DIAMOND DRILLING, GEOCHEMISTRY, GEOPHYSICS
On the ZAP Claims
Liard Mining Division
NTS 104P/13E, 14W

January, 1981 J. R. Wilson

Vancouver, B. C.

DIAMOND DRILLING, GEOCHEMISTRY, GEOPHYSICS

ON THE

ZAP CLAIMS

Liard M.D

N.T.S. 104P/13E, 14W

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SUMMARY

From mid August to early October, 1980, (477m.) 1566 feet of diamond drilling tested parts of the Zap mineral claims. Despite nearly continuous mechanical and logistical problems some encouraging results were obtained. Minor Pb-Zn-Cu mineralization and lithologies similar to the Gataga camp were intersected. Sections of core were split and analysed geochemically.

The drill results are significant in confirming this region as having stratiform Pb-Zn-Ag-Cu potential. Further drilling is recomminded on the Zap claims to better explore the pyritic argillite encountered in 1980 and to test other anomalies.

A later winter program is suggested, thus avoiding access problems.

Preparatory ground work in the 1981 summer should locate, survey, and mark important sites for the following winter's program.

LOCATION - In B.C. 48 km WSW from Watson Lake, Y.T.

ACCESS - By FNM constructed road leaving the One Ace Mountain forestry road.

BACKGROUND - Refer to " Geology, Geochemistry, and Geophysics of Zap claims " by P. Burns, July 4, 1980. for property work done prior to drilling.

The claims are believed to be in the transition zone from the Selwyn Basin to the Kechika Trough (probably an extension of the Basin). For this discussion, both areas will be termed the Selwyn Basin.

In 1980 R. Carne wrote (at the CIM Annual General Meeting):

" The majority of the zinc, lead and silver resources of western Canada are contained in stratiform mineral deposits hosted by Paleozoic clastic sedimentary rocks, commonly shales, within Selwyn Basin of Yukon N.W.T. and northern British Columbia. Over half of these deposits have been discovered within the past decade and the steady rate of discovery suggests that many more will be found.

Recent studies of these deposits, and of other well-known examples, such as the McArthur *H.Y.C.) deposit in Australia, the Meggen and Rammelsberg Mines in Germany and the Sullivan Mine in British Columbia, have led to an emerging, but still controversial, model of ore deposition. Shale-hosted or "sedimentary exhalative" (sedex) deposits form in active tectonic environments from metalliferous geothermal brines that rise to the seafloor along deep-seated fault zones and precipitate as bedded sulphide deposits, usually accompanied by barite. Although their mineralogy and zoning can be similar to that of volcanogenic massive sulphide deposits, sedex deposits have only a weak genetic link with volcanism."

Carne (1980) described the four major clusters of sedex deposits : in Yukon - Anvil, Howards Pass and MacMillan Pass in B. C. - Gataga.

Lithologic characteristics of each camp is similar.

In 1980 D MacIntyre mapped and reported on the Gataga area (at the District 6 CIM meeting). The following descriptions are from his paper. The mineral district is over 180 km. long and contains six major occurrences.

"The Cirque is the lagest known deposit with reserves in excess of 30 million tonnes grading 10 per cent combined lead-zinc and 45 grams per tonne silver. The host rocks for the Cirque and other deposits in the area are Middle to Upper Devonian carbonaceous black shales, siliceous argillites, and cherts (Gunsteel 'Formation').

The mineralized interval of the Devonian succession appears to be present throughout the basin of deposition, typically consisting of thin beds of nodular barite with interbedded pyrite laminae. This interval locally thickens and grades into lens-shaped bodies of massive bedded barite which may or may not contain sphalerite and galena. Minor zinc and lead mineralization is also found in elses of laminated pyrite which are spatially associated with the bedded barite deposits."

"The K showing is currently the main exploration target on the Cirque property. The showing consists of several small outcrops and a prominent white-weathering barite kill zone exposed on the northeast-facing slope of a northwest-trending ridge. Diamond drilling in this area has intersected a massive barite bed containing diffuse bands and interstitial blebs of pyrite, sphalerite, and galena. This horizon varies from less than 5 metres on surface to greater than 35 metres down dip to the southwest. Average grades of drill intersections from this horizon are in the range of 9 to 15 per cent combined lead-zinc with 50 to 70 grams per tonne silver. The zinc/zinc + lead ratio of the 1978 drill intersections varied from 0.72 to 0.77. The overall ratio for the reserves defined in the 1979 program is 0.77.

Very fine-grained sphalerite and trace amounts of galena also occur in bands of laminated fine-grained and massive coarse-grained pyrite directly overlying the main barite horizon. Assay results from this zone are extremely variable and range from 0.5 to 8 per cent combined lead-zinc. Anomalously high background concentrations of lead and zinc also occur in rocks immediately underlying the overlying the main deposit."

At the Driftpile Creek occurrence:

"The main massive sulphide horizons are characterized by very finely laminated pyrite which locally has soft sediment deformation and graded bedding."

Barite and sphalerite are present in variable amounts.

"What appears to be the same horizon was intersected in drill holes immediately south of Driftpile Creek but here finely laminated pyrite predominates and galena and varite are present in very minor amounts."

The Anvil Camp consists of seven potential orebodies along a 25 km. belt. According to Carne (1980) the "characteristic vertical and lateral zonation seen in all deposits is, in descending order:

(i) baritic massive sulphide
(ii) pyritic massive sulphide
(iii) pyritic quartzite
(iv) ribbon banded graphitic quartzite.

Chalcopyrite - pyrrhotite stringer zone are recognizable beneath some deposits."

DIAMOND DRILLING

D. J. Drilling completed 1566 feet (477metres) of the 2000 feet contracted in five holes. FNM was not charged for the undrilled portion. A Longyear 17 A drill was used and BQ core was recovered. All holes were vertical and were sited to test a variety of geophysical and geochemical anomalies. Drilling was entirely on the Zap 1 claim.

A D 6, rented from Grant Stewart Construction, prepared drill roads and hauled the drill and sloop.

Figure 079-80-1 shows drill hole locations and roads.

Hole #A1 drilled one of two EM-16 conductors near the base of slope that paralleled the valley axis east of our campsite. A few modestly anomalous soil samples (252 ppm Zn, 3.0 ppm Cd, 1.0 ppm Ag) and a good silt value of 10 ppm Ag had been found nearby. Drilling encountered a vertical fault zone with high water pressure. Twelve metres of overburden were found but 67 metres of casing were used in the very broken and open fault. The hole was stopped at 107 metres. Barren quartzites and siltstones were the only lithologies found. Overall core recovery was about 30%. The EM conductor is probably the fault. The high water pressure and warm water temperature encountered in the fault suggests that anomalous metal values found in nearby spring sediments could be due to migration from a considerable distance.

Hole #A2 tested a southeast trending EM-16 reverse cross-over that parallelled a normal conductor 50 metres away. This strike direction corresponds to regional fold axes as mapped by P. Burns. No soil samples at the site showed elevated values but scattered highs occur through the area (eg. to 410 ppm Zn, 4.3 ppm Cd, 1.2 ppm Ag).

Twenty metres of casing was used and the hole went to 151 metres encountering pyritic quartzites, siltstones and pyritic, graphitic black shales explaining the EM anomaly. Quartz/calcite veinlets are common and some carry specks of galena. A single 8 cm.

long section of core contains a veinlet with sphalerite, pyrite, galena, and chalcopyrite. Examination of the sample at Thornhill also confirmed traces of arsenopyrite and pyrrhotite (see attached report). Bedding here was found to be nearly vertical. Nevertheless, drilling was allowed to continue because of favourable results. Future angle holes are needed to test across the stratigraphy at the best mineralized depths or at levels suggested by rock geochemistry. Drilling should especially be directed towards the nearby EM conductor to the southwest.

Hole #A3/A4 was collared on the western "limb" of a coincident EM-16 - soils anomaly. The feature is ay least 700 metres in length, strikes roughly 100°, and is slightly sinuous indicating possible faulting or folding. Soils immediatly downslope were 14 ppm Pb, 1.5 ppm Ag, 470 ppm Zn, 10 ppm Cd. Although better soils values lie to the east this site was drilled because the EM response was clearest.

Drilling was difficult in this sheared graphitic shale. Casing couldn't be driven into solid rock because of the tight graphite and the BW sub broke off in hole A3. The set up was moved a few metres and hole A4 began with N casing going to 24 m. B casing going to 37 m., and coring coming to a standstill at 40 metres. During this difficult stage (12 days) considerable time was spent repairing the drill, obviously not capable of handling the conditions.

Core recovered was black, graphitic, pyritic, sheared argillite/shale. One 3 cm breccia fragment held about 50% disseminated pyrite.

The graphitic rock explains the EM response but the associated geochemical values have yet to be accounted for. This hole can be regarded as partially successful since it encountered the lithology usually associated with Selwyn Basin stratiform deposits.

Hole #A5 was on the eastern end of the same feature tested by the previous hole. It was collared on a strong EM response and the best soils anomaly was immediatly downslope (over 10,000 ppm Zn, 215 ppm Cd).

Thirty metres of casing was used and the hole was stopped at 148 metres. All rock encountered was black argillite with graphite on fractures and disseminated pyrite throughout. Pyrite is also seen on fractures, as discrete blebs to 1 cm diameter, as irregular indistinct massive patches to 10 cm. and as laminated beds (sometimes massive) to 1 cm. thick. Rip-up soft sediment deformation is exhibited by one pyritic bed. An 8 metre section is interpreted as a possible vent with rounded clasts ot the top grading down to angular fragments and passing into solid rock. Veinlet stockworks of calcite are prominent throughout the core.

On this hole the lithology, bedded pyrite, and occasional specks of galena heighten interst and point to the necessity of more drilling.

A final drill set up was made on the road in the Zap 10 claim but freezing weather reduced the nearby water supply making drilling impossible. The site should be drilled at a future date. It consists of an EM-16 conductor and high soil values (1675 ppm Zn and 71 ppm Cd).

All drilling was terminated at this point because of deteriorating water supplies, an inadequate drill for the difficult ground, small footage remaining in the contract (and no charge for cancellation), and a nearly impassible access road whose upgrading would be too expensive.

ANALYSIS OF DRILL CORE

Core from all holes except A1 was split and geochemically analysed, generally in alternate 5 foot lengths. Shorter sections were taken based on lithology or mineralogy. Sludge samples analysed were taken during drilling when core recovery was poor.

Ranges of values in drill core and in average sedimentary rocks are shown below in ppm.

Hole #	# of samples	Cu	Pb	Zn	Ag	Ba
A2	49	4-110	2-90	4-1400	0.2-1.3	30-1090
A3/4	4	26-39	14-18	98-187	0.2-0.3	920-1350
A5	33	32-97	6-70	43-5800	0.2-7.0	490-1830
Average Ranges of geochemical values (Hawkes & Webb)						
shale		30-150	20	50-300		300-600
Black shale		20-300	20-400	100-1000	5-50	450-700

According to Hawkes & Webb some of our Zn and Ba results are well above average. The high barium content in drill core is especially significant as barite is commonly associated with mineralization at the Anvil, MacPass, and Gataga camps. However it is not present at Howards Pass.

In hole A5 a chemical change occurs at about 320 feet (97.5 m):

a) Sb was found in all rock below this depth but not above it.

b) Ag values change at this point. 18 samples from 30.5 to 96.0 metres had a mean of 1.9 ppm Ag (standard deviation = 1.0) and 15 samples from 97.5 to 147.8 metres had a mean Ag content of 3.6 ppm (standard deviation = 2.0)

c) For the same top section Zinc's mean was 306 ppm (S.D. = 308) and for the bottom section Zinc's mean value was 1639 ppm (S. D. = 2045).

Although not obvious, the stronger silver values appear to correspond roughly with higher pyrite content in the form of massive pyrite patches. The lower values are in core containing a long brecciated section (based on structure this may be a vent).

No other prominent traits were recognized but a thorough manipulation of data should preceed further groundwork.

SOIL GEOCHEMISTRY

Regional soil sampling conducted by P. Burns (see earlier reference) located a concentration of good Cd and Ag values near our access road on Zap 10. I.L.Elliott reanalysed the samples for Pb and Zn. Results clarify a few multi element anomalies:

(a) two Pb zones with moderate Zn, Ag, Cd associated values are centered on line 0+00 at 8+00 S and 17+00 S (to 128 ppm Pb, 880 ppm Zn, 2.2 ppm Ag, 3.9 ppm Cd).

(b) Strong Zn and Cd results are on Line 5 E between 24+00 S and 28+00 S. (to 1675 ppm Zn, 71 ppm Cd, 3.5 ppm Ag, 13 ppm Pb).

GEOPHYSICS

Steve Presunka was in the area to run a few lines of EM-16 on John Schussler's Donna claims. While here, he made traverses over the soils anomaly and located a nearby conductor (DDH A6-not drilled).

ROAD CONSTRUCTION

The FNM road built in 1979 received considerable traffic during our program and consequently deteriorated quickly in the few wet sections. Culverts were installed to help drain spring waters. The road was thus improved for a week until very unusual late season rainfalls made the rest of the road nearly impassable. The cat, intended only for drill moves, had to be used to upgrade the road, adding a significant, unforseen expense.

New roads were built to three drill sites and considerable time was spent building across unavoidable swamps. Grant Stewart construction supplied an efficient crew to do the roadwork.

K. H. Christensen and A. MacArthur started cleaning up debris from the 1979 road construction but spent more time on camp building, road repairs and construction of drill roads before leaving for personal reasons.

J. Hugi and J. Wilson later continued the clean up until snowfalls blanketed the slash, preventing safe, efficient work. Hazard abatement can be completed in 1981 while exploration ground work is in progress here.

CONCLUSIONS AND RECOMMENDATIONS

Diamond drilling was successful in locating minor mineralization and promising lithologies. However, mechanical and logistical problems thwarted completion of the drill contract. Several thousand feet of drilling are needed to complete primary exploration and to follow up the 1980 drill results.

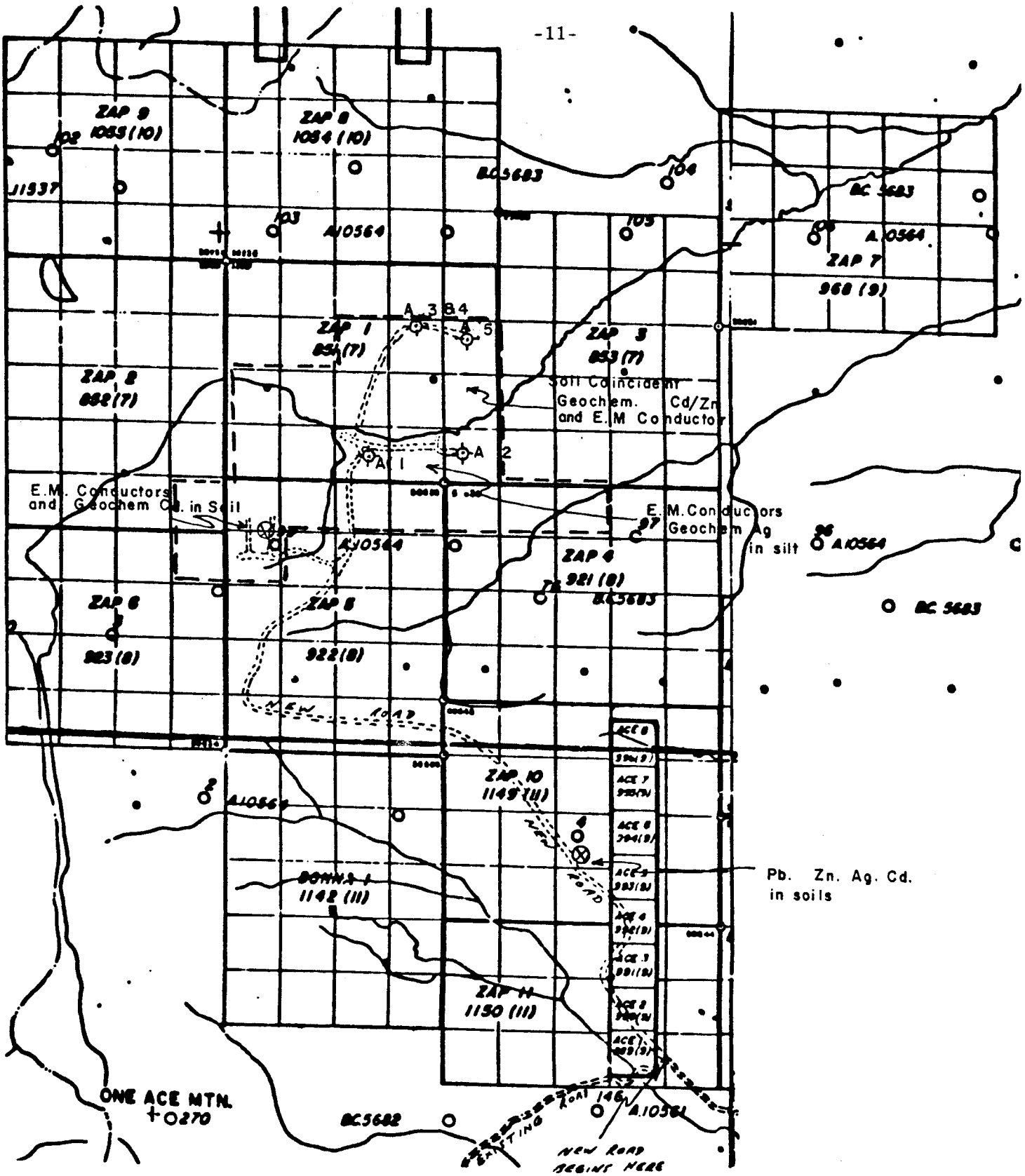
Soil sampling and EM-16 surveys provided the drill targets in 1980 and such work should be continued as fill in lines over known regional anomalies.

The following schedule is recommended:

Summer 1981 - fill in lines of soils and EM-16 in areas of good regional soils geochemical response, survey 1980 drill holes and 1980 roads with transit, survey critically placed tie lines through the grid to relate it to our topographic map and as an accurate record for future years work, mark drill sites, camp sites, water supplies, etc. for a winter drill project, and finish hazard abatement.

Late winter 81/82 (March) - Diamond drilling. Winter work will be more expensive than normal B.C. drill costs but, for this area , is the most economical. The main problem overcome is that of road building. In late winter most swamps and

and creeks are frozen and can be traveled by cat, avoiding forests, thus reducing problems with B.C.F.S. and costs to us. Also, the frozen road needs less maintenance. Finally drill sites can easily be made in swamps and waterways.



ALBERT CREEK SILVER

⊕ Drill holes 1980

⊗ Future drill targets

F.N.M. Road 1979-1980

N.T.S. NO.:104-P-13 ; FIG. NO.:079-80-1

SCALE: 1:50 000

APPENDIX I

Drill Logs for Holes #A1, A2, A3/A4 and A5

ABBREVIATIONS

H.	hardness
no.	none
mod.	moderate
v.	very
m.g.	medium grained
f.g.	fine grained
vfg	very fine grained
med.	medium'
qzte	quartzite
dia.	diameter
bed	bedding
occ.	occasional
tr.	trace
diss.	disseminated
fr.	fracture
inter.	interstitial
cm.	centimetre
mm.	millimetres
m.	metres
spl.	sample of core
qz.	quartz
calc.	calcite
py.	pyrite
gr.	graphite
cpy	chalcopyrite
gal	galena
sph	sphalerite
?	questionable
*	dominent (angle, mineral, etc).

veins and stockworks spacing
(eg.) 1-3/cm =1 to 3 per cm.
(eg.) 1-3 cm =1 to 3 cm between veins.

FALCONBRIDGE

DIAMOND DRILL RECORD

NORTH / West 10+75
EAST ~~8+00~~
ELEV. 1016 metres
BEARING Vertical
DIP -90° collar. Acid test not possible due to high water pressure.

STARTED 26 Aug. 1980
COMPLETED 31 Aug. 1980
LENGTH 107.3 m (352 ft)

PROPERTY ALBERT CREEK

PURPOSE For geologic data, testing EM-16 conductor, and testing near good silt sample.
LOGGED BY J. Wilson

HOLE No. A 1
CLAIM Zap 1
SECTION
OFFSET
PLOTTED

FOOTAGE	DESCRIPTION	SAMPLE	FOOTAGE	C.L.				
D. J. Drilling. 17 A Drill B Q Core								
0 - 12.2 m	Overburden							
12.2 - 46.9 m	F.g. - m.g. light grey, porous qzte.vugs to 1 cm.							
	dia. Mod. to very hard but occ. soft, buff weathering							
	patches (spl. 16.4 m) Bed: 50° @ 14.3 m, 64° @							
	30.5 m.							
	Concretion ? spl: 20.7 m. Sand layer spl:26.5 -							
	26.8 m.							
46.9 - 53.3 m	As above plus soft, buff, finely laminated							
	siltstone spl: 47.2 m. Bed - contorted, slumped ?							
	20° - 80°.							
53.3 - 74.1	Mod H, f.g., light grey qzte vugs to 5 mm.							
	Bed: 50° @ 71.9 m.							
74.1 - 107.3 m	Mod. H, f.g., med. to dark grey impure quartzite,							
End of hole	vugs to 5 mm. brown coatings on fractures.							
	Bed: 45° @ 89.9 m							

HOLE No.

FOOTAGE	DESCRIPTION	SAMPLE	FOOTAGE	C.L.				
	Spl: 76.8, 84.1, 86.9, 89.9, 92.0, 107.3.							
	Veins							
27.2 - 30.5	Rare 45° to 60° 3 mm qz veinlets							
76.2 - 107.3	Occasional 5° 1mm qz veinlets.							
	Fractures							
12.2 - 12.95	1 cm spacing @ 20°, 70°							
12.95- 13.9	5 cm @ 20°							
13.9 - 14.0	1 cm @ 35°							
14.0 - 15.5	5 cm @ 40°							
15.5 - 26.5	3 cm @ 5°, 40°							
26.5 - 32.0	5 cm @ 5°, 20°							
32.0 - 32.6	2 cm @ 3°							
45.7 - 70.1	2-5 cm @ 3°, 35°							
70.1 - 72.5	5-2 cm @ 20°, 30°							
72.5 - 83.8	2-5 cm @ 3°, 25°, 40°							
83.8 - 107.3	7-2 cm @ 5°, 25°, 45°							
	mn stain @ 88.4 m							
	HCL test							
12.2 - 18.0	mod, interstitial and vugs							
18.0 - 24.0	Weak, interstitial							

SHEET No. 2

HOLE No. A 1

FOOTAGE	DESCRIPTION	SAMPLE	FOOTAGE	C.L.				
24.0 - 26.0	weak, frs.							
26.0 - 28.0	weak, frs, & vugs							
28.0 - 35.0	weak, inter & vugs & frs							
35.0 - 46.0	mod, inter							
46.0 - 48.0	none in siltstone							
48.0 - 51.0	mod, inter							
51.0 - 52.0	mod, inter & vugs, none in siltstone							
52.0 - 53.0	mod, inter							
53.0 - 60.0	none							
60.0 - 68.0	mod, vugs							
68.0 - 70.0	mod, inter & vugs							
70.0 - 72.0	weak inter, strong vugs							
72.0 - 74.0	mod, inter							
74.0 - 75.0	weak inter							
75.0 - 77.0	strong, vugs							
77.0 - 78.0	weak, inter, mod, frs.							
78.0 - 79.0	strong vugs							
79.0 - 81.0	weak, inter							
81.0 - 88.0	mod, frs							
88.0 - 89.0	weak inter, mod vugs							

FOOTAGE	DESCRIPTION			SAMPLE	FOOTAGE	C.L.
89.0 - 101.0	weak inter & frs					
101.0 - 103.0	weak inter, mod frs.					
103.0 - 104.0	weak inter, weak frs					
104.0 - 106.7	weak inter, mod vugs					
	Core Recovery (%) and casing					
0 - 12.2	casing	45.7 - 48.8	25%		85.3 - 88.4	62%
12.2 - 15.5	90%	48.8 - 51.8	16%		88.4 - 91.4	20%
		51.8 - 54.9	28%		91.4 - 94.5	16%
12.2 - 15.2	casing	45.7 - 67.1	casing		94.5 - 97.5	15%
15.5 - 18.6	40%	67.0 - 70.1	20%		97.5 - 100.6	33%
18.6 - 23.5	7%	70.1 - 73.1	43%		100.6 - 103.6	57%
23.5 - 26.5	6%	73.1 - 76.2	48%		103.6 - 107.3	12%
26.6 - 32.6	sand 25%	76.2 - 79.2	60%			
		79.2 - 82.3	34%			
15.2 - 45.7	casing	82.3 - 85.5	30%			

SHEET No. 4

HOLE No. A 1

NORTH 10+25 West 1+00 ~~EAST~~ | STARTED 1 Sept. 1980 | COMPLETED 5 Sept. 1980 | ELEV. 1018 m. | LENGTH 150.9 m (495 ft) | BEARING vertical | DIP -90° @ collar Acid test @ 150.9 m is -88°

FALCONBRIDGE
DIAMOND DRILL RECORD

PROPERTY: ALBERT CREEK

PURPOSE: Geologic data, testing EM-16 conductor | CLAIM: Zap 1 | LOGGED BY: J. Wilson | HOLE No. A 2 | SECTION | OFFSET | PLOTTED

FOOTAGE	DESCRIPTION — D. J. Drilling — 17 A Drill — BQ core	SAMPLE	FOOTAGE	C.U.	Pb	Zn	Ag	Ba
0 - 19 m	casing							
19.7 - 26.8	Mod. H, f.g., light grey quartzite. Occ. trace diss		21.3 - 22.9	10	6	16	0.2	90
	py and py in veinlets. (26 m 5° veinlets with py, gr?)		24.4 - 25.9	7	8	12	0.2	40
26.8 - 53.9	Hard, f.g. med to dark grey impure qzte. Buff, iron		27.4 - 28.9	6	8	16	0.2	140
	stained zones: 27.1 - 27.3, 33.5-34.2 Bedding 10° @ 27.7 m 5° @ 33.2 m		30.5 - 32.0	8	5	10	0.2	80
	Trace diss. py & possibly cpy throughout 28.3 - 32.6 0° to 5° 2 mm calc vein. Tr py & gr ?		33.5 - 35.0	10	20	20	0.2	40
	34.1 - 34.7 5° to 15° 1-4 mm py vein. 37.2 - 37.3 altered, sheared? with 1-4 mm pyrite vein		36.6 - 38.1	6	6	8	0.2	40
	as above. Py. increasing gradually downhole		39.6 - 41.1	6	6	8	0.2	20
	40.5 py in 2 mm vugs. 41.1 80°, irregular, 2 mm black (Fe ?) vein.		42.7 - 44.2	6	10	8	0.2	40
	41.8 - 45.7 1% py in 15° & 80° 1 mm py. veins and blebs to 1 cm dia, and on rim of calc/qz vugs, and diss.		45.7 - 47.2	6	7	6	0.2	40
	45.7 - 49.1 0.5% py. as above but mainly diss. 1% black mineral in veinlets.		48.8 - 50.3	6	6	8	0.2	20
	51.8 - 53.6 occ. suture-like fractures with trace black mineral & py.		51.8 - 53.3	8	10	15	0.2	50
53.8 - 55.3	Soft, v.f.g., black mudstone as silt/clay or core with							
	0° to 15° fractures. 1% (?) v.f.g. diss. py.; possibly graphitic. Bedding 5° @ 54.6 m.		54.9 - 55.3	33	24	36	0.9	740
55.3 - 57.0	Hard, v.f.g., light grey, quartzite with trace v.f.g.							
	diss. py. 55.5 - 57.0 brecciated & poorly cemented, with calc.							
	cavities. Top 5 cm is buff.							

HOLE No.

FNM 15 TMP

FOOTAGE	DESCRIPTION	SAMPLE	FOOTAGE	C.U.	Pb	Zn	Ag	Ba
57.0 - 60.3	Very hard, f.g., banded light to dark grey quartzite.		57.9 - 59.4	3	22	128	0.4	30
	Usually 2 to 5 mm parallel bands @ 0°, indistinct contacts. Bedding 0° @ 58.5 5° @ 59.7.							
	Note: (2) 3 cm green volcanic pebbles @ 57.6 m.							
	Caved? or in place?							
	60.0 - 60.3 py, galena, brown sph., + cpy? in							
	1-2 mm. veinlet.							
60.3 - 61.9	V. hard, f.g., dark grey, impure qzte with minor		60.9 - 61.9	1	2	5	0.2	100
	light grey streaks.							
	Rare diss, f.g. py.							
61.9 - 62.6	Light breccia zone. Pale f.g. qzte fragments in calcite		61.9 - 64.0	4	22	24	0.2	50
	rich matrix. Rare, irregular, dark, pyritic veinlets.							
	Bed: 5° @ 62.2							
62.6 - 67.5	Hard v.f.g. light grey qzte with occ. dark wisps.		64.0 - 65.5	2	10	28	0.2	220
	Patches of mod. H, f.g. med. grey qzte.		67.1 - 67.5	3	10	21	0.2	60
	Traces f.g. py. throughout.							
	67.2 - 67.5: 1% py-diss. and veinlets and one							
	v.f.g. galena in veinlet.							
67.5 - 72.4	Mod. to v.h. , f.g., med grey. impure qzte with occ.		67.5 - 68.6	8	16	14	0.2	60
	1-2 mm black wisps often pyritic.		70.1 - 71.6	6	4	7	0.2	20
	Traces diss f.g. py. cubes throughout and 1 mm py.							
	on frs.							
	68.4 - 70.6 Brecciated qzte with qz/calc.							
	stockworks 1% py on fractures. Up to 2% black							
	mineral. Lower contact is 35°, 3 cm calc/qz							
72.4 - 73.8	V.H, vfg, med. grey qzte with 3 - 5% vfg fr. & diss.		73.1 - 73.8	3	14	4	0.2	340
	py.cubes.							
73.8 - 74.7	Soft to mod. H, f.g. med. grey, impure qzte. Bed:		73.8 - 74.7	15	20	10	0.3	1090
	0° @ 74.1 3 - 5% vfg diss py.							

SHEET No. 2

HOLE No. A 2

FNM 15 TMP

FOOTAGE	DESCRIPTION	SAMPLE	FOOTAGE	C.U.	Pb	Zn	Ag	Ba
74.7 - 75.4	Soft to mod. H, m.g, med. grey, impure qzte. Possible breccia. 1 - 3% py-diss and on frs.							
75.4 - 82.3	Hard, f.g, light to med. grey, impure qzte. 79.9 - 80.5 - Breccia. Bed: 10° @ 76.2. 0.5% py in 1 mm irregular frs with black mineral. Lower contact is 3 cm, 30° qz vein in qzte breccia.		76.2-77.1	7	10	20	0.2	80
			79.2-80.8	6	6	8	0.2	30
82.3 - 82.9	Soft. vfg, med. grey siltstone 3 - 5% diss. vfg py 82.3 m: 5 mm py vein.		82.3-82.9	25	12	24	0.2	70
82.9 - 83.8	V.H, vfg, light grey, qzte with 0°, 1 - 3 mm. wisps of black mineral & pyrite. Dark grey 1 cm band with 2% diss. py. Bed: 10° @ 83.5, 13° @ 83.8		82.9-83.8	35	14	17	0.3	260
83.8 - 85.0	Soft, vfg, med. grey siltstone with 1 - 3% diss. fg. py. occ. veinlets of pale green waxy mineral (clay?).							
85.0 - 86.6	Hard, vfg, light grey impure qzte with zones of med. grey wisps carrying 3% diss. py. eg. (Dark wisps in light rock - 3% py. throughout light grey - trace py). Lower contact is 4 cm. brecciated, calc & qz filled at 25°.		85.3-86.6	18	6	11	0.2	390
86.6 - 87.2	Soft, med. grey siltstone. 5% vfg. diss. py.							
87.2 - 90.7	Hard, fg to mg, med. grey qzte .5%-10% diss. vfg py		88.4-88.7	13	17	12	0.2	730

SHEET No. 3

HOLE No. A 2

FNM 15 TMP

FOOTAGE	DESCRIPTION	SAMPLE	FOOTAGE	C.U	Pb	Zn	Ag	Ba
	Strongest py to 88.7 2-4% py in frs & diss. to 90.7		88.7-89.9	9	14	25	0.2	480
90.7 - 91.4	Soft, med grey, siltstone. 3% f.g. diss. py.							
91.4 - 93.9	Mod. to hard, f.g. to m.g, impure qzte 1-2% diss.		91.4-93.0	9	6	11	0.2	310
	f.g. py. 1% py in 5° to 45° frs. with 1% black mineral							
93.9 - 95.2	0° bedding contact between (a) v. hard f.g pale grey							
	qzte with 1-2% diss. py and 1% py in frs. (b) soft, graphite ? black shale with white							
	layer (barite ? or calc-qz ? or both ?). 5% diss. py. in shale.							
	Bedding 5° @ 94.2							
95.2 - 97.7	V.hard, f.g, pale grey qzte with patchy trace diss. py & tr. py on frs.		97.5-99.1	10	12	11	0.2	560
97.7 - 98.8	Soft, fg-m.g, med. grey, impure qzte. 5% diss. f.g py.							
98.8 - 101.6	V. hard, f.g., light grey. qzte. Occ. dark grey patches. Tr. to 0.5% f.g. diss. py. often cubes. Some on frs.		100.6-102.1	10	16	28	0.2	170
101.6 - 102.1	Hard, f.g. to m.g., pale grey qzte with rare diss.py laminated with mod. H to soft, black, graphitic ? shale with 1% py vein on contact. 3 mm to 2 cm white							
	barite ? or qz-calc ? vein ? in shale . Bed 5° @ 102.1							
102.1 - 103.5	Hard, f.g. to m.g pale grey qzte with occ. dark streaks. Patches of tr. to 1% diss vfg py usually with dark zones.							
103.5 - 103.9	Soft, med. grey siltstone. 3% diss. py.		103.6-103.9	110	28	31	1.3	300
	Bed 5° @ 103.6							

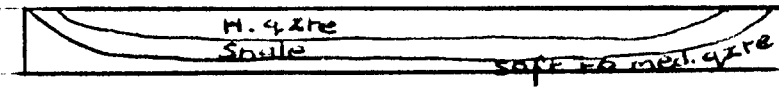
HOLE No. A 2

FNM15TMP

FOOTAGE	DESCRIPTION	SAMPLE	FOOTAGE	C.U.	Pb	Zn	Ag	Ba
103.9 - 105.6	m.g., pale grey qzte		103.9 - 105.2	23	20	72	0.2	140
	104.4 - 104.7: brecciated 105.0 - 105.6: altered friable.							
	Trace to 0.5% diss. fg. py.							
105.6 - 107.2	Mod. H, f.g. med. grey, impure qzte. Dense, fine (1 mm)		106.7 - 107.2	12	16	10	0.3	810
	black pyritic stockworks. Total py. 5 to 10%. Lower contact @ 36°.							
107.2 - 108.8	Mod H, m.g., pale grey, pzte with 1 cm band of shale							
	and white qz ? @ 20°. Tr. diss. f.g. cube py. 107.9 108.2: as 105.6 - 107.2							
108.8 - 110.5	V. hard, f.g. pale grey qzte. Tr. to 0.5% diss. py.							
	108.8 - 109.7: brecciated, qz-calc filled 110.4: greenish waxy veinlet (clay ?)							-21-
110.5 - 110.9	Mod. H. m.g., med. grey, impure qzte.		110.5 - 111.2	10	8	16	0.2	360
110.9 - 112.6	Brecciated as 108.8 - 110.5							
112.6 - 113.8	Hard, m.g., med. grey qzte. Irregular 1-2 mm black		112.8 - 113.8	28	20	580	0.2	360
	and pyritic veinlets @ 0° total py. 0.5%.							
113.8 - 114.3	Mod. H, f.g., dark grey, impure qzte 2% DISS. PY.							
	Bed: 0° @ 114.3.							
114.3 - 118.4	Hard to mod. H, m.g., light grey qzte		115.8 - 117.3	14	16	94	0.2	190
	Vague, laminated appearance to 115.2 (dark wavy 1-3 mm							
	bands and occ. qz veins @ 0 to 10°.							
	116.4 - 117.3: 30° sheet, soft, friable.							
	118.1 - 118.4: sheared							
	Tr. diss. py. throughout.							
	115.2 : 80° 1 to 6 mm py. veining.							
	115.3: Tr. galena on fr.							

SHEET No. 5

HOLE No. A2

FOOTAGE	DESCRIPTION
118.4 - 120.2	V.H. f.g., med. grey, qzte
	118.4 - 118.9 shear 1% diss. f.g. py. Tr. py. on frs. Lower contact @ 12°
120.2 - 120.4	Soft, friable, black shale 2% diss. py.
120.4 - 123.4	Mod. H to soft, m.g., med. grey, impure qzte. Irregular 1 mm py. stockworks @ 0°,5°,80°. 120.4 - 121.0: 0.5% diss. py.
123.4 - 127.6	Soft to mod. H, f.g. med. grey qzte. (125.3 - 126.5: ½ to 1cm black shale with 2-5% diss. py. Contact zone is 2 mm py. vein @ 0° to 5°).
	eg. 
	123.4 127.6
	5% diss. f.g. py. as cubes in qzte. some concentration in blackish zones. Note: vague, near boxworks of black throughout. Bed: 5° @ 126.2
127.6-137.2	V.H., fg, light grey qzte. 0.5% diss vfg py cubes & 0.5% py on frs 131.7-137.2 broken, sheared? 131.7-132.0 whitish, bleached, brecciated.
137.2-149.0	usually Hard, f.g light grey qzte. Brecciated, veined, fractured. Some parallel 0° to 5° white and light grey laminations (1-3 mm). Trace diss. vfg py.
149.0 - 150.9	Soft to mod. H, f.g., pale grey qzte trace to 0.5% diss. py. 149.0 - 149.2 med. H. fg, med. grey qzte with 1% diss. py. Bed @ 5°
End of hole.	

SAMPLE	FOOTAGE	C.U.	Pb	Zn	Ag	Ba
	118.9 - 120.2	6	12	20	0.5	620
	~~121.9 - 123.4~~	~~7~~	~~13~~	~~16~~	~~0.2~~	~~80~~
	121.9 - 123.4	7	13	16	0.2	80
	125.3 - 126.5	11	66	167	0.8	750
	128.0 - 129.5	4	12	530	0.4	360
	131.1 - 132.6	6	19	36	0.2	430
	134.1 - 135.6	6	16	18	0.2	50
	137.2 - 138.7	13	42	1400	0.2	700
	140.2 - 141.7	11	9	11	0.2	80
	143.3 - 144.8	9	20	16	0.2	140
	146.3 - 147.8	9	12	8	0.2	60
	149.3 - 150.9	3	6	12	0.2	150

HOLE No. A 2

Veins, stockworks, breccia filling

From	To	Spacing	Width (mm)	Mineral Filling	Angle (°)
19.7 m	29.0 m	1-2/cm	0.5-1	qz*, calc	10,17,55,85
29.0	31.4	1-10 cm	0.5-1	calc*,qz	0, 5,40
31.4	33.2	5-20 mm	0.5-1	calc	5,80
33.2	34.7	1-4 /cm	0.5-2	calc,py,qz	5,20,35,75
34.7	38.7	1-2 cm	0.5-2	qz*,calc	10,40,80
38.7	39.6	breccia		qz	
39.6	50.3	1-3 /cm	0.5-5	calc,qz,py, black mineral	40,80
50.3	51.5	1-3 cm	0.5-1	calc,qz	5,20,40,80
51.5	53.0	1-3 /cm	0.5-1	calc,qz	5,20,40,80
53.0	53.9	2-10/cm	0.5-2	calc,qz	5,20,40,80
53.9	55.8	1-2 cm	0.5-1	calc,qz	5,20,40,80
55.8	57.3	breccia and 1-2 /cm	0.5-2	calc,qz	15
57.3	63.4	1-3 cm	0.5-2	qz*,calc,sph,gal,py	10,50,80
63.4	67.4	3-20 cm	0.5-1	qz*,calc	5,40
67.4	72.5	1-2 /cm	0.5-2	calc	5,20,60,80
72.5			3 cm vein	calc	33
72.5	74.8	5 cm	0.5-3	calc*,qz	20,45,80
74.8	80.5	1-3 /cm	0.5-4	calc,qz,py, black mineral	5,25,80
80.5	84.6	1-3 cm	0.5-3	calc*,qz	10,20,80
83.8			2 cm vein	qz, calc	15
82.3			3 cm vein	qz,calc,py	35
84.6	86.7	1-2 /cm	0.5-4	calc*,qz	30,40
86.7			2 cm vein	qz,calc	20
86.7	88.7	5-20 cm	0.5-1	calc,qz	20,80
88.7	89.1	1 cm	0.5-3	calc	15,25
89.1	89.6	10-20 cm	0.5	calc	15,20
89.6	93.0	1-3 cm	0.5-2	calc	15,20
93.0	93.3	10-20 cm	0.5	calc*,qz,py	10
93.6	94.5	2-5 cm	0.5-2	qz*,calc	5,25
94.5	97.5	1-2 /cm	0.5-3	calc*,qz	5,30,50
94.8			1 cm vein	calc,qz	20
97.5	98.7	20 cm	0.5	calc,qz	4
98.7	101.2	1 /cm	0.5-2	calc	15,50
101.2	104.2	1-5 cm	0.5-2	calc*,qz	15,30
101.8			1 cm vein	qz,calc	5
104.2	104.5	3 cm	0.5-1	calc	
104.5	108.8	2-10 cm	0.5-1	calc	5,20
108.8	109.7	primary ? (sedimentary) breccia zone with: 5-10 cm	0.5-1	calc,qz	15,30
109.3			1 cm vein	qz*,calc	15

Veins, stockworks, breccia filling

From	To	Spacing	Width (mm)	Mineral Filling	Angle (°)
109.7m	110.3m	3-10 cm	0.5-1	calc	40
110.3	110.6	1-3 cm	0.5-1	calc,qz,waxy grain mineral	5,40
110.6	112.9	2-4 cm	0.5-2	calc	10,30,70
112.9	113.6	1 cm	0.5-2	qz*,calc	10,30,70
113.6	116.7	5-20 cm	0.5-2	qz*,calc	30,75
115.1			1 cm vein	py	75
116.7	118.9	1-4 /cm	0.5-5	calc*,qz	15,35,70
118.9	120.4	2-5 cm	0.5-2	calc*,qz	15,35,70
120.4	122.7	1-2 /cm	0.5-3	calc,qz,py	5,45
112.7	122.9	2-4 /cm	0.5-3	calc*,qz	30
122.9	127.7	10-20 cm	0.5-1	calc,qz	5,30
127.7	134.7	1 /cm	0.5-2	qz*,calc	5,25,35,55
134.7	140.2	breccia zone, gouge		calc	
140.2	149.0	1-2 /cm	0.5-2	calc	15,20,70
149.0	150.8	1-3 cm	0.5-2	calc,qz*	20,35,50

Fractures

From	To	Spacing (cm)	Angle
19.7m	21.9m	1-5	25,60*
21.9	25.9	10	70
25.9	33.2	15-30	10,25,55
33.2	34.7	1-10	10,80*
34.7	52.6	10-25	70
52.6	53.0	1-5	5,80*
53.0	53.8	5-15	25,60
53.8	55.3	clay, graphitic, pyritic gouge	
55.3	57.4	10-20	65,80
57.4	58.7	1-5 & pebbles	5,45,80
58.7	63.4	5-7	50,70
63.4	68.3	1-5	5,40,70
68.3	71.3	7-20	55
71.3	75.0	5-15	40
75.0	75.3	clay, graphitic, pyritic, gouge	30
75.3	78.2	10	10,40,65
78.2	80.1	1-5	35,75
80.1	80.2	crumbly - clay, graphite,py	

Fractures

From	To	Spacing	Angle
80.2m	84.7m	1-5	5,35*,75*
84.7	90.5	10-15	30,50
90.5	98.4	5-10	0,75
98.4	99.1	1-5	5,25
99.1	99.7	5	65
99.7	100	0.5-3	50
100.0	100.9	1-5	55
100.9	103.0	5-15	10,65
103.0	105.8	5	5,35
105.8	110.0	10-20	5,25
110.0	116.4	7-15	5,30
116.4	121.0	1-5	5,35,45
121.0	122.8	5-15	5,35
122.8	126.5	1-5	0,5,25
126.5	128.9	5-20	10,40,80
128.9	131.7	1-5	25,80
131.7	137.2	0.5-1 & pebbles	
139.9	150.9	5-15	5,40,60

Acid Test

From	To		
19.7m	27.4m	moderate	interstitial and veinlets
27.4	33.5	strong	interstitial
33.5	38.1	moderate	interstitial
38.1	51.8	strong	interstitial
51.8	56.4	v. strong	interstitial
56.4	57.8	strong	interstitial
57.8	67.0	weak frs	
67.0	71.6	strong	interstitial
71.6	74.7	weak frs	
74.7	86.9	strong	interstitial
86.9	95.1	moderate	interstitial
95.1	101.2	weak	frs
101.2	101.8	strong	
101.8	103.0	weak	frs

Acid Test

From	To		
103.0m	105.5m	moderate	frs
105.5	107.1	weak	frs
107.1	108.8	v. strong	none in shales
108.8	123.3	usually v. strong in white matrix of fragmental rock none in dark grey zones of qzte.	
123.3	131.7	weak	frs
131.7	131.8	v. strong	
131.8	138.4	moderate	interstitial
138.4	150.6	strong	interstitial in shear ?
150.6	150.9	moderate	interstitial

Core Recovery

From	To	%
18.3m	21.3m	55
21.3	24.4	95
24.4	33.5	100
33.5	36.6	95
36.6	45.7	100
45.7	48.8	95
48.8	54.9	100
54.9	57.9	95
57.9	128.0	100
128.0	131.0	60
131.0	134.1	55
134.1	137.2	45
137.2	140.2	60
140.2	143.3	95
143.3	146.3	20
146.3	149.3	20
149.3	150.9	100

NORTH 19 + 90
West 4 + 75
~~EAST~~
ELEV. 1077 metres
BEARING Vertical
DIP -90° @ collar

STARTED 5, Sept 1980
COMPLETED 17, Sept 1980
LENGTH 40.2 metres (132 feet)

FALCONBRIDGE
DIAMOND DRILL RECORD

PROPERTY ALBERT CREEK
D. J. Drilling, 17A Drill, B.Q. core

PURPOSE Geologic data, EM-16 conductor, soil sample anomaly.
LOGGED BY J. Wilson

HOLE No. A 3 & A 4
CLAIM Zap 1
SECTION
OFFSET
PLOTTED

FOOTAGE	DESCRIPTION	SAMPLE	FOOTAGE	C.u	Pb	Zn	Ag	Ba
0 - 21.3 m	N casing to 24 m. B casing to 36.6 m							
21.3 - 40.2	Black Graphitic, sheared shale. Probably near vertical							
	fault. Pyrite throughout as 0.5% (?) diss. v.f.g. One							
	3 cm. breccia fragment seen near top of hole with 50%							
	pyrite in dark f.g. mass. Very angular clasts to 2 cm.							
	are fine laminated mudstone. Black laminae alternating							
	with light grey. Stockwork veinlets across fragments,							
	not matrix.							
	No veining.							
	Fractures, Structures.							
21.3 - 22.9	1 cm., gravel/chips		21.3 - 24.4	26	14	90	0.2	920
22.9 - 23.5	1-3 cm @ 5°, 45°							
23.5 - 24.4	3 mm. to 1 cm. flakes, occasional 3 cm. block.							
24.4 - 27.4	2 cm. pebbles.		24.4 - 30.5	38	16	143	0.2	1160
27.4 - 29.6	3 mm. to 1 cm. flakes							
29.6 - 34.7	0.5 to 1 cm. chips @ 5° to 20°		30.5 - 36.6	38	16	173	0.3	1350
34.7 - 40.2	5 to 20 cm. segments, some chips @ 5° to20°		36.6 - 40.2	39	18	187	0.2	1190
End of Hole	Dark to medium grey breccia fragments in black matrix throughout hole.							
	HCL test							
	Strong to moderate reaction throughout Interstitial							
	and in veinlets.							

-27-

V-11.

HOLE No. A3/A4

FNM 15 TMP

FOOTAGE	DESCRIPTION	SAMPLE	FOOTAGE	C.L.				
	Core Recovery							
21.34 - 24.4	40%							
24.4 - 27.4	15%							
27.4 - 30.5	15%							
30.5 - 33.5	45%							
33.5 - 36.6	90%							
36.6 - 39.6	40%							
39.6 - 40.2	25%							

SLUDGE SAMPLED

Footage (m)	Pb	Zn	Ag	Ba
30.5	20	220	0.2	1490
36.6	23	260	0.3	1740
40.2	16	136	0.2	1180

SHEET No. 2

HOLE No. A 3 & 4

NORTH 20 +80
EAST 2 + 00
ELEV. 1077 metres
BEARING Vertical
DIP -90° @ collar, 87° @ 148 M

STARTED 16, Sept 1980
COMPLETED 22, Sept 1980
LENGTH 148.4 m. (487 feet)

FALCONBRIDGE
DIAMOND DRILL RECORD

PROPERTY ALBERT CREEK

D.J. Drilling 17A Drill, B.Q. core

PURPOSE Geologic data, EM-16 conductor, soil sample anomaly
LOGGED BY J. Wilson

HOLE No. A 5
CLAIM Zap 1
SECTION
OFFSET
PLOTTED

FOOTAGE	DESCRIPTION	SAMPLE	FOOTAGE	C.U.	Pb	Zn	Ag	Ba
0 - 30.5	Casing							
30.5 - 45.7	Very soft, crumbly black shale to 38.7 and broken chips of black argillite to 45.7.		30.5 - 32.0		16	230	1.4	1280
			33.5 - 35.0		22	1400	3.4	1830
45.7 - 48.8	Mod. to v. Hard black, fragmented argillite. Rounded clasts (0.5 to 1 cm. dia). Clast supported. 20% v.v.fg diss. py. in clasts. Matrix is black with diss py. occ. 5mm. py bleb. and py. on edges of calc veins. 45.8: brucite crystals in vertical vein (?) Total py = 5% (?) Graphite on frs.		45.7 - 47.2	52	14	43	2.3	1210
48.8 - 53.9	As above but angular brecciated fragments to 3 cm. diameter. Gradation of roundness indicates possible vent/collapse type structure.		48.8 - 50.3	46	12	110	1.4	800
			51.8 - 53.3	71	10	124	3.0	1210
	51.8, 49.4 m. 25° banding (bed?) 50.6 m. grey specks gal.? graph.? 50.3 - 53.9 - strong black material and diss & bleb py. + 10%							
53.9 - 81.4	As above but usually massive.		54.9 - 56.4		16	570	0.9	1020
→	Higher py (10-15%) diss., layers & veins in black argillite.		57.9 - 59.4	66	14	630	1.0	1100
	57.9: 1mm. 60° py.layer		60.9 - 62.5		14	144	0.2	1250
	59.4: 1mm. 40° py. layer 60.6: 5mm. 55° py layer		64.0 - 65.5		14	138	1.0	1150
	66.4: 3mm. 40° py layer		70.1 - 71.6		8	174	4.2	940
			73.1 - 74.7		6	166	2.8	780
			76.2 - 77.7		6	110	0.8	1270

FNM 15 TMP

FOOTAGE	DESCRIPTION	SAMPLE	FOOTAGE	C.U.	Pb	Zn	Ag	Ba
81.4 - 91.1	As above but 1% (?) v.v.f.g. diss. py.		79.2 - 80.8		17	126	1.0	1810
91.1 - 114.6	As above but py as bands, veins, blebs, diss., and		82.3 - 83.8		8	210	2.1	770
	irregular patches total 5-10%							
	92.3: 1-2 mm. 50° py. layers and calc. veinlet		85.2 - 86.9	30	15	420	1.8	1110
	w. specks of grey mineral (galena ?)							
	107.6 - 107.9: 1-3 cm. irregular massive py. patch		88.4 - 89.9	40	25	350	2.4	920
	111.9: 3 mm. 35° py. band.							
	112.2 - 113.1: 1 mm. calc. vein with occ. grey specks.		91.4 - 93.0	33	22	320	1.6	720
	114.0: 1 cm. 30° py layer and grey specks in 1 mm.							
	calc vein.		94.5 - 96.0	32	9	230	2.4	740
114.6 - 130.1	As above (massive black, moderate to hard argillite).		97.5 - 99.1	44	10	310	4.0	840
	Trace to 1% diss. vfg py. graphite on fractures and							
	some strongly graphitic zones (116.1 - 116.7, 121.0 -		100.6 - 102.1		10	260	5.7	620
	121.3, 122.2 - 122.5)		103.6 - 105.2		30	1300	7.0	1100 -30-
130.1 - 134.1	As above but 3% py. (vfg. diss, veins, 5 mm. blebs).		115.8 - 117.3	43	8	340	3.8	720
134.1 - 136.5	As above but stockworks prominent. Trace diss. py.		118.9 - 120.4		6	250	3.4	570
136.5 - 146.3	Upper contact is 5 mm. py. layer @ 40°.		121.9 - 123.4		10	370	6.0	710
	Rock is as above but trace to 1% total py. as patches							
	of 5% (?) diss. vfg py., blebs, layers		125.0 - 126.5		7	320	3.5	720
	142.3: 1 cm. py layer @ 55°.		128.0 - 129.5		25	1200	5.6	1120
146.3 - 148.4	As above but trace py.		131.1 - 132.6		26	370	0.3	810
End of hole.			134.1 - 135.6		8	80	0.2	490
	Veins, stockworks, breccia fillings		137.2 - 138.7		48	5500	4.2	910
			138.7 - 140.2	97	70	5800	4.0	800
30.5 - 148.4	All calcite filling except at 96.8 & 146.0 : 2-3 mm. calcite		140.2 - 141.7 and qtz.		44	5000	4.4	740
30.5 - 45.7	Broken rock.		143.3 - 144.8		22	3200	2.4	760
			146.3 - 147.8		12	290	0.2	1040

HOLE No. A 5

FNM 15 TMP

FOOTAGE	DESCRIPTION	SAMPLE
45.7 - 54.5	Brecciated with 1 mm. stock works 1 to 5 /cm spacing	
	(1 cm vein 45.9 m. 45°)	
	(5 mm vein 47.8 m. 5°)	
	(1 cm vein 50.3 m. 10°)	
54.5 - 70.1	5 - 10 cm spaced 1 - 2 mm vein @ 45°, 55°	
70.1 - 80.5	Breccia zone and 1/cm veins @ 60°	
80-5 - 82.0	5 - 10 cm. spaced 1 mm. @ 50°	
82.0 - 89.6	2 - 5 /cm spaced stockworks	
	85.3 - 89.6: very broken	
89.6 - 106.7	2 / cm spaced stockworks 0.5 - 1 mm.	
106.7 - 112.6	2 - 5 /cm spaced stockworks 0.5 - 1 mm.	
	occasional 3 mm. vein @ 15°, 60°.	
112.6 - 122.5	1 - 3/cm spaced stockworks 0.5 - 1 mm.	
122.5 - 133.8	1 / cm spaced stockworks 0.5 - 2 mm.	
	(123.4 1 cm 25° vein)	
	(132.6 4 mm 20° vein)	
133.8 - 133.9	3 mm irregular calcite veins.	
133.9 - 136.2	1 - 5/cm spaced stockworks and breccia filling 0.5 0	2 mm.
	134.2 2 cm qz, calc, breccia filling @ 55°, 80°.	
136.2 - 137.0	1 / cm spaced 1 mm @ 25°.	
137.0 - 146.3	2 - 3 / cm spaced 0.5 - 1 mm stockworks.	
146.3 - 148.1	Stockworks and breccia filling 0.5 - 3 mm.	
148.1 - 148.4	1 - 2 cm spacing @ 20°, 70°.	

SLUDGE SAMPLES

Footage (m)	Cu	Pb	Zn	Ag	Ba
21.3		10	600	0.4	2040
44.8		12	510	1-2	1480
82.3		20	690	15.	1270
85.3		18	890	4.2	1060
88.4		16	480	2-5	1240
91.4		24	940	6.6	1070
94.5		20	570	5.8	1150

SHEET No. 3

HOLE No. A5

Fractures

From	To	Fracture spacing (cm.)	Angle (°)
30.5	45.7	1-5	
45.7	47.2	5-10	45,55
47.2	54.2	10-30	0,45*,15
54.2	56.4	2-5	35,55
56.4	59.1	5-10	0,55,70
59.1	60.0	1-5	55,70
60.0	60.6	10	20,70
60.6	61.6	1	0,70
61.6	62.5	5-10	25,55
62.5	65.2	1-5	5,30
65.2	84.1	5-15	30,65*
84.1	88.1	1-3	irregular
88.1	91.4	0.5*-5	crumbly*,5,30
91.4	95.7	1*-5	0,80
95.7	98.4	2-10*	5,30
98.4	99.1	1-5	0,80
99.1	105.5	5-15	5,60*
105.5	106.7	2-5	15
106.7	110.9	10-20	15,30
110.9	111.5	1-5	5
111.5	114.6	5-15	5,20
114.6	117.3	1-5	5,30
117.3	127.8	2-10	25,50
127.8	133.8	3-5	25
133.8	138.4	10-15	30,45,60
138.4	139.3	1-5	45,60
139.3	139.9	10-20	25
139.9	141.1	1-3	45,60
141.1	142.3	10.15	25
142.3	143.3	5-10	5,30
143.3	145.4	1-5	0,45
145.4	148.1	10-15	60
148.1	148.4	1-5	25

HCL Test

30.5 - 65.2	strong	interstitial
65.2 - 133.2	none	
133.2 - 136.2	strong	interstitial
136.2 - 146.6	none	
146.6 - 148.2	strong	

Core Recovery (%)

From	To	%
30.5	33.5	30
33.5	36.6	16
36.6	42.7	2
42.7	45.7	10
45.7	54.9	100
54.9	57.9	80
57.9	61.0	100
61.0	64.0	80
64.1	67.1	45
67.1	70.1	50
70.1	73.1	60
73.1	76.2	40
76.2	79.2	100
79.2	82.3	100
82.3	85.3	60
85.3	88.4	30
88.4	94.5	75
94.5	97.5	80
97.5	100.6	75
100.6	115.8	100
115.8	121.9	95
121.9	125.0	55
125.0	131.1	65
131.1	134.1	90
134.1	137.2	100
137.2	140.2	80
140.2	143.2	90
143.2	146.3	70
146.3	148.4	90

APPENDIX II

Thornhill Mineralogical Report (JO#2754)

by R. Buchan

Albert Creek Project

A. Drill core A2, 197.0' - 197.2'

A description of PTS 5893, cut from the mineralized drill core, is given on the following page. The host rock is an equigranular, fine grained quartzite. It is cut by veinlets of carbonate-sphalerite accompanied by lesser pyrite, arsenopyrite, chalcopyrite and galena.

B. "Gunnar's sphalerite"

The brown mineral in a carbonate matrix now consists entirely of goethite with traces of hematite. However, relict textures in the polished section (PS7202) and the presence of zinc (Table I, sample B), strongly indicate that the goethite has completely replaced sphalerite.

C. Overburden cuttings, hold A2 (10', 50' and 100' depth).

At first examination, there appeared to be no obvious heavy minerals in the three samples of drill cuttings. The samples from 10' and 50' were both treated by heavy liquid separation (S.G. - 2.9), giving sink fractions of about 20% the original volume. Both heavy fractions appeared similar and a portion of the sample from 10' was crushed and X-rayed. It consists of feldspar, clinopyroxene, amphibole and possibly epidote with no indications of any common heavy minerals.

The sample from A2 at 100' was also X-rayed. It consists of quartz, mica, chlorite, feldspar and possibly calcite and dolomite. Again there are no indications of a heavy mineral constituent. The presence of barium in the qualitative spectrographic analysis, Table I, might indicate the presence of minor amounts of barite.

In summary, no abnormal amounts of heavy minerals were detected in any of the samples which would account for the difficulty in raising the cuttings during drilling.

R Buchan

RB:sls
Attach.

B. Buchan

FALCONBRIDGE METALLURGICAL LABORATORIES

QUALITATIVE SPECTROGRAPHIC ANALYSIS

DISTRIBUTION: _____ REPORT No. _____

ANALYTICAL METHOD: _____

REQUESTED BY: _____ DATE: _____

RECEIVED FROM: _____ CHARGE: JO#2754

SAMPLE No.: 80-705 No. of SAMPLES: 1

SAMPLE DESCRIPTION: Mineralized Sediment

DRILL CORE (DDH #A2)

A2, 197.0' - 197.2'

10 – 100%	Si
3 – 30%	Zn
1 – 10%	Fe
0.3 – 3%	Mg, Ca
0.1 – 1%	
0.03 – 0.3%	Al, Ni, Cu, Ti
0.01 – 0.1%	Mn, Cr, Co
0.003 – 0.03%	Pb
0.001 – 0.01%	
0.0003 – 0.003%	
0.0001 – 0.001%	Ag
< 0.0003%	
I	K, Sr, Cd, Zr
S	

I = Interference prevents positive identification.

S = Strong spectral lines, unable to estimate amount.

Unless specified above, the following were not detected at the approx. ppm lower limits of 0.5 Cu, Ag; 1 Mn; 5 Mg, Cr; 10 Ba, Be, Bi, Ca, Co, Ni, V; 25 Ge, Fe, Pb, Mo, Si, Sr, Sn, Ti, Zr, Tl, Pd; 50 Al, Sb, B, Cd, Ga, In, Li, Zn; 100 As, Au, Na; 200 Rh, Re, Ir, Pt, Ru, Sc; 300 Te, Os; 1000 K, U, Th; 2000 P.

FML-1017

Analyst _____

FALCONBRIDGE METALLURGICAL LABORATORIES

QUALITATIVE SPECTROGRAPHIC ANALYSIS

DISTRIBUTION: _____ REPORT No. _____

ANALYTICAL METHOD: _____

REQUESTED BY: _____ DATE: _____

RECEIVED FROM: _____ CHARGE: 83-302

SAMPLE No.: 80-705 No. of SAMPLES: 3

SAMPLE DESCRIPTION: Rock Samples

Cuttings from DDH A2

	A2 cuttings at 100'	"B"	"SC-1"
		Scraping of sphal? in calcite	Black S after Py(?)
10 – 100%	Si		
3 – 30%	Fe, Ca, Al	Fe	Fe
1 – 10%			Si
0.3 – 3%	Mg, Ti, Na	Si	
0.1 – 1%		Mg, Ca	Mg, Al
0.03 – 0.3%		Zn	
0.01 – 0.1%	Mn, Ni, V, Ba	Al, Pb	Ni, Cu, Ti
0.003 – 0.03%	Cr	Ni	Ca, Co
0.001 – 0.01%	Cu, Zn	Mn, Cu, Au	Mn
0.0003 – 0.003%	Pb, Co, Mo		Mo
0.0001 – 0.001%		V, Mo	V
< 0.0003%		Ag	Ag
I	B, K, Sr, Be, Zr	K, Sr, Zr	K, Sr, Zr
S			

I = Interference prevents positive identification.

S = Strong spectral lines, unable to estimate amount.

Unless specified above, the following were not detected at the approx. ppm lower limits of 0.5 Cu,Ag; 1 Mn; 5 Mg, Cr; 10 Ba, Be, Bi, Ca, Co, Ni, V; 25 Ge, Fe, Pb, Mo, Si, Sr, Sn, Ti, Zr, Tl, Pd; 50 Al, Sb, B, Cd, Ga, In, Li, Zn; 100 As, Au, Na; 200 Rh, Re, Ir, Pt, Ru, Sc; 300 Te, Os; 1000 K, U, Th; 2000 P.

FML-1017

Analyst _____

Location: Albert Creek Project, B.C. Lab. No. 80-705

DRILL CORE (DDH A2)

Sample Description: DDH A2, 197' - 197.2' PTS No. 5893

MINERALS	Est. % by Vol.	Grain Size Max.	(m.m.) Avg.
Quartz	86	-	0.12
Tourmaline	Tr	-	0.08
Zircon	Tr	-	0.05
Carbonate	5	-	0.25
Sphalerite	5	-	0.25
Galena	<1	-	0.02
Chalcopyrite	1	-	<0.01
Arsenopyrite	Tr	-	0.08
Pyrite	<1	-	0.12
Pyrrhotite	Tr	-	0.01

DESCRIPTION

The host rock consists of equigranular partly rounded quartz with scattered grains of tourmaline and zircon. It is transected by trains of minute gas and/or fluid inclusions and with occasional sulphide-carbonate veins. Sulphides consist mainly of dark brown sphalerite containing abundant micro-inclusions of exsolved chalcopyrite, pyrrhotite and galena. Subhedral arsenopyrite and pyrite occur as blocky grains associated with the sphalerite veinlets.

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Geochemical Lab Report

FROM: Falconbridge Nickel Mines REPORT NUMBER: 21 - 85

PROJECT: 079 WILSON Albert Creek DATE: February 2, 1981

SAMPLE NUMBERS from (metres)	to	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Mo ppm (core)
21.3	70 22.9	10	6	16	0.2	90
24.4	80 25.9	7	8	12	0.2	40
27.4	90 28.9	6	8	16	0.2	140
30.5	100 32.0	8	8	10	0.2	80
33.5	110 35.0	10	20	20	0.2	40
36.6	120 38.1	6	6	8	0.2	40
39.6	130 41.1	6	6	8	0.2	20
42.7	140 44.2	6	10	8	0.2	40
45.7	150 47.2	6	7	6	0.2	40
48.8	160 50.3	6	6	8	0.2	20
51.8	170 53.3	8	10	15	0.2	50
54.9	180 55.3	33	24	36	0.9	740
57.9	190 59.4	3	22	128	0.4	30
60.9	200 61.9	1	2	5	0.2	100
61.9	203 64.0	4	22	24	0.2	50
64.0	210 65.5	2	20	28	0.2	220
67.1	220 67.5	3	10	21	0.2	60
67.5	221 68.6	8	16	14	0.2	50
70.1	230 71.6	6	4	7	0.2	20
73.1	240 73.8	3	14	4	0.2	340
73.8	242 74.7	15	26	10	0.3	1090
76.2	250 77.7	7	10	20	0.2	30
79.2	260 80.8	6	6	8	0.2	30
82.3	270 82.9	25	12	24	0.2	70
82.9	272 83.8	35	14	17	0.2	260
85.3	280 86.6	18	6	11	0.2	390
88.4	290 88.7	13	17	12	0.2	790
88.7	291 89.9	9	14	25	0.2	380
~~91.4~~ 91.4	300 93.0	9	6	11	0.2	310
97.5	320 99.1	10	12	11	0.2	560
100.6	330 102.1	10	26	28	0.2	170
103.6	340 103.9	110	28	31	1.3	300
103.9	341 105.2	23	20	72	0.2	140
106.7	350 107.2	12	15	10	0.3	310
110.5	362 111.2	10	4	16	0.2	360
112.8	370 113.8	28	30	530	0.2	360
115.8	380 117.3	14	16	94	0.2	190
118.9	390 120.2	6	12	20	0.5	620
121.9	400 123.4	7	13	16	0.2	80
125.3	411 126.5	11	66	167	0.8	750

FOR METHOD, EXTRACTION AND FRACTION USED – SEE ATTACHED

BONDAR-CLEGG & COMPANY LTD.

Geochemical Lab Report

REPORT NUMBER: 21 - 85 PAGE: 2

core

SAMPLE NUMBERS from	to	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ba ppm
128.0	129.5	4	12	530	0.4	360
131.1	132.6	6	19	36	0.2	430
134.1	135.6	6	16	18	0.2	50
137.2	138.7	13	42	1400	0.2	700
140.2	141.7	11	9	11	0.2	80
143.3	144.8	9	20	26	0.2	140
146.3	147.8	9	12	8	0.2	60
149.3	150.9	3	6	22	0.2	150
21.3	24.4	26	14	98	0.2	920
24.4	30.5	38	16	143	0.2	1160
30.5	36 6	36	16	178	0.3	1350
36.6	40.2	39	18	187	0.2	1190
30.5	32.0	-	16	250	1.4	1230
33.5	35.0	-	22	1400	3.4	1830
45.7	47.2	52	14	43	2.3	1210
48.8	50.3	48	12	110	1.4	800
51.8	53.3	71	18	124	3.0	1210
54.9	56.4	-	16	570	0.9	1020
57.9	59.4	66	14	630	1.0	1100
60.9	62.5	-	-14	144	0.2	1250
64.0	65.5	-	-14	138	1.0	1150
[illegible]	71.6	-	-8	174	4.2	940
73.1	74.7	-	-6	166	2.8	790
76.2	77.7	-	-6	110	0.8	1270
79.2	80.8	-	-17	126	1.0	1810
82.3	83.8	-	-8	210	2.1	770
85.3	86.9	30	15	420	1.8	1110
88.4	89.9	48	25	350	2.4	920
91.4	93.0	33	22	320	1.6	720
94.5	96.0	32	9	230	2.4	740
97.5	99.1	44	10	310	4.0	840
100.6	102.1	-	-10	260	5.7	620
103.6	105.2	-	-30	1300	7.0	1100
115.8	117.3	43	8	340	3.8	720
118.9	120.4	-	-6	250	3.4	570
121.9	123.4	-	-10	370	6.0	710
125.0	126.5	-	-7	320	3.5	720
128.0	129.5	-	-25	1200	5.6	1120
131.1	132.6	-	-26	370	0.5	810
134.1	135.6	-	-8	0	0.2	490
137.2	138.7	-	-48	3500	4.2	910
135.7	455	97	70	3100	4.0	800
140	460 141.7	-	-44	3000	4.4	740
143.3	470 144.8	-	-22	3200	2.5	760
146.3	480 147.8	-	-12	290	0.2	1040

Geochemical Lab Report

REPORT NUMBER: 21 - 33 Sludge

PAGE: 3

Fe-Ax method

SAMPLE NUMBERS	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ba ppm
30.5 A3 100	-	20	220	0.2	1490
36.6 A4 120	-	23	260	0.3	1740
40.2 132	-	16	136	0.2	1150
21.3 A5 70	-	10	600	0.4	2020
44.8 147	-	12	510	1.2	1480
82.3 270	-	28	690	15.	1270
85.3 250	-	18	890	4.2	1060
88.4 290	-	16	480	2.5	1240
91.4 300	-	24	940	6.6	1070
94.5 310	-	20	570	5.8	1150

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Geochemical Lab Report

FROM: Falconbridge Nickel Mines REPORT NUMBER: 21 - 209

PROJECT: 079 DATE: February 20, 1981

SAMPLE NUMBERS	Pb ppm	Ba ppm							
2 - 70	-	90							
80	-	40							
90	-	140							
100	-	80							
110	-	40							
120	-	40							
130	-	20							
140	-	40							
150	-	40							
160	-	20							
170	-	50							
180	-	740							
190	-	30							
200	-	100							
203	-	50							
210	-	220							
220	-	60							
221	-	60							
230	-	20							
240	-	340							
242	-	1090							
250	-	80							
260	-	30							
270	-	70							
272	-	260							
280	-	390							
290	-	780							
291	-	480							
300	-	310							
340	-	300							
341	-	140							
350	-	810							
362	-	360							
370	-	360							
380	-	190							
390	-	620							
400	-	80							
411	-	750							
420	-	360							
430	-	430							

FOR METHOD, EXTRACTION AND FRACTION USED – SEE ATTACHED

BONDAR-CLEGG & COMPANY LTD.

Geochemical Lab Report

REPORT NUMBER: 21 - 209

SAMPLE NUMBERS	Pb ppm	Ba ppm
2 - 440	-	50
450	-	700
460	-	80
470	-	140
480	-	60
490	-	150
4 - 70	-	920
80	-	1160
100	-	1350
120	-	1190
5 - 100	16	1280
110	22	1830
150	-	1210
160	-	800
170	-	1210
180	16	1020
190	-	1100
200	14	1250
210	14	1150
230	8	940
240	6	780
250	6	1270
260	17	1810
270	3	770
280	-	1110
290	-	920
300	-	720
310	-	740
320	-	840
330	10	620
340	30	1100
380	-	720
390	5	570
400	10	710
410	7	720
420	25	1120
430	26	810
440	8	490
450	48	910
455	-	800
460	44	740
470	42	760
480	12	1040
A3 - 100	-	1490
A4 - 120	-	1740

BONDAR-CLEGG & COMPANY LTD.

Geochemical Lab Report

REPORT NUMBER: 21 - 209

SAMPLE NUMBERS	Pb ppm	Ba ppm
A4 - 132	-	1180
A5 - 70	-	2040
147	-	1480
270	-	1270
280	-	1060
290	-	1240
300	-	1070
310	-	1150

NOTE: 5-330 to 5-480 contain Sb