Current Geological Evaluation

E & L NICKEL-COPPER DEPOSITS

Snippaker Creek, Iskut River District

November, 1966

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November 15, 1966

Silver Standard Mines Ltd.,
808 - 602 West Hastings Street,
Vancouver 2, B.C.

Attention: Messrs. A. C. Ritchie, P. Eng.
W. St. C. Dunn, P. Eng.

Dear Sirs:

The accompanying report provides an up-dated review of the principal features of your E & L Nickel-Copper prospect, augmented by data accruing from your 1966 program of diamond drilling, trenching, and magnetometer surveys. The latter, including logs and assays of core from five new drill holes, and assays of surface mineralization exposed by the long cross-trench within the "Southeast" zone, permit a re-calculation of potential ore reserves.

Much of the content of the writer's 1965 report is recapitulated, in abbreviated form, for purposes of immediate reference and completeness.

A complete summary of geochemical investigations performed during the 1965 season depends upon the possible receipt of Asarco's analyses of certain pertinent rock-chip samples submitted by the writer and Mr. Lammle last fall. Complete analyses of the large number of concurrent silt, soil and chip samples have been kindly provided directly to the writer by Asarco staff.

The considerable amount of data provided by Silver Standard staff, and relating to diamond drill, magnetometer, mineralogical, and metallurgical investigations, is gratefully acknowledged.

Respectfully submitted,

W. M. Sharp.

W. M. Sharp, P. Eng.

encl.

REPORT

CURRENT GEOLOGICAL EVALUATION

and

PROPOSALS FOR FURTHER EXPLORATION

of the

E & L NICKEL-COPPER DEPOSITS

near

SNIPPAKER CREEK, ISKUT RIVER DISTRICT

LIARD MINING DIVISION, B. C.

for

SILVER STANDARD MINES LTD. (N.P.L.)

Vancouver, B.C.

by

W. M. Sharp, P. Eng.

November, 1966

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SUMMARY & RECOMMENDATIONS

Iron-nickel-copper sulphide mineralization occurs within an olivine gabbro stock outcropping along the crest of the sharp ridge between E & L Creek and an extensive ice field on the north. This stock is one unit of an E-W trending, intermittently-exposed, mile-long belt of gabbros of quite uniform composition, and which extends northward and eastward for an unknown distance under the snowfield and glacier. The various exposures are probably part of one continuous, elongate intrusive which is largely concealed by the flanking glacier and intervening areas of "Hazelton" rocks.

Mineralization and related hydrothermal alteration appear generally localized to a system of N.E.-trending cross-fractures and, locally, to the fractured contact zones and prongs of the E & L stock. These zones of mild, closely-spaced shear-fracturing are generally confined to the gabbro body; a few larger shears - marginal to the general E & L fracture zone - are continuous within the enclosing cherts and related gabbroic phases of the intrusive.

Pyrrhotite, pentlandite, chalcopyrite, and pyrite occur together as generally coarsely-crystalline masses and disseminations; mutual boundaries, intergrowths, and 'segregations' of one or more of the constituent sulphides are characteristic textural features. The texture suggests an origin by segregation from a late magmatic sulphide-rich solution or melt. Structural evidence also indicates that these segregations, or injections, were induced by, or localized to zones of shear adjustment within the cooling intrusive. It is also probable that a continuation of these stresses beyond the period of solidification produced the current zones of shear-fracturing, and also the post-sulphide shattering of the gangue silicates; hydrothermal or deuteric alteration, with later (out-lying) phases of sulphide mineralization, probably accompanied the later fracturing.

The steeply-plunging mineralized 'pipes' and the composition and texture of the sulphide minerals suggests continuity of mineralization to much greater depths than presently delimited.

The recent magnetometer survey, which was generally restricted to the area of the local mineralized stock and adjoining (deep) ice field, has indicated a possible N.E. extension of the N.W. sulphide zone to, and perhaps beyond the central N-S fault. The survey indicated only very weak, or localized extensions of mineralization from the S.E. zone through the east ridge; however, the scope and effectiveness of the survey was limited by the adjoining ice-field.

Geological reconnaissances accomplished by crews associated with Silver Standard's district exploration program located significant regional extensions of the gabbro belt within a few miles of the E & L area and beyond the intervening snow fields and glacier. Positive evidence of similar sulphide mineralization was provided by Cu-Ni bearing float fragments of local origin.

Five diamond drill holes, put down during 1966 to test depth extensions of the N.W. and S.E. zones, indicated an increase in nickel content below the weathered shallow sections previously tested. Consequently the writer's 1965 tonnage-grade estimates are revised as follows:

Total Trench & Drill-Indicated Reserves:

1,911,000 tons @ 0.80% Ni; 0.62% Cu

Total Inferred Reserves - (to include probable depth extensions of contiguous surface mineralization not actually intersected during the 1966 drill program):

1,316,000 tons at approximately the above grade.

On the basis of the near -90% average core recovery attained on the deep-drilling program, the writer infers that the attendant core assays are representative of the actual mineralization-in-place; hence the above estimates are reasonably accurate.

A general improvement of grade with depth, and within less-severely weathered horizons of the deposit is suggested by the average of the 1966 holes within the N.W. zone; 0.85% Ni; 0.67% Cu.

Metallurgical testing of a well-mineralized, but strongly-weathered bulk sample of E & L trench material provided the following results:

1. Bulk Cu-Ni concentrate @ 9.47% Ni; 5.05% Cu for recoveries of 83.63% and 95.05% respectively.

2. Nickel Concentrate #1 @ 10.4% Ni and 77% recovery.
   Nickel Concentrate #2 @ 12.5% Ni and 73% recovery.

3. Copper Concentrate @ 26% Cu and 87% recovery.

These preliminary tests on weathered material, in which roughly 20% of the nickel content occurs as a highly-refractory secondary mineral (violarite), indicates that fully satisfactory separations of the Ni-and Cu-bearing minerals will be achieved with less-weathered sulphides.

Direct evidence provided by the latest deep diamond drill intersections, together with the indirect indications of further depth continuity, as provided by structural and mineralogical features, indicate that more detailed exploration at depth is both warranted and required. The plunging, pipe-like form of the seperate ore zones furnish rather difficult targets for deep drill exploration. Moreover, as both confirmatory exploration and development of the deposits should be accomplished via extensive work at a horizon below the existing drill-hole intersections, it is recommended that an exploration cross-cut, with subsequent drifts and laterals, the initial program involving 2,000 lineal feet of tunnelling, be commenced from the only practicable portal-site on the south slope of the mountain - this being at about the 5000' level (Dwg. No. 2). Excavation of underground drill stations would be in addition.

The following additional exploration should be included within the principal program:

1. Investigate, by one or more 300' - 400' drill holes, the downward extensions of the east-ridge mineralized shears.

2. Extend the magnetometer survey to investigate possible westerly

and southwesterly extensions of gabbro and associated mineralization.

3. Establish adequate survey control for the proposed deep exploration.

Respectfully submitted,

W. M. Sharp, P. Eng.

INTRODUCTION

The writer received the necessary authorization from Company officers on October 26, 1966 to prepare a new geological report on the E & L nickel copper prospect which would include the additional geological and assay data derived from diamond drill and trench exploration accomplished during the 1966 field season. Following a general discussion of the results of the most recent field exploration, the writer was advised that the current report should include an up-dated geological assessment of the probabilities of significant depth extensions of mineralization below the principal zones thus far explored at only shallow to intermediate depth horizons. Consequently, the major purpose of the report would be to provide sufficient specific information, with reasonably well-founded inferences, to allow detailed consideration of a consequent stage of deeper underground exploration and development.

The current report is, essentially, an extension of the writer's initial report, "Geological Investigation of the E & L Nickel-Copper Prospect and Vicinity", dated October 14, 1965. This, in turn, was based on a field examination by the writer during a three week period during August-September, 1965. Subsequent recommendations called for the drilling of at least one deep hole within the N.W. zone to sample mineralization at a significantly greater depth than that obtained by the 1965 program of shallow X-ray drilling, three additional cross-trenches on both the lower N.W. and the S.E. zones, and short drill holes to further investigate the geology and mineralization of surface exposures at Brunton stations 16-17.

During 1966, diamond drill exploration and trenching were directed by Dr. R. H. Seraphim. His records of the above work, plus details of a concurrent magnetometer survey, were furnished to the writer.

The complete results of geochemical field and laboratory analyses of silt, soil and rock-chip sampling accomplished by Asarco, with a lesser number of supplementary soil and rock-chip samples provided by the writer, have been forwarded by Asarco. The results of rock-chip samples 1B #14 - #24 inclusive, of the general diabase-gabbro exposures on the "East" and "Southwest" ridges, are pending. The analyses of these could have some influence on plans for general exploration.

The 1966 diamond drill program comprised four holes of intermediate depth on the N.W. zone, and a single short hole on the S.E. zone. Trenching consisted of a single long cross-trench across a central area within the S.E. zone.

A new set of drawings to supplement the text of this report has been prepared. These are designated in the Index.

Material prepared by Dr. Seraphim - including drill-hole logs and location sketches, a map and report covering his magnetometer survey, and miscellaneous memos to the Company's Vancouver office, are specifically acknowledged.

PROPERTY - Location, Access and Claims:

The E & L Nickel-Copper property, in the Liard Mining Division, is situated 70 miles N.N.W. of Stewart, B C., it is approximately 8 miles south of the Iskut River at a point midway between the mouths of tributary Forest Kerr and Snippaker Creeks.

Fixed-wing aircraft transport personnel and supplies to an air-strip located within a few miles of the property; the local transportation is provided by helicopter.

The E & L claim group (Dwg. 1) extends up the south-facing slope of the "E & L" creek valley over the crest of the high ridge flanking permanent ice-fields and glaciers to the north of it.

The topography is moderate, to steep, to locally precipitous. The main showings occur between 5800 - 6150 elevations.

The group consists of a single, approximately rectangular block of 40 claims. This includes the currently-known extent of the local system of diorite-to-gabbro intrusives which, locally, form the host rocks for the E & L Ni-Cu mineralization.

E & L #29 - #40 inclusive were located this year.

The original discovery claims, E & L no's. 1 and 2, were staked by Ed and Lila Freeze for the BIK syndicate in 1958; the group was then expanded through additional staking by Silver Standard field engineers to include possible occurrences and extensions of favourable host rocks and structures beyond the restricted area enclosed by the discovery claims.

GENERAL

Local survey control for the 1965 surface geological investigation and concurrent X-ray drill and trench exploration was provided by Brunton-tape traverses from general mapping points located on 500- and 200- scale topographic maps prepared from air photos.

The 500- scale map appeared reasonably accurate except within two minor areas; these were in the area of the ridge extending northwesterly of the upper showings, and along the bluff-talus line southwest of the upper (N.W.) mineralized zone.

The writer repeats the earlier suggestion that more precise survey control be established prior to commencing further exploration of depth projections of the currently-established mineral zones from significantly lower, or more distant map locations.

GENERAL GEOLOGY (Drawing No. 1)

The map area is generally underlain by rocks tentatively assigned to the Jurassic Hazelton group. Within the claims area these consist of both volcanic and sedimentary facies occurring as essentially distinctive belts underlying, respectively, the easterly and westerly halves of the map area embraced within Dwg. No. 1.

The easterly volcanic assemblage is composed of typical "Hazelton" andesitic tuffs and breccias, generally trending northwesterly and with steep- S.W. to-vertical ~~southwesterly~~ dips. Locally, as within the northeasterly corner of

Dwg. No. 1, and where minor intercalations of much less competent argillite occur, some close folding and/or buckling is apparent. Also, a significant northeasterly deflection of trends is apparent within the vicinity of the gabbro contact along the easterly E & L ridge.

The broad belt of predominantly sedimentary rocks underlying the western section of the property consists of soft, incompetent argillites and firm brittle cherts - the latter generally occurring within or adjacent to bodies of intrusive rock. The argillites have been folded and crumpled, broadly and locally. The deformational stresses have also produced sections of extremely fissile rock which disintegrates to produce an extensive talus consisting of fine shaly fragments.

All of the exposed intrusives are located within the northwesterly corner of the 500-scale map area. These rocks have a general gabbroic composition and medium-grained euhedral to ophitic textures. The visible exposures are seen to occur soley within the westerly section of soft argillites and brittle cherts.

The map distribution and contact relationships of the few disconnected bodies of gabbro observed suggests that individually N.E. trending masses are disposed along a general E-W belt. As all visible exposures are terminated to the north by the extensive ice-field, it may be assumed that they extend for some distance below the concealing glacier; also they may be interconnected at depth. The ophitic, or "diabasic" textures of the gabbros suggest an hypabyssal, rather than a plutonic magmatic origin.

The apparently systematic easterly-to-northeasterly trends of the gabbros markedly varies from the general regional (N.W.) trend of the "bedded" rocks which they intrude. Within the argillite-chert panel locally pronounced fold-and-fracture deformation near intrusive contacts suggest that the gabbros were rather forcefully intruded.

The cherty alteration of sections of argillaceous rocks appears to pre-date the gabbro intrusions. Within the brittle apparently more competent chert panel underlying the exploration area the gabbro intrusions appear, primarily, to have been structurally controlled by cross-fracturing on northeasterly trends, and to a lesser extent by northerly and northwesterly-striking fractures. The effect of this, within the general area of mineralization, has

poss. bedded or sed. cherts.

been to produce an apparent offset block-and-panel pattern of intrusion. Also, there is a possibility that the intervening chert "blocks" are roof-pendants of rather local vertical extent. This inference may be confirmed or negated through geological observations made during the contemplated program of underground exploration.

PETROGRAPHY OF THE GABBROS

Dr. H. T. Carswell has generally classified the representative suite of specimens submitted by the writer as diabases - or as rocks of typically gabbroic composition, but with the ophitic texture which usually denotes an hypabyssal (plutonic-volcanic) origin, rather than the usual plutonic origin associated with normal gabbroic rocks (euhedral textures).

All of the specimens, or occurrences within this general belt of intrusives, are compositionally closely related. Individual compositions range from hornblende-diabase, to normal diabase, to olivine ($\pm$ hornblende) diabase. The most basic specimen (S11A) of the suite submitted is of mildly-altered coarse-grained (olivine) diabase from within the N.W. sulphide zone. For the remainder of this report the intrusives will be simply termed gabbros.

H.T. Carswell notes that "orthoclase, chlorite, quartz, carbonate, albite, prehnite, epidote, micas, etc. are probably related to very late magmatic solutions. Opagues are interstitial and therefore late."

R. M. Thompson has described three samples from the vicinity of the Ni-Cu showings:

(A) - altered, unmineralized gabbro;

"Hydrothermally-altered gabbro that has been sheared and fractured. Consists of coarse phenocrysts of pyroxene, massive prehnite, chlorite, plagioclase---."

(B) - altered mineralized gabbro;

"Typical gabbro with pyroxene and plagioclase showing ophitic texture; slight alteration to chlorite, prehnite, and the fibrous amphibole (variety of serpentine?) The rock has been squeezed and deformed.--- The disseminated metallic minerals---are surprisingly coarse."

(C)- strongly mineralized gabbro;

"---shows about 60% sulphides disseminated in gangue--etc.---."

SUMMARY, PETROGRAPHY

All of the examined occurrences of gabbro shown on Dwg. No. 1 are assumed to have been derived from a common source. A reasonable inference is that they may, areally or locally, extend and/or join to the north- under the glacier - or under the black shale outcrops and talus to the west of the current exploration area.

Alteration of the gabbro appears most pronounced within fractured zones.

Fe-Ni-Cu mineralization appears to be genetically related to the gabbro, but the more significant concentrations also appear preferentially localized within the same altered fracture zones.

MINERALOGY:

The following data are derived from laboratory examination reports on typical E & L Fe-Ni-Cu sulphide mineral samples submitted by Silver Standard Mines Ltd.:

Pyrrhotite, chalcopyrite and pentlandite occur in close association as coarse masses and disseminations within variably fractured and altered gabbroic host rocks. As all of the sample material was derived from surface excavations, the constituent sulphides have been weathered to a greater or lesser extent.

Pyrrhotite is the most prevalent sulphide; chalcopyrite and pentlandite comprise a relatively minor proportion of the aggregate content of "ore" and gangue sulphides. Secondary, or supergene ore minerals identified were limonite (and goethite), covellite, chalcocite, bornite, and violarite $(NiFe)_3S_4$. Because of weathering, pentlandite forms only about 80% of the total amount of nickel minerals, and chalcopyrite about 95% of the total amount of copper minerals present.

The percent recovery of the total Ni and Cu content of the above material, via the usual extractive metallurgical techniques, is obviously closely related to the intensity of the weathering processes on the sulphides at any given section or horizon of the deposit. The extent of sub-surface weathering may be expected to vary in accordance with sub-surface depth and the continuity post-mineral fracturing to depth - the latter feature probably governing the amount of circulation of corrosive ground waters originating from the actively-weathering surface zones.

Some detailed features of the mineralogy, as derived from available reports and the accompanying photomicrographs, are listed:

(A)

1. The texture of the constituent sulphides is typically coarse granular.

2. The pyrrhotite and chalcopyrite are rarely, or only poorly crystallized and frequently exhibit "mutual" boundaries.

3. Pyrite occurs as granular disseminations, or as veinlets within and between "grains" of pyrrhotite and chalcopyrite.

4. Chalcopyrite less frequently occurs as disseminations and/or veinlets in pyrrhotite and gangue silicates.

5. Pentlandite occurs as "blades" or blebs within grains of pyrrhotite, as rims on pyrrhotite, or between grains of pyrrhotite and chalcopyrite.

6. Covellite, bornite, and chalcocite rim, vein, or completely replace chalcopyrite.

(B) Silicate minerals (pyroxene, calcic feldspar, amphibole, olivine, etc.) composing the gabbro host rock - particularly within the mineralized peripheries or prongs - are normally sheared or broken; they are usually highly altered or replaced by albite, chlorite, carbonates, prehnite, and minor quartz.

(C) Aggregates and disseminations of Fe-Cu-Ni sulphides less frequently occur within shear-fractures (N.and N.E. trends) cutting relatively less basic gabbros at localities somewhat remote from the principal occurrences noted in (B). The typical chlorite-serpentine-carbonate type of alteration occurs within the local wall rocks; however, pyrrhotite, chalcopyrite (and pentlandite?) occur in a more obviously disseminated form within the wall rocks of these "outlying" zones.

SUMMARY, DETAILED MINERALOGY

Mineral textures suggest that the sulphides originated essentially by segregation during a late stage of solidification of the gabbroic magma. However, their deposition within steeply-dipping, or plunging (pipe-like) peripheral zones, together with ample microscopic and megascopic evidence of squeezing, shearing, and shattering also suggests that they were injected as sulphide melts, charged with "mineralizers" during relatively dynamic environmental conditions, and that they and/or the sulphide-rich solutions could have been considerably displaced from their original sites of deposition. Further, it appears that the final mineral-bearing solutions effected a part of the mineral transfer to sites away from the principal zones of deposition. To carry the above inference a stage farther, it can also be inferred that these late solutions also effected the deuteric or hydrothermal alteration characteristic of the more fractured and better mineralized zones within the irregular E & L gabbro plug.

The apparent pipe-like form of the mineralized zones is contrary to the usual shape and disposition of such zones resulting from relatively static in-situ segregations. Normal gravitative segregation would result in the development of essentially flatly-lying sulphide deposits within more central sections of the plug. However, it is possible that such zones may occur at depth, or in some other locality within the general gabbro intrusive.

The coarse texture of the sulphide minerals suggests crystallization at relatively high temperatures and/or crystallization in the presence of abundant mineralizers such as would be released during late stages of solidification of the magma. As either of the above processes is usually associated with significantly deep geological environments, it is a logical assumption that the existing mineralization will persist to considerably greater depths than presently explored.

DETAILED GEOLOGY

The more obvious geological features of the E & L mineral zones and wall rocks are illustrated by the accompanying 50-scale plans and sections (Dwgs. 2,3, & 4). Also, a tabular summary of sample-assay data referring to the more significant trench and drill hole intersections is included on Dwg. No. 2, for ~~purposes of~~ convenient reference.

The composite E & L gabbro stock (?) is intrusive into a relatively firm, brittle panel of thinly-bedded cherty argillites. Bedding within this panel generally trends northwesterly and dips southwesterly. The degree of silicification is rather uniform, showing no marked variations by reason of relative proximities to gabbro contacts. The silicification appears to have occurred prior to intrusion by the gabbros, and not by a release of silica from the cooling, normally quartz-deficient magmas.

Gabbro-chert contacts are typically sharp and discordant. Within the main chert panel the intrusion appears to have been accomplished rather permissively; no marked evidence of near-contact buckling, suggesting force-ful intrusion, was observed by the writer. Such flexures as do occur in the chert ~~were apparently~~ caused by pre-intrusive tectonic forces. However, it appears that some folding of the beds could have been caused by more-or-less concealed gabbro intrusions, such as at the foot of the chert cliff immediately west of the N.W. mineralized zone.

The generally east-west trending panel-and-block pattern of gabbros and cherts containing the E & L Ni-Cu deposits appears to have been developed by intrusion of the gabbros into pre-existing zones of fracturing in the cherts. This fracture system is made up of both northeasterly, and northerly to northwesterly-trending sets. The northeasterly-trending set has a tendency to steep northwesterly dips; the other set tends to near-vertical dips.

The presently-delimited mineralized areas occur within two principal zones of altered gabbro. These are partly concealed by local talus or ice and snow. The two areas, designated as the "N.W." and "S.E." zones are structurally separated by an inferred N-S fault which is almost totally concealed by the steep talus-filled draw extending below sta. 11. All olivine gabbro exposures, comprising the host rocks of each zone, are probably part of one continuous body, but insufficient trenching or drilling has been done to confirm this assumption.

Both alteration and mineralization appear to have been localized to specific zones of shear adjustment within the gabbroic host rocks. Some evidence of the early existence of these zones is supplied by the present occurrence of numerous fractures along zones generally coinciding with currently - visible spreads of mineralization and alteration. The writer believes that the N.E. to E. -N.E. trending zones provided the principal structural control for mineralization and alteration - this inference being based mainly on the predominance of such structural trends within the N.W. and S.E. zones and also because significantly mineralized fractures outwards of the main zones are on this trend. Control by essentially N-S trending planes or zones of adjustment appears to have been largely restricted to the westerly margin of the N.W. gabbro body and to the aforementioned N-S fault between the N.W. and S.E. zones. Finally, the geometry of the composite plug suggests that the controlling differential movements ultimately leading to the above fracture patterns probably occurred closely inside present gabbro-chert contacts in directions essentially parallel to their dips or plunges.

Higher-grade Ni-Cu mineralization within the N.W. zone is essentially restricted to the westerly and northerly peripheral sections of the plug, but also, significantly, occurs within a S.W.-trending prong from its northwest corner. The richer sections of mineralization within the other two zones are distinctive, in that they appear to occur within E.N.E. to N.E.-trending bands within the general interior regions of the respective gabbro masses. However, further exploration may yet prove that the highest grade mineralization essentially favours the peripheral sections.

The writer's preliminary inferences of the depth range of mineralization, based on the general assumption that it would persist to a depth at least equivalent to the width of the composite E & L structure (700'), now appears to have been rather well substantiated by the 1966 program of diamond drilling.

Surface geological detail of Dwg. No. 2 is shown on composite cross and longitudinal sections, on A-A and B-B of Dwg. No. 3, and on Sect. ~~the~~ X-X on Dwg. No. 4. Pertinent geological details and drill-hole intersections occurring in front of and behind the respective sections have been projected to the general plane of the sections to provide adequate correlations of related features.

Sufficient drill-hole data was available to allow fairly conclusive sections on the N.W. ore zone; projections of the S.E. ore zone are, by necessity, general inferences, based on data accruing mainly from surface mapping and one drill hole. No additional detailed geological information concerning exposures in the long S.E. trench was received by the writer. As the single drill hole (5-66) did not penetrate either boundary of the S.E. zone it does not provide any indication of general zone attitudes; however, it does provide the necessary samples of less-weathered sulphides for comparison with, and evaluation of the strongly-weathered surface and trench material.

The 1966 drill holes #1 - #4 inclusive provide the necessary samples of deeper mineralization for a more conclusive estimate of the probable tenor of depth extensions. The generally good core recoveries obtained ensure that the consequent assay data are quite indicative of actual grades of mineralization within the sections penetrated.

Dwg. No. 3 projections (A-A) show a marked southerly dip of the N.E. limb; similar projections on Dwg. No. 4 indicate a very steep easterly dip of the west limb of the N.W. zone mineralization. This combination of dips produces a marked southerly, and slightly easterly plunge of the northwesterly corner of the N.W. zone.

The projection of this central part of the N.W. zone at the 5500' horizon is shown on plan (Dwg. No. 2).

Projections on section B-B indicate a marked northerly dip for the S.E. zone. However, this inference is based solely on the rather inconclusive geological data obtainable from surface exposures, hence should not be taken as entirely factual. The intermediate mineralized zone (lower N.W. zone) appears to dip similarly to the S.E. mineralization. These two zones, or at least their presently indicated ~~exposed~~ sections, are markedly similar in respect to general fracture attitudes and distribution.

The current sectional interpretations of depth extensions suggest a possible convergence of the N.W. and S.E. zones between the 5,000' - 5,500' levels. This possibility could lead to an interesting structure-mineral situation within this region of the deposit, but the lack of direct structural information via a drill hole is unfortunate.

The fair probability that the E & L structural elements and gabbros will extend northeastward under the glacier and/or southwestward under the extensive talus slopes provides considerable lateral exploration potential. More locally, it appears that the N.E. limb of the N.W. zone will continue some 200 feet northeastward below the glacier to the principal N-S fault zone. The intersection of the N.E. limb and the N-S fault could produce another favourable structural situation for mineralization in this general vicinity.

A northeasterly extension of parallel or "off-set" fracture structures related to the S.E. zone is suggested by the occurrence of significant Ni-Cu mineralization on the two observed northeasterly-trending fractures within the east-ridge gabbros in the sta. 16-17 locality.

Evidence of a possible southwesterly extension of mineralization beyond the N.W. zone is furnished by a minor occurrence of Fe-Cu mineralization within the fractured and chloritic-altered gabbros prong exposed near sta. 40, at the foot of the "N.W." bluffs. Although relatively weak, the structure is geologically well situated and requires some investigation of southwesterly extensions.

GEOCHEMICAL EXPLORATION

All of the available data, with the exception of the pending results of analyses on rock-chip samples I.B. #14 - #24 inclusive are shown in tabular and plotted form on Dwg. No. 1.

The principal anomalous area, as indicated by silt and soil sampling, occurs over the drainage course and slopes below, and to the south of the general currently-known mineralized areas, as might be expected. However, a few distinctly anomalous (Cu/Ni) rock chips may be significant if related to intrusive rocks. Anomalies occurring within the black shales and associated rocks of detrital origin are not considered significant; locally, these all appear to be relatively "rich" in "heavy metals" (Zn-Pb-Cu-Ni, etc.).

Of the few silt samples taken along drainage courses from the easterly parts of the E & L glacier, some appear very mildly anomalous. However, the data are too sparse to attempt to relate these to possible mineralized northeasterly extensions of the E & L gabbroic host rocks.

The analyses of rock chip specimens (IB 14-24) of the various exposures of gabbra over the upper west half of the map area are awaited with interest.

DRILLING & TRENCHING

The location of all significant trenching and drilling accomplished to date, together with widths ond Ni-Cu assays of related intersections are included on Dwg. No. 2, and, in part, on sectional Drawings No's. 3 & 4. To complete the above record, the principal geological data from the 1966 drillings, derived from R. H. Seraphim's drill logs are recorded in the following summary:

D.D.H. #66-1:

0-75': Olivine gabbro or diabase; healed brecciation - some fragments rimmed with feldspars; minor quartz seams on healed fractures; a few slip planes serpentinized; trace sulphides; rock relatively unoxidized.

75-110': Olivine gabbro with decreasing grain size and an increased shattering and oxidation; pyrrhotite (pht), chalcopyrite (cp) and pentlandite (pnt) in coarse grains sparsely disseminated.

110-149': ol. gabbro with further decrease in grain size to aphanitic at contact at 149'; considerable oxidation principally on slips and broken core (2-5% limonite).

149-151 1/2': Argillite hornfels, 50% pht(?). *porphyroblastic*

151 1/2-181': Argillite hornfels, with feldspar porphyroblasts and fine biotite; shattered; 2-3% limonite; traces sulphides.

Recovery, 75' - 151 1/2' = 89%

D.D.H. #66-2:

0-158': Olivine gabbro, (barren)

158-297': Olivine gabbro, mineralized with varied oxidation and shattering.

Recovery, 158' - 278' = 88.5%

D.D.H. #66-3:

0-180': Olivine gabbro, rel. fresh.

180-400': Olivine gabbro, decreasing grain size, variably shattered, altered, and mineralized; slight limonite; 1 foot pale feldspathic segregation in sect. 320-330'.

note: 330' - 340' - both gabbro and sulphides becoming finer grained.

340-390' - pronounced healed breccia.

390-400' - 2 inches of massive sulphide at 397'; few small argill. frags. suggest nearing gabbro-chert contact.

Recovery, 190'-310' = 89.4%

D.D.H. #66-4:

0-117': Olivine gabbro.

117-127': as above, tr.ox; minor sulphides.

127-197': as above; var. 2-10% ox. on fractures (20% to core); well mineralized Fe-Cu-Ni.

197-239': as above; var. 15-20% ox.; well mineralized.

239-248': as above; 60-70% sulphides - banded at 35° to core.

248-258': hornfelsized argillite; no visible sulphides.

258-270': less altered argill. and quartzite - bedded at 20° to core (sugg. parallel to W. contact).

Recovery: 127' - 248' = 95.3%

D.D.H. #66-5:

0-20': Gabbro, fine grained & very broken; 5% Fe-ox. sparse to medium sulphides.

20-80': Gabbro, fine to medium-grained; sparse to trace Fe-ox. minor to moderate sulphides.

80-100': Gabbro, coarser grained, sparse Fe-ox.; moderate to good sulphides. Note sect. B-B sugg. hole approaching south edge of zone with depth).

Recovery: 0-100' = 74.5%

Summary: Core recoveries in all holes were reasonably good; there is no suggestion that the ± 10% average loss occurred in either less-than, or better-than-average mineralizations, hence the resulting assay data can be considered reasonably indicative of the grade of the respective mineral sections penetrated.

MAGNETIC SURVEY (Drawing No. 5)

This was performed by R. H. Seraphim during the 1966 field season. The following observations are summarized from his report "E & L Magnetic Survey":

w. S.

"The (pyrrhotite-chalcopyrite-pentlandite) mineralization outcrops around the edge of a permanent ice and snow field. The portion surveyed (from) the snowfield - particularly that furthest northeast, might contain readings lower than otherwise because of ice thickness of at least forty or fifty feet, and perhaps several hundred feet.

The ground to the west and south is predominantly steep, and in places too precipitous for practicable traversing. Some readings taken near the bottom of cliffs and in gullys are probably anomalous because of local topography (lateral effect).

Three different magnetometers were used; a Sharp A-3 "sputnik" was not sufficiently accurate; an Askania torsion balance was broken after only a half-day's use. Most of the survey was then completed with a fluxgate instrument. Corrections were made for diurnal variation, and the fluxgate readings correlated to the Askania readings. The northwest section of the ground, surveyed with the A-3 only, is obviously "flat", so time for its resurvey was not taken.

The survey was run to determine continuation of mineralization under the snowfield, and to determine whether arnot the principal areas of mineralization are faulted segments of originally the same body. Precise conclusion is not reached on either problem.

The broad N-S fault along approximately 8300 East does not appear to terminate the mineralized zone corresponding to anomaly "A" (N.W. zone). Weakly-anomalous readings reappear beyond the projected fault, but the weakness may be due to thick snow and ice.

The high readings in the west portion of anomaly "A" correspond to much massive sulphide there (mineralized S.W.-N.E. prong). The anomaly weakens towards the east, where mineralization is disseminated only.

Anomaly "B" corresponds fairly well with the disseminated mineralized zone (intermediate zone) along the south contact of the gabbro. Its eastern extension is again (?) apparently terminated at the fault zone. A very minor anomaly appearing approximately on strike beyond the fault contains argillite outcrop, thus is apparently of little consequence.

Anomaly "C" corresponds to part of the east (S.E.) zone of mineralization. The anomaly does appear to cover the part which contains some of the better-grade mineralization, but the anomaly does not extend southward to the limits of the better grade. The hillside here slopes about 37 degrees southerly, and perhaps topography has some effect on the southern limit. "C" appears definitely (?) without extension under the moraine and ice to the northeast."

Summary:

1. The anomaly centering on 13000 N, 8350 E rather vaguely indicates a N.E. extension of the N.W. zone below an unknown, but probably considerable depth of snow and ice; the alignment of this and minor parallel anomalies does not appear to be entirely fortuitous.

2. There is a suggestion of a deflection of the N.W. zone near the northerly projection of the main N-S fault.

3. The displacement of anomaly "B" with respect to the mapped mineralized area is suggestive of a southerly dip for the zone - barring side-influences due to topography.

4. A similar comparison with respect to anomaly "C" is suggestive of a northerly dip (ref. sect. B-B Dwg. No. 3). That the anomaly does not indicate a direct extension of mineralization from the N.E. end of the S.E. zone is not wholly surprising; a system of rather attenuated weak anomalies, generally conforming with the east ridge fracture zones, indicates the possibility of other occurrences still farther northeast below the ice-field.

5. A survey along the foot of the westerly cliffs, and outward over the talus is required to complete the preliminary survey and adequately investigate possible westerly or southwesterly extensions of the E & L zone.

CURRENT MINERAL ESTIMATES

The current estimates involve a division of grade calculations to allow for a near-surface interval of variably lightly - to strongly weathered Ni-Cu bearing sulphides, and a deeper section of much less-weathered material. The character of the deeper mineralization is disclosed by the deeper diamond drilling accomplished during the 1966 season.

The grade and areal extent of surface exposures in the N. W. zone are re-estimated by combining the former trench and shallow drill-hole data in one calculation, rather than two. The dimensional data in the above are supplemented by the new information accruing from the 1966 drill-hole intersections.

The preliminary inference of a 700-foot depth, based on the premise that this dimension would be at least equal to the gross mineralized width of the E & L zone, is retained; this is quite well substantiated by the longest hole (No. 3), drilled to 400' @ -85°, and which shows a normal grade of contact mineralization at the bottom of the hole.

The areal extent of the upper N.W. zone is increased - by reason of the more positive definition of cross-seotional widths by the 1966 drill intersections; preliminary estimates of the areas of the lower N.W., and S.E. zones are retained, as the writer did not feel that the revisions were justified by the small amount of new data accruing from 1966 exploration in the respective areas. However, the writer feels that his estimates of the areal extent of the lower N.W., and S.E. zones are conservative, and that the additions of inferred mineralization is quite permissable.

A weighted-average grade for the more highly-weathered upper sections (0-150') of all zones includes the deep-trench and shallow drill-hole assays of the N.W. zone together with assays of the generally more weathered material derived from the relatively superficial trenching and single, relatively short drill hole in the lower S.W. and S.E. zones; hence this grade estimate is considered reasonably conservative.

Finally, the average grade of the lower (150' - 700') ore section has been computed as the arithmetic average of d.d.h.'s 1 and 2 combined, 3,4 and 5 - placing most weight, by necessity, on the N.W. zone intersections.

Drawings 2, 3 and 4, and the preceding section "Diamond Drilling and Trenching" illustrate and provide the basic data for the following estimates:

"Average-Grade" Estimates:

N.W. zone, Surface-Weathered section

#6203 trench,	7.0'	x 1.17% Ni	= 8.20,	x	1.40% Cu	=	9.80
Tr. #6-55,	50.0'	x 0.32% Ni	= 16.00,	x	0.42% Cu	=	21.00
Tr. #4-55,	16.0'	x 2.35" "	= 37.60,	x	1.35" "	=	21.60
d.d.h. #3-65,	48.0'	x 0.75" "	= 36.00,	x	0.63" "	=	30.20
d.d.h. #2-65,	16.2'	x 0.74" "	= 12.00,	x	0.61" "	=	9.90
Tr. #5-65,	76.0'	x 0.52" "	= 39.60,	x	0.65" "	=	49.40
Tr. #3-65,	34.0'	x 0.49" "	= 16.68,	x	0.49" "	=	16.68
d.d.h. #7-65,	16.9'	x 0.71" "	= 12.00,	x	0.58" "	=	9.80
d.d.h. #5-65,	77.0'	x 1.20" "	= 92.50,	x	0.61" "	=	47.00
Tr. #2-65,	14.0'	x 0.35" "	= 4.90,	x	0.36" "	=	5.05
#6212 Tr.,	13.0'	x 0.37" "	= 4.81,	x	0.45" "	=	5.85
d.d.h. #6-65,	14.0'	x 0.49" "	= 6.85,	x	0.37" "	=	5.16
	(382.1)		(287.14)				(231.44)

Weighted Average = 12,500 sq. ft. @ 0.753% Ni; 0.61% Cu.

Lower N.W. Zone

#6218 Tr.,	41.0'	x 0.47% Ni	= 19.25,	x	0.55% Cu	=	22.60
#6219 Tr.,	22.0'	x 0.36% Ni	= 7.92,	x	0.55" "	=	12.10
#6220 Tr.,	25.0'	x 0.33" "	= 8.25,	x	0.50" "	=	12.50
#6232 Tr.,	36.0'	x 0.44" "	= 15.85,	x	0.65" "	=	23.40
	(124.0)		(51.27)				(70.60)

Weighted Average = 6,000 sq. ft. @ 0.413% Ni; 0.570% Cu.

S.E. Zone

#6225 Tr.,	13.0'	x 0.56% Ni	= 7.26,	x	0.70% Cu	=	9.10
#6226 Tr.,	30.0'	x 0.40" "	= 12.00,	x	0.60" "	=	18.00
#6227 Tr.,	45.0'	x 0.66" "	= 30.00,	x	0.60" "	=	27.00
#6228 Tr.,	14.0'	x 0.34" "	= 4.75,	x	0.45" "	=	6.30
#6229 Tr.,	54.0'	x 0.55" "	= 29.70,	x	0.65" "	=	35.10
d.d.h. #5-66,	100.0'	x 0.69" "	= 69.00,	x	0.48" "	=	48.00
N. 1966 Tr.	33.0'	x 0.47" "	= 15.50,	x	0.41" "	=	13.50
	(289.0)		(168.21)				(157.00)

Weighted Average = 8,800 sq. ft. @ 0.583% Ni; 0.543% Cu.

Combine: 12,500 sq. ft. x 0.753 % Ni = 9,412, x 0.61 % Cu = 7630
6,000 sq. ft. x 0.413 % Ni = 2,478, x 0.57 % Cu = 3422
8,800 sq. ft. x 0.583 % Ni = 5,130, x 0.543% Cu = 4780
(27,300) (17,020) (15832)

(A) Wtd. Avg., Surf.-Weath. Mineralization = 0.623% Ni and 0.580% Cu

D.D.H. #1-66 = 0.72 % Ni; 0.66 % Cu
" #2-66 = 0.73 % Ni; 0.63 % Cu
Average for #1-2 Section = 0.725 %Ni; 0.645% Cu

D.D.H. #3-66 = 0.610 % Ni; 0.570 % Cu
D.D H. #4-66 = 1.330 % Ni; 0.810 % Cu
D.D.H. #5-66 = 0.690 % Ni; 0.480 % Cu

(B) Average, deeper sulphides = 0.84% Ni and 0.63% Cu

(C) SUMMARY-MINERAL ESTIMATES:

General: Indicated vertical depth = 700 feet.
Assumed vol/ton factor = 10 cu. ft. per ton
copper N.W. Block @ 1250 tons per vert.-foot
Lower N.W. Block @ 600 tons per vert.-foot
S.E. Block @ 880 tons per vert.-foot
Total: 2,730 tons per vert.-foot

1. "INDICATED" BLOCKS

Surf. weath. sect. = 150' x 0.623% Ni = 93.45; x 0.58% Cu = 87.00
current deeper sect = 550' x 0.84% Ni = 462.00; x 0.63% Cu = 346.50
(700') (555.45) (433.50)

Wtd. Average, surf.-deep min.= 0.80% Ni; 0.62% Cu

Total "Indicated" Reserves: 700' x 2730 = 1,911,000 tons

2. "INFERRED" BLOCKS

(a) S.E. Zone, prob. addition; 880 x 700 = 616,000 tons
(b) Intermediate to N.W.-S.E. Zones probable concealed
block = $\frac{50' \times 200'}{10}$ tons x 700 ft. = 700,000 tons

Total inferred reserves: = 1,316,000 tons

n.m.f.

TOTAL INDICATED & INFERRED- 3,227,000 tons

W. M. Sharp, P. Eng.

METALLURGY

Reference is made to the preceding section "Mineralogy" for detailed descriptions of the composition, texture, and alteration of samples of E & L "Fe-Ni-Cu" sulphides submitted for metallurgical testing. These were submitted to Lakefield Research of Canada Limited and Sumitomo Metal Mining Co. Ltd. during late 1965. They consisted of weathered sulphide material derived from surface trenches - principally within the N.W. zone.

The Lakefield laboratory testing, employing specific reagents on generally acidic to neutral pulps, did not produce acceptable bulk or individual concentrates. Their tests were performed on a slightly better-than-average grade of sulphides.

Sumitomo's metallurgical tests produced markedly higher recoveries of Cu and Ni for higher-grade bulk and individual copper-nickel sulphide concentrates. The higher grade of the head sample may have partly contributed to the improved results; the relative amounts of weathering of Lakefield versus Sumitomo head sample material is not known to the writer: A summary of Sumitomo's results is as follows:

Assay of Head Sample - "high-grade" feed
3.11% Ni; 1.43% Cu; 0.11% Co; 26.39% Fe;
18.57% S; 0.01% Zn.

(A) BULK FLOTATION TESTS:

optimum pH @ approx. 9.0
optimum grind at 65%-86% minus 200 mesh

Concentrate:	recovery Ni= 83.63%;	content Ni= 9.47%
	recovery Cu= 95.05%;	content Cu= 5.05%
		content Fe S, etc. =85.48%

(B) DIFFERENTIAL FLOTATION TESTS:

Feed was bulk Ni-Cu concentrate per (A)

1st Nickel Concentrate;	recovery Ni= 77%;	content Ni = 10.4%
2nd " " ;	recovery Ni= 73%;	content Ni = 12.5%
Copper concentrate;	recovery Cu= 87%;	content Cu = 26. %

The above preliminary test results on weathered surface material are encouraging, in view of the fact that, of the nickel minerals present, approximately 20% consisted of the metallurgically-refractory "secondary" mineral violarite. These preliminary results also indicate that less-weathered sulphides will permit increased Cu-Ni recoveries and content on both bulk concentrate and individual Cu and Ni concentrates.

Results of the above laboratory tests by both organizations might have been more comprehensive if parallel tests had been run on selected fractions of visibly less-weathered material; however, this may be achieved via samples of relatively fresher, average-grade drill-core material subsequently submitted.

W. M. Sharp

W. M. Sharp, P. Eng.

CERTIFICATE

I, William M. Sharp, with business address in Vancouver, British Columbia and residential address in North Vancouver, British Columbia, do hereby certify that:

1. I am a consulting geological engineer.

2. I am a graduate of the University of British Columbia with B.A.Sc. (1945) and M.A.Sc. (1950) degrees in Geological Engineering.

3. I am a registered Professional Engineer in the Province of British Columbia.

4. I have practiced my profession since 1946, in both geological and managerial capacities, with Canadian mining companies until 1964, when I established my own consulting practice.

5. I have personally investigated the E & L mineral deposit and have examined all available technical data, reports, and correspondence pertaining to it; in addition I have discussed the recent developments with Silver Standard staff and other engineers associated with the exploration of the property and surrounding areas.

6. I have no interest, direct or indirect, in the properties or securities of the above Company, nor do I expect to acquire any such interest.

Respectfully submitted,

W. M. Sharp

William M. Sharp, P. Eng.

Vancouver, B.C.
November, 1966.

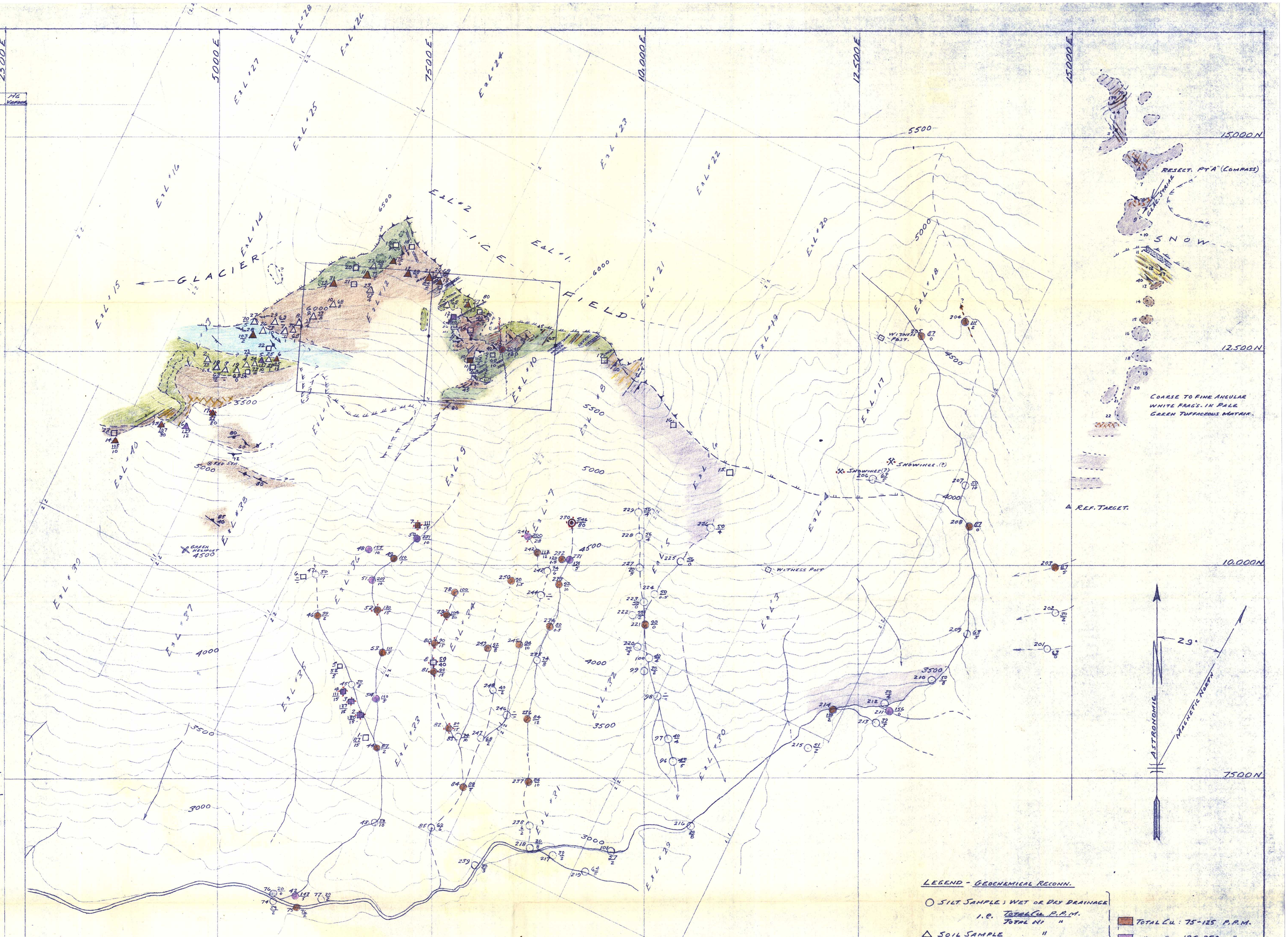
Sample No.	Wt.	Heavy Metal (ML.)	Cold Cu (P.P.M.)	Total Cu (P.P.M.)	Zn (P.P.M.)	Pb (P.P.M.)	Mo. (P.P.M.)	Ni (P.P.M.)	Hg Vapour
○ I-42		6	41	143	54	0	0	5	
-43		5	10	50	60	26	13	10	
-44		31	41.	87	62	20	0	2	
-45		6	40	50	143	24	10	8	
-46		5	41	99	88	20	0	2	
-47		4	20	50	84	0	12	1.	
-48		17	53	155	126	60	5	10	
-49		10	45	110	120	0	18	1	
-50		16	151	231	88	54	5	10	
-51		12	76	207	124	44	5	10	
-52		8	69	120	80	32	0	15	
-53		4	65	111	62	18	3	5	
-54		5	114	160	80	24	0	5	
-74		3	2	39	40	0	3	2	
-75		3	34	76	58	18	3	2	
-76		3	10	20	61	18	8	0	
-77		4	3	20	84	0	3	2	
-78		3	40	100	84	60	3	1	
-79		2	30	104	44	2	0	20	
-80		2	20	90	46	4	13	15	
-81		2	20	90	50	18	0	15	
-82		4	30	90	50	0	0	15	
-83		4	45	74	91	52	0	10	
-84		5	53	88	62	12	3	5	
-85		4	20	60	54	16	0	6	
-96		1	5	43	63	25	2	5	
-97		4	5	40	106	24	10	4	
-98		3	3						
-99		1	2	30	133	18	10	2	
-100		1	13	40	123	38	10	4	
-101		3	14	57	42	2	3	2	
-201		4	22	63	78	10	0	0	
-202		2	45	30	143	46	11	2	
-203		4	2	87	81	10	3	5	
-204		6	41	111	58	29	0	2	
-205		6	22	87	24	0	0	0	
-206		6	22	63	58	8	0	5	
-207		5	3	50	50	16	0	10	
-208		7	22	87	68	0	0	0	
-209		7	14	63	84	0	3	5	
-210		6	3	50	46	18	5	8	
-211		4	0	156	163	112	14	0	
-212		2	1	30	36	18	0	4	
-213		2	2	39	48	10	0	5	
-214		3	14	100	58	7	3	2	
-215		5	4	51	48	10	0	2	
-216		1	1	20	34	4	8	8	
-217		3	4	39	44	16	3	2	
-218		3	2	20	52	10	8	8	
-219		3	22	64	42	4	5	5	
-220		2	30	30	91	32	10	2	
-221		3	55	90	84	104	3	0	
-222		3	30	50	106	60	8	2	
-223		2	3	50	78	74	11	0	
-224		3	3	50	61	112	14	0.5	
-225		3	40	56	133	38	3	0	
-226		3	13	50	155	52	3	4	
-227		1	5	70	78	17	0	5	
-228		1	30	56	114	32	10	4	
-229		3	20	56	114	100	3	4	
-230		9		546	123	32	8	80	
-231		5	149	191	104	81	10	5	
-232		7	82	120	90	112	10	1.5	
-233		2	45	92	133	52	0	10	
-234		3	45	80	120	81	10	0.5	
-235		2	72	74	123	4	5	8	
-236		3	72	84	123	10	11	12	
-237		2	(15)	84	133	24	14	10	
-238		1	1	6	43	4	8	2	
-239		3	0	30	61	104	11	3	
-240		40	2275	3040	96	60	6	120	
-241		2	138	200	98	60	3	28	
-242		3	-	112	155	18	8	12	
-243		1	65	74	143	4	5	6	
-244		1	55						
-245		3	82	84	114	18	0	10	
-246		3	40						
-247		3	-	68	123	32	5	2	
-248		1	3	40	143	24	8	2	
-249		3	13	92	114	0	3	8	
-250		2	40	90	84	104	3	1.5	

Sample No.	Wt.	Heavy Metal	Cold Cu	Total Cu	Zn	Pb	Mo	Ni	Hg Vapour
△ Ic-1		1	5	76	143	38	3	6	
-2		2	30	73	104	81	6	0.5	
-3		1	40						
-4		1	10	73					
-5		7	15	137	120	22	5	10	
-6		10	40	85	134	18	8	12	
-7		1	5	71	90	81	10	1	
-8		2	5	73	143	38	8	4	
-9		2	40	73	70	46	5	8	
-10		2	5	68	155	38	0	8	
-11		2	5	79	156	82	3	5	
-12		2	10	88	146	32	5	2	
-13		1	30	79	130	169	12	1	
-14		2	40	115	99	43	0	10	
-15		2	43	107	108	22	0	30	
-16		1	35	127	143	52	10	12	
-17		1	5	97	120	38	0	20	
-18		1	10	63	196	24	11	2	

Sample No.	Wt.	Heavy Metal (ML.)	Cold Cu (P.P.M.)	Total Cu (P.P.M.)	Zn (P.P.M.)	Pb (P.P.M.)	Mo (P.P.M.)	Ni (P.P.M.)	Hg Vapour
△ Ic-19		1	5	68	90	81	6	0	
-20		1	60	68	143	52	4	8	
-21		1	5	84	228	236	10	8	
-22		1	20	40	114	0	10	2	
-23		1	20	73	212	200	0	4	
-24		4	5	73	NOT ENOUGH SAMPLE				
-25		8	25	58	104	81	14	1.	
-26		7	25	73	114	4	8	10	
-27		1	35	70	102	22	6	5	
-28		2	25	103	143	38	11	2	
-29		(5)	5	63					
-30		1	30	68	96	81	14	1	
-31		1	5	79	196	116	3	7	
-32		1	20	68	112	112	6	1	
-33		1	35	97	143	0	2	12	

Sample No.	Wt.	Heavy Metal (ML.)	Cold Cu (PPM)	Total Cu (PPM)	Zn (PPM)	Pb (PPM)	Mo (PPM)	Ni (PPM)	Hg Vapor
□ IB-1		2	76	87	62	10	58	15	6
-2		2	32	130	58	0	56	15	7
-3		5	8	127	42	12	66	15	6
-4		6	44	111	58	0	56	15	7
-5		2	52	52	40	0	27	5	12
-6		4	INSUFFICIENT SAMPLE.						260 ?
-7		3	52	111	82	16	26	15	19
-8		2	50	50	18	10	75	40	3
-9		1	?	60	44	11	0	10	10
-10		1	0	112	35	4	11	2.	14
-11		3	0	68	84	52	0	4	14
-12		2	20	30	228	10	5	2	3
-13		1	20	40	66	60	12	0.5	8
-14		4							10
-15									
-16									
-17									
-18									

Sample No.	Wt.	Heavy Metal (ML.)	Cold Cu (P.P.M.)	Total Cu (P.P.M.)	Zn (P.P.M.)	Pb (P.P.M.)	Mo (P.P.M.)	Ni (P.P.M.)	Hg Vapour
□ IB-19									
-20									
-21									
-22									
-23									
-24									



LEGEND - GEOCHEMICAL RECONN.

○ SILT SAMPLE; WET OR DRY DRAINAGE
i.e. TOTAL Cu P.P.M. / TOTAL Ni "

△ SOIL SAMPLE "

□ ROCK CHIP SAMPLE "

TOTAL Cu: 75-125 P.P.M.
" " 125-250 "
" " 250-500 "
TOTAL Ni ≧ 15 P.P.M.

W. M. SHARP, P.Eng. CONSULTING GEOLOGICAL ENGINEER
808 - 900 W. HASTINGS ST., VANCOUVER 1, B.C.

SILVER STANDARD MINES LTD. (N.P.L.)

PROPERTY: E&L NICKEL-COPPER PROSPECT
SNIPPAKER CREEK, VIC. ISKUT R., LIARD MINING DIVISION, B.C.

TITLE: DETAILS OF TOPOGRAPHY & MINERAL CLAIMS AND RECONNAISSANCE GEOLOGICAL & GEOCHEMICAL SURVEYS

LEGEND:

- GABBRO: (W. OLIVINE, AUGITE ETC.)
- DIORITE AND/OR DIABASE
- ARGILLIC ROCKS / CHERTY ALT'N.
- GREYWACKE / ANDESITIC TUFF, BRECCIA.
- YOUNGER (DIABASIC) DYKES
- ATTITUDES: BEDDING, JOINTS, FISSILITY
- FAULTS & SHEARS.
- MINERAL: PYRRH. CPY. PENTL. ALTERATION: TALC-SERP.-CHLOR. ETC.

SCALE: 1" = 500'
DATE: NOV. 1966
DWN BY: W.M.S.
REVISION: ADDITIONS TO DWG. #1 - E&L. AUG/65
DWG/FIG. No. 1

inches 1
centimetres 1 2
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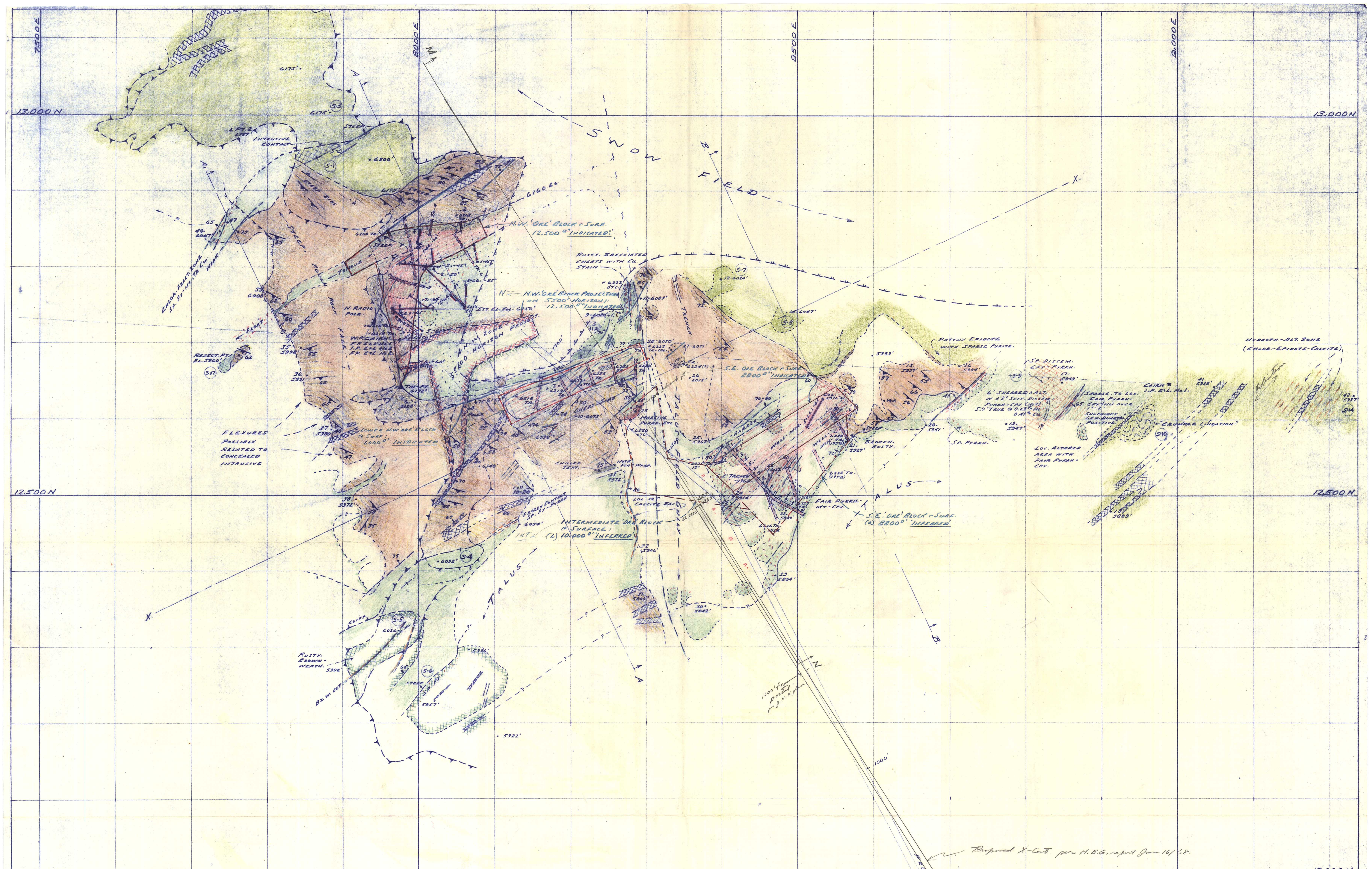

SUMMARY OF SAMPLING & ASSAYS.

LOCATION	SAMPLE INTERVAL.	SLOPE LENGTH	HOR. WIDTH	% NI	% CU
(A). N.W. ZONE					
No. 1 TRENCH (1965)	RIM SECT.	10'	10'	0.32	0.30
2 " "	INNER RIM SECT.	14'	14'	0.35	0.36
3 " "	CENTRAL " "	34'	34'	0.49	0.49
4 " "	OUTER " "	16'	16'	2.35	1.35
5 " "	FULL RIM SECT.	76'	76'	0.52	0.65
6 " "	INNER " "	50'	50'	0.32	0.42
No. 6203 " (1958)	OUTER " "	7'	7'	1.17	1.40
6204 " "	CHERT-GABBRO SECT.	(18')	(18')	(0.37)	(0.65)
6212 " "	OUTER RIM SECT.	13'	13'	0.37	0.45
6214 " "	RIM-CORE "	(30')	(30')	(0.25)	(0.45)
PACKSACK DDH. #1	INNER RIM, N.E.	11.0'	7.8'	0.28	0.15
" " #2	INNER RIM, CENTRAL	25.2'	16.2'	0.74	0.61
" " #3	APPROX. FULL RIM "	66.8'	48.0'	0.75	0.63
" " #4	OUTER RIM SECT.	20.0'	10.0'	0.59	0.60
" " #5	RIM & CORE "	90.9'	77.0'	1.20	0.61
" " #6	RIM-CORE "	28.1'	14.0'	0.49	0.37
" " #7	INNER RIM, CENTRAL	33.8' 275.8 (276')	16.9'	0.71	0.58
DDH. #1-66: -60°	FULL RIM, CENTRAL	66.5'		0.72	0.66
#2-66: -85°	" " , "	110.0'		0.73	0.63
#3-66: -85°	RIM SECT. "	120.0		0.61	0.57
#4-66: -70°	FULL RIM, "	121.0		1.33	0.81
(B) LOWER N.W. ZONE					
#6218 TRENCH, 1958.	X-SECT. WEATH. ZONE		41'	0.47	0.55
#6219 " , "	" " "		22'	0.36	0.55
#6220 " , "	" " "		25'	0.33	0.50
#6232 " , "	" " "		36'	0.44	0.65
#6233 " , "	" " "		27'	0.18	0.35
#6223 'OUTCROP' (TR)	" " "		10' (MAP)	5.06	2.05
#6224 TRENCH, 1958	" " "		13'	0.97	0.90
#6230 OUTCROP "	" " "		10' (MAP)	4.07	1.35
(C) S.E. ZONE.					
#6225 TR. 1958			13'	0.56	0.70
#6226 TR. " (LOC.?)	X-SECT. WEATH. ZONE		40'	0.40	0.60
#6227 " - " (")	" " "		45'	0.66	0.60
#6228 ", " (")	" " "		28' (+)	0.34	0.45
#6229 ", " (")	" " "		54' (+)	0.55	0.65
LONG TRENCH, 1966	X-SECT. SEMI-WEATH "				
" " E.L. #1	@ N.W. END.		8.2	0.37	0.38
2			8.2	0.43	0.50
3			8.2	0.54	0.45
4			8.2	0.52	0.29
5			8.2	0.37	0.23
6			8.2	0.33	0.18
7			8.2	0.36	0.22
8			8.2	0.26	0.33
9			8.2	0.26	0.33
10			8.2	0.35	0.36
11			8.2	0.40	0.24
12			8.2	0.31	0.18
13			8.2	0.30	0.37
14			8.2	0.28	0.28
15			8.2	0.35	0.35
16	@ S.E. END		10.0	0.35	0.37
DDH #5-66: -65° (?)	N.E. CENTER SECT.	0'-100'	——	0.69	0.48

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SILVER STANDARD MINES LTD. (N.P.L.)

PROPERTY: E&L NICKEL-COPPER PROSPECT
SNIPPAKER CREEK, LIARD MINING DIVISION, B.C.

TITLE: DETAILED GEOLOGY, DIAMOND DRILLING, AND TRENCHING WITH SAMPLE-ASSAY DATA

LEGEND:
- INTRUSIVES: GABBROIC/DIORITIC.
- ARGILLITES, SLATES / CHERTS
- YOUNGER (DIABASE) DYKES
- MINERALIZATION: PYRH., CPY., PENTL. ALTERATION: TALC-SERP.-CHLOR.
- BEDDING ATTITUDES.
- SHEAR-FRACTURES ; JOINTS
- BROW OF STEEP SLOPES, CLIFFS.
- (S-7) SPECIMEN ROCK SAMPLE.

SCALE:	DATE:	REVISION:	DWG/FIG. No.
1" = 50'	NOV., 1966	SUPPLEMENT DWG. 2. AUG. 1965	2.
	DWN BY:		

— WMS Cmy —


SECTION A-A
N.W. ZONE.
X
30'W.
4.
3.
2.
6150' COL'S ON SECT.
LOWER N.W. ZONE
(WEST LIMB-TO WEST OF SECT. A-A.
CENTRAL
44.5' @ 0.72/0.44
N. CONTACT
SUB-SECT. A,-A,
(@ 233' WEST.)
-ICE-
12.
CHERT (SCHIST?)
N.-S. FAULT LINK (?)
32'W.
1-LL
65'
153
32
121'
121' @ 1.33/0.81 W. LIMB
W. CONTACT
88'W.
4-LL
(2)-110' @ 0.73/0.63 CENTRAL
(3)-120' @ 0.61/0.57 N.E. LIMB
0.31% NI
0.11% NI
10'W.
2-LL
GEN. CONTACT PER SEC. DDH'S.
15'E.
3-LL
CHERTS, ETC.
GABBRO
106
15
121'
N.E. LIMB N.W. ZONE.
6000 EL.
SECTION B-B.
S.E. ZONE.
6229 TR.
100' @ 0.69/0.48
5-LL
60° IN SEC.
S. E. ZONE (INFERRED DIP).
5500 EL.
LEGEND:
ARGILLITE, CHERT, ETC.
GABBRO / DIORITE-TO-DIABASE.
MINERALIZATION: PYRRH., CHALCOPY., PENTLANDITE
ALTERATION: TALC-SERPENTINE-CHLORITE, ETC.
PRINCIPAL FRACTURES; LOCAL (?) SHEARS, FRACTURES.
DIAMOND DRILL HOLE.
ASSAY NOTATION:
LENGTH @ NI % : CU %.
5000 EL.
E & L NICKEL-COPPER PROSPECT
CROSS-SECTIONS
1" = 50'
NOV., 1966
W.M.S.
X.
DWG. NO. 3
inches
0
1
0
1
2
centimetres
BRITISH COLUMBIA GEOLOGICAL SURVEY
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E & L NICKEL-COPPER PROSPECT

LONGITUDINAL VERTICAL SECTION X-X

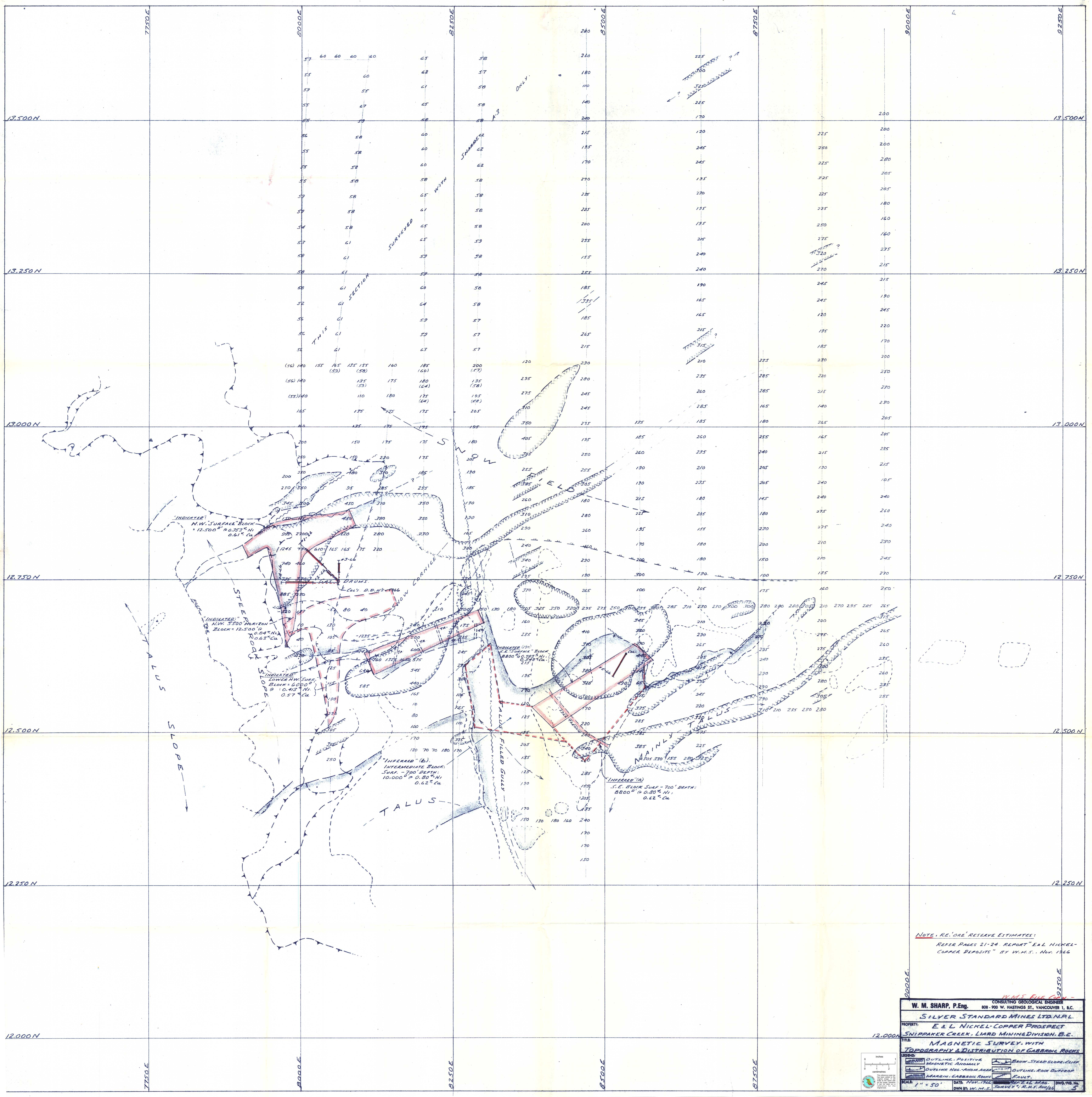
GEOLOGY, DIAMOND DRILLING & MINERALIZATION

1" = 50'

COMPILED NOVEMBER, 1966
W.M.S.

DWG. No 4.

DWG. No. 4


7750 E
8000 E
8250 E
8500 E
8750 E
9000 E
9250 E
13.500 N
13.250 N
13.000 N
12.750 N
12.500 N
12.250 N
12.000 N
THIS SECTION SURVEYED WITH SHARPE A-3 ONLY.
SNOW FIELD
SNOW CORNICE
"INDICATED": N.W. "SURFACE" BLOCK = 12.500 @ 0.753% Ni 0.61% Cu.
"INDICATED:" N.W. 5500' HORIZON BLOCK = 12.500 @ 0.84% Ni. 0.63% Cu.
"INDICATED" LOWER N.W. SURF. BLOCK = 6000 @ 0.413% Ni. 0.57% Cu.
DRUMS.
COL'S. D.D.H'S - 1966
GAS
STEEP ROCK SLOPE
ROCK TOE
TALUS SLOPE
INDICATED (190) S.E. "SURFACE" BLOCK 8800 @ 0.583% Ni. 0.543% Cu.
"INFERRED" (b). INTERMEDIATE BLOCK: SURF. - 700' DEPTH: 10.000 @ 0.80% Ni 0.62% Cu.
"INFERRED" (a) S.E. BLOCK SURF. - 700' DEPTH: 8800 @ 0.80% Ni. 0.62% Cu.
TALUS FILLED GULLY
TALUS
MAINLY TALUS
NOTE. RE. 'ORE' RESERVE ESTIMATES:
REFER PAGES 21-24. REPORT "E&L NICKEL-COPPER DEPOSITS" BY W.M.S.. NOV. 1966
W.M.S FILE COPY. -
W. M. SHARP, P.Eng.
CONSULTING GEOLOGICAL ENGINEER
808 - 900 W. HASTINGS ST., VANCOUVER 1, B.C.
SILVER STANDARD MINES LTD. N.P.L.
PROPERTY: E & L NICKEL-COPPER PROSPECT
SNIPPAKER CREEK. LIARD MINING DIVISION. B.C.
TITLE: MAGNETIC SURVEY. WITH TOPOGRAPHY & DISTRIBUTION OF GABBROIC ROCKS
LEGEND:
OUTLINE. POSITIVE MAGNETIC ANOMALY
OUTLINE NEG.-ANOM. AREA
MARGIN. GABBROIC ROCKS
BROW. STEEP SLOPE. CLIFF
OUTLINE. ROCK OUTCROP
FAULT.
SCALE: 1" = 50'
DATE: NOV. 1966
DWN BY: W.M.S.
[redacted] REF. "E&L MAG. SURVEY": R.H.S. AUG/66
DWG/FIG. No. 5
inches
centimetres
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