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CAVENDISH TOWNSHIP GEOPHYSICAL TEST RANGE: 1973 DIAMOND DRILLING

D.A. WILLIAMS
W.J. SCOTT
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Figure 1. Geology, Cavendish Township geophysical test range	in pocket
2. Interpreted cross-sections, Cavendish Township geophysical test range	in pocket

ABSTRACT

During the winter of 1972-73, thirty-three holes averaging 100 feet in length were drilled on the geophysical test range in Cavendish Township, Ontario. The bedrock consists of Grenville mafic gneiss, crystalline limestone and granitic gneiss. Two zones of pyrite-pyrrhotite concentration are found within the gneisses. Each zone is characterized by an outer region containing approximately 2% sulphides, and an inner region with concentrations of up to 10% sulphides. The two zones appear to dip towards each other. Although traces of sphalerite and chalcopyrite were observed, no base metal concentration in excess of 600 parts per million was found.

RESUME

Au cours de l'hiver 1972-73, 33 forages de 100 pieds en moyenne ont été exécutés sur le terrain d'essais géophysiques du township de Cavendish en Ontario. La roche en place est constituée de gneiss ferromagnésien de Grenville, de calcaire cristallin et de gneiss granitique. Les gneiss renferment deux zones de pyrite-pyrrhotine. Chacune est caractérisée par une zone enveloppante contenant environ 2% de sulfures et une zone intérieure à concentration de sulfures jusqu'à 10%. Ces deux zones semblent descendre l'une vers l'autre. Bien que l'on ait observé des traces de sphalérite et de chalcopyrite, la concentration de métaux communs n'excède pas 600 parties par million.

INTRODUCTION

During the period from February to May 1973 a program of shallow diamond drilling was undertaken at the Cavendish Township geophysical test range. The purpose of the program was to obtain some geological control to aid in the evaluation of geophysical results obtained at the range.

The test range is located in Cavendish Township, on the south side of the Salmon Lake Road, 1.3 miles west of Highway 507 and 6.5 miles south of Gooderham. It was used in 1967 as the site of the field seminar held by the Geological Survey of Canada in conjunction with the Centennial Conference on Mining and Groundwater Geophysics.

Of the 33 holes drilled during the program, 4 were vertical and the remainder plunged to the west at approximately 45°. The average length of the holes was 100 feet.

The grid established by the Geological Survey in 1967 was used for location. Four holes were drilled on Line 4S (Line B), eighteen on Line 8S (Line C) and eleven on Line 12S (Line D). In general the holes were drilled at intervals of 100 feet, although in some places intermediate holes were drilled to provide additional information. Table I summarizes the locations and attitudes of the holes.

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The drilling was carried out with two Winkie drills manufactured by J. K. Smit and Sons Ltd. EX drill rods were used with IEX bits and core barrels to obtain core with a diameter of one inch. After being logged on the site, the core was transported to Ottawa for storage. The appendix contains the logs of all the holes.

Acknowledgments

Since the test range lies on private property, permission to carry out the work was obtained from the various owners prior to commencement. The co-operation of the following proprietors is gratefully acknowledged:

Mrs. Helen Harling, Maidstone, Ontario
Mrs. Daisy E. Bunn, Willowdale, Ontario
Mr. L. W. Cheevers, Richmond Hill, Ontario
Mr. Richard F. Coble, Fairfax Station,
Virginia, U.S.A.
Mr. Ronald Moir, Peterborough, Ontario
Mr. C. J. Stoughton, Gooderham, Ontario

In 1967 the test range was mapped by L. J. Kornik of the Geological Survey. Mr. Kornik set at the disposal of the authors his original samples and notes, which were used in conjunction with the drilling results and some further mapping to prepare this report.

The drilling program was funded under the Federal Winter Works program for the winter of 1972-73.

The field geologist from the beginning of the project was K.O. Stangl, who handed over to D.A. Williams at the end of April. The drill foreman were initially Mr. Alfred Beaudry, and later Mr. Henry Brazeau.

TABLE I

1. LINE 4 S (LINE B)		
Sta	Plunge	Total Length (ft)
6 + 10W	45°W	30
6 + 20W	45°W	113
7 + 10W	45°W	130
13 + 60W	45°W	94

3. LINE 12 S (LINE D)		
Sta	Plunge	Total Length (ft)
8 + 00W	45°W	119
9 + 00W	45°W	123
10 + 00W	45°W	122
11 + 00W	45°W	103
12 + 00W	53°W	112
13 + 00W	45°W	101
14 + 00W	45°W	99
15 + 00W	45°W	95
16 + 00W	45°W	98
16 + 80W	45°W	94
17 + 50W	45°W	99

2. LINE 8 S (LINE C)		
Sta	Plunge	Total Length (ft)
0 + 00W	Vertical	101
3 + 00W	"	97
4 + 00W	"	98
5 + 00W	"	94
6 + 00W	55°W	98
7 + 00W	45°W	97
8 + 00W	45°W	98
9 + 00W	45°W	102
9 + 40W	45°W	102
10 + 00W	45°W	99
11 + 00W	45°W	99
12 + 00W	45°W	97
13 + 00W	45°W	84
14 + 00W	50°W	100
15 + 00W	45°W	99
15 + 55W	45°W	64
15 + 80W	48°W	114
16 + 50W	45°W	70

GEOLOGY OF THE CAVENDISH TEST RANGE

General geology

Figure 1 is a geological map of the test grid area, compiled on the basis of the drilling and surface mapping. The bedrock consists of Grenville mafic gneiss, crystalline limestone, and granitic gneiss. Foliation is well developed, and dips steeply east. Two types of mafic gneiss can be distinguished; hornblende gneiss (with minor biotite) and biotite gneiss (with minor or no hornblende). The granitic gneiss is characterized by alternating mafic (hornblende-biotite) and felsic layers, a fraction of an inch to several inches thick, and by feldspar augens.

Mineralized alteration zones

The entire grid area forms part of a calcite-quartz-calc-silicate (diopside-garnet)-sulphide (pyrrhotite-pyrite) alteration zone. Pyrrhotite is associated mainly with calcite, and pyrite with quartz. Sulphide content is generally approximately 0.1%. There are two areas of sulphide concentration, Zone A (in the western part of the grid area) and Zone B (in the central part); both are characterized by an outer zone containing approximately 2% sulphide, and a central zone containing up to 10% sulphide. Figure 2 shows the drilling results in section. The sulphide distribution is best documented on lines 8S and 12S, where drilling was concentrated; the distribution on the other lines is based on surface mapping, extrapolation, and the limited amount of drilling on line 4S.

The sulphide minerals occur as disseminations and as stringers parallel to the foliation. Although the sulphide zones strike generally parallel to the foliation, the discordant nature of the mineralization is evident

from local crosscutting of lithologies and distortion of the foliation attitude. Zone A dips to the east, but Zone B apparently dips west. Structural control of emplacement is suggested by the occurrence of slicken-sided graphite within and adjacent to the sulphide zones in drillholes at 8S, 9 + 40W; 8S, 15 + 55W; and 12S, 16W.

Zone A

On line 4S, the drillhole at 13 + 60W intersected a 4-foot section containing 2% pyrite in stringers parallel to the foliation. Pyrrhotite stringers were noted in an outcrop of biotite gneiss along the east bank of St. Croix Creek, at approximately 14 + 20W.

On line 8S, a 10-foot section of pyrrhotite-pyrite stringers in garnetiferous biotite gneiss, averaging about 10% sulphide was intersected in drillholes at 15 + 55W and 15 + 80W. The enveloping zone containing 2% sulphide is about 80 feet thick.

On line 12S, a 43-foot section containing 2% sulphide was intersected in the drillhole at 16W.

Zone B

On line 4S, the drillhole at 6 + 20W intersected 57 feet containing about 1% pyrrhotite; silicified layers up to 1 foot thick were noted. The drillhole at 7 + 10W intersected four sections (23, 5, 4 and 8 feet thick) of silicified hornblende gneiss containing 5% pyrite; the overall sulphide content of the entire zone is approximately 2%.

On line 8S, the drillhole at 8W intersected 30 feet of mineralization similar to that in the hole at 4S, 6 + 20W. The drillhole at 9W intersected 68 feet containing about 2% sulphide; close to the middle of the section, two intersections of 4 inches and $\frac{1}{4}$ inch of pyrrhotite-

pyrite-calcite separated by about 3 feet were observed to contain about 80% sulphide. A westward dip of the zone is indicated by the lack of significant mineralization in the drillhole at 9 + 40W.

On line 12S, the drillhole at 8W intersected 90 feet containing 2% pyrrhotite, and the drillhole at 9W intersected 57 feet containing 1% pyrrhotite. The drillhole at 10W cut 68 feet containing about 2% pyrrhotite, with a 2-foot section in the central part of the zone averaging about 10% pyrrhotite-pyrite.

Economic geology

Nine samples with high sulphide content were analyzed for Zn, Cu, Pb and Ni. The highest values obtained were 170 ppm Zn, 600 ppm Cu, 17 ppm Pb and 230 ppm Ni. Since none of these values was over a greater thickness than a few feet, it is highly unlikely that the test-range sulphides offer any economic possibilities.

APPENDIX

LOCATION 4S, 6 + 10W
 INCLINATION 45°W
 TOTAL DEPTH 30'

ROCK TYPE			FOLIATION			ALTERATION AND MINERALIZATION		
from	to	observations	core angle	approximate attitude		from	to	observations
0	3.5	Overburden	3.5	45°	030°/85°E	3.5	30	Calcite replacement, with diopside alteration. ~3% disseminated pyrrhotite. Deformation of foliation is concentrated in sections showing least alteration.
3.5	30	Biotite (-hornblende) gneiss						5. 5-7, 7. 5-8. 5: very little alteration. Few thin calcite-pyrrhotite veinlets. 19. 5-28: very little alteration. Veinlets of calcite-pyrrhotite and quartz-pyrite up to 2" thick.

LOCATION 4S, 6 + 20W
 INCLINATION 45°W
 TOTAL DEPTH 113'

ROCK TYPE			FOLIATION			ALTERATION AND MINERALIZATION		
from	to	observations	core angle	approximate attitude		from	to	observations
0	14	Overburden	14	35°	040°/90°	14	71.5	Calcite replacement, with diopside alteration. ~1% pyrrhotite (disseminated and stringers). Deformation of foliation is concentrated in sections showing least alteration.
14	77.5	Biotite (hornblende) gneiss	35	39	20° 070°/90°			14-19: very little alteration. Few thin calcite-pyrrhotite veinlets.
77.5	112	Hornblende-biotite gneiss	39	52	35° 040°/90°			35-39: very little alteration. Veinlets up to 1" thick of calcite pyrrhotite, with diopside along contacts.
112	113	Lost core	56	65	60° 030°/70°E			41. 5-42. 5: brecciation and calcite-pyrrhotite veinlets up to $\frac{1}{2}$ " thick.
			65	76	40° 035°/85°E			44-44. 5: silicified, with 0. 2% disseminated chalcopyrite.
			76	84	60° 030°/70°E			45-45. 5, 47. 5-48, 48. 5-49: very little alteration.
			84	112	40° 035°/85°E			57. 5, 58. 5-59, 62-63, 64. 5, 65. 6: silicified in layers ≥ 2 " thick.
						71. 5	112	Partial calcite replacement, with diopside alteration. ~ 0. 5% pyrrhotite (disseminated and stringers). Foliation well defined.
								93. 5: silicified in layer 3" thick.

LOCATION 4S, 7 + 10W
 INCLINATION 45° W
 TOTAL DEPTH 130'

ROCK TYPE			FOLIATION			ALTERATION AND MINERALIZATION		
from	to	observations	from	to	core angle	from	to	observations
0	$\frac{9}{9}$	Overburden	9	$\frac{45}{45}$	035°/85°E			Slight calcite replacement.
9	117. 5	Hornblende-biotite gneiss	45	$\frac{47}{25}$	060°/90°	9-34:	~ 5% pyrite disseminated and stringers parallel to foliation.	
			47	$\frac{130}{40}$	035°/85°E	19-21:	very little alteration.	
117. 5	130	Biotite-hornblende gneiss				23-26:	very little alteration.	
			26:	pyrrhotite veinlet $\frac{1}{4}"$ thick.				

- 45-49. 5: silicified, ~ 5% pyrite (disseminated and stringers parallel to foliation).
59. 5-62: silicified, ~ 5% pyrite (disseminated and stringers parallel to foliation).
78. 3: lens of garnet-quartz-calcite-pyrrhotite.
- 92-95, 96-100: silicified, ~ 5% pyrite (disseminated and stringers).

ROCK TYPE			FOLIATION			ALTERATION AND MINERALIZATION		
from	to	observations	from	to	core angle	from	to	observations
0	$\frac{12}{12}$	Overburden	12	$\frac{94}{94}$	020°/70°E			Discontinuous calcite replacement parallel to foliation.
12	94	Biotite gneiss				Diopsidite alteration.		

- 14-16. 5: very little alteration.
- 29-33: ~ 2% pyrite (stringers parallel to foliation).
- 39: minor pyrite in stringers parallel to foliation.
61. 8: concordant quartz veinlet $\frac{1}{2}"$ thick. Chlorite along contact.
71. 5: Silicified, with minor pyrite.
87. 2-88. 2: ~ 1% pyrite, associated with feldspar porphyroblasts. Minor garnet.

	LOCATION	INCLINATION	TOTAL DEPTH (feet)	ROCK TYPE		ALTERATION AND MINERALIZATION	
				from 4	to 101	observations Crystalline limestone.	from 4
8 S, 0 W	90°	101				Micaceous (phlogopite biotite) layers with minor folds.	to 101
							Mineralized sulphide. Diopsidic common.
							42: 1" calcite vein with disseminated chalcopyrite, bornite and galena.
							51: < 1% tourmaline (black, striated).
							69: quartz veinlets with diopsidic along contacts.
8 S, 3 W	90°	97	12	72	Crystalline limestone. Micaceous layers.	12	97
							Mineralized alteration zone. Minor sulphide. Diopsidic common.
				72	80	Biotite gneiss.	
				80	97	Crystalline limestone. Micaceous layers.	
8 S, 4 W	90°	98	5.5	88	Biotite gneiss.	5.5	98
				88	98	Crystalline limestone.	
							Mineralized alteration zone. Minor sulphide. Veinlets of calcite-pyrite-pyrrhotite common. Diopsidic common, particularly along veinlet contact.
							11: minor chalcopyrite-bornite in calcite veinlets.
							18: minor garnet in veinlets.
							51: minor chalcopyrite.
							58: ½" calcite veinlet.
8 S, 5 W	90°	94	5.5	94	Crystalline limestone. Micaceous layers.	5.5	94
							Mineralized alteration zone. Minor sulphide. Diopsidic common. Veinlets of calcite-pyrite-pyrrhotite.
							20: ¼" pyrrhotite stringer.
							61: 1" calcite quartz diopsidic minor sulphide veinlet.
							66-78: silicified. (67: ½" calcite pyrite veinlet)
							82: ½" quartz-diopsidic veinlet.
8 S, 6 W	55°W	98	9	98	Crystalline limestone. Micaceous layers.	9	98
							Mineralized alteration zone. Minor sulphide. Diopsidic common.
				22	72	Crystalline limestone. Micaceous layers.	22
8 S, 7 W	45°W	97	72	97	Biotite (-hornblende) gneiss.	97	
							28: garniferous.
							Mineralized alteration zone. Minor sulphide. Diopsidic common. Calcite veinlets.
							31: garniferous.
							91-97: calcite replacement. Diopsidic alteration.

LOCATION	INCLINATION	TOTAL DEPTH (feet)	ROCK TYPE	ALTERATION AND MINERALIZATION	
				from 4	to 98 observations Calcite replacement zone. Minor sulphide. Diopside common. Calcite veinlets.
8 S, 8 W	45° W	98	Hornblende-biotite gneiss.		
		50	Hornblende-biotite gneiss.		
		4	Hornblende-biotite gneiss.	22, 5: $\frac{1}{4}$ " quartz veinlet. (21-41: silicified. (47-51: silicified with 3% disseminated pyrite-pyrrhotite. 75: < 1% tourmaline.	27
8 S, 9 W	45° W	102	Biotite-hornblende gneiss.	4	Mineralized alteration zone. Minor sulphide. Calcite veinlets with diopside along veinlet contacts.
		42	Biotite-hornblende gneiss.	12: sillimanite needles. 17: minor chalcopyrite. 25: $\frac{1}{4}$ " pyrrhotite in calcite veinlet.	
		27		27	Mineralized alteration zone ~2% sulphide. Diopside common.
		35-42:	garnetiferous. (40-42: 5% sulphide)	95	
		55-58:	quartz veinlets.		
		67:	4" pyrrhotite-pyrite-calcite.		
		70:	$\frac{1}{4}$ " pyrrhotite.		
		71:	garnetiferous.		
		74:	calcite veinlets.		
		84:	pyrite veinlet.		
		85:	1" calcite-pyrrhotite-pyrite veinlet, with diopside along contacts.		
		95	Mineralized alteration zone. Minor sulphide. Calcite veinlets with diopside along contacts.	102	
		100-102:	garnetiferous.		

LOCATION 8S, 9 + 40W
 INCLINATION 45° W
 TOTAL DEPTH: 102'

ROCK TYPE

FOLIATION

ALTERATION AND MINERALIZATION

from	to	observations	core	approximate
0	5	Overburden.	5	45° / 85° E
5	102	Biotite-horn-blende gneiss.	20	48 55° / 75° E
		40-41: fractured and slickensided.	48	56 30° / 90°
			56	62. 5 40° / 85° E
			62. 5	102 55° / 75° E

from	to	angle	from	to	angle	observations
5	20	45°	5	102	45°	Discontinuous calcite replacement parallel to foliation. Diopside alteration. ~ 0. 2% pyrrhotite (disseminated and stringers), associated mainly with calcite replacement. Garnetiferous @ 5-9, 17-18, 27-27. 3, 30-31, 44-44. 5, 52-54. 5, 61. 5-62.
						14. 5: $\frac{1}{2}$ " concordant quartz-pyrrhotite veinlet.
						19. 5: $\frac{1}{4}$ " concordant quartz-pyrrhotite veinlet.
						27. 3-28. 5: unaltered-dark, massive.
						46. 5: $\frac{1}{4}$ " concordant quartz-pyrrhotite veinlet
						56: 2" discordant quartz veinlet; disseminated clusters of dark mineral.
						59. 5: 1" quartz veinlet.
						66. 7-67: quartz-pyrite stringers.
						84. 5-85: foliation deformed. Concordant quartz-pyrrhotite stringers fraction of an inch thick.
						86. 5-88. 5, 94. 7-95. 1: concordant quartz-pyrrhotite-pyrite veinlets up to $\frac{1}{2}$ " thick.

LOCATION	INCLINATION	TOTAL DEPTH (feet)	ROCK TYPE	ALTERATION AND MINERALIZATION							
				from 15.5	to 61	observations	from 15.5	to 99	observations		
8 S, 10 W	45°W	99	Biotite-hornblende gneiss. 59: minor folding.						Mineralized alteration zone. Minor sulphide. Diopside common. Calcite veinlets.		
				61	99	Biotite gneiss.			24: quartz-pyrrhotite lenses.		
									41-44: pyrrhotite stringers.		
									68-88: quartz-diopside-sulphide lenses; foliation contorted.		
8 S, 11 W	45°W	99		8	99	Hornblende-biotite gneiss.	8	99	Mineralized alteration zone. Minor sulphide. Calcite veinlets.		
									8-62: garnet-diopside-pyrrhotite aggregates.		
8 S, 12 W	45°W	97		4.5	75	Hornblende-biotite gneiss.	4.5	97	Mineralized alteration zone. Minor sulphide. Calcite veinlets.		
									87-84: garnetiferous.		
8 S, 13 W	45°W	84		75	97	Biotite-hornblende gneiss.	8	84	Mineralized alteration zone. Minor sulphide. Calcite veinlets. Diopside common.		
									67-84: garnetiferous.		
8 S, 14 W	50°W	100		13	75	Hornblende-biotite gneiss.	13	100	Mineralized alteration zone. Minor sulphide. Veinlets of calcite-pyrite-pyrrhotite, with diopside along contacts.		
					75	Biotite gneiss.			13-75: garnet in veinlets and micaceous layers.		
8 S, 15 W	45°W	99		4	99	Biotite gneiss	4	44	Mineralized alteration zone. Minor sulphide. Calcite veinlets. Diopside common. Quartz lenses.		
									44	99	Mineralized alteration zone. ~ 2% sulphide.
									Quartz-garnet pyrrhotite lenses.		
									72-91: pink calcite replacement.		

LOCATION	INCLINATION	TOTAL DEPTH (feet)	ROCK TYPE				ALTERATION AND MINERALIZATION		
			from	to	observations	from	to	observations	
8 S, 15 + 55W	45°W	64			Biotite gneiss.	9.5	64		
									9. 5-19: pink calcite replacement. 28-36: garnetiferous. 49-54: garnetiferous.
									Mineralized alteration zone. ~10% sulphide. Garnetiferous sulphides (pyrrhotite-pyrite) occur in stringers.
									54. 5 minor chalcopyrite. 58: slickensided graphite. 64: minor chalcopyrite.
									Mineralized alteration zone. ~2% sulphide. Quartz-calcite-pyrrhotite-diopside lenses.
									23: minor sillimanite.
									Mineralized alteration zone. ~10% sulphide. Garnetiferous.
									Mineralized alteration zone. ~2% sulphide. Sulphides occur in stringers. Chlorite alteration. Calcite replacement.
									62. 114 Mineralized alteration zone: minor sulphide, minor calcite replacement. 111: garnetiferous.
									Mineralized alteration zone: minor sulphide, minor calcite replacement.
									38: calcite veinlets.
8 S, 16 + 50W	45°W	70	6. 5	32	Biotite-hornblende gneiss.		6. 5	70	
									51. 5 Granitic gneiss. Feldspar augens, compositional layering.
									51. 5 70 Biotite-hornblende gneiss.

LOCATION 12 S, 8 W
 INCLINATION 45° W
 TOTAL DEPTH 119'

ROCK TYPE			FOLIATION						ALTERATION AND MINERALIZATION		
from	to	observations	from	to	core angle	approximate attitude	from	to	from	to	observations
0	12	Overburden.	12	44. 5	40°	035°/85°E	12	102	12	102	Calcite replacement, with diopside alteration. ~2% pyrrhotite (disseminated and stringers).
12	82. 5	Biotite (horn-blende) gneiss.	44. 5	47	20°	070°/90°					14-15. 5: very little alteration.
82. 5	119	Hornblende-biotite gneiss.	47	50	40°	035°/85°E					20. 5: quartz veinlet 0. 1" thick.
			50	55	20°	070°/90°					51-52: very little alteration.
			55	76	30°	050°/90°					53. 5: discordant calcite-pyrrhotite veinlet 1" thick.
			76	119	45°	030°/85°E					83. 5-87. 5: very little alteration; mottled texture. 86. 5: small blebs of pyrite.
							102	119			89. 7: $\frac{1}{2}$ " pyrite parallel to layering. ~0. 1% disseminated pyrrhotite.
											Partial calcite replacement, with diopside alteration. ~0. 1% disseminated pyrrhotite.

LOCATION 12 S, 9 W
 INCLINATION 45° W
 TOTAL DEPTH 123'

ROCK TYPE			FOLIATION						ALTERATION AND MINERALIZATION		
from	to	observations	from	to	core angle	approximate attitude	from	to	from	to	observations
0	5	Overburden.	5	28	35°	040°/90°	5	24. 5	5	24. 5	Partial calcite replacement, with diopside alteration ~0. 1% disseminated pyrrhotite.
5	123	Hornblende-biotite gneiss.	28	90	45°	030°/85°E					17, 18, 20, 24: silicified in layers $\geq 1"$ thick.
			90	97	60°	030°/70°E					Calcite replacement, with diopside alteration. ~1% disseminated pyrrhotite.
			97	123	45°	030°/85°E					48-49: quartz-calcite-pyrite stringers up to $\frac{1}{2}"$ thick. 74-51: Calcite-tourmaline veinlet.
							82	95			Discontinuous calcite replacement, with diopside alteration. Very little alteration in layers up to 6" thick. ~0. 1% disseminated pyrrhotite.
							95	123			Partial calcite replacement with diopside alteration. ~0. 1% disseminated pyrrhotite.
											113. 5 quartz vein 2" thick.

LOCATION	INCLINATION	TOTAL DEPTH (feet)	ROCK TYPE		ALTERATION AND MINERALIZATION	
			from 0	to 7	from 7	to 49
12 S, 10 W	45°W	122		Overburden.		Mineralized alteration zone. ~2% sulphide. Stringers and disseminations of calcite-pyrrhotite. Diopside common. 42: Quartz veining and silicification with pyrite.
			7	65	Biotite-hornblende gneiss.	
		65	122		Biotite gneiss.	
						Mineralized alteration zone (pyrrhotite-pyrite-calcite-quartz). ~10% sulphide. Sulphides occur as stringers.
						Mineralized alteration zone. ~2% sulphide. 54-65: garnetiferous.
						Mineralized alteration zone. Minor sulphide. 75
						103-116: small masses of calcite-quartz-sulphide-garnet.
						11
12 S, 11 W	45°W	103	11	54	Biotite gneiss.	102
			54	103	Hornblende-biotite gneiss.	
						6.5
						112
						6.5
						112
						Mineralized alteration zone. Minor sulphide. Diopside common. 43-112: garnetiferous.
						15
						101
						15
						101
						Mineralized alteration zone. Minor sulphide. 98: calcite veinlets with pyrite-pyrrhotite-minor chalcopyrite.
						16.5
						99
						16.5
						99
						24
						99
						Hornblende-biotite gneiss.
						10
						47
						47
						95
						Biotite gneiss.
						10
						95
						Mineralized alteration zone. Minor sulphide. 43: garnetiferous. 5% sulphide (disseminated and stringers), 77: sillimanite needles. 83: garnetiferous.
						12
						39
						82
						82
						Mineralized alteration zone. ~2% sulphide 72: slickensided graphite (minor chalcopyrite) on fault surface.
						82
						98
						Mineralized alteration zone. Minor sulphide.

LOCATION 12 S, 16 + 80 W
 INCLINATION 45°W
 TOTAL DEPTH 94'

		ROCK TYPE	FOLIATION			ALTERATION AND MINERALIZATION		
from	to		observations	core	approximate	from	to	observations
0	11	Overburden.		61. 5	70°	11	94	Partial calcite replacement. ~0.1% pyrrhotite (disseminated and stringers).
11	27	Biotite gneiss.		61. 5	94	015°/65°E		
27	61. 5	Granite gneiss. Alternating mafic and felsic layers, fraction of an inch to several inches thick. Feldspar augens.		61. 5	50°	030° / 80° E		
61. 5	94	Biotite-hornblende gneiss. 64. 5-65: granitic gneiss. 72. 5-73: granitic gneiss.				11		

21-21.5: calcite replacement, with diopside alteration.
 38: thin concordant lenses of quartz in discordant
 calcite veinlet 1" thick.
 77-94: irregular silicification; foliation indistinct.
 89: $\frac{1}{4}$ " massive pyrrhotite.

LOCATION 12 S, 1°7' + 50 W
 INCLINATION 45° W
 TOTAL DEPTH 99'

		ROCK TYPE		FOLIATION				ALTERATION AND MINERALIZATION	
from	to	from	to	core	angle	approximate		from	to
0	8	8	21	24. 5	30°	030°/85°E		8	99
		Overburden.							
8	31. 5	Biotite-hornblende gneiss.	21	24. 5	30°	050°/90°			
31. 5	49	Granitic gneiss. Alternating mafic and felsic layers a fraction of an inch to 1 ft. thick. Feldspar augers.	24. 5	33	45°	030°/85°E			
			33	61. 5	70°	015°/65°E			
			61. 5	82	50°	030°/80°E			
			82	84	40°	035°/85°E			
			84	99	55°	030°/75°E			
49	85	Biotite-hornblende gneiss. Granitic gneiss @ 54-55. 5, 58, 59. 5-60, 72, 75-77, 82-83.							
			Granitic gneiss. Alternating mafic and felsic (colourless to pink) layers, a fraction of an inch to several inches thick. Feldspar augers.						
85	99								

observations
 0: 030°/85°E
 8: 050°/90°
 21: 045°
 24. 5: 030°/85°E
 33: 015°/65°E
 61. 5: 030°/80°E
 82: 035°/85°E
 84: 030°/75°E
 99: 030°/85°E
observations
 8-31: irregular silification.
 29, 5-31: silified; ~1% pyrite concentrated along fractures. 51-52. 5: very little alteration. 53: concordant calcite-pyrrhotite 2" thick.
 60-61. 5 very little alteration.

