Public-data File 85-54

# PRELIMINARY PROSPECT EXAMINATIONS IN THE McGRATH A-2, A-3, AND B-2 QUADRANGLES, ALASKA

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November 1985



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Preliminary prospect examinations in the McGrath A-2, A-3, and B-2 Quadrangles, Alaska.

by T.E. Smith and M.D. Albanese, 1985

Brief descriptions and geochemical sampling of prospects and occurrences southwest of Farewell in the McGrath A-2, A-3 and B-2 quadrangles were conducted during July 19-22, 1982 by DGGS geologists T.E. Smith and M.D. Albanese in conjunction with regional field mapping of the McGrath A-2 and A-3 Quadrangles (see Bundtzen and others, 1982 and 1984). The prospects and occurrences visited include Bowser Creek, the Rat Fork drill sites, Smith Lake prospect, Valesca Lake occurrences, Tin Creek Occurrence, Sheep Creek drill site, and the Chip Loi prospect. Field time at each location was limited and ranged from 1 day to a few hours. Analytical results are reported in ppm unless indicated otherwise.

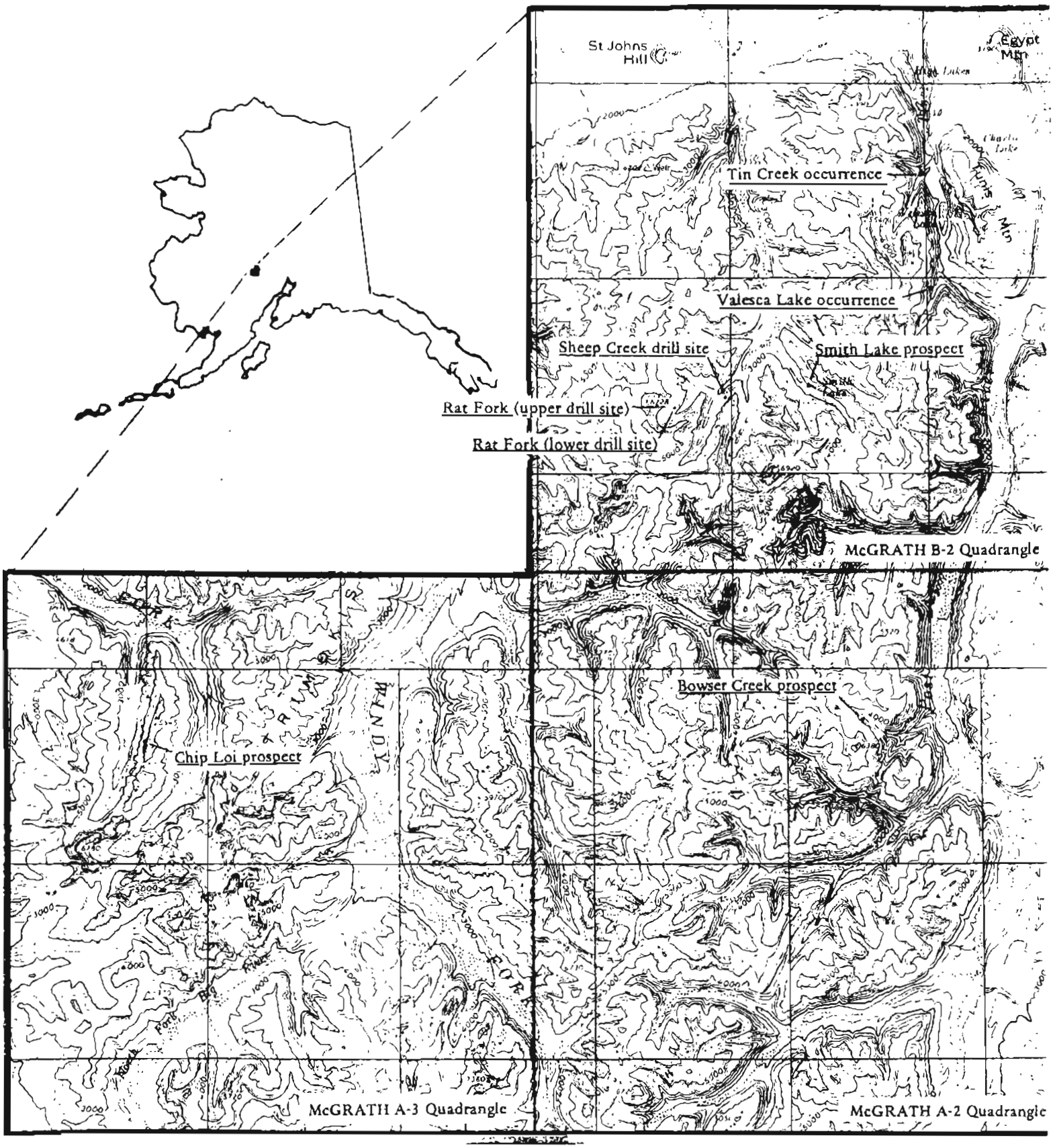
BOWSER CREEK PROSPECT

Location: McGrath A-2 Quadrangle (see fig. 1)

1. Traverse at head of valley near Pb-Zn-Ag veins.

Traverse along cirque wall suggests igneous breccia is intruded by felsic porphyry. Igneous breccia contains angular clasts of limestone, siltstone, and clots of calcite. Zone of mineralization in creek is apparently near contact of breccia and younger felsic intrusives. Many of the "veins" are very thin traces of sulfide along fracture surfaces without appreciable alteration or gangue material. Two chip samples of the porphyritic intrusive containing

Figure 1. Location of the Bowser Creek, Rat Fork, Tin Creek, Smith Lake, Valesca Lake, and Chip Loi prospects.

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trace disseminated sulfides (samples #2507 and #2508) contained 100 ppm Cu, 200 ppm Pb, 1200 Zn, and 9.5 ppm Ag. Sample #2514, a chip sample of vein material from Reed's location #54 (Reed, 1968) was high in base metals.

| Sample | Cu | Pb | Zn | Au | Ag | W | As | Co | Ni | Fe | Mn | Cd | Cr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2507 | 78 | 358 | 10% | <0.1 | 6.2 | ? | 23 | <10 | <10 | 2.93% | 130 | 10 | 39 |
| 2508 | 107 | 202 | 1210 | <0.1 | 9.4 | 3 | 42 | 10 | <10 | 3.57% | 279 | 13 | 45 |
| 2514 | 1.09% | 0.2% | 12.3% | <0.1 | 57.6 | 3 | 83 | 169 | 30 | 3.35% | 0.2% | 1280 | 52 |

2. Main prospect area

Most of the workings in the valley are near a prominent rock glacier, along the contact between igneous breccia and limestone. Limestones are metasomatized to skarns with diopside, calcite, vesuvianite chalcopyrite, sphalerite, and galena. The contact zone is complex with abundant diking by younger quartz porphyrys.

Some semimassive veins of sulfide (to 70 percent sphalerite, 20 percent chalcopyrite, 30 to 40 percent galena) appear to cut the skarn. Potential for tonnage appears low, probably less than a few thousand tons of sulfide bearing material. A grab sample of skarn mineralization from the main pit (sample #2527) contained high base metals, particularly zinc. A grab sample of laminated hornfelsed rock containing a 1 ft thick layer of sulfides (sample #2509) was also collected and analyzed.

| Sample | Cu | Pb | Zn | Au | Ag | W | As | Co | Ni | Fe | Mn | Cd | Cr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2509 | 131 | 29 | 181 | <0.1 | 0.4 | 2 | 1 | 16 | 55 | 4.66% | 477 | 2 | 125 |
| 2527 | 990 | 337 | 11.0% | <0.1 | 10.6 | 2 | 1 | 42 | 36 | 20.7% | 1900 | 1100 | 64 |

Hand selected concentrate of nearly pure galena, reported to be from a vein cross cutting the skarn (Szumigala 1983, personal commun.) has been collected by Bundtzen and others.

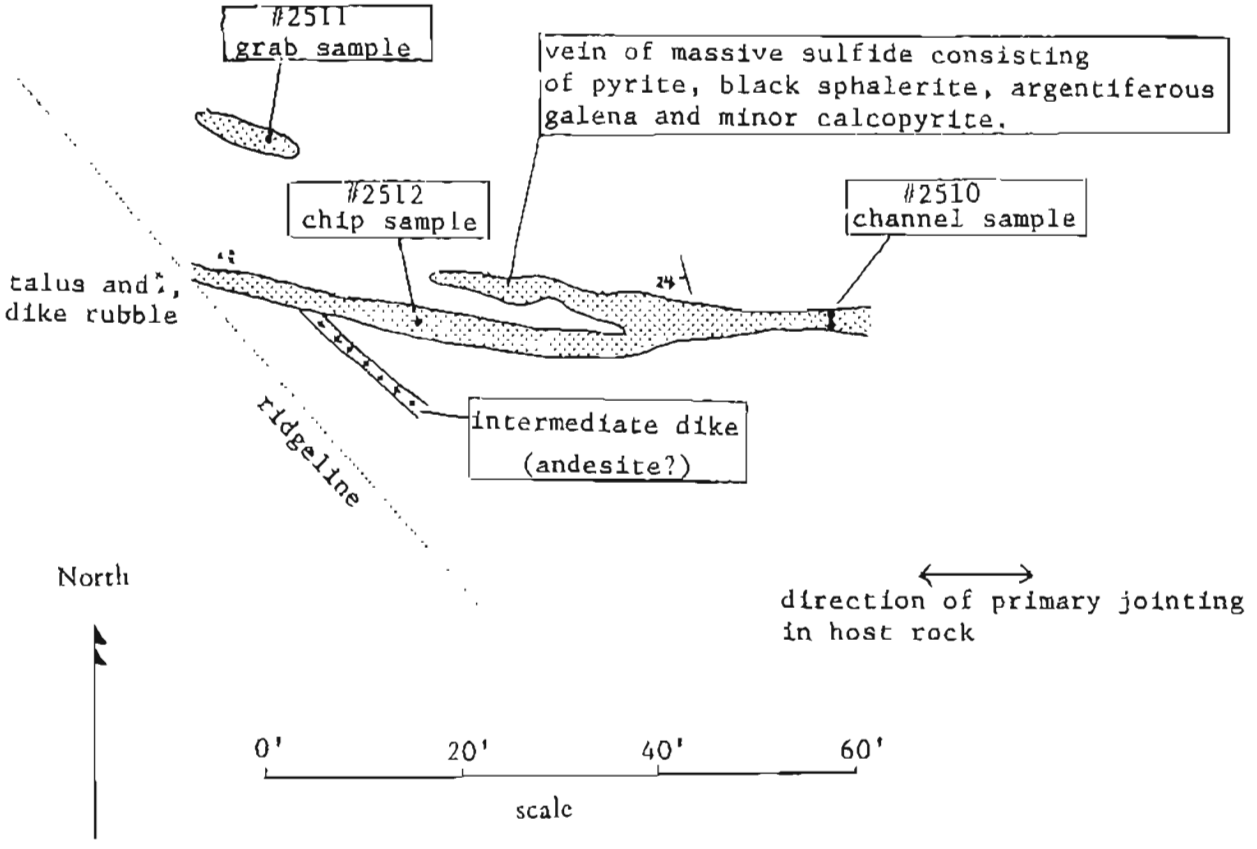
RAT FORK PROSPECT

Location: McGrath B-2 Quadrangle (see fig. 1)

Development at the Rat Fork prospect consists of 2 abandoned drill pads.

The upper drill pad (at 5,500 ft elevation) was sited for a shallow angle drill hole directed north to intersect a near vertical sulfide vein trending E - W, 85°S. The vein is exposed for about 70 ft. and consists of nearly massive sulfides (pyrite, black sphalerite, galena, and minor chalcopyrite). The vein parallels a pervasive joint set, which cuts the various calc-silicate rocks and marbles hosting the vein. The vein thickness varies from 1 to 8 ft (see fig. 2). Geochemical samples collected from the mineralized vein contained lower base metal values than expected (about 0.5 percent Cu, 10 percent Pb, and 10 percent Zn) along with silver values up to 276 ppm (see fig. 2).

host rock: calc-silicate with epidote-calcite-pink quartz assemblage, slightly hornfelsed and grades to marble




*Analytical data (in ppm unless stated otherwise).*

| sample | Cu | Pb | Zn | Au | Ag | W | As | Co | Ni | Fe | Mn | Cd | Cr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2510 | 5630 | 9.18% | 10.4% | <0.1 | 276 | 3 | 0.76% | <10 | <10 | 42.4% | 1160 | 851 | <10 |
| 2511 | 5080 | 7980 | 14.1% | <0.1 | 44.2 | 3 | 2440 | 10 | 26 | 37.5% | 1160 | 1210 | <10 |
| 2512 | 2620 | 11.1% | 10.2% | <0.1 | 206 | 14 | 3.8% | 22 | 14 | 33.6% | 1110 | 881 | <10 |

Figure 2 Upper drill site, Rat Fork prospect.

Rock types of the lower drill pad/staging area (elevation 4,175 ft) are calc-silicates and marble intruded by a mafic dike or sill parallel to bedding. The calc-silicates and marble contain minor iron-stained pyritic alteration.

Talus on the rock glacier below the drill sites (at elevation 3,500 ft) include numerous pieces of pyrrhotite and chalcopyrite-bearing material. Scheelite was suspected in one grab sample (#2513) although it ran low tungsten.

| Sample | Cu | Pb | Zn | Au | Ag | W | As | Co | Ni | Fe | Mn | Cd | Cr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2513 | 3160 | 80 | 1.85% | <0.1 | 7.1 | 3 | 15 | 158 | 52 | 41.4% | 67 | 161 | 34 |

SMITH LAKE PROSPECT

Location: McGrath B-2 (see fig. 1)

Small timbered prospect in joint within Silurian sandstone-siltstone. Graded beds are about 2 to 3 ft wide containing iron-stained mineralization consisting of some galena, pyrrhotite, pyrite, and minor sphalerite in secondary pyroxene-bearing gangue material. One grab sample of the sulfide ore rock was collected and analyzed (sample #2503). Analytical results are as follows.

| Sample | Cu | Pb | Zn | Au | Ag | W | As | Co | Ni | Fe | Mn | Cd | Cr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2503 | 1440 | 1.05% | 5.22% | 0.1 | 42.6 | 3 | 1 | 57 | 41 | 23.8% | 219 | 491 | 39 |

VALESCA LAKE OCCURRENCE

Location: McGrath B-2 (see fig. 1)

Flat-lying sequence of purple Tertiary(?) basalt and dacite intruded by numerous hypabyssal bodies of varying lithologies including coarse hornblende-bearing intrusives (hornblende up to 3/4 in. long), pyroclastic fragments up to 4 in. long and aphanitic medium-dark gray andesitic-basalt. The andesitic-basalt is cut by occasional thin vertical fracture sets containing pyrrhotite, pyrite, chalcopyrite(?) and minor galena. Sulfides zones are about 2 in. thick although iron-staining of host rock occurs up to 2 ft wide. Float contains epidote similar to that found in dikes on the upper Sheep Creek area (related system?). A grab sample of the sulfide vein material was collected and analyzed (#2504). Analytical results are as follows:

| Sample | Cu | Pb | Zn | Au | Ag | W | As | Co | Ni | Fe | Mn | Cd | Cr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2504 | 598 | 8440 | 1.62% | <0.1 | 13.5 | 2 | <1 | 48 | <10 | 1.48% | 904 | 110 | 10 |

TIN CREEK OCCURRENCE

Location: McGrath B-2 (see fig. 1)

The Tin Creek Occurrence consists of a 5 ft by 30 ft zone of heavily malachite-stained rock containing chalcopyrite, pyrite, sphalerite, and galena within gray bedded limestone adjacent to large porphyritic dike or plug (see fig. 3a and b). The mineralized zone is parallel to bedding and is in part bordered by concordant sills up to 2 ft thick. Epidote-garnet--calcite skarn minerals occur within the mineralized zone. Small criss--crossing anastomosing dikes occur throughout the limestone which do not appear to alter the limestone. A grab sample of the stratabound mineralized zone was collected and analyzed (#2505). Analytical results are as follows:

| Sample | Cu | Pb | Zn | Au | Ag | W | As | Co | Ni | Fe | Mn | Cd | Cr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2505 | 5890 | 229 | 6690 | <0.1 | 37.5 | ? | <1 | <10 | <10 | 3.27% | 1840 | 74 | 28 |

Prospect: Sheep Creek Drill Site

Location: McGrath B-2 (see fig. 1)

A creek just west of the 1982 Anaconda drill site was traversed (see fig. 4 and 5).

Figure 3a. Looking west at the Tin Creek occurrence.

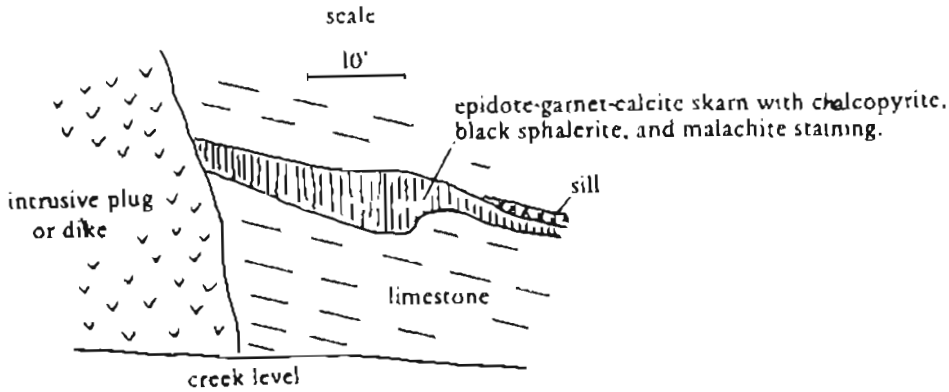



Figure 3b. The Tin Creek skarn.


Figure 4. Looking north at the Sheep Creek drill site. Samples were collected along the creek cut shown in the foreground.

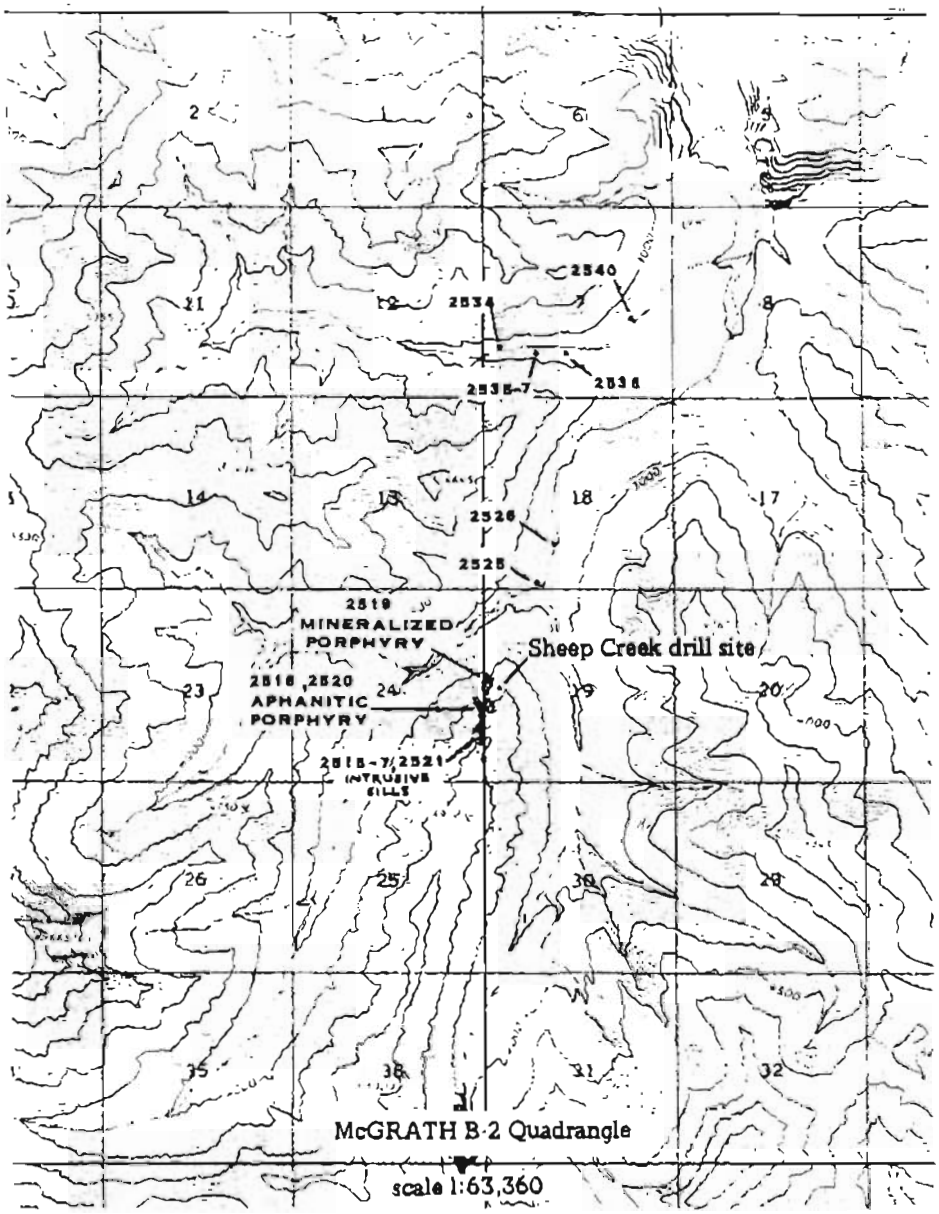



Figure 5. Location of Sheep Creek drill site and geochemical samples.

The bedrock above the drill site is mainly organic-rich limestone, limey sediments, and minor shale. The unit contains some sill-like, iron stained, fine-grained, medium-light gray intrusives with trace pyrrhotite. Four geochemical samples (#2515 at 4,200 ft elevation, #2516 at 4,150 ft elevation, #2517 at 4,100 ft elevation, and #2521 at 3,950 ft elevation) were collected within three pyrrhotitic sills. Alteration is conspicuously lacking at the intrusive-limestone contacts.

At 3,700 ft elevation, a light gray to white porphyritic intrusive with 1 percent pyrrhotite sporadically pinches in and out throughout the limestone unit. Two geochemical samples of leucocratic porphyry (#2518 at 3,700 ft elevation and 2,520 at 3,650 ft elevation) were collected.

At 3,600 ft porphyritic rocks occur in three varieties including 1) fine-grained tan-weathering rock with disseminated pyrrhotite, 2) dense gray pyrrhotite rich quartz porphyry, and 3) salt and pepper textures green amphibolite-bearing intrusives. These porphyritic dikes cross-cut the nearly vertical sedimentary beds and are highly altered with abundant pyrrhotite ± sphalerite and chalcopyrite. A 10 ft x 70 ft zone exposed along the west wall of the creek within the altered porphyry contains tabular 1 ft thick spongy gossan zones with stringers of malachite, and abundant pyrrhotite, pyrite, sphalerite ± chalcopyrite (sample #2519) in a greenish fine-grained altered intrusive host rock. Nearby sedimentary rocks also contain disseminated pyrrhotite.

Analytical results are as follows:

| Sample | Elevation | Cu | Pb | Zn | Au | Ag | Sb | W | Co | Ni | Fe | Mn | Cd | Cr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2515 | 4200 | 18 | 25 | 34 | <0.1 | 0.3 | <1 | 2 | <10 | <10 | 4.35% | 507 | <1 | 22 |
| 2516 | 4150 | 16 | 33 | 65 | <0.1 | 0.2 | <1 | 2 | <10 | 17 | 3.39% | 538 | 1 | 30 |
| 2517 | 4100 | 23 | 201 | 116 | <0.1 | 0.7 | <1 | 6 | <10 | 12 | 3.96% | 522 | 1 | 29 |
| 2521 | 3950 | 43 | 16 | 8 | <0.1 | 0.4 | <1 | 4 | <10 | <10 | 3.94% | 230 | <1 | 34 |
| 2518 | 3700 | 7 | 9 | 27 | <0.1 | 0.1 | <1 | 3 | <10 | 14 | 2.57% | 292 | 1 | 52 |
| 2520 | 3650 | 49 | 7 | 86 | <0.1 | 0.2 | <1 | 4 | <10 | 19 | 3.18% | 361 | 1 | 51 |
| 2519 | 3600 | 5050 | 2780 | 3.48% | <0.1 | 83 | <1 | ? | 55 | 102 | 21.5% | 469 | 449 | 108 |

LOWER SHEEP CREEK ORDOVICIAN ARGILLITE (Osh unit of Bundtzen and others, 1982). Location: McGrath B-? (see fig. 5)

The Osh unit in this area consists predominantly of siliceous dark gray to black argillite with fine-grained pyrite. The section also includes minor pyritic chert, thin shale chip conglomerate horizons, folded light gray aphanitic dikes with minor pyrrhotite, small plugs of coarse hornblende-biotite-plagioclase-K-feldspar assemblages in quartz monzonite, and coarse-grained purple dikes containing large epidote replacement of feldspar crystals up to 1/2 in. in length. The argillite is thinly bedded (beds up to 3 in. thick) without obvious grading. Bedding generally appears thicker downsection. The unit contains some local iron staining and

yellowish-to-white efflourescence which often reacts to zinc zap. The section is highly deformed, showing at least two episodes of folding, some of which is disharmonic (see fig. 6).

Geochemical samples are listed below in approximate stratigraphic order.

| Sample no. | Description |
|---|---|
| 2525 | Arsenopyrite-bearing quartz vein 4 to 6 in. thick containing fragments of black silic siltstone. |
| 2526 | Sulfide bearing, medium light gray pyritic dike with iron-stained box works. |
| 2534 | Three pound bulk chip sample typical of the uppermost section of the Osh unit. |
| 2535 | Bulk chip sample of Ordovician silicic shale with a 3 ft thick layer of red-brown silty chert. Contains some white efflourescence which reacts moderately to zinc zap. |
| 2536 | One foot thick bed of malachite stained Cu-Zn bearing shale, capped by more resistant silicic argillite unit and sedimentary breccia. |
| 2537 | One and one-half ft thick sedimentary breccia containing small chalcopyrite veinlets with visible galena. Metal source may be stratiform bed of sample 2536 or introduced along brecciated zone. |

Figure 6. Ordovician siltstone to argilite (Osh unit of Bundtzen and others, 1984) along Sheep Creek. Note the highly contorted folded sequence overlain by a gently folded sequence.

2538 Thin bedded argillite (1/2 to 1-1/2 in. thick beds with minor white efflourescence that reacts slightly to zinc-zap).

2540 Representative chip sample over a 30 ft length of silicic argillite.

| Sample | Cu | Pb | Zn | Au | Ag | Sb | W | Co | Ni | Fe | Mn | Cd | Cr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2525 | 14 | 20 | <1 | 0.1 | 1.9 | 54 | 18 | 12 | 38 | 7.92% | <10 | 1 | 116 |
| 2526 | 34 | 720 | 47 | <0.1 | 37.1 | 472 | 5 | <10 | 45 | 3.03% | 61 | 1 | 147 |
| 2534 | 28 | 6 | 25 | <0.1 | 0.4 | 5 | 3 | <10 | 43 | 0.76% | 72 | 1 | 109 |
| 2535 | 88 | 12 | 291 | <0.1 | 1.2 | 1 | 2 | 11 | 51 | 2.63% | 276 | 4 | 131 |
| 2536 | 143 | 86 | 940 | <0.1 | 5.4 | 1 | 3 | 12 | 96 | 2.16% | 213 | 13 | 113 |
| 2537 | 316 | 37 | 273 | <0.1 | 10.3 | 7 | 2 | <10 | 55 | 1.29% | 49 | 3 | 154 |
| 2538 | 26 | 7 | 2 | <0.1 | 0.3 | 1 | 3 | <10 | 28 | 0.83% | 31 | 1 | 103 |
| 2540 | 26 | 9 | 83 | <0.1 | 0.4 | 1 | 6 | <10 | 28 | 0.73% | 32 | 2 | 117 |

CHIP LOI PROSPECT

Location: McGrath A-3 (see fig. 1)

The Chip Loi prospect is a pyrrhotite-rich contact zone between a mafic intrusive dike(?) and Silurian clastic unit just above the Silurian-Ordovician contact (see Herreid, 1968). The contact contains an iron-stained zone that extends over 40 ft into both the sedimentary unit and the diabase. A sulfide zone within the iron-stained contact contains abundant sulfides, predominantly pyrrhotite (50 to 70 percent) with minor chalcopyrite and possible pentlantite. W. Roberts (USBM, personal commun.) reports up to 1,000 ppm Cu and 1 to 2 percent Ni in selected grab samples from the prospect.

An estimated 0.25 to 2 million tons of sulfide bearing material may exist at the prospect.

Eleven continuous channel geochemical samples were collected across the mineralized contact zone from the silic black siltstone-sandstone unit to the altered diabase (see fig. 7).

Analytical results of the geochemical analyses are as follows:

| Sample | Cu | Pb | Zn | Au | Ag | Mo | Sb | W | As | Co | Ni | Fe | Mn | Cd | Cr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2542 | 83 | 7 | 26 | <0.1 | 0.1 | 3 | <1 | 2 | 10 | 43 | 1140 | 3.91% | 328 | -- | -- |
| 2543 | 5546 | 23 | 226 | <0.1 | 5.6 | 4 | <1 | 2 | 378 | 496 | 8200 | 16.3% | 292 | <1 | 169 |
| 2544 | 2300 | 35 | 153 | <0.1 | 2.3 | 5 | <1 | 2 | 111 | 291 | 5320 | 14.7% | 401 | <1 | 144 |
| 2545 | 579 | 18 | <1 | <0.1 | 1.5 | 4 | <1 | 3 | 105 | 14 | 456 | 15.0% | 117 | -- | -- |
| 2546 | 4670 | 10 | <1 | <0.1 | 3.1 | 17 | <1 | 2 | 22 | 863 | 1.44% | 43.2% | 10 | -- | -- |
| 2547 | 3340 | 29 | <1 | <0.1 | 1.7 | 8 | <1 | 2 | <10 | 930 | 1.35% | 26.2% | 10 | -- | -- |
| 2548 | 2820 | 36 | 24 | <0.1 | 4.8 | 4 | <1 | 3 | <10 | 182 | 2590 | 9.73% | 196 | -- | -- |
| 2549 | 2250 | 27 | 46 | <0.1 | 3.5 | 3 | <1 | 2 | <10 | 101 | 1810 | 6.79% | 166 | -- | -- |
| 2550 | 627 | 28 | 28 | <0.1 | 0.9 | 1 | <1 | 2 | <10 | 55 | 747 | 4.88% | 209 | -- | -- |

## REFERENCES CITED

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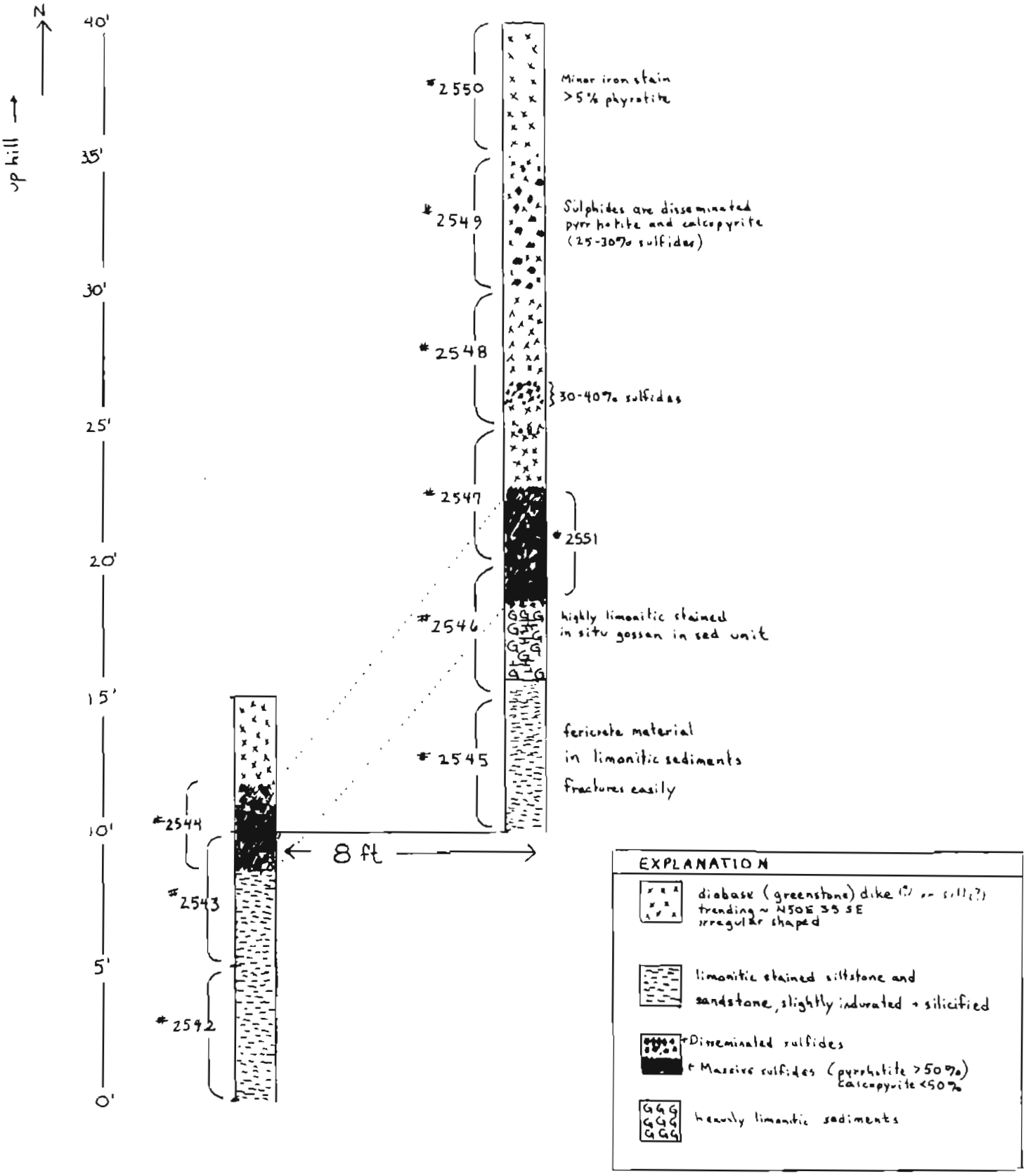
Figure 7. Continuous channel samples 2542-2550 across a 40' interval that includes the mineralized contact of a diabase dike intruding siltstone and sandstone host rock at the Chip Lot prospect.



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