

Field Observations on the Broken Hammer Gold Occurrence and NIKO Gold Deposit¹

P.L. Schwann

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Studies of lithologic, structural and alteration characteristics of gold occurrences along the Byers Fault began in 1989, (Schwann, 1989) and continued in 1990 (Schwann, 1990) and 1991. Two prospects, Broken Hammer and NIKO, were investigated in 1991. They are located 32 km apart at opposite ends of the Byers Fault (Figure 1).

Previous work in the area by the Saskatchewan Geological Survey was carried out by Byers (1948), Kirkland (1959), Johnston (1969, 1970), and more recently by Harper (1984, 1985). Coombe (1984) presents an overview of gold deposits in the Star-Waddy Lakes area of the La Ronge Domain.

1. Regional Geology

The Byers Fault area is located within the La Ronge Domain near Waddy Lake, about 150 km northeast of La Ronge. The geology has been described by Harper (1984, 1985) as follows. The metavolcanic succession

comprises ultramafic to intermediate flows which are overlain by felsic flows and pyroclastics. Intravolcanic metagreywackes, meta-argillites meta-arkoses and iron formation locally overlie the felsic metavolcanics. This metamorphosed volcanosedimentary assemblage is unconformably overlain by metaconglomerates. The supracrustal rocks are intruded by a variety of ultramafic to granitic plutons and stocks ranging in age from syn-volcanic to post-tectonic. The dominant structural feature of the area is the 35 km long, easterly-trending Byers Fault. In the west, it dips moderately to steeply south but at its eastern end it dips steeply northwest. Subparallel faults (e.g. Oven-Corner Lakes Fault) form splays to the south of the main structure and intersect it in the Lower Waddy Lake area. Harper (1985) envisaged these faults as early ductile brittle structures formed parallel to intrusion margins during D1 folding. Northwest-trending lineaments offset the Byers Fault, which at its east end is deflected to the northeast by the north-northeast-striking Redhill Lake Tectonic Zone (RLTZ), the northern extension of the McLennan Lake

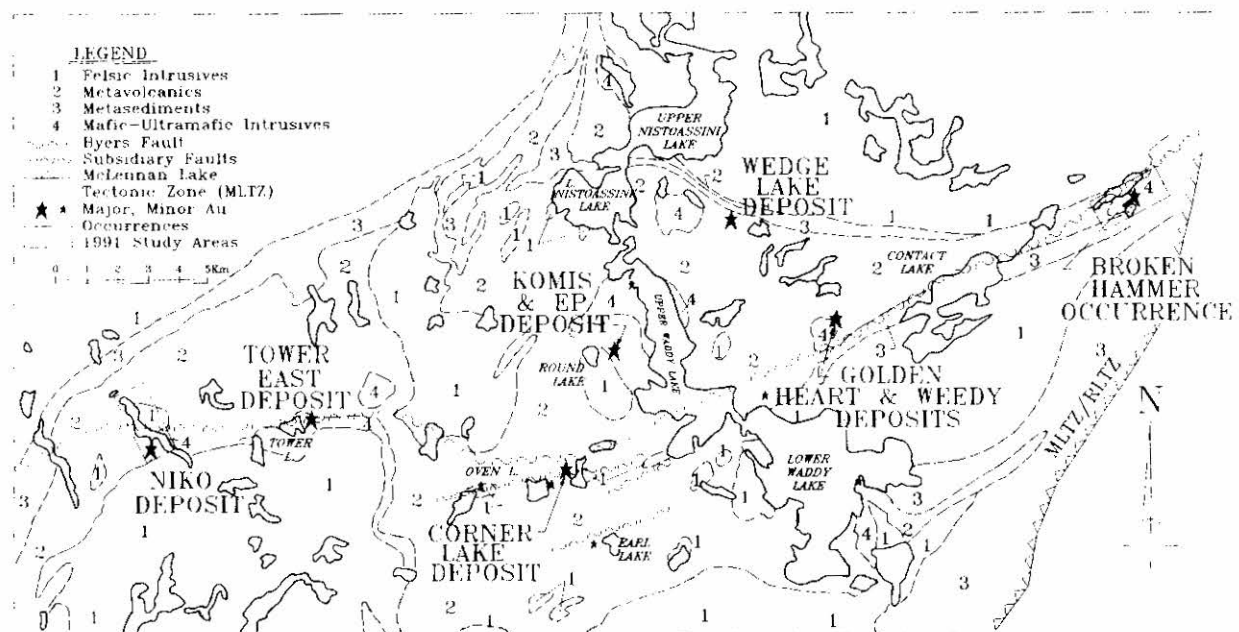


Figure 1 - Geological sketch map of the Byers Fault area.

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Tectonic Zone (MLTZ) (Harper, 1985). The MLTZ was interpreted by Lewry (1983) as a possible thrust zone, and by Poulsen *et al.*, (1987) as a transpressional shear, separating Central Metavolcanic Belt rocks from MacLean Lake Belt Gneisses.

Regionally the area shows geological similarities to gold-producing camps in the Superior Province (Colvine *et al.*, 1988). For example gold deposits are located:

1. within or immediately adjacent to volcanic belts intruded by felsic plutons,
2. within regional deformation zones,
3. close to faults and fault splays, and
4. within rocks metamorphosed at greenschist to middle amphibolite facies.

The Byers Fault zone was first recognized as a gold-bearing structure in the early sixties from work done by the Augustus Concession (SEM Assessment Files 64D4-NE-0001 and -0005). Numerous showings are located along the Byers and related faults (Figure 1). The majority are structurally controlled quartz-sulphide-carbonate-healed shear and tension veins within volcanics and felsic to mafic intrusions (Coombe *et al.*, 1985).

2. Broken Hammer Property

a) Property History

The Broken Hammer property is located 165 km north-east of La Ronge, 5 km west of Highway 102 and is centred on Alligator Lake. The area was initially explored in 1967 by Sherritt Gordon Mines Ltd. for its base metal potential. Six diamond drill holes tested a 2 mile long series of northeast-trending ground electromagnetic conductors. Disseminated to massive pyrite-pyrrhotite mineralization in metavolcanic rocks was intersected over a 0.5 m core length but no further drilling was done. In 1982, Saskatchewan Mining Development Corporation (SMDC) identified two strong and two weak electromagnetic conductors along strike immediately southwest of the property. A grab sample of a garnet-actinolite-chalcopryite rock (interpreted as silicate facies iron formation) on strike with one of the strong conductors assayed 0.56 percent Cu and 310 ppb Au (Assessment File 64D4-0080). Alligator Resources acquired the area in January, 1985. Initial prospecting of the northern property (CBS 6120) resulted in an anomalous Pd assay (4000 ppb), which could not be repeated. Subsequent ground prospecting discovered several interesting showings, including a massive sulphide boulder (up to 3800 ppm Zn), an asbestos vein in an ultramafic body and an auriferous quartz vein (the "Broken Hammer" occurrence) which assayed up to 21 oz/ton Au. Recent exploration programs on the property have included prospecting, trenching, sampling (rock, biogeochemistry, soils) and minor outcrop stripping; however, the Broken Hammer gold occurrence remains the most promising discovery to date.

b) Geology of the Broken Hammer Property

The property area is underlain by Central Metavolcanic Belt rocks of the La Ronge Domain. Ultramafic to felsic metavolcanics intruded by ultramafic and mafic sills are structurally underlain by meta-arkose and calcareous metagreywackes. To the northeast the granitic Nistoasini Pluton intrudes the metavolcanic sequence and a diorite-gabbro body. A related granodioritic sill intrudes the metavolcanics to the north of Radiant Lake.

The contact between the metavolcanics and metasediments, although not exposed, is marked by a prominent topographic lineament suggesting it may be a faulted contact. Regionally, Harper (1985) envisaged the faulted contact between the metavolcanics and structurally underlying metasediments as the faulted limb of a syncline, thereby implying that the metasediments are younger than the metavolcanics. The Byers Fault itself does not outcrop, although its trace is indicated by a strong positive vertical gradiometer signature, passing through the long axis of Alligator Lake. Northeast and southwest of Alligator Lake it is marked by a muskeg-filled lineament. Gneisses of the MacLean Lake Belt outcrop directly to the east of the map area, separated from the Central Metavolcanic Belt sediments by a series of topographic ridges. The property was mapped at 1:8600 scale (Map 1), the showing itself at 1:50 scale.

Metavolcanics

Metavolcanics occur both as flows and pyroclastics and are compositionally variable from ultramafic to felsic. Intermediate to felsic metavolcanics are locally garnetiferous. Interlayered amphibole-garnet rocks may represent thin, intravolcanic silicate facies iron formations.

Ultramafic flows form extensive, smooth weathering, rounded outcrops that weather a distinctive emerald green. They are fine grained and massive, commonly crosscut by hairline-width, white-weathering veinlets.

Mafic metavolcanics are not abundant. To the south of Radiant Lake they form hills of gray, massive, hornblende porphyroblastic rock and east of Alligator Lake appear as dark gray to black, fine-grained, massive, hornblende-phyric flows interlayered with intermediate metavolcanics.

Intermediate metavolcanics occur east and west of Alligator Lake. They are grayish green and texturally variable, from fine-grained, laminated, aphyric flows and tuffs to amphibole and plagioclase-phyric, unsorted lapilli tuffs containing both mafic and felsic fragments. Intermediate tuffs are commonly interlaminated with thin, (<0.5 m) felsic layers. Felsic metavolcanics outcrop along the southwest shore of Alligator Lake where they are pink weathering, quartz phyric, massive units that host heavily disseminated (10 percent) pyrite mineralization. Sericite schists interlayered with intermediate lapilli tuffs outcrop along the west shore of Alligator Lake along strike of the felsic metavolcanics.

Metasediments

Metasediments, including meta-arkose and calcareous metagreywackes, outcrop as ridges in the eastern part of the study area, structurally underlying the metavolcanics and ultramafic intrusives.

Meta-arkoses comprise thick, buff to pink weathering, fine-grained, massive units characterized by centimetre-scale fracture cleavage. They contain minor muscovite and biotite and thin, (centimetre-wide) diopsidic bands. Massive, white, discontinuous, brittle quartz veins cut the meta-arkose. Both the quartz veins and wallrock contain disseminated (2 percent) pyrite. The meta-arkoses are structurally overlain by dark gray to green, laminated calcareous metagreywackes. Layers containing mafic fragments suggest a volcanic source for the metagreywackes which are composed of quartz, feldspar, biotite, amphibole, epidote and finely disseminated sulphide.

Ultramafic Intrusives

Ultramafic rocks, including massive to weakly foliated peridotite, pyroxenite and tremolite schists, outcrop in two bodies. In both, relict oikocrystic clinopyroxene enclosing olivine, is preserved. The larger body of peridotite intrudes the metavolcanics between Alligator and Radiant Lakes, truncating them along strike. It is bluegreen with orange knobby weathering, and medium to coarse grained. A centimetre-wide asbestos vein crosscuts the intrusive. The second, compositionally and texturally similar ultramafic body outcrops to the east of the main body. It is dominantly medium to coarse grained and shows distinct centimetre- to metre-scale compositional layering of peridotite (blue-green weathering) and pyroxenite (orange weathering). The second body is concordant to the metavolcanic sequence and structurally underlies the green-weathering ultramafic metavolcanics. Primary magmatic layering (S_0) is parallel to interlayering of the intermediate and felsic metavolcanics. A thin (2 m wide) zone of cream weathering, massive tremolite schist may represent an altered, thermal contact zone between the peridotite and overlying ultramafic metavolcanics. Magnetite, formed by serpentinization of olivine, occurs in peridotite and to a lesser extent in pyroxenite. Tremolite schists are non-magnetic. Sulphides and chromite were not observed in the ultramafic bodies. The position and close spatial association of the ultramafic intrusions with the ultramafic basalts suggests the intrusions are subvolcanic feeders, as proposed by Harper (1985).

Mafic, Intermediate & Felsic Intrusives

The large granitic intrusion that outcrops along the northwest shore of Alligator Lake is part of the Nistoassini Pluton. It is pinkish-white weathering, homogeneous, moderately foliated, medium grained, and contains quartz, potassium feldspar and biotite as major constituent minerals. The intrusion is in sharp, folded contact with metavolcanics on the west shore of Alligator Lake where both are garnetiferous.

A smaller, granodioritic sill intrudes the metavolcanics midway between Alligator and Radiant Lakes. Quartz veining is focussed along the hanging wall contact of the granodiorite and metavolcanics. Both the granodiorite and quartz are strongly foliated to submylonitic and are sericitic and pyritic.

A gabbroic to dioritic stock occurs at the north end of Alligator Lake, adjacent to the Nistoassini Pluton. It is dark green to black weathering, coarse-medium grained, and locally displays compositional layering defined by centimetre-scale, white plagioclase- and dark green clinopyroxene-rich bands. Gabbro-diorite contacts are gradational and marked by a decrease in mafic content. The relationship between the gabbro-diorite body and Nistoassini Pluton is uncertain; however, Harper (1984) noted, that in places, the pluton has a gabbroic-dioritic marginal phase.

c) Alteration

Some rocks in the area have been subject to alteration prior to metamorphism. Hydrothermal alteration of the intermediate to felsic metavolcanic rocks is indicated by "mineralogical anomalies" (Allard and Carpenter, 1982). Local concentrations of garnet-sillimanite and sericite represent metamorphic manifestations of aluminous and potassic alteration respectively.

d) Structure and Metamorphism

Throughout the area, the dominant tectonic foliation (S_1) generally parallels primary layering (S_0) and dips moderately to steeply (70° to 80°) to the northwest. Early isoclinal folds (F_1) with boudinaged limbs plunge steeply (70°) to the northeast. A younger generation of open folds (F_2) was noted in the meta-arkosic and diopsidic metasedimentary rocks. Fold axes plunge moderately to steeply (55° to 70°) to the north. Other linear fabrics, including amphibole and garnet mineral lineations and streaking of feldspar-amphibole aggregates, plunge moderately to steeply (55° to 65°) to the north-northeast.

Faulting is indicated by steep, northeast-trending cliffs parallel to S_0/S_1 along the shore of Alligator Lake. A zone of strong deformation is indicated by an east-northeast-trending hartschiefer banding (millimetre scale) in ultramafic rocks to the southwest of Radiant Lake.

Garnet and sillimanite porphyroblasts in sericitized felsic volcanics indicate middle to upper amphibolite facies conditions. Crystallographic orientation of amphibole and dimensional orientation of garnet porphyroblasts in S_1/S_0 contrast with a random orientation of sillimanite porphyroblasts suggesting peak deformation occurred during or after amphibole and garnet blastesis, but before peak metamorphism indicated by sillimanite growth.

e) Mineralization

The Broken Hammer gold showing is a structurally-controlled quartz vein, emplaced into a sequence of inter-layered intermediate to felsic metavolcanics and amphibole-garnet layers. The quartz vein is parallel to the

regional S_1/S_0 foliation, and dips steeply (70° to 80°) to the northwest. At the discovery outcrop the quartz vein is exposed over a 15 m strike length, and ranges from 5 cm to 1.5 m wide with an average width of 1.2 m. The quartz is sheared and glassy and contains trace molybdenite, pyrite and visible gold. A thin, concordant sliver (10 cm) of granodiorite intrudes the hanging wall. Contacts of the quartz vein with hanging wall and footwall rocks are sheared but sharp; the strain fabric rapidly decreases outward over 0.5 to 1.0 m from the mineralized quartz vein. A reddish brown colouration in the immediate footwall reflects the distribution of fine (< 1 mm), disseminated (< 2 percent) garnets and pyrite. Garnets first appear 5 m from the footwall, and increase in size (5 mm) and abundance (15 percent) towards the quartz vein; pyrite is also more heavily disseminated in the footwall proximal to the quartz vein. Pyrite and garnet do not occur in the hanging wall rocks. At the base of the outcrop, heavily disseminated to semi-massive pods of molybdenite occur at the footwall contact of the quartz vein and metavolcanics. The quartz vein continues along strike to the northeast for another 250 m, beyond the discovery outcrop; however, here the quartz vein lies at the contact of a granodioritic sill and overlying intermediate metavolcanics. The granodiorite has a strong planar fabric defined by quartz ribboning and alignment of feldspar and biotite. Strong linear fabrics are defined by biotite-feldspar aggregates and elongate quartz grains. Both planar and linear fabrics are consistent with the regional trends. Within the shear zone the granodiorite is sericitic, and both it and the quartz vein contain disseminated (< 2 percent) pyrite and molybdenite. The mineralized quartz vein is not exposed at surface southwest of the discovery outcrop. Assays from various grab samples are indicated in Table 1. Sample locations are indicated on Map 1.

f) Discussion

- 1) Gold mineralization on the Broken Hammer property is structurally controlled. The quartz vein and shear system is northeast-trending, subparallel to the regional S_1/S_0 foliation and Byers Fault. The quartz vein occurs at the contact of granodiorite and

metavolcanics over most of its exposed length; however, preliminary assays indicate the highest values occur where the quartz vein is hosted by metavolcanics.

- 2) Disseminated molybdenite and pyrite are associated with gold mineralization.
- 3) Wall rocks immediately adjacent to the mineralized vein are noticeably altered. At the discovery outcrop garnet alteration is concentrated in the metavolcanics footwall. This alteration may be associated with gold mineralizing fluids. Alternatively, the compositional anisotropy between pre-existing garnetiferous and nongarnetiferous units may have constrained deformation and focussed later migrating, gold-bearing fluid.
- 4) Metasediments on the east of the property contain other environments for possible gold mineralization, and include:
 - i) brittle, fracture-controlled, quartz veins and pyritized wallrock in the meta-arkose (southeast of Radiant Lake) and,
 - ii) stratabound, sulphidic, calcareous metagreywacke horizons (east of Radiant Lake).
- 5) Ultramafics offer limited potential for PGE or nickel exploration due to the lack of sulphides and primary oxides.
- 6) Intermediate and felsic metavolcanics on the southeast and west shores of Alligator Lake may have some potential for base metals, especially as there are several showings along strike to the northeast (Fleming Lake) and southwest (Contact Lake). Garnet, sillimanite and sericite together with heavily disseminated pyrite is suggestive of hydrothermal alteration system underlying volcanogenic massive sulphide deposits.

Table 1 - Geochemical Assays - Broken Hammer Property

Sample	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag oz/t	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	Au oz/t
180	30	600	100	3200	.05	400	100	600	30.04	100	.004
181	10	100	100	100	.01	100	100	400	2.76	100	.002
177A	1397	162	75	10	.06	29	25	101	4.45	2	.002
177B	491	31	25	1	.03	9	3	44	1.09	2	.404
175	15790	300	100	100	.22	100	100	100	4.99	100	.023
178											.070
179	293	14	111	7	.10	33	5	204	1.22	14	.002

Samples 177A, 177B, 175 and 179 are from the Broken Hammer showing and strike extension; #178 from a quartz vein on the northwest side of Alligator Lake; #180 from a mineralized boulder; and sample 181 from mineralized quartz phryic rhyolite.

3. Kaslo/NIKO Property

a) Property History

The Kaslo property is located 130 km northeast of La Ronge. Exploration began in the late 1940s when E. Partridge found gold-bearing float. In the 1960s, Augustus Exploration Ltd. and Triana Exploration Ltd. discovered several gold occurrences along an easterly-trending fault zone at the contact between diorite and metavolcanics. A total of 6274 ft. was drilled with the better assays running 0.55 oz/ton over 5 ft. Since 1982, Golden Rule Resources, (operator) along with joint venture partners Goldsil Resources Ltd. and Cameco have undertaken exploration programs to define these gold occurrences. These have included geophysical surveys, mapping, prospecting and drilling programs. The NIKO occurrence was discovered in 1987 when a grab sample from a mapping program assayed 4620 ppb Au. Since then, exploration has concentrated on defining the potential of this occurrence.

b) Geology of the Kaslo Property

The Kaslo property is underlain by rocks of the Central Metavolcanic Belt of the La Ronge Domain. Interbedded mafic to felsic metavolcanics and sulphidic meta-argillites are intruded by mafic to felsic phases of the Brindson Lake Pluton and associated dykes. The dominant structural features of the area are reflected by topographic lineaments. From Tower Lake through Narrow Lake the Byers Fault is characterized by topographic depressions. Geophysically it coincides with a discontinuous zone of low magnetic signature and a broad (150 to 300 m wide) weakly conductive zone (Patterson, 1987). The zone of low magnetic signature bifurcates into east-northeast- and northeast-trending subzones east of the property. The dominant east-northeast-trending subzone transects the northern narrow neck of Narrow Lake. Its trace continues along the valley at the southwestern end of Narrow Lake and along the southern shore of Centre Lake. The southwest-trending subzone cuts across the south end of Narrow Lake. This early set of east-northeasterly- to north-easterly-trending magnetic lineaments is offset by a second set of northeasterly-trending lineaments and both sets by northwesterly-trending lineaments.

Exposure on the property is generally poor, characterized by small, blocky, isolated outcrops. The property was mapped at 1:2500 scale and the NIKO showing at 1:100 scale.

Metavolcanics

Metavolcanic rocks occur both as flows and pyroclastics and are compositionally variable from mafic to felsic. A mafic to intermediate unit outcrops along the south shore of Narrow Lake and is locally garnetiferous. It is dark grey to black weathering, aphanitic and well foliated with irregularly pitted surfaces making identification of primary features difficult. Quartz amygdales are locally abundant.

Intermediate pyroclastic rocks are relatively abundant in the west where they are interfingering with felsic metavolcanics. Lapilli tuffs are unsorted, massive and contain clast supported felsic and mafic lithic fragments. The dark green matrix is felspar-and amphibole-phyric. Both felsic fragments and the matrix contain 0.5 to 1.0 mm quartz eyes. These rocks become finer grained and matrix supported to the east. Clasts are elongated parallel to the foliation. A friable bluish-gray weathering, aphyric, vesicular, (scoriaceous ?) rock is poorly exposed at the southwest end of Narrow Lake. It shows a weak centimetre-scale fracture cleavage and contains fine biotite, quartz, felspar and graphite.

Felsic flows, along the south shore of Narrow Lake, form hills of massive, bluish-gray to pink weathering plagioclase- and amphibole-phyric rock that contains irregularly distributed quartz eyes and magnetite. Felsic lapilli tuffs generally occur interlaminated with intermediate pyroclastic rocks. They are plagioclase-phyric, weather cream to pale green with pitted surfaces and contain unsorted felsic and mafic fragments. Felsic metavolcanics are weakly to moderately foliated and clasts are strongly elongate. At the southwest end of Narrow Lake they host heavily disseminated pyrite mineralization.

Metasediments

Recessively weathered layers of sulphidic meta-argillite are interdigitated with metavolcanics in the central part of the map area. Meta-argillites are dark grey to rusty brown (gossanous), aphanitic, siliceous, finely laminated and moderately foliated. They contain finely disseminated pyrrhotite, pyrite and magnetite.

Mafic-Felsic Intrusions

Granodioritic to gabbroic intrusions occur on both the north and southeast shores of Narrow Lake. They are separated lithologically by a westward thickening wedge of supracrustal rocks and structurally by both the east-northeast-trending Byers Fault and a northwest-trending lineament that runs through Narrow Lake. The larger southern intrusive body is part of the compositionally zoned Brindson Lake Pluton; the northern body is compositionally and texturally similar and may represent a faulted off portion. Cream to buff weathering, massive, equigranular granodiorite is the most abundant phase of the Brindson Lake Pluton. Diorite, which varies from leucocratic to melanocratic, is a marginal phase outcropping along the southeast and northeast shores of Narrow Lake. It is a cream to medium gray, medium- to coarse-grained, homogeneous rock comprising plagioclase, clinopyroxene and amphibole.

The intrusive rocks are generally weakly foliated except adjacent to the narrows in Narrow Lake where discrete narrow shears in the granodiorite develop into a more extensive zone of shearing and alteration. Numerous dykes intrude the metavolcanics and granitic to gabbroic intrusives. A pale green weathering, massive, fine-grained, amphibole-phyric mafic dyke crosscuts the metavolcanics. Salmon-pink-weathering, aphyric to quartz-phyric; white-weathering plagioclase-phyric; and

white-weathering, equigranular tonalite dykes intrude the supracrustal sequence and the marginal mafic phase of the Brindson Lake Pluton. The salmon-pink-weathering felsic dykes also intrude the granodiorite and may be related to a more felsic phase of the pluton.

c) Structure

Regional foliation parallels the trace of the Byers Fault and dips steeply (70° to 80°) to the south-southeast.

Early isoclinal minor folds were not observed, although the large scale distribution of lithologies and the convergence of foliation are suggestive of a major closure. Clast elongation in intermediate-felsic metavolcanics plunges moderately (50° to 60°) southeast. In drill core, the Byers Fault is a 1 to 15 m wide zone of deformation and alteration within granodiorite to the north of Narrow Lake. It is characterized by a quartz-carbonate vein stockwork and a chloritic fault gouge containing angular, altered, and foliated granodiorite clasts. Hematite and epidote coat fracture surfaces. These features also characterize the fault zone where it outcrops on the north shore of Narrow Lake at the narrows. Here the granodiorite is strongly foliated and hematized. Quartz veining and silicification are well developed in the mafic to intermediate volcanics in the hanging wall of the fault.

The contact of the metavolcanics and granodiorite in the hanging wall of the Byers Fault to the north of Narrow Lake is a zone of brecciation known locally as the "Fault Breccia". It is not exposed at surface. A number of west-northwest-trending shears and faults occur along the southern shore and are crosscut by northwest-trending narrow, centimetre-wide shears.

d) Mineralization

Drilling has identified three zones of mineralization: the "Cornflake", "Red Cube" and "Granny" at the NIKO occurrence (Golden Rule Resources Annual Report, 1990). All are in the hanging wall of the Byers Fault. Relative to the "Fault Breccia", the "Cornflake" and "Red Cube" zones occur in the hanging wall of the "Fault Breccia" and the "Granny" zone in the granodiorite footwall.

Cornflake Zone

The "Cornflake" zone is up to 25 m wide and contains most of the identified reserves of the NIKO occurrence. Mineralization is hosted by quartz-amphibole-pyrite veins (<10 cm width) and enclosing silicified and pyritized, strongly foliated mafic to intermediate metavolcanics. Uniformly disseminated (10 percent), 0.5 to 1.0 mm pyrite grains flattened in the foliation plane account for its distinctive "cornflake" texture. Gold grade correlates sympathetically with pyrite content.

Red Cube Zone

"Red Cube" mineralization is restricted to centimetre-wide quartz veins that are oblique to the regional foliation. Mineralized zones are up to 2 m wide. Gold occurs as individual, isolated grains or as fine disseminations

peppered throughout brick-red, hematized pyrite cubes in the quartz veins.

Granny Zone

The "Granny" Zone is hosted by bleached albitized granodiorite. Mineralized zones are narrow, and free gold occurs in silicates and along discrete hairline fractures. Sulphides or their oxidized equivalents are absent.

All three styles of mineralization have been tentatively identified at surface by the author. "Cornflake" and "Red Cube" mineralization occurs at the exposed NIKO showing. A 0.5 to 1.0 m wide, east-northeast-trending, steeply south-dipping, quartz-infilled shear zone separates pyritized felsic metavolcanics (herein referred to as the "Frosted Flake" style) from pyritized mafic to intermediate metavolcanics ("Cornflake" style) over a 65 m strike length (Figure 2). The quartz vein contains green amphibole rosettes (<20 percent), and fine (<0.5 mm) to coarse (3 cm) pyrite grains and clusters. The vein is locally brecciated along its footwall contact. A north-northwest-trending, narrow, (<0.5 m wide) zone of brick-red hematite ("Red Cube" style) crosscuts the quartz vein and fault breccia. Mineralization similar to that of the "Granny" zone is exposed on an island of bleached granodiorite just west of the narrows of Narrow Lake. The outcrop is transected by hairline fractures, epidote-filled shears and a quartz-phyric felsic dyke, but lacks sulphide mineralization and/or quartz veining. Visible gold was found enclosed within a biotite crystal in the granodiorite. Significantly, this outcrop is located in the footwall of the Byers Fault.

"Cornflake" and "Frosted Flake"-style mineralization is exposed at the southwest shore of Narrow Lake at the PW showing. A metre-wide shear zone in pyritized felsic metavolcanics comprises powdery-white quartz and albite alteration containing heavily disseminated to semi-massive pyrite mineralization. A 30 to 40 cm quartz vein is central to the shear zone. The zone continues along strike to the west for at least 100 m where it is exposed in three old, overgrown trenches. Intermediate metavolcanics forming the footwall to the sheared, felsic metavolcanics exhibit flattened disseminated (5 to 10 percent) pyrite similar to that in the "Cornflake Zone" proper. Assay results from the NIKO surface showing and the PW showing are listed in Table 2.

Table 2: Gold Assays - NIKO showing

Sample #	oz/t
120	.001
154	.009
157	.004
158	.001
D9	.047
D22A	.195
D22B	.014
DFB	.352

D sample locations are indicated on Figure 2 and on the accompanying map.

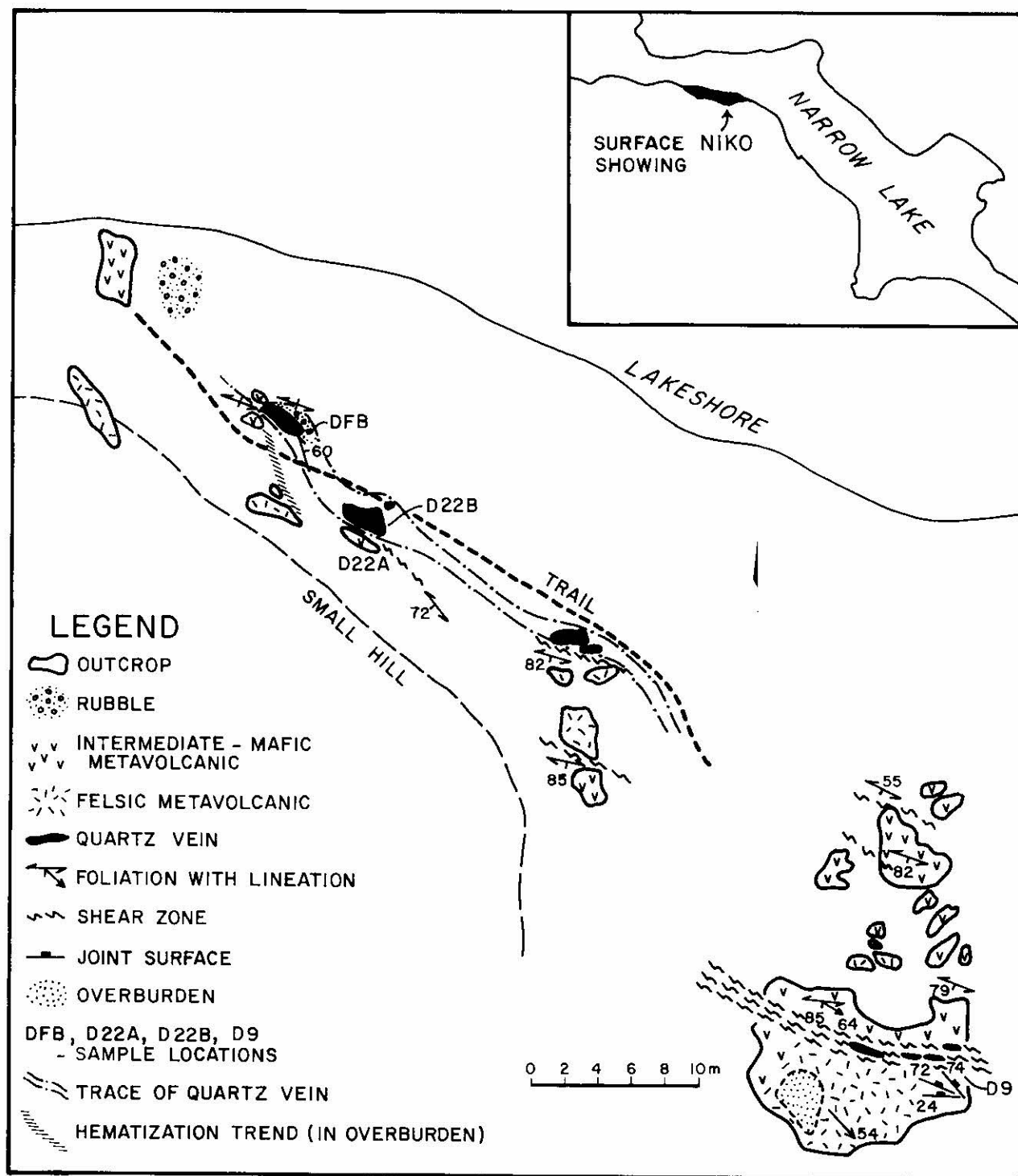


Figure 2 - Geological sketch map of the NIKO showing.

e) Discussion

- 1) Gold mineralization on the Kaslo property is controlled by a combination of structure and alteration. The "Cornflake", "Red Cube" and "Granny" zones have different structural and alteration characteristics. "Cornflake" style mineralization is early, with pyrite

and quartz veins confined to zones which parallel the regional east-northeast-trending foliation and the Byers Fault. The sympathetic correlation between gold and pyrite suggests that gold mineralization was associated with sulphidation and the pyrite grains flattened within the regional foliation suggest this process was pre- to syn-tectonic. "Red Cube"-

style mineralized structures trend northwest and crosscut "Cornflake" mineralization. A later episode of hematization has oxidized primary pyrite. The nature and timing of the "Granny" mineralization is difficult to assess as there is no obvious structural or alteration control. From this summer's work it was observed that "Granny"-style mineralization is not confined to the hanging wall of the Byers Fault.

- 2) A second example of the "Cornflake" and "Frosted Flake" style mineralizations occurs at the PW showing at the southwest corner of Narrow Lake. Sample 158 is from the altered felsic rocks within the shear zone. The low assay result indicates that at this location the shear zone is not auriferous. Assays for "Cornflake"-style mineralization footwall to the shear zone and from trenches along strike of the shear zone were not available at the time of publication.
- 3) Other auriferous environments include;
 - (i) stratabound sulphidic meta-argillite units, and
 - (ii) felsic and mafic phases of the Brindson Lake Pluton that are crosscut by structures. The latter typify the mineralization style of the original Kaslo occurrence.
- 4) Mylonitized fragments in the Byers Fault breccia indicate early ductile movement overprinted by an episode of brittle deformation. Offset of the Byers Fault by later northwest-trending structures is indicated on surface and by geophysical lineament patterns.

4. Conclusions

The Byers Fault structure trends east-northeast at the Kaslo property and northeast at the Broken Hammer Property. The trend of this regional structure is paralleled by mineralized, lower order structures at these locations. Compositional anisotropies are favourable sites for shear zone and quartz vein development. Mineralized shear structures have brittle-ductile transitional characteristics. Altered wallrock indicates fluids penetrated and interacted with rocks outside the shears. Gold mineralization is commonly found associated with sulphides (and their oxidized equivalents), including pyrite and molybdenite, an exception being "Granny"-style mineralization, where sulphides are notably absent.

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