsack holes were also drilled to test favourable outcrops east and west of the river. Work was completed by early September and the camp left in a winterized condition. Earlier reports describe the property more thoroughly and these descriptions will not be repeated in this report. All maps prepared to date have been included in an office folio; only those of recent direct interest are included with this report.

LOCATION, ACCESS AND PERSONNEL

The claims are located near the Turnagain River in north central B.C. approximately 40 miles due east of the south end of Dease Lake. (Centre of group on Cry Lake Sheet 104 I at 58°28'N, 128°50'W.) The claims cover an area

ranging in elevation from 3,500 ft. at the river to 6,000 ft.

Access was either by helicopter or by light plane to an airstrip built on the river bank a mile from the main camp. A winter Cat road passes through the property.

In March, Schussler staked or restaked 43 cancelled claims on which the 1969 air E.M.-mag survey indicated appreciable anomalies. This was necessitated by the increased activity of other companies in the area. To date, therefore, there are 119 Turn, 1 Cobalt and 1 Pyrrhotite claims. Final option payments were made in September on the optioned Cobalt and Pyrrhotite claims.

S. Presunka assisted by student G. Kifiak and M. Mickle continued geophysical surveys from May to June. Drilling by Schussler and crew started in May and continued to early September. Drilling was supervised by and core logged by R. Wares during May, after which student J. Novaczek was responsible for core logging. Supervision was by J. J. McDougall who made several brief visits.

A small amount of silt sampling was completed by a student J. Whitaker.

GEOLOGY

Mapping undertaken on the property during the year consisted of tieing-in of the hanging wall contact west of the river. Significant geological information was obtained from diamond drill holes 14, 15, 16, 17 and 18 logged by R. Wares. Precise logging of the later holes is incomplete but generally adequate as far as main rock type, structure and mineralization is concerned, since the work was examined at intervals by J. J. McDougall and R. Wares.

Regional mapping by the G.S.C. shows the Turnagain area within a broad N.W. trending belt of ultrabasics thought to have a sill like form. The sill dips southwest and is one limb of a synform. The rocks on either side of the ultrabasic belt are intensely folded schists bounded on the east

by the Cassiar Batholith. Little progress was made in the understanding of local geology or its relation to the regional geology as unusually heavy and persistent snow prevented the regional mapping planned by R. Wares before moving to his accelerated southern commitments.

Mapping by Novaczek along the western hanging wall contact suggests an average strike of about 320° and a dip to the south of 70°-80°. This parallels the major banding of the ultrabasic and the attitude of the schists.

Unusual rocks encountered in holes 22 and 23 have completely confused a Ph. D. petrographer (his report on 3 thin sections enclosed). Thus there was little point in a student trying to name these in the field. A greenish grey, dark speckled rock (#22-260) not unlike that encountered elsewhere within the ultrabasic and logged as a pyroxenite, is either a "skarn" or an "unusual pyroxene-rich basic or ultrabasic". Specimen #23-1 termed a green tuff in the logs has been called a "highly epidotized basic to intermediate volcanic rock ???". This is believed to be the most common rock in the greenish outcrops.

Of interest is the fact that the above described rocks are not markedly schistose and are thus supposedly younger than the enclosing schists to the west. However, the hanging wall contact of the ultrabasic immediately to the east is on occasions somewhat schistose. The possibility, therefore, exists that these are actually later dykes or sills and as such may be related to the little understood tuffaceous breccia pipe (?) containing fragments of "reaction rimmed" and foreign granitic rocks. This breccia was intersected by drill holes in the vicinity of the Turnagain River and could possibly underlie the whole ultrabasic mass. Correlation has yet to be carried out.

A rock type, represented by Specimen #23-4-64, intersected in the westernmost drill holes, appears in the core as a "feldspathized hornblende diorite" and is described from this section as either a "spessartite hornblende

lamprophyre or a micro diorite". This rock type has not been recognized on surface.

GEOPHYSICS

S. Presunka has now completed ground E.M. 16, Mark IV and magnetometer surveys of most of the interesting parts of the property. Diamond drilling shows that many of the numerous E.M. 16 anomalies are due to massive, barren pyrrhotite with or without graphite. These E.M. 16 anomalies group into three broad trends: (1) a northwesterly - parallel to the regional strike of the ultrabasic, (2) westerly and, (3) south westerly. Several Mark IV and magnetic anomalies were also delineated.

In general, it was very difficult to correlate the numerous airbourne anomalies with those on the ground - at least for drilling purposes. However, the 1969 magnetics generally outline the ultrabasic as did the E.M. although the latter overlapped at least ½ a mile into the bounding schists.

The following is a report by S. Presunka on results obtained during 1970 work:

Turnagain River, B. C. - Map T.G.8 and 9/70
Discovery Detail Grids

The area covered by the detail E.M.-16 survey as shown on map T.G. 8/70 lies east of the Turnagain river. This covers an area of approximately 800 feet by 1000 feet from L-2 E to 11 E and 400 feet north of the C-base line to 500 south. The purpose of this detail grid was to determine if the contoured trend is more informative than the profiled lines.

E.M.-16 station 18.6 Tilt direction 070°

The well defined "A" conductor has a N.W. trend: This conductor crosses the base line some 675 feet east. By the contour of this anomaly the dip of this conductor could be interpreted to lie steeply to the S.W. "B" conductor located on line 10E has a N.S. strike. The overburden is heavy here. Too bad that more area wasn't covered here. The "C" conductor indicated some 500 feet south of the base line is terminated to the N.W. but opened to the S.E. This too is in heavy overburden. The "D" conductor located on line I.E some 500 feet south, indicated to have a N.E. trend. This conductor very closely follows the "E" conductor using ST. 17.8 of map T.G. 9/70. This is an interesting conductor which happens to lie in the bend of the river.

E.M.-16 Station 17.8 Tilt direction 350° map T.G. 9/70

The "A" conductor has the same strike as the "A" conductor of the other station, Map T.G. 8/70. The break in the strike of this conductor around the base line at 500 E is due to the strike of the conductor being in same direction as the tilt direction.

The wavey "D" conductor 250 feet north of base line starting on line 650 E extends beyond line 11.E. The "C" and the "E" conductors are very likely to be same zone. This lies in vicinity of the big bend in the river.

The "E" conductor having a N.E. strike, starts on line 5 east some 200 feet north of the base line is open to the north. Some fair mineralization has been observed in the outcropping of this conductor.

The colored contours certainly give a better picture of the trends of the conductors. The reverse cross-overs colored yellow are the area between two conductors. The purple line is the actual cross-over. The green represents the positive and the red negative as shown on the maps. The arrows indicate the direction of tilt. The quadrature has not been contoured yet. If time permits will try the quadrature contours.

S. Presunka

Vancouver, B. C.
October 21, 1970

GEOCHEMISTRY (See Map Ref. No. 5/1970)

A limited silt sampling programme was conducted along the creeks on the property draining into the Turnagain River. Samples were analyzed by the Vancouver Laboratory for Cu, Ni and Co. A number of highly anomalous sections were revealed. Two of possible significance are: (1) east and west of the Turnagain River near the footwall contact, (2) 4,000-5,000 ft. west of the river in the vicinity of the baseline. The latter is in an area containing a concentration of E.M. and mag anomalies just north of the southwestern contact of the ultrabasic.

The following are reports by R. B. Band on the significance of the Turnagain geochemical data:

October 26, 1970

J. J. McDougall

R. B. Band

Turnagain River Silt Sampling

Location : Turnagain property, North B.C.

Purpose: Detailed sampling in area of known nickel mineralization.

Date of Work: July - Sept. 1970

Analyses: Cu, Ni, Co - 10% HNO_3 - AA

Concentration levels

	Reg Bkd	Local Bkd	Anom.	Range	Mode
Ni ppm	< 100	100-250	> 250	41-2220	60-70
Cu ppm	< 65	65-200	> 200	17-810	21-30
Co ppm	< 35	35-50	> 50	1-140	11-20

Results: (See attached map)

Anomalous values are concentrated in the area west of the Turnagain River. The stream immediately east of the camp has highly anomalous Ni, Cu and Co values. The stream north of the camp has anomalous Ni and possibly anomalous Cu contents.

On the east side of the Turnagain River anomalous Ni and Cu values occur in a small stream crossing the base line at 4000E. Other streams on the east side of the Turnagain have low Ni, Cu and Co contents, in the 'regional' or 'local' background ranges.

Recommendations

(a) Silt sampling should be extended to close off the highly anomalous zone to the west of the Turnagain River.

(b) The Ni,Cu silt anomaly at 4000'E on the base line should be followed up.

(c) Streams with Ni and Cu contents in the "local background" range may be draining areas of favourable, but locally unmineralized bedrock. The possibility should be checked out.

R. B. Band

Encl.: 1 map

December 17, 1970

J. J. McDougall
S. N. Charteris

R. B. Band

Turnagain River Silt Sampling

Location: Turnagain property, North B. C.

Purpose: Detailed sampling in area of known nickel mineralization

Date of Work: July - Sept. 1970

Analyses: Cu, Ni, Co - 10% HNO_3 - AA

Concentration levels

	Reg Bkd	Local Bkd	Anom	Range	Mode
Ni ppm	<100	100-300	>300	41-2220	60-70
Cu ppm	< 65	65-200	>200	17-810	21-30
Co ppm	< 35	35-50	>50	1-140	11-20

Interpretation

The silt data for the Turnagain River property provides information concerning:

(a) the extent of the favourable ultrabasic rock unit.

(b) the presence of mineralization within this unit.

Available geologic information indicates that the southern contact of the ultrabasic body has a NW - SE strike and that this contact crosses the Turnagain River approximately 1500 ft. upstream from the present camp-site.

On the west side of the river the area known to be underlain by ultrabasic bedrock is characterized by high Ni contents (>300 ppm Ni). Similar high Ni values occur in the streams 4000 ft. and 12,000 ft. NE of the contact, suggesting that the ultrabasic unit has an outcrop width of at least 12,000 ft. To the south-west of the mapped contact Ni contents are slightly lower than over the ultrabasic unit.

Much lower Ni contents occur in the area to the east of the Turnagain River, only two samples exceeding 300 ppm. The data for Ni in silts therefore strongly suggests that the ultrabasic rock unit does not extend eastwards across the Turnagain River, and points to the possibility of a faulted contact approximately along the line of this river. A second posibility which should be borne in mind, however, is that the depth of overburden may increase significantly east of the Turnagain River leading to lower Ni values in the silts.

The high background Ni content over the ultrabasic unit complicates recognition of those anomalous Ni values related to mineralization. Published average values suggest, however, that in the case of Cu a slightly lower background values should be expected over the ultrabasic body compared with the surrounding basic rock types. Since Ni and Cu commonly co-vary in mineralization of the Turnagain type high Cu contents may, therefore, be more diagnostic of the presence of mineralization within the ultrabasic unit.

The ratio $\frac{Ni}{Ni+Cu}$ may also serve to indicate potentially mineralized areas. Ni anomalies due to high Ni in silicates will be characterized by a high $\frac{Ni}{Ni+Cu}$ ratio, of the order of 0.90. Mineralized areas, on the other hand, will be characterized by high Ni values and a lower $\frac{Ni}{Ni+Cu}$ ratio, say <0.75. Higher Co values are also to be expected in mineralized areas.

On this basis the most favourable area for mineralization appears to lie along the south-western margin of the ultrabasic unit. The inferred extension of the ultrabasic unit to the north-east appears on the basis of present silt data, to have a low mineralization potential.

Recommendations

1. The most favourable area for mineralization appears to lie along the south-west contact of the ultrabasic unit.

2. Prospecting and detailed silt and soil sampling should be continued to the north-west, so as to cover the inferred strike extension of this favourable zone.

3. The area east of the Turnagain River appears to be relatively barren, the data suggesting that the ultrabasic body does not extend across the Turnagain River. The localized grouping of three high Ni values on this side of the river should, however, be followed-up.

4. The possibility that the Turnagain River follows a fault zone which has truncated the outcrop of the ultrabasic unit should be investigated. If evidence supporting this hypothesis is found, then a silt sampling programme should be carried out along the east bank of the river to locate a possible faulted extention.

R. B. Band

RBB:lst

DIAMOND DRILLING

During the year, totals of 4,690 ft. of AQ and 403 ft. of packsack drilling were completed. Fifteen AQ holes (#s14-28) were put in as planned to test the better defined geophysical anomalies along the largely overburdened hanging wall contact section of the west central Turnagain claim group. Numerous sulphide-rich intersections were obtained, several of which contained short (1-3 ft.) sections of 1-1½% nickel within 30-40 foot "envelopes" of low grade (0.3-0.4%) material generally in peridotites near the pyroxenite contacts. One 6 inch section of massive sulphides contained 2% of rare molybdenite plus 1½% nickel. As assays were several weeks behind the drilling, there was no way to determine the nickel content of the fine grained sulphide sections, although pentlandite was readily recognized in some of the coarser grained material. Follow through with additional sections of any one nickeliferous zone was thus not usually feasible within the time available. The programme had been intended to spot test a number of targets and to return to those which "assayed out" at a later date.

Detailed packsack drilling within the one area of nickeliferous outcrops

hinted at a local (?) flatish control (packsack hole #1-15 ft. @0.58% Ni, #3-20 ft. @0.5% Ni.). Correlation of geology and assays suggests that the pyrrhotite-rich hanging wall schists and those sulphides in this contact area are not nickel-bearing.

Drilling near the presumably more favourable but unexposed footwall contact east of the river, other than for a couple of short and hurried packsack holes was not attempted. Low grade mineralization was encountered (packsack hole #9-10 ft. @0.35% Ni.) but these short holes were still many hundreds of feet away from the overburdened contact and were put in with possible assessment purposes in mind, to test strong E.M. anomalies occurring near a water source.

In general, we have to date tested an area of about 2 miles X ½ mile in which geophysics has shown several dozen strong northwest trending anomalies. Due to shear physical and financial capabilities less than 25% of these have been tested and no one continuous zone has been cut more than once. Drilling in the largely overburdened areas (holes 14-23) has shown that, coincidentally or not, most of these are related to sulphide concentrations -- with or without graphite.

Some of the fine grained graphitic pyrrhotite, probably occurring in shears, which may be related to included sedimentary remnants (?), contains low nickel values thus no general rule of thumb is possible. There is a hint, however, that much of this fine grained material is later than the coarser grained pentlandite-chalcopyrite rich type. Generally, a nickel content greater than 0.1% is present only in the coarser grained sulphides. To date those few nickel values intersected have been in the darker peridotites -- sometimes near the contact with repetitive bands of pyroxenite or well within the peridotites. A few of the anomalies were caused by pyrrhotite, with

or without graphite, near the schistose hanging wall of the ultra basic.

Hole 16 was totally within the schist while holes 21-24 cut the contact area ending in peridotite or pyroxenite. A fine grained unidentified feldspathized granitic(?) micro-diorite(?) plus a greenish volcanic was intersected in the contact area between holes 22 and 23. The poorly exposed highly altered volcanic rock (see petrographic description) appears to parallel the hanging wall as a band or sill several hundred feet in width.

To date, no holes have encountered the footwall contact although it was planned that at least one east of the river could have been completed this season.

CONCLUSIONS

Geophysical surveys including magnetometer and E.M. have indicated a large number of strong anomalies to be present (700+). A selection of these mainly near the southwestern contact (hanging wall) of the ultrabasic, west of the Turnagain River have been test drilled. This indicated that many of the anomalies, particularly the E.M. sponsored ones, are caused by graphite or pyrrhotite concentrations. No amount of geological mapping on any scale would have explained these anomalies or have contributed more on the same general scale than that already understood before the drilling was undertaken. Past experience on the well mapped but only partially exposed Horsetrail zone proved this beyond a doubt when impressive thickness of sulphides were intersected which were not reflected in the least on the surface. Our geological thinking re nickel is still changing from year to year (i.e. Wabowden) and foolproof cataloguing has just not worked. Sufficient sulphides have been intersected in most of the Turnagain drilling to satisfy many nickel properties and obviously much more remains undetected. Our continued probing is based on the fact that some good grade nickel does occur in amounts exceeded only at

a few other localities in B.C.; we have not been informed of any usable magic formula - including geological mapping - which tell us that sizeable lenses can or cannot occur. Testing to-date of the geophysical anomalies has been done as best possible under the circumstances. Although a minimum of short intersections with encouraging nickel-copper values were obtained, the controls are still not well defined due to lack of good surface exposure or detailed grid drilling.

A lack of geological information exists of the type obtainable from possible drill log correlation however. There are surface indications that the ultrabasic is layered and also that it is folded along with the schists on either side. Repetition is suspected. A unique breccia pipe intrudes the deposit and an andesite(?) sill(?) as well as a microdiorite body appears to parallel the hanging wall. The significance of any of these factors on control of sulphide developments, taken in proper order, could be important. East of the river, detailed mapping of the limited surface exposure is necessary as is logging of core and coordination of both.

RECOMMENDATIONS

Rather than probing any more of the numerous geophysical anomalies, a drilling programme in 1971 should be aimed at two specific targets: (1) to test the highly anomalous and known nickel-bearing footwall section of the "layered" peridotite-pyroxenite intrusive and (2) to attempt to outline the several better nickel sections (i. e. 0.8%+) obtained in the 1970 work.

The footwall area (Cliff Zone) as described and shown in more detail on earlier maps has always been the subject of a last day rush including this season when a couple of days were spent drilling a couple of packsack holes on E.M. anomalies. The main zone of interest, near the cliffs, has never been drilled although such was planned for 1970. Extremely coarse grained sulphides, including pentlandite, were encountered (0.35% Ni.) in a background

presumably no greater than 0.05% -- i.e. 0.30% nickel as sulphide. Grab samples from the "cliffs" further north had assayed about 0.8% and it is hoped that as the footwall is approached still further north the grade increase will continue, particularly if the often encountered more basic (olivine rich) layers are present deeper in the section. Two holes totalling about 1,000 feet are planned for this area with extra drilling dependent on the results.

Holes northwest of the river that encountered nickel mineralization drilling through overburden and which were spotted sparingly on various geophysically outlined zones include:

(1) D.D.D. #19 - 1.5 ft. @ 1.20% Ni. included a 40 ft. zone of 0.52% Ni.

(2) D.D.H. #23 (furthest west hole) - 3.0 ft. @ 0.82 included in a 13 ft. zone of 0.48% or a 60 ft. zone of about 0.30% Ni.

(3) D.D.H.'s #24-28 - 10-15 ft. sections of 0.33% Ni. including, in #28, 6 inches of massive pyrrhotite, pentlandite and molybdenite.

At least extensions to intersections from #19 and #23, and possibly #28, should be probed for and allowance made for 1,500 feet of AQ drilling.

Detailed geological mapping should be undertaken in conjunction with the drilling. The main object will be to establish a cross-section picture of the ultrabasic body to answer some of the following:

(1) Is it a layered complex and if so are sulphide or nickel concentrations related to the layering?

(2) Is the ultrabasic body folded? If so, does the footwall outcrop repeatedly? Is mineralization concentrated by folding or in-faulted remnants?

(3) What effects, if any, have been caused by later intrusions (breccias or diorites) as suggested by Kilburn (Turnagain Project - June 9th, 1967)? Certainly, the variety of rock types in the west is unusual and on this basis alone continued investigation is warranted.

J. J. McDougall

G. Harper

Vancouver, B. C.

February, 1971

APPENDIX - THIN SECTION DESCRIPTIONS

1970 Petrographic Examination Results - Drill Holes 22, 23
(logged as a feldspathized diorite)

Specimen #23-464

The rock is fine grained, and consists predominantly of somewhat equigranular, randomly oriented andesine and olive-green hornblende. Quartz is minor and sphene is a ubiquitous accessory. Cobaltinitrite staining reveals that potash feldspar is absent. The rock type is either a hornblende lamprophyre (spessartite) or possibly a microdiorite. The odd small phenocryst of plagioclase and hornblende are sporadically present. Alteration is mainly restricted to moderate to strong saussuritization of the plagioclase. Sulphides (pyrite ? predominant; chalcopyrite ? trivial) are disseminated throughout.

The mode of the rock based on 400 points is as follows.

Quartz	1.9%
Plagioclase (andesine)	53.8%
Hornblende	38.5%
Chlorite (penninite - alteration of hornblende)	0.5%
Sphene	2.6%
Opaques (pyrite ?; trivial chalcopyrite ?)	2.2%
Calcite	0.5%

Accessories include apatite and magnetite.

The plagioclase occurs in stubby randomly oriented laths which have been moderately to highly saussuritized. Crystals are generally subhedral and relatively uniform in size (about 0.2 to 0.3 mm). An estimate of the composition is in the andesine range.

The hornblende occurs as slender euhedral to anhedral prisms. In many cases crystals are mottled, and terminations ragged due to incipient alteration (in a few cases minor alteration to penninite can be discerned). The hornblende is randomly oriented and sporadically is clustered in groupings of several crystals. It is moderately to strongly pleochroic (moderate to deep olive-green - occassionally tinted bluish-to pale greenish yellow). Simple twinning is fairly common. Crystals vary in size 0.2 to 0.5 mm.

Quartz is minor and interstitial, and is mildly to moderately strained. Size ranges 0.05 to 0.2 mm.

Sphene is ubiquitously present as small euhedral to subhedral blades. Size ranges 0.05 to 0.1 mm.

Anhedral sulphides are disseminated throughout, and appear to be predominantly pyrite (?) with the odd "speck" of chalcopyrite (?). Size varies 0.1 to 0.5 mm.

Accessories include minute apatite and magnetite. Much of the latter mineral is associated with the hornblende. Sporadic clusterings of anhedral calcite also occur in the rock.

The odd fine veinlet composed of quartz (predominant), sodic plagioclase, and occassional epidote and muscovite, cuts the rock. They are unmineralized.

Specimen #22-2-60 (logged as a pyroxenite)

The rock is unaltered and is essentially composed of two minerals, a clinoamphibole (possibly richterite) and a clinopyroxene (probably diopside). The clinoamphibole occurs as medium grained crystals which poikilitically enclose fine grained, stubby clinopyroxene prisms; the latter also occurs interstitially. The rock also carries minor calcite and disseminated sulphides (pyrite ? and pyrrhotite ?). It is cut by calcite and quartz/orthoclase veins which carry a little pyrite (?).

The rock type is either a skarn, or is of a rather unusual basic or ultramafic "parentage". Unfortunately the texture of the specimen is of very little help in resolving the problem.

The mode of the rock (based on 450 points) is as follows:

Clinoamphibole (richterite ?)	51.5%
Clinopyroxene (diopside)	46.7%
Calcite	0.8%
Opaques (pyrite ? and pyrrhotite ?)	1.0%

The fresh, poikilitic crystals of clinoamphibole are subhedral to anhedral and range in size 1 - 4 mm. In hand specimen the amphibole is a medium to dark greenish-brown colour (occassionally tinted orangish). In thin section the amphibole is slightly to moderately pleochroic (neutral to medium orange), is biaxial negative with a $2V_{\alpha}$ of

about 70^{o} - 80^{o}, and has an extinction (max.) γ:z = 27^{o}. The birefringence is second order (greens and yellows), cleavage is typical amphibole, and crystals occassionally simple twinned. It is possibly a richterite (a soda-tremolite).

The clinopyroxene is much finer grained than the amphibole, ranging 0.1 to 1 mm (commonly 0.3 to 0.5 mm), and is euhedral to anhedral.

The clinopyroxene occurs both as "inclusions" with the amphibole and interstitially between amphibole crystals. In hand specimen it is pale green coloured. In thin section it is neutral, is biaxial positive with a $2V_{\gamma}$ approximately 50 - 60^{o}, and has an extinction (max.) γ:z = 37^{o}. The birefringence is second order (greens and yellows). It is probably diopside. Commonly the crystals are finely mottled with "exsolution" (unrecognisable).

The disseminated sulphides are anhedral and range in size 0.05 - 0.2 mm.

Specimen #23-1 (probably the same paralleling the green rock hangingwall)

The rock is a fine-grained, non-foliated low grade (green schist) metamorphic rock, composed of a basic assemblage of epidote - actinolite - chlorite - calcite - sphene - quartz - albite. The constituents are highly variable in grain size, are somewhat randomly oriented, and are set in sporadic, indistinct murky brown areas of highly saussuritized primary "felsics". Fine-grained anhedral sulphides (pyrrhotite (?) - predominant, pyrite - minor) are disseminated throughout.

The primary texture has all but been obliterated, but occassional areas exist which give a very vague indication of the original texture. These are composed of fine-grained, randomly oriented subhedral laths of very highly saussuritized plagioclase. The original ferromagnesian mineral(s) have been completely altered. On the grounds of the very flimsy textural evidence, the writer (if pressed) would favour a volcanic (basic to basic intermediate) origin for the rock.

The rock is cut by an array of fine veinlets and stringers composed of orthoclase, calcite and quartz. These carry only minor sulphides.

Epidote is by far the most abundant constituent of the rock. It is neutral to very pale yellow, is euhedral to anhedral, and is highly variable in size, ranging from minute practically indistinct crystals present in the saussurite to distinct crystals up to 0.4 mm.

Actinolite occurs as very pale green to medium green (bluish tint in places) randomly oriented subhedral to anhedral slender prisms. It varies in size 0.2 to 0.5 mm.

Chlorite is ubiquitously present, generally in small clusters of very fine, randomly oriented flakes. Flakes range 0.05 to 0.1 mm in size.

Albite and quartz are sporadically present in small, "isolated" crystals; they are relatively minor. The size range for both is of the order 0.05 to 0.2 mm.

Sphene is ubiquitous and is generally anhedral, occurring both as small isolated granules and clusters of a few small granules. Anhedral calcite crystals are also scattered here and there.

The sulphides are anhedral and range in size 0.1 to 0.5 mm. They appear to consist predominantly of pyrrhotite (?) with trivial amounts of pyrite (?), and they are disseminated throughout.

The rock is cut by veinlets and stringers (highly variable in thickness - some being visible only with the aid of the microscope). They are composed of calcite, orthoclase and minor quartz, or combinations of these three minerals. The occassional veinlet is composite, and the majority appear to have undergone slight deformation. The orthoclase is clouded with very fine brown incipient alteration. Both the orthoclase and the quartz exhibit strong undulose extinction. Abundant very fine needles of tremolite have developed marginally within many of the fine calcite-rich veinlets. The veinlets carry very minor sulphides(pyrrhotite ? and pyrite ?).

MAP REF. No.: 145/TG/71/2
N.T.S. No.: 104-I-7

A

A'

Surface grab sample
0.79% Ni; 0.21% Cu.

Surface grab sample
1.95% Ni; 0.31% Cu.

P.S. 5 P.S. 4

25 24

26 PS 2,1, 3

P.S. 6

5ft.
12ft.
28ft.
28ft.
49 ft.
20ft.
53ft.
139 ft.
253 ft.

4240 ft.
4220 ft.
4200 ft.
4100 ft.

N

BASELINE
76 W
72 W
68 W
52,000 N.
CAT ROAD
BASELINE
Stream
48,000 E
78 W 77 W 76 W 75 W 74 W 73 W 72 W 71 W 70W 68 W

0 50 100 200 400 600 feet.
SCALE: 1 INCH TO 200 FEET

LEGEND

Schistosity
Jointing
Fault
21 Diamond drill hole - AQ
P.S.3 Diamond drill hole - Packsack
Trench

Peridotite
Nickeliferous gossan

LEGEND

Overburden
Peridotite
Drill hole Assay Values: % Nickel plotted on a scale of 1 inch to 2%.
Values of less than 0·20 % Ni not plotted.

Section on a bearing of 025° true, viewed looking west.

OUTLINE OF CLAIM BLOCK
Turnagain R.
52000N
MAP AREA
N
SCALE: 1 INCH TO 6000 FEET
6000 feet

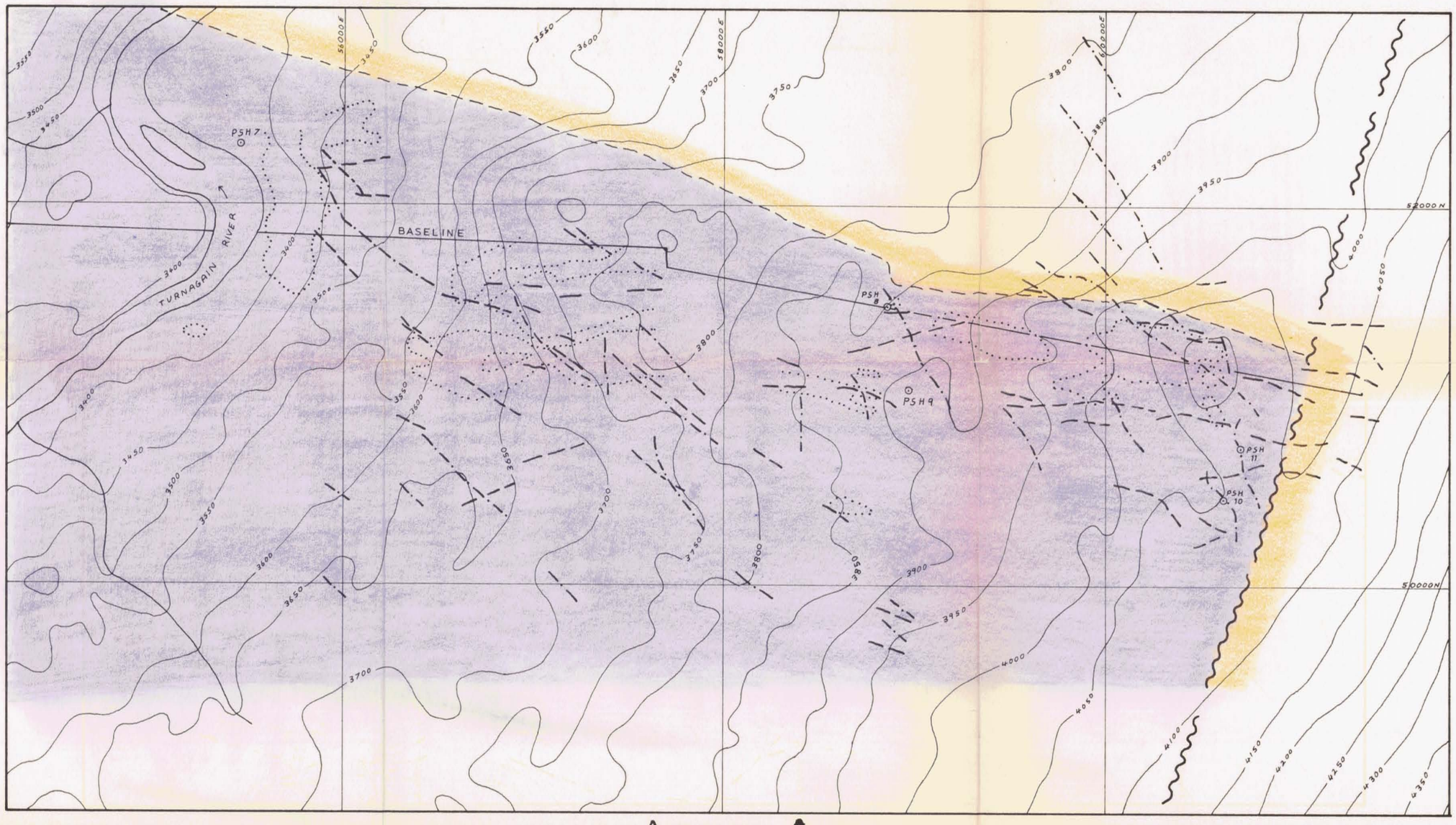
0 10 20 40 60 80 100 200 feet.
SCALE: 1 INCH TO 20 FEET

COMPANY . . FALCONBRIDGE NICKEL MINES LTD.
PROPERTY . . TURNAGAIN PROSPECT - P.N.145
LOCATION . . Turnagain River, Cassiar Mtns., B.C.

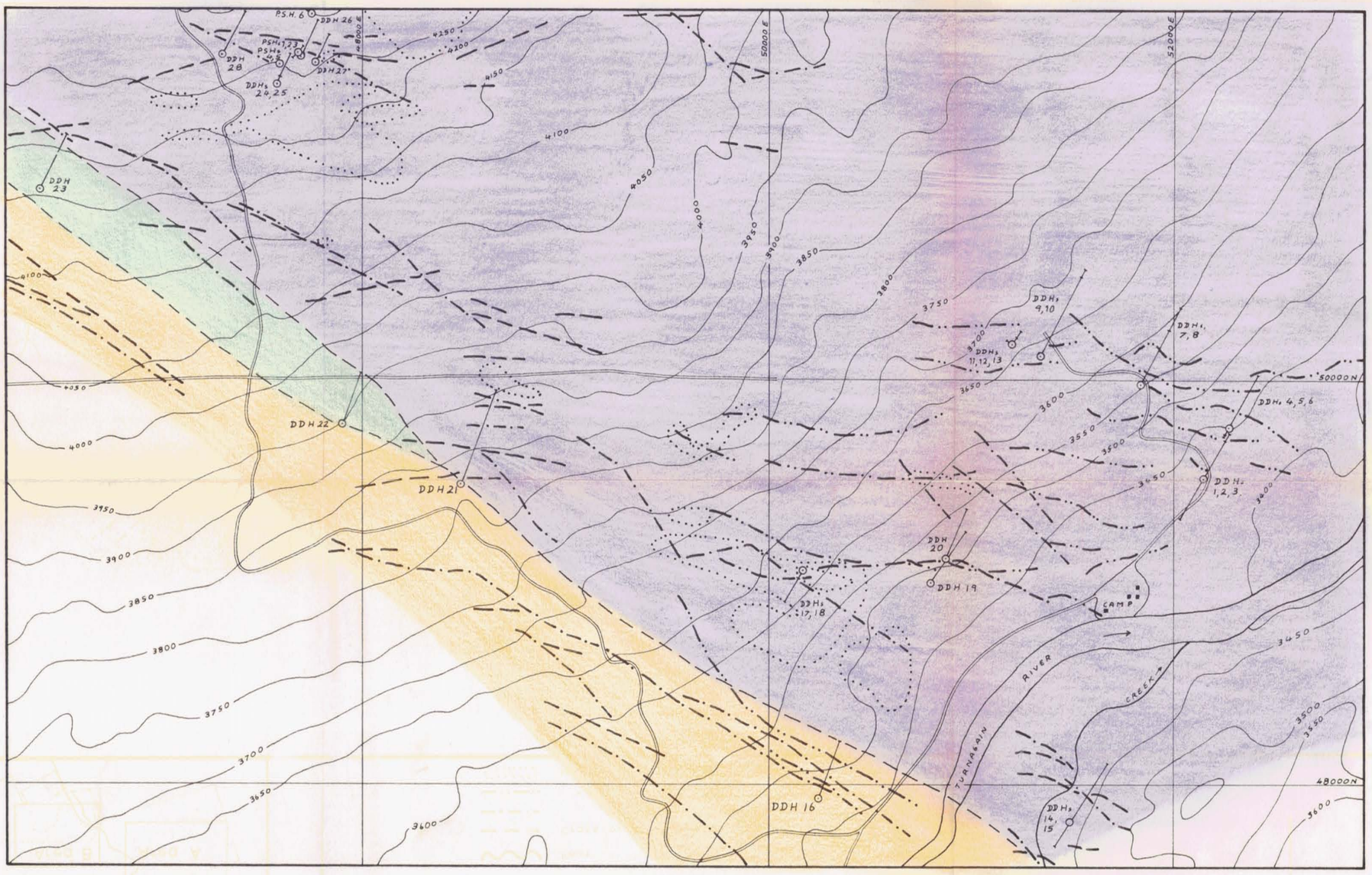
WORKING PLACE . . See inset map.
TYPE OF MAP . . Geology, plan and drill hole sections.
BASED ON . . Mapping and core logging by J. Novaczek.

DATE . . 8th February 1971.
DRAWN BY . . G. Harper.
DATE OF WORK . . July-August 1970

Fig. No.:

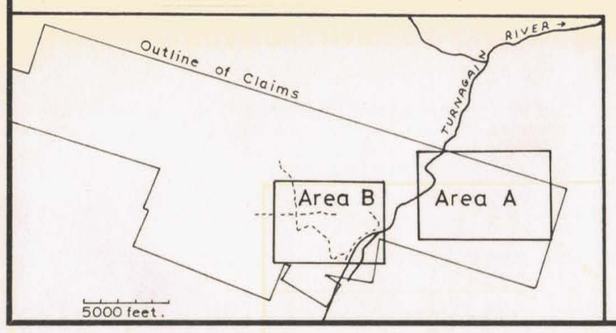


Area A



Area B

LOCATION MAP



LEGEND

- Ultrabasics including peridotite and pyroxenite
- Schists
- Metavolcanics
- Approximate contact
- Fault
- Cross-over E.M.16 (St.17·8 - 350°)
- " " " (St.18·6 - 070°)
- " " " (St.21·4 - 190°)
- M.F.I. Flux-gate Magnetometer Survey high areas (>6000 gammas)

True North

4000 feet

0 400 800 1200 2000

SCALE: 1 INCH TO 400 FEET

DATE . . February 1971 MAP REF NO: 145-TG-71-3

DRAWN BY . . G.T. - G.H. N.T.S. NO: 104-I-7

TYPE OF MAP . . Geology with superimposed Geophysics. DATE OF WORK . . 1966 - 70

BASED ON . . Mapping by J. Novaczek, surveys by S. Presunka.

COMPANY . . FALCONBRIDGE NICKEL MINES LIMITED WORKING PLACE . . See Location Map

PROPERTY . . TURNAGAIN PROSPECT - PN 145.

LOCATION . . Turnagain River, Cassiar Mountains, B.C.

35,000 E
40,000 E
45,000 E
50,000 E
55,000 E
60,000 E
65,000 E
60,000 N
55,000 N
50,000 N
45,000 N
Island Creek
Map. Ref. No. 5/1970

1000 0 1000 2000 3000 4000 5000

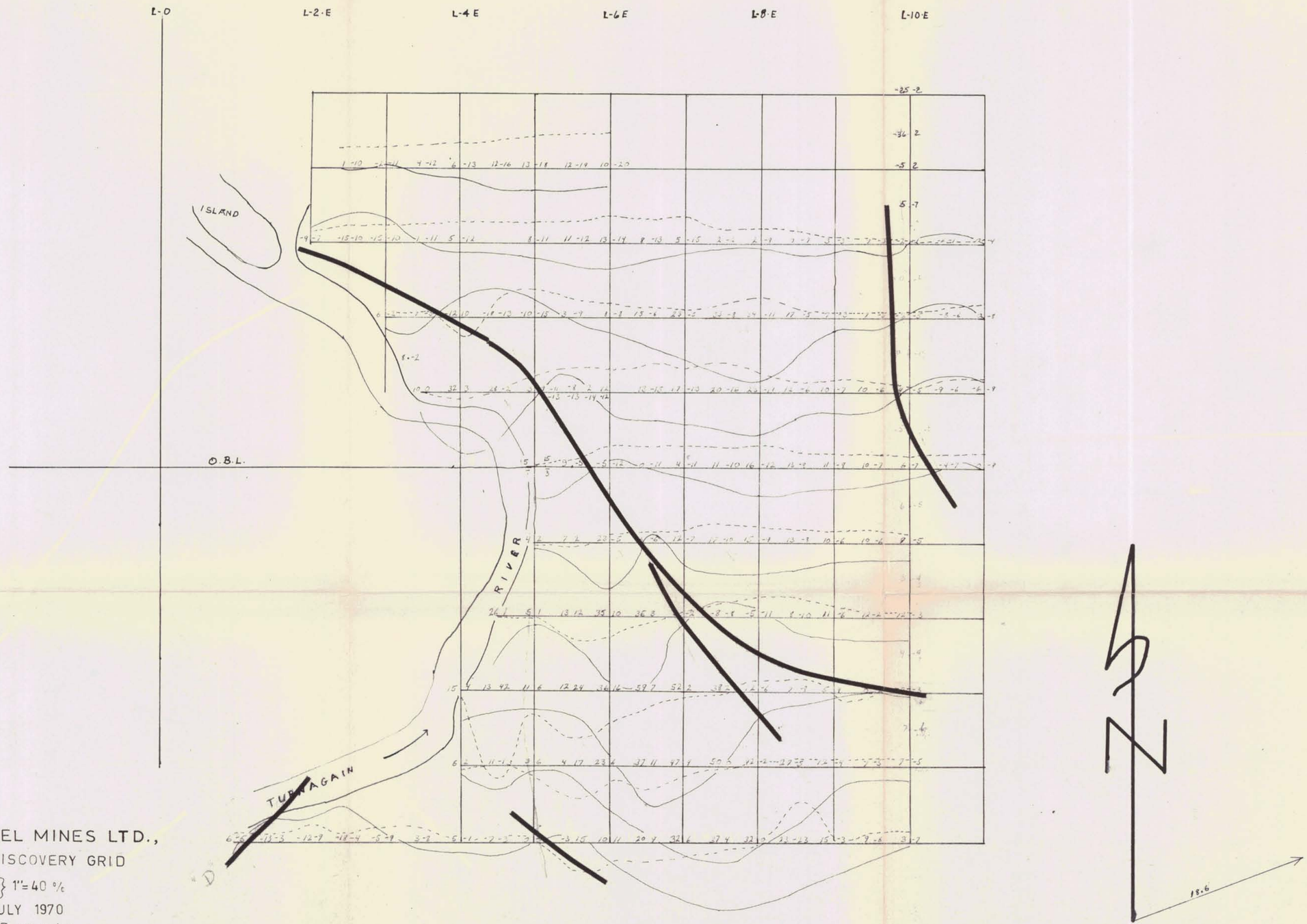
SCALE: 1 INCH TO 2000 FEET

COMPANY . . FALCONBRIDGE NICKEL MINES LTD.
PROPERTY . . Turnagain River
LOCATION . .

WORKING PLACE . .
TYPE OF MAP . .
BASED ON . . Claims and Grid Location

DATE . .
DRAWN BY . . G.T.
DATE OF WORK . . June 1970

T.G. MAP # 8/70



FALCONBRIDGE NICKEL MINES LTD.,

TURNAGAIN RIVER-B.C. DISCOVERY GRID

Inphase ——— } 1"=40 ft

Quadrature - - - - - - - }

SCALE 1"=100' JULY 1970

S. Presunka

LEGEND

- Ultrabasics inc. peridotite and pyroxenite.
- Schists.
- Meta-volcanics.
- Nickeliferous gossan.
- Approximate contact.
- Fault or lineament from air photograph interpretation.
- Schistosity.
- Jointing.
- Trench or pit.
- Diamond drill hole.
- Packsack diamond drill hole.
- Magnetic contours in γ from air magnetometer survey by Seigel Associated Ltd. in 1969.

62,000 N
57,000 N
52,000 N
47,000 N
40,000 E
45,000 E
50,000 E
55,000 E
60,000 E

BASELINE

OUTLINE OF CLAIM BLOCK

Hard Cr.

N

0 500 1000 2000 3000 4000
Scale: 1" = 1000'

WATSON LAKE
LOWER POST
CASSIAR
S. McDAME
DEASE LAKE
Dease L.
SURVEY AREA

FALCONBRIDGE NICKEL MINES LIMITED

TURNAGAIN PROSPECT - PN 145

Turnagain River, Cassiar Mtns., B.C.

GEOLOGY

WORKING PLACE: CLAIM AREA		
BASED ON: MAPPING BY D.H.B.(1966), J.J.M.(1966-70), J.N.(1970).		
DATE: 2nd. February 1971	MAP REF. NO. 145/TG/7 1/1	FIG. NO.
DRAWN BY: G.HARPER.	N.T.S. NO. 104-I-7	
DATE OF WORK: 1966-70		

TURNAGAIN CU - NI

APPROXIMATE FALCONBRIDGE CLAIM BOUNDARY

APPROXIMATE SILL OUTLINE

A/R MAG HIGH ZONE

COINCIDING E.M. & MAG ANOMALIES

POSSIBLE FAULTS, SHEARS, FRACTURES

Ni SZ OUTCROPS

SCALE 1 INCH = 1000 FEET

T.G. 10/66

H 18076-237

1"=1000'

HYDRO RADAR

SCHIST

DAVIS

SILVER STANDARD

CASSIAR

TERTIARY VOLCANICS

GRAPHITE SCHIST

ASBESTOS