ASSESSMENT REPORT OF PHANTOM CLAIMS GROUP

FOR MINISTRY OF MINES AND PETROLEUM RESOURCES

VANCOUVER MINING DISTRICT

M 92G/14W

FOR CLOWHOM MINING AND EXPLORATION LTD.

BY D.M. O'NEILL B.Sc. (Geol.)

JUNE 3, 1988

TABLE OF CONTENTS

1.0 SUMMARY AND CONCLUSIONS

The author was retained by Sid C. Johnson of Clowhom Mining and Exploration Limited to log the 1987 program drill core and write a report to fulfill assessment work obligations. This report is based on examination of the drill core, petrographic and SEM analyses, previous reports, and all other information available on the property. No visit to the property was made by the author.

The Phantom Claims Group is located approximately 30 kilometers northwest of Squamish, in the Vancouver Mining District. Access is afforded by helicopter or float-equipped plane.

Exploration on the propery, in the form of prospecting and two previous small drill programs, has been concentrated along the inferred fault zones followed by the Clowhom River and the unnamed creek. These zones were also the target of the 1110 foot 1987 diamond drill program.

The property is underlain by quartz diorite of the Coast Mountain intrusive complex and by metasedimantary and metavolcanic rocks. Petrographic analysis of 4 samples submitted from the 1987 drill core identified the rocks as spotted andalusite-biotite hornfels, pyrrhotite-biotite hornfels (probably of volcanic origin) and hornfelsed amygdaloidal andesite. Indications of platinum group minerals, ultramafic rocks or chromite are not obvious, if present, in these rocks. Observations within this study do not show significant hydrothermal activity. Very small amounts of rare-earth bearing phosphate was discovered by SEM analysis of the sample taken at 440ft in DDH #2.

No significant values of gold, platinum or palladium were recovered in core samples from the 1987 or 1986 drill program which were submitted to certified laboratories. Gold anomalies were intersected in the 1982 drilling program with values of 0.018 oz/ton and 0.011 oz/ton over five foot sections.

2.0 INTRODUCTION

The Phantom Mineral Claims Group is located approximately 30 kilometers from Squamish, B.C., in the Vancouver Mining District. The claims are owned by Clowhom Mining and Exploration Limited. No visit was made to the property by the author. This report is based on examination of the 1987 drill core, petrographic - SEM analyses, reports on the two previous drill programs, and relevant data available on the property area.

The 1987 diamond drilling program consisted of a total of 1110 feet of NQ core from two holes located on Phantom #2. The core was logged and sampled. Three samples were analyzed for gold, platinum and palladium. Results returned low gold values. Four samples were submitted for petrographic analysis. The dominant rock types intersected are hornfelsed sedimentary rocks, one of which appears to be volcanic in origin.

3.0 LOCATION AND ACCESS

The Phantom Mineral Claims Group is located near Phantom Lake and Clowhom River, in the Vancouver Mining District. The nearest major town is Squamish, B.C., which is located 30.4 kilometers to the southeast of the claims. Access to the property is by helicopter or float plane (Figs. 3-1).

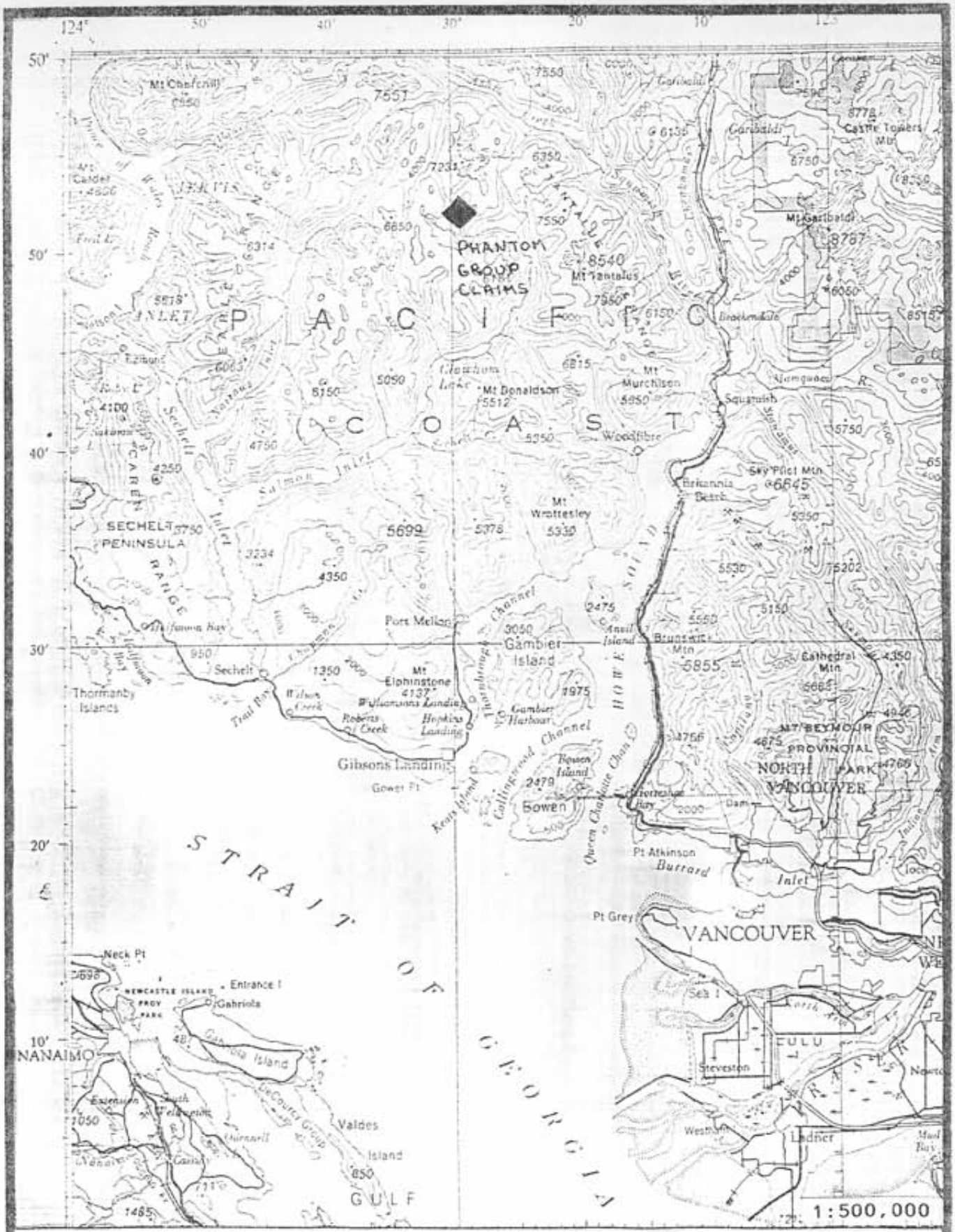
The property is on steep mountainous terrain typical of the coastal mountains.

Latitude: 49 51.5'

Longitude: 123 29.5'

Elevation: 3200 - 5000 ft. (920 - 1440 m)

N.T.S. 92G/14W



LOCATION MAP FIG.3-1

From: ENERGY, MINES AND RESOURCES 92 SE

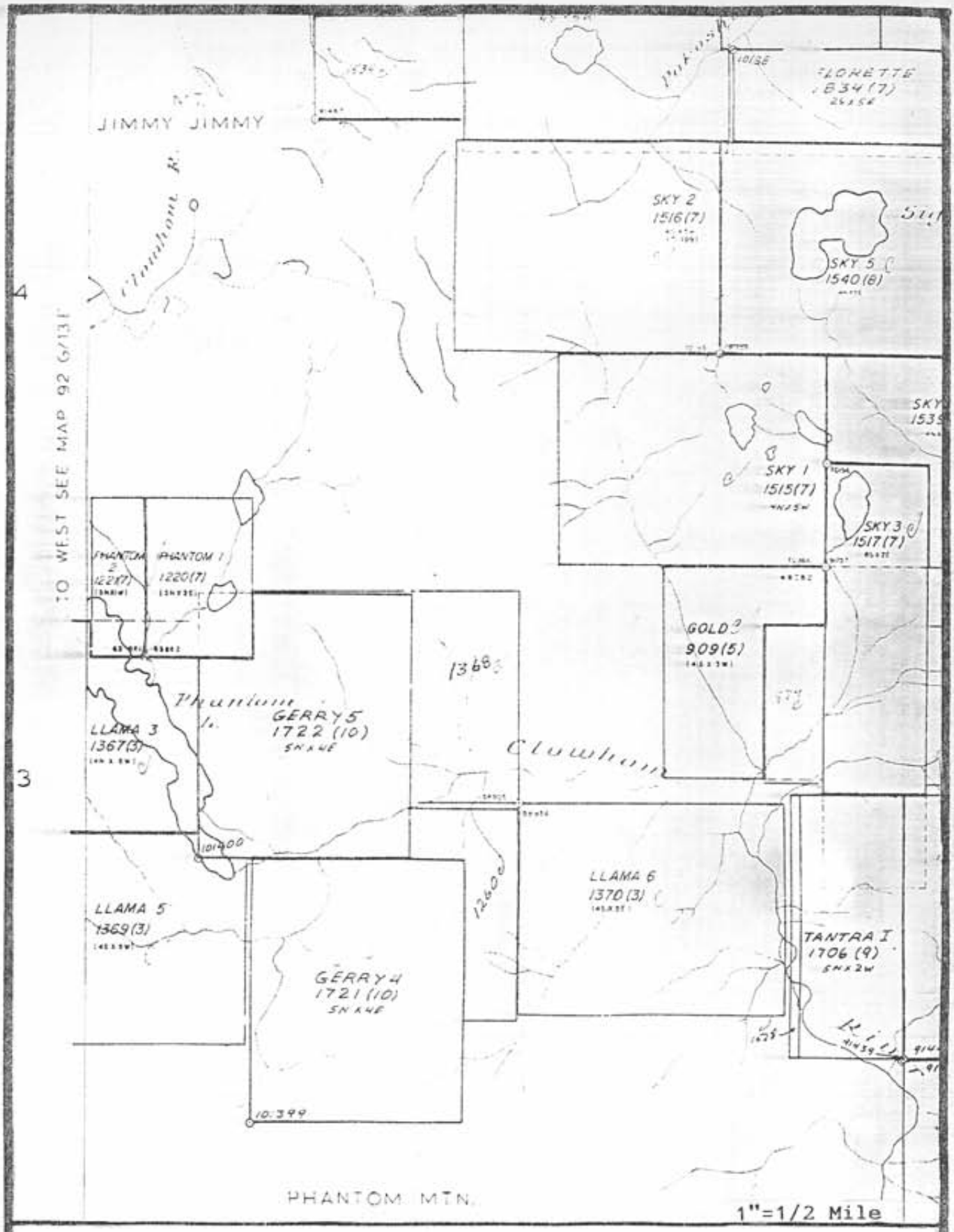
Clowhom Mining and Exploration Limited. March 20, 1988

4.0 CLAIM INFORMATION

The Phantom Mineral Claims Group covers nine units. The claims are currently owned and operated by the Clowhom Mining and Exploration Limited. Figure 4-1.

CLAIM INFORMATION

NAME	RECORD NUMBER	EXPIRY DATE
Phantom 1	1220	July 2, 1989
Phantom 2	1221	July 2, 1989



CLAIM MAP FIG. 4-1

MINISTRY CLAIMS INDEX MAP 92G/14W

Clowhom Mining and Exploration Limited. March 20, 1988

5.0 HISTORY AND PREVIOUS WORK

Prior to 1982 no history or work record is available for the Phantowm Mineral Claims area. Previous work on the property, with the Phantom Group as operator, consisted of preliminary prospecting of the two claim claims as well as the eastern shore of Phantom Lake and the drainages of the two creeks crossing the property from the northwest and northeast. The prospecting was followed by 45.4 meters of AX diamond drilling in two holes. These holes wee drilled, logged and sampled in October 1982. Assay values of 0.011 and 0.018 oz/ton Au were obtained from two 5 foot sample sections. Drill sites are located on Figure 7-1.

A second drill program was completed on the Phantom Mineral Claims Group in October of 1986, by the Phantom Group. Tkwo NQ diamond drill holes, with a total of 869 feet, were completed. The core was logged and sampled. Trace values of Au were obtained while Ag ranged invalue from 0.03 oz/ton to 0.09 oz/ton.

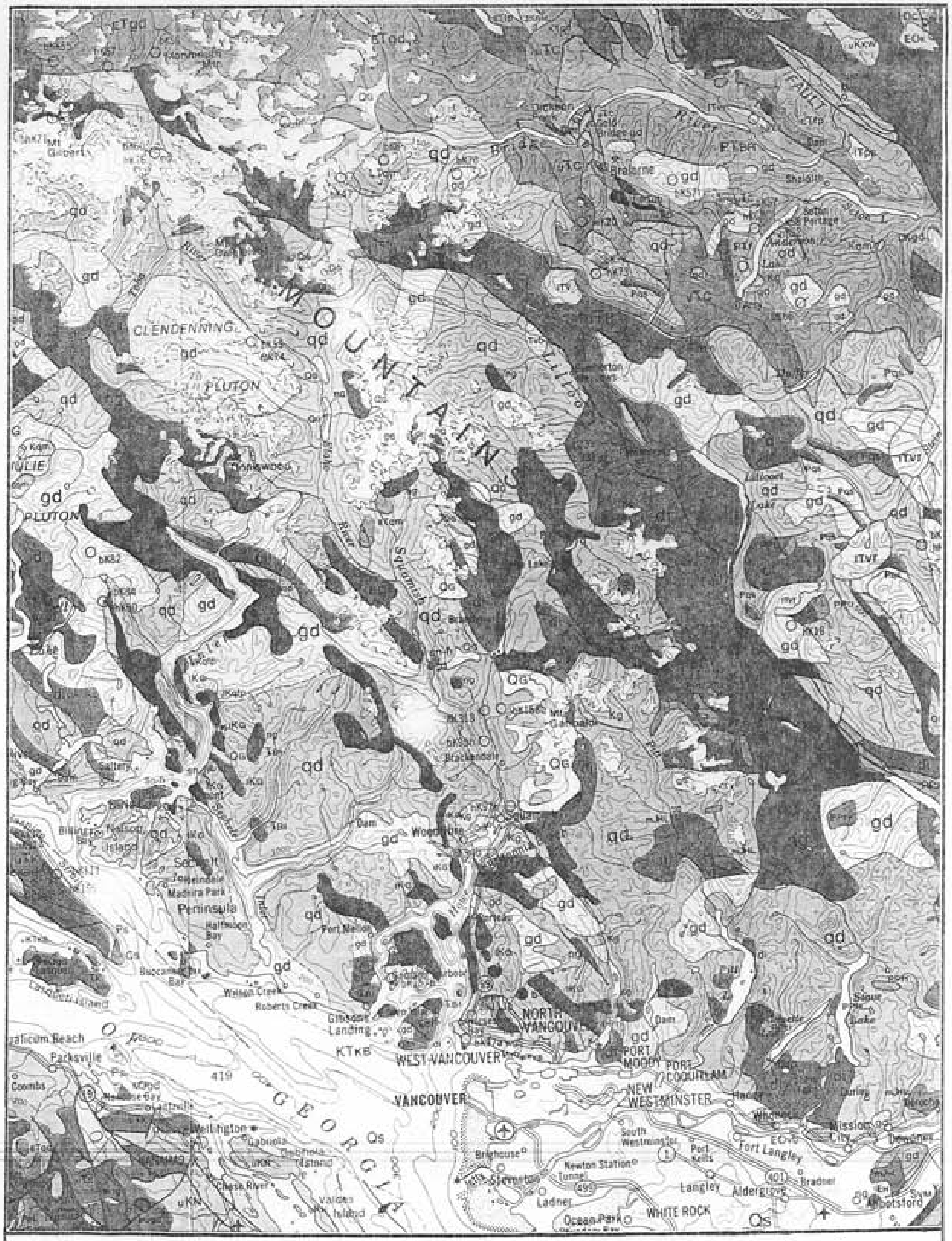
No geological mapping, geochemical or geophysical surveys have been carried out on the Phantom Mineral Claims Group.

6.0 REGIONAL GEOLOGY

The Phantom Mineral Claims Group lies in the western belt of the Coast Mountain Range, approximately 30 kilometers northwest of Squamish, British Columbia (Figure 6-1). The area is underlain by the Coast Plutonic Complex which consists mainly of quart diorite and granodiorite. Potassium - argon dating, of the plutonic rocks in the western belt, result in ages of Late Jurassic - Early Cretaceous for minimum final cooling (Roddick et al., 1979). The period of felsic pluton emplacement caused regional metamorphism, regional uplift and subsequent erosion.

The oldest non-granitoid rocks are considered to be Paleozoic in age and consist of amphibolite schist and quartzite. These rocks form screens that are oriented northwest and almost vertical.

Upper Triassic - Lower Cretaceous pendents are generally northwest in orientation and elongate. The rocks are sedimentary and volcanic in origin and have been subjected to moderate to intense deformation resulting in metamorphism ranging from sub-greenschist facies to amphibolite grade of the sillimanite facies.



REGIONAL GEOLOGY FIG. 6-1

From: Fraser River, Sheet 92, Map 1386A G.S.C.

Clowhom Mining and Exploration Limited. 1:1,000,000

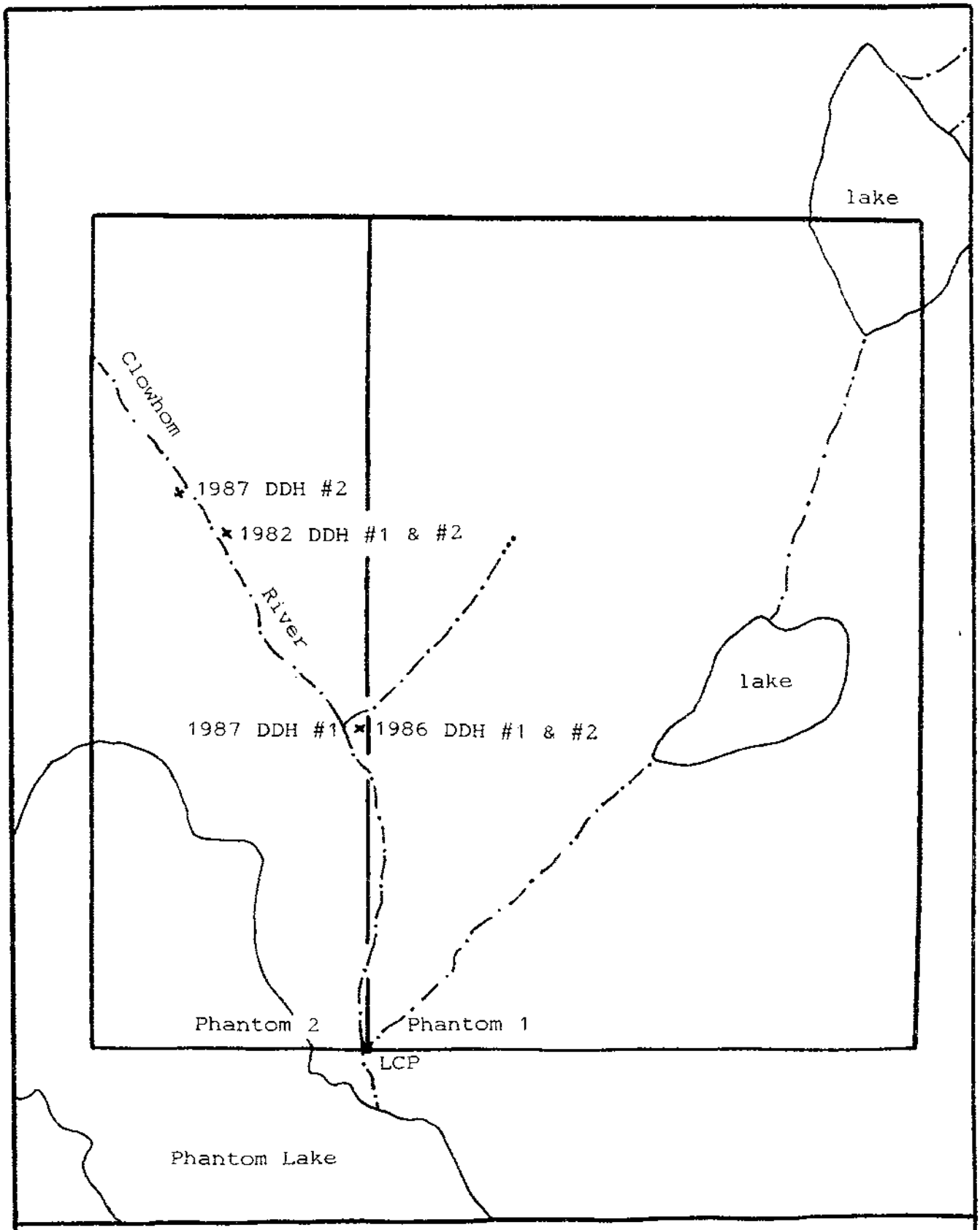
7.0 GEOLOGY AND DRILL PROGRAM

The area of the Phantom Mineral Claims Group has not been geologically mapped. The regional map shows the claim area underlain by quartz diorite of the Coast Plutonic Complex (qd) and rocks of the Lower Cretaceous Gambier Group (lKG) which consist of tuff, breccia and argillite (Figure 6-1).

A total of 1110 ft (338.3 meters) of NQ core diamond drilling was completed in two holes on Phantom #2 and concentrated on inferred fault zones followed by Clowhom River and the unnamed creek. The drill sites were chosen by S. Johnson. The relation of the drill collar locations to the claim boundaries, previous drill sites and surface features are shown in Figure 7-1.

Diamond drill hole #1 is located on the east bank at the confluence of Clowhom River and an unnamed creek. This was also the site of the two 1986 drill holes. DDH#1 has and inclination of -60° towards 216° and a length of 535 ft (163m). Drilling commenced on September 7, 1987 and was completed on September 28, 1987. Core recovery was very good averaging better than 95%.

The petrographic analysis of a sample taken at 407 feet of DDH#1 described the specimen as pyrrhotite-biotite hornfels. Texture indicates that this is sedimentary rock of volcanic derivation that has undergone contact metamorphism to as high as amphibolite grade, but has since retrograded to greenschist facies (C. Leitch, Appendix C). This specimen was chosen for its relatively will mineralized appearance. Section analyses shows that magnetic pyrrhotite (5%) is finely disseminated throughout with occasional trace chalcopyrite.



DRILL HOLE LOCATIONS FIG. 7-1

Vancouver Mining District 92G/14W Scale 1:10,000

Clowhom Mining and Exploration Limited. March 20, 1988

The remainder of the hole was similar in composition under the hand lens with some variations. These being areas of biotite enrichment and the presence of small garnets (max. 2mm) near the top of the hole. This would indicate the higher grade of metamorphism and not the same retrogradation. Pyrrhotite is not visible to the eye in most of the drill core. Chalcopyrite is present in very minor amounts on fracture surfaces and in thin quartz veinlets in the lower portion of the hole. Pyrite is generally present in minor amounts as disseminations or blebs on fracture surfaces and in tiny discontinuous stringers.

Diamond drill hole #2 is located on the west bank of Clowhom River, 510 meters upstream of the confluence and DDH#1. DDH#2 has and inclination of -60' towards 48'. Hole #2 has a length of 575 feet (175.3 m). Drilling commenced on October 15, 1987 and was completed on November 15, 1987. The rock is competent and core recovery was very good, averaging better than 95%.

Petrographic analysis of two samples, one sample from 164 feet and the other taken a 440 feet, shows the dominant rock type in hole #2 is a spotted andalusite-biotite hornfels. This hornfelsed sedimentary rock is weakly magnetic due to the presence of pyrrhotite in fine grains.

Analysis did not indicate that the rock has undergone significant hydrothermal activity. Platinum group minerals, or indications of ultramafic rocks or chromite are not obvious, if present, in these rocks. Very small amounts of rare-earth bearing phosphate was discovered by SEM analysis of the specimen taken at 440 ft (Appendix C).

At 561 feet the hornfelsed sedimentary rock is in contact with a hornfelsed amygdaloidal andesite. The hornfelsed sediment in DDH#1 (sample at 407 ft) could be derived from a precursor such as this hornfelsed andesite due to the form of the amphibole and to similarity of the plagioclase (C. Leitch).

Sulphides mineralization consists of pyrrhotite, pyrite and chalcopyrite. They are present in minor to moderalte amounts locally as fine grained disseminations and on fracture surfaces. Quartz-carbonate veinlets are infrequent and small (less than 1 cm).

The drill logs are included in this report as Appendix A and B. The location of the core is 24745 - 102nd Avenue, Whonnock, B.C.

8.0 COST BREAKDOWN

Work completed on Phantom Group Claims in 1987 consisted of two diamond drill holes with NQ size rod on Phantom Claim #2.

Drill Hole #1 total depth of 163 meters

Drill Hole #2 total depth of 175.2 meters

The following is a cost breakdown of all expenditures on the property:

Air Transportation	$ 13,021.45
Car and truck transportation	704.67
Drilling expenses; bits, rods, fuel, etc.	7,105.18
Drill repairs	986.39
Camp supplies and equipment	391.04
Food	824.54
Drill rental - 1,110 ft @ $6.00/ft	6,666.00
Core logging, assays, petrographic work, etc.	1,500.00
TOTAL	$ 31,119.27

LABOUR CONTRACTS

Jack Bickle	$ 360.00
Joe O'Neill	420.00
Norm Anderson	618.00
Gil Johnson	702.00
Joe Andrews	772.50
Ed Herman	2,272.50
Wayne Clark	3,880.00
Sid Johnson	8,475.00
TOTAL	$ 17,500.00

TOTAL COST FOR THE 1987 DRILL PROGRAM

Supplies, transportation and repairs	$ 31,119.27
Labour Contracts	17,500.00
TOTAL	$ 48,699.27

9.0 CERTIFICATE

I, D.M. O'Neill hereby certify:

1. I reside in the city of Vancouver, British Columbia.

2. I received a Bachelor of Science degree, major in geology ,from the University of British Columbia in 1983.

3. I have been practising my profession since 1980.

4. I have no interest, directly or indirectly, in Clowhom Mining and Exploration Limited, nor do I expect to receive any.

Signed this 3rd day of June, 1988

D. M. O'Neill

10.0 BIBLIOGRAPHY

Leitch, C., P.Eng; Petrogaphic-SEM Report on the Phantom Project, January 1988

O'Neill, D; Assessment Report of Phantom Claims Group 1987

Wolfe, R., P.Eng; Assessment Report of Phantom Claims Group 1982

MAPS

Map 1386A compiled by Rodderick, J.A.; Muller, J.E.; Okulitch,A.V.;
Geology of the Fraser River area, Sheet 92, 1979
1:1,000,000

APPENDIX A

DRILL LOG

PAGE 1 of 7
HOLE 1
LENGTH 535 ft
LOCATION 580m from LCP at 355°
ATTITUDE 216° -60°
CASING TO 24 ft.

STARTING DATE SEPTEMBER 17, 1987
COMPLETION DATE SEPTEMBER 28, 1987
DRILL _____ CORE N.Q
CONTRACTOR _____
LOGGED D. O'Neill

BOX	FOOTAGE FROM	FOOTAGE TO	core length	% REC.	ROCK TYPE	STRUCTURE: Br	Go	Con	Fr	ALTERATION: Ep	Ser	chl	clay	cal	fsar	VEINS: Qtz	Cal	MINERALIZATION: Py	Cpy	Apy	Pyr	Pent	NOTES	ANALYSIS NO.
	24	37	12.4	95	very fine grained locally micaceous amphibolite facies						✓	✓					✓							serpentinized fracture surfaces 32' v. minor broken section minor calcite and chlorite at 37'	
	37	47	10	100	"					✓	✓			✓				✓						appears banded like a metamorphosed siltstone very minor pyrite occassionally on fractures fracture surfaces smooth	
	47	57	10	100	very banded in appearance													✓						very sogary on 1 fracture surface, quartz at 55' 1 minor bleb pyrite	
	57	69	12	100	bands 40°-50° to core			✓			✓			✓										sericite on fractures minor clay at 68', broken	
	69	77	8	100	banded slightly reddish hue			✓			✓							✓						3 - 0.5 cm blebs pyrite at 72' pyrite disseminated + blebs on a few fracture surfaces associated with calcite	
	77	87	9.5	95	speckled, less banding									✓	✓			✓						very tiny garnets in black micaceous rock 79' calcite in fracture	

DRILL LOG

PAGE 2 of 7
HOLE 1
LENGTH 535 ft
LOCATION
ATTITUDE 216° -60°

STARTING DATE SEPT 17/87
COMPLETION DATE SEPT 28/87
DRILL CORE NQ
CONTRACTOR
LOGGED D. O'Neill

BOX	FOOTAGE FROM	FOOTAGE TO	core length	% REC.	ROCK TYPE	STRUCTURE Br	Go	Con	Fr	ALTERATION Ep	Ser	Chl	clay	cal	Gar	VEINS Qtz	Cal	MINERALIZATION Py	Cpy	Apy	Pyr	Pent	NOTES	ANALYSIS NO.
4 5	87	96.5	8	84	speckled less garnets		?		✓		✓		✓	✓	✓			✓					More broken, calcite white powdery fracture infilling, min py locally minor pyrite, minor clay gouge to 89'	
5 6	96.5	106.5	9.5	95	very speckled occassionally banded less fractured				✓		✓		✓		✓								105 - 105.5 2 fractures 106 - 106.5 broken serpentinized fractures, with minor clay	
	106.5	115	9.5	100	very fine grained dark grey						✓			✓									Fracture surfaces, serpentinized and after 112' powdery smooth coating, calcite? sericite?	
7	115	126.5	11.5	100	slightly speckled after 117'				✓		✓				✓								Sericite on fractures	
7 8	126.5	136	9.5	100	fine grained sugary				✓					✓									minor calcite on fracture surfaces	
8	136	147	11	100	sugary, grey locally reddish hue				✓														occassionally chlorite on fracture surfaces	

DRILL LOG

PAGE 3 of 7
HOLE 1
LENGTH 535 ft
LOCATION
ATTITUDE 216° -60°

STARTING DATE SEPT 17/87
COMPLETION DATE SEPT 28/87
DRILL ____ CORE N.Q
CONTRACTOR
LOGGED D. O'Neill

BOX	FOOTAGE FROM	FOOTAGE TO	core length	% REC.	ROCK TYPE	STRUCTURE Br	Go	Com	Fr	ALTERATION Ep	Ser	Chl	Clay	VEINS Cal	Gar	Qtz	Cal	MINERALIZATION Py	Cpy	Apy	Pyr	Pent	NOTES	ANALYSIS NO.
8	147	156	9	100	banding minor garnets visible at 151'			✓						✓	✓								minor calcite in fractures few fractures no visible mineralization	
9	156	169	13	100	speckled at 168 banded			✓							✓								157' more broken few fractures in rest of core	
	169	178	9	100				✓			✓			✓									slightly more fractures micaceous, sillimanite	
	178	187	8.5	94		✓																	quartz calcite on fracture surfaces, slickensides minor clay gouge at 182.8', 186-7' broken	
11	187	197	9.5	95			✓	✓															minor clay gouge at contact	
							✓																	
12	197	207	10	100							✓			✓									slight serpentinization on fractures after 198 more broken no visible mineralization	

DRILL LOG

PAGE 4 of 7
HOLE 1
LENGTH 535 ft
LOCATION
ATTITUDE 216° -60°

STARTING DATE SEPT 17/87
COMPLETION DATE SEPT 28/87
DRILL CORE N.Q
CONTRACTOR
LOGGED D. O'Neill

BOX	FOOTAGE FROM	FOOTAGE TO	core length	% REC.	ROCK TYPE	STRUCTURE: Br	Go	Com	Fr	ALTERATION: Ep	Ser	chl	clay	cal	VEINS: Cour	Qtz	Cal	MINERALIZATION: Py	Cpy	Apy	Pyr	Pent	NOTES	ANALYSIS NO.
12	207	218	10	90	broken dark grey to black										✓								some calcite on fractures 1-2 mm band at 216.5	
13																	✓							
13	218	232	14	100	quartz eyes medium-gray to greenish fine grained matrix			✓						✓				✓					more quartz in rock v. minor disseminated sulphides on fractures with calcite finely disseminated 220 qtz bleb 2-2.5 cm with mica minerals	
14	232	244	12	100	quartz eyes to 236' banded, micas and chloritic mins to 244.5			✓			✓			✓									occassionally broken minor serpentine on fracture some with micaceous minerals powdery calcite	
15	244	254	10	100	speckled from 244.5 to 251 then banded competent			✓			✓				✓			✓					pyrite very minor on some fractures, minor serpentinization.	
15	254	272	18	100	speckled competent			✓							✓			✓					pyrite on some fractures minor.	
16					271-272' more fractured				✓					✓									calcite mineral on fracture	
16	272	285	13	100	275 clay on fractures, chlorite some speckled locally micaceous			✓			✓	✓	✓					✓					280' fracture 20° to core, serpentinized crystall	

DRILL LOG

PAGE 5 of 7
HOLE 1
LENGTH 535 ft
LOCATION
ATTITUDE 216° -60°

STARTING DATE SEPT 17/87
COMPLETION DATE SEPT 28/87
DRILL CORE N.Q
CONTRACTOR
LOGGED D. O'Neill

BOX	FOOTAGE FROM	FOOTAGE TO	core length	% REC.	ROCK TYPE	STRUCTURE Br	Go	Con	Fr	ALTERATION Ep	Ser	chl	clay	VEINS cal	Gar	Qtz	Cal	MINERALIZATION Py	Cpy	Apy	Pyrr	Pent	NOTES	ANALYSIS NO.
16	285	301	16	100	speckled and banded mafic*			✓						✓	✓			✓					minor calcite on some fractures with very minor pyrite disseminated in same	
17	301	319	18	100	"	✓	✓											✓	✓				fractures, serpentinized, slickensides, sericite, fracture gouge pyrite and chalcopyrite dissem in gouge 307.5 broken, minor clay gouge gray black.	
19	319	338	19	100	core is competent.			✓											✓		✓		333.5 fracture cpy, pyrrhotite 336 finely dissem. cpy in speckled rock 1-2% 335 very fine disseminated cpy <1%, reddish yellow min, 1 fleck	
20	338	355.5	15.8	90	minor serpentinized fractures			✓										✓	✓				some fractures with sugary texture. mineral striated surfaces dark brown to black very minor very minor py, cpy diss. on fractures	
21	335.5	364	25.7	90		✓	✓											✓	✓		✓		357 covering 6" mafics sericite gouge w minor breccia, speckled, talcy material serpentinized 5 mm py, cpy, pyrrhotite, magnetite? stringers w/ solphides. similar sections at 359' and 362 but smaller sections Pyrite; cubes 362.5	

DRILL LOG

PAGE 6 of 7
HOLE 1
LENGTH 535 ft
LOCATION
* ATTITUDE 216° -60°

STARTING DATE SEPT 17/87
COMPLETION DATE SEPT 28/87
DRILL ____ CORE N.Q
CONTRACTOR
LOGGED D. O'Neill

BOX	FOOTAGE FROM	FOOTAGE TO	core length	% REC.	ROCK TYPE	STRUCTURE Br	Go	Com	Fr	ALTERATION Ep	Ser	Chl	clay	cal	Gar	Qtz	Cal	MINERALIZATION Py	Cpy	Apy	Pyr	Pent	NOTES	ANALYSIS NO.
24	364	373	9	100	speckled to banded serpentine on fractures													✓					361.5 - 370.2 banding with very finely disseminated pyrite	
25	373	400.5	24.8	90	speckled to 384 more banding to 386.5 - 400.5 possible quartzite with py finely dissem and in blebs	✓		✓										✓					381 serpentinized fractures broken at 386.5	
	00.5	417.5	17	100	401 - 412 qtzite? with disseminated Pyrite 412 → speckled meta sediment						✓							✓			✓		401 - 402 broken, serp + talcy with minor pyrite 407 1cm calcite veinlet 45° to core with pyrrhotite and dissem. pyrite in rock, qtz. Pyr on broken surfaces. 411 qtz cal veinlet	PETROLOGY 407' PYRRHOTITE-BIOTITE HORNFELS
26	417.5	436	18.5	100	speckles and banding more subdued			✓			✓							✓					0.5 cm pyr. disseminations and blebs of pyrite and discontinuous stringers < 1mm	
27	436	455	19	100	sugary, reddish brown			✓			✓							✓	✓				pyrite and less often cpy very occassionally foound on fractures py dissem 2x3cm area w/ chlorite at 438	
28	455	472	17	100	speckled, more broken 465-66 banding			✓	✓														Fractures talcy coating	

DRILL LOG

PAGE 7 of 7
HOLE 1
LENGTH 535 ft
LOCATION
ATTITUDE 216° -60°

STARTING DATE SEPT. 17, 1987
COMPLETION DATE SEPT 28, 1987
DRILL ____ CORE N.Q
CONTRACTOR
LOGGED D. O'Neill

BOX	FOOTAGE FROM	FOOTAGE TO	core length	% REC.	ROCK TYPE	STRUCTURE Br	Go	Com	Fr	ALTERATION Ep	Ser	Chl	clay	cal	Feor	VEINS Qtz	Cal	MINERALIZATION Py	Cpy	Apy	Pyr	Pent	NOTES	ANALYSIS NO.
27	472	487	13.5	90	grey fine grained faint banding occassionally		✓		✓		✓							✓					476.5-478 very broken fractures, talcy 485 quartz vein 1.5cm wide broken clay, chlorite gouge w/ py, brown glassy mineral (sphalerite?)	
28	487	502	13.5	90	grey to brown fine grained		✓				✓ ✓			✓		✓		✓					488 fracture, serpenthnized fracture speckled 497.5-498 very minor pyrite in seam	
29	502	517	15	100	fractured sections competent						✓													
30	517	519	1.8	90	broken with gouge speckled grey minor pyrite		✓				✓												gouge zone, very little effect on surrounding rock except fractures.	
30	519	535	16	100	speckled				✓		✓													

APPENDIX B

DRILL LOG

PAGE 1 of 6
HOLE # 2
LENGTH 575 ft
LOCATION 1750m from LCP at 345°
ATTITUDE 48° DIP : -60°
CASING 17 FEET

STARTING DATE OCTOBER 15, 1987
COMPLETION DATE NOVEMBER 15, 1987
DRILL _____ CORE NQ
CONTRACTOR _____
LOGGED D. O'Neill

BOX	FOOTAGE FROM	FOOTAGE TO	core length	% REC.	ROCK TYPE	STRUCTURE Br	Go				Con	Fr	ALTERATION Ep	Ser	Chl	Clay	cal	Gar	Veins Qtz	Cal	MINERALIZATION Py	Cpy	Apy	Pyr	Pent		Mag	NOTES	ANALYSIS NO.
1	17	35	14	77	Speckled to slightly banded 23-27 1.5' core recovery - clay seam																							minor clay mineral on fracture very minor serpentine	
2	35	52	17	100	darker, mineral faces, less sugary speckled		✓				✓	✓										✓		✓				chalcopyrite and pyrrhotite on fracture at 37', 43', 49.2 smeared pyrrhotite in disseminated blebs <1% in core, local 48' broken, minor grey gouge	
	52	69	17	100	massive, competent dark, without sugary appearance banded, speckled						✓						✓			✓								very minor quartz seam at 58' no mineralization occassional calcite on fracture no minerals in visible	
4	69	86	17	100	72-75' more broken very fine disseminated grey, metallic, magnetic with pyrite in 3-4 cm long blebs												✓				✓						?	minor pyrite on fractures and disseminated, calcite on fractures more fractured 83'-84', minor serpentine more green grey last 1 foot	
5	86	104	18	90	speckled, not sugary dark coating on fracture (not serpentine) 102-104' sugary												✓				✓				?			Broken 86-87', 92, 94, 98' 89' bleb, disseminated, non-magnetic (pentlandite?) and pyrite, next 2 ft pyrite disseminated and stringers 1% max	
6	104	121	17	100	sugary texture to 110' 110 → darker fractures with serpentine							✓	✓								✓							very minor pyrite disseminated at beginning	

DRILL LOG

PAGE 2 of 6
HOLE 2
LENGTH 575 ft
LOCATION
ATTITUDE 48° Dip -60°

STARTING DATE Oct. 15 /87
COMPLETION DATE Nov 15 /87
DRILL CORE NQ
CONTRACTOR
LOGGED D. O'Neill

BOX	FOOTAGE FROM	FOOTAGE TO	core length	% REC.	ROCK TYPE	STRUCTURE Br	Co	Con	Fr	ALTERATION Ep	Ser	Chl	clay	cal	Gar	VEINS Qtz	Cal	MINERALIZATION Py	Cpy	Apy	Pyr	Pent	Sph	Mag	NOTES	ANALYSIS NO.
7	121	138	17	100	Competent to 130' with occassional fracture speckled to banded dark, not sugary 130-138 fractures low angle to core			✓	✓		✓		✓					✓			✓		?		pyrite disseminated sphalerite ? in stringers, red brown lustre assoc. with pyrrhotite 1-2%	
8	138	156	18	100	occ. fractures low angle to core speckled not sugary			✓			✓			✓				✓ ?			✓ ?		?		sulphides with red brown mineral still disseminated but decreasing to 146' calcite on fracture especially at 155', no mineralization	
	156	172	15	94	massive, speckled to 167', occasional fracture, non-sugary serpentinized fractures speckled, dark calcite in fractures	✓	✓	✓ —			? ✓			✓ ✓				✓							164' py, cpy, possible pentlandite, blebs minor reddish mineral with quartz in stringer 1 mm and fracture 167' brecciated broken with gouge, 170 v. broken, serpentine with pyrite	PETROLOGY 164' SPOTTED ANDALUSITE BIOTITE HORNFELS
10	172	190	18	100	very speckled dark Change at 187' sugary texture			✓																		
11	190	208	18	95	sugary, intermediate grey, 192-199 is more bleached esp at 193, calcite on fractures, 199-208 brown, sugary 205-207 rubble, min. gouge		✓	✓						✓												
12	208	226	18	100	Speckled and slightly banded dark with slight sugary textures			✓																	fractures have slight talcy feel. fractures 50-60° to core	

DRILL LOG

PAGE 3 of 6
HOLE 2
LENGTH 575 ft
LOCATION
ATTITUDE 48° Dip -60°

STARTING DATE Oct 15/87
COMPLETION DATE Nov 15/87
DRILL CORE NQ
CONTRACTOR
LOGGED D. O'Neill

BOX	FOOTAGE FROM	FOOTAGE TO	core length	% REC.	ROCK TYPE	STRUCTURE Br	Go	Con	Fr	ALTERATION Ep	Ser	Chl	clay	cal	Gar	Veins Qtz	Cal	MINERALIZATION Py	Cpy	Apy	Pyr	Pent	Mag	NOTES	ANALYSIS NO.
13	226	244	17.1	95	Brown sugary w/ mafics 233-234 bleached 237-238 mafics, coarse 242.5 - broken 8"						✓ ✓			✓										bleached to grey/blue calcite on fracture surfaces, no mineral serpentine min. on fracture contact black aphanitic mafic w/ brown sugary	
14	244	261	16.2	95	Speckled to banded 246.5 - 247 rubble speckles locally sugary brown/red 259.3-260 rubble			✓	✓ ✓		✓ minor			✓ ✓											
	261	277	14.5 -15	90-95	speckled, not sugary 261-270 4 stringers at 45° 3 mm max sulphides, pyrr, py with chlorite at 265			✓	✓			✓						✓			✓ ✓				270-275 more fractured, drill rounded 2-4" pieces minor clay gouge at 274' acc. pyrrhotite << 1%	
15 16	277	297	20	100	effects of silica influx? bleached green/grey 277.5 3 min. stringers up to 1.5 cm pyrr + py in veinlets and in fractures 286									✓		✓	✓	✓	✓		✓ ✓				calcite veinlets at 280 285 sugary texture, calcite on fractures 287-296 cal on fractures acc. veinlet, sugary with qtz glassy irregular 296.3 - 297 bleached, siliceous, sulphides	
17	297	313	16	100	bleached look to 305.5' acc. calcite veinlet min pyrr + py, flaky fracture surface 302. serpentine fracture 310-313 sugary, recrystallized?			✓	✓	/								✓	✓		✓				
18	313	331	18	100	speckled mafic sugary at contact 329.5 - 330'									✓				✓	✓					cpy and py in stringers 329 - 330' and on fracture surfaces 329.5	

DRILL LOG

PAGE 4 of 6
HOLE 2
LENGTH 575 ft
LOCATION
ATTITUDE 48° Dip -60°

STARTING DATE Oct 15/87
COMPLETION DATE Nov 15/87
DRILL CORE NQ
CONTRACTOR
LOGGED D. O'Neill

BOX	FOOTAGE FROM	FOOTAGE TO	core length	% REC.	ROCK TYPE	STRUCTURE: Br	Go	Com	Fr	ALTERATION: Ep	Ser	Chl	clay	cal	Gar	VEINS: Qtz	Cal	MINERALIZATION: Py	Cpy	Aspy	Pyr	Pent	Mag	NOTES	ANALYSIS NO.
A	331	350	19	100	aphanitic bleb sugary zones 347-348 slightly bleached mica-biotite			✓											✓		✓			348.5 cpy, pyr associated with qtz in sugary rock, smooth fracture	
20	350	366	16	95	bleached with mineralization at 353' 355-356 chl/cal gouge 360 - broken, talcy, fracture		✓	✓				✓ ✓		✓					✓	✓					356.6 alteration chloritic calcite reasonably competent but softer. No visible mineralization 361-366 brown slightly sugary occassionally chloritic!	
	366	384	18	100	occassional fracture talcy coating locally slightly bleached, calcitic chloritic (½ mm)			✓				✓		✓											
22	384	402.5	18.5	100	rock harder calcite on fractures glassy qtz at 400.5 ~1 cm wide no visible mineralizatn rock sugary, brown			✓							✓										
23	402.5	420	16-17.5	95-100	brown-grey sugary competent 415.5-420 more siliceous, occ. qtz flooded seamlets 3mm 417-417.4 gr-grey bleached		✓ min?	✓				✓			✓										414.6 slight clay gouge over 1" no visible mineral"	
24	420	437	16-17	95-100	more fractures but still competent sugary to non sugary texture.		✓	✓										✓	?		✓			428-437 local and very minor amounts pyrite pyrrhotite and possible chalcopyrite in fracture and in disseminations	

DRILL LOG

PAGE 5 of 6
HOLE 2
LENGTH 575 ft
LOCATION
ATTITUDE 48° DIP -60°

STARTING DATE Oct. 15/87
COMPLETION DATE Nov 15/87
DRILL _____ CORE NQ
CONTRACTOR
LOGGED D. O'Neill

BOX	FOOTAGE FROM	FOOTAGE TO	core length	% REC.	ROCK TYPE	STRUCTURE							ALTERATION						VEINS		MINERALIZATION							NOTES	ANALYSIS NO.					
						Br	Go				Con	Fr	Ep	Ser	Chl	clay	cal	Gar	Qtz	Cal	Py	Cpy	Apy	Pyr	Pen		Mag						
25	437	456	19	100	fcels silica enriched fracture 445.5 pyrr + cpy coated						✓										✓			✓				pyrrhotite disseminated in blebs up to 3 cm and in discontinuous stringers up to 3mm wide scattered throughout section max 1%	PETROLOGY 440'		SPOTTED AND HORNFELS		ANDALUSITE		BIOTITE
26	456	472	16	100	not sugary 466.5 2 quartz seamlets up to 2.5cm pyrr bleb 3.5 x 0.5cm						✓								✓					✓				mineralization mainly pyrrhotite in tiny stringers 1mm occassionally disseminated up to 1%. Pyrite may be present, v. min.	Assay	Au oz/ton 0.008	Pd oz/ton 0.001	Pt oz/ton 0.001	Te ppm 1.6		
	472	489	17	90	485 gouge for 6" 487 sugary		✓				✓						✓		✓			✓						chalcopyrite on fracture seamlet 477.8, minor 484.4 - 0.5cm qtz veinlet calcite on fractures 486 qtz in core not veinlet but glassy and diffuse, pyrr at 487							
28	489	506	17	90	494-498 sugary 500-503 non sugary sugary						✓						✓				✓			✓				calcite on fractures very minor pyrr and probably pyrite disseminated < 1%							
29	506	524	18	100	Brownish colour coarse calcite on fractures fractures minor						✓						✓							✓				pyrrhotite + sulphides (py or possibly pentlandite) disseminated in stringers 514 - 7.5 x 3mm bleb pyrr 10%, bleb assoc w/ quartz							
30	524	541	16-	95	competent but more fractures rock finer grained						✓										✓			✓				very minor pyrite and pyrrhotite in stringer < 1% at 528 536.5 pyrrhotite disseminated							

DRILL LOG

PAGE 6 of 6
HOLE 2
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LOCATION
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STARTING DATE Oct 15/87
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DRILL CORE N.Q
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LOGGED D. O'Neill

BOX	FOOTAGE FROM	FOOTAGE TO	core length	% REC.	ROCK TYPE	STRUCTURE Br	Go	Con	Fr	ALTERATION Ep	Ser	chl	clay	cal	Gar	VEINS Qtz	Cal	MINERALIZATION Py	Cpy	Apy	Pyr	Pent	Mag	NOTES	ANALYSIS NO.
31	541	558	17	100	fine sugary recrystallized? very occassionally py on fracture			✓								✓		✓						3 quartz seams between 541-542' 2mm-3mm wide no mineralization Qtz seam 3mm wide at 555.3' chlorite and 2% pyrite in cubes	
32	558	575	17	100	559.7-561 qtz stringers no mineralization sheared to gouge fine grained dark sugary rock in contact at 561 with siliceous gray to green hornfelsed amygdaloidal andesite with qtz stringers up to 0.6cm wide		✓	✓				✓													PETROLOGY 572' Hornfelsed Amygdaloidal Andesite

APPENDIX C

PETROGRAPHIC-SEM REPORT - PHANTOM PROJECT

SAMPLE NO. DDH-1 @ 407': PYRRHOTITE-BIOTITE HORNFELS

Purplish brown, fine grained, pyrrhotitic biotite hornfels. The minerals recognizable in thin section are:

Quartz	35%
Plagioclase (Andesine?)	30%
Chlorite	20%
Biotite	5%
Sericite	5%
Pyrrhotite	5%
Chalcopyrite	tr
Apatite, ilmenite	tr

The rock is composed of a fine grained interlocking mosaic of quartz and plagioclase grains of about 0.2 to 0.5 mm diameter, with slightly smaller mafic remnants interstitial to the quartz and feldspar. Smaller grains of all these major minerals also occur in between the larger grains, but there is no suggestion of a porphyritic (volcanic) texture. Rather the texture is suggextive of a sedimentary rock, perhaps a fine grit or volcanic wacke. The rock has been contact metamorphosed, possibly to as high as amphibolite grade, but has since retrograded to greenschist facies.

Quartz grains are anhedral and relatively clear, with only minor alteration (flecks of sericite and biotite; these could merely be intergrown rather than an alteration product). There is no evidence of dynamic metamorphism: the quartz grains show no undulose extinction or flattening. They are somewhat attacked around their margins by the finer grains of quartz surrounding them. These finer grains average about 0.03 mm in diameter.

Plagioclase grains are subhedral to anhedral and cloudy with incipient clay-sericite alteration; a few are moderately altered to sericite as fine 1 to 2 micron size flakes. Most grains do not show twinning, and the few that do are not large enough to give interference figures. However, the maximum extinction angle Y^010 is about 15 to 20 degrees, and both refractive indices (Y and Z) are above quartz, so it seems probable that the plagioclase is andesine, An 35 or so.

The mafic mineral in this rock looks to have been amphibole prior to retrograde alteration: the shapes are suggestive, and traces of remnant hornblende(?) and actinolite are left amongst the chlorite, biotite, and sericite now replacing these original mafic sites. The mafic sites are about 0.5 mm across on average, and usually consist of several intergrown grains of varying orientations suggestive of formerly intergrown amphibole, now showing all stages of breakdown, principally to chlorite but with interleaved biotite and sericite. The original mineral looked to have been fibrous (?hornblende), with parts altered to elongated aciciular ?actinolite. This texture has been mimiced by the biotite, which itself appears to be altered to chlorite and sericite.

Biotite and sericite flakes as small as 0.01 mm also occur scattered through the rock, but chlorite seems to be restricted to the mafic sites. Traces of apatite as minute grains, 0.02 mm long, are also rarely present, as are similarly sized laths of Ti oxides, probably ilmenite (which range up to 0.2 mm long).

Magnetic pyrrhotite is evenly disseminated in fine grains (less than 0.5 mm) throughout this typical hornfels, occasionaly with traces of chalcopyrite to 0.1 mm across. Chalcopyrite also is found in occasional thin quartz veinlets as

DDH 2 @ 164': SPOTTED ANDALUSITE-BIOTITE HORNFELS

Dark grey to black spotted hornfels with abundant 2 to 3 mm sized grey andalusite porphyroblasts in a black biotitic matrix. One large fragment of several cm diameter is finer grained and even-textured, lacking the andalusite grains. Sulfides form about 3% of the rock, as fine blebs of pyrrhotite disseminated through the rock, but are more abundant and mixed with pyrite of similar size in the fragment. Sulfides are also rarely distributed along veinlets, which are also more prevalent in the fragment. Mineral abundances as seen in thin section are:

Host rock:	
Andalusite (porphyroblasts and matrix)	50%
Biotite	25%
Quartz	13%
Opaques (fine dust-like Fe-Ti oxides)	10%
Sulfides (pyrrhotite and pyrite)	2%
Fragment:	
Quartz	45%
Biotite	45%
Opaques (fine Fe-Ti oxides)	5%
Sulfides	5%

There does not appear to be any plagioclase in this rock, which is a marked point of difference with the previous sample from DDH #1. Instead, the host rock consists mainly of andalusite porphyroblasts, often aggregate grains, which are full of minute inclusions of opaque (unidentifiable in thin section, but probably Fe-Ti oxides, although some may be amorphous carbon, commonly found in andalusite). The carbonaceous matter is not however arranged in the cruciform manner to give the mineral the name "chiastolite". Other minerals included in the andalusite are quartz and minor biotite, showing that the andalusite grew in place, gradually including its surrounding minerals as it grew.

The matrix of the rock consists of a finely intergrown mixture of biotite, quartz, sericite, and andalusite, again with abundant minute black inclusions of carbonaceous matter and lesser sulfide. In this matrix, the average grain size is about 0.03 mm for quartz, biotite and andalusite, but much finer (micron size) for the opaques and carbonaceous matter.

Biotite of the matrix is a deep red-brown colour, and also contains abundant fine inclusions of opaque material (?carbon) as in the andalusite. The brown biotite is strongly pleochroic, but a few grains of greenish biotite ("hydrobiotite", with more Fe) are not pleochroic. Sericite is largely restricted to a few, larger (0.05 mm) flakes usually located near the margins of the andalusite porphyroblasts.

The fragment is composed of an even, fine grained mat of about equal proportions of quartz and biotite, with lesser amounts of black opaques (carbonaceous matter and sulfide). Andalusite is not identifiable in this portion of the rock, although it might be present in this very fine-grained intergrowth (average grain size 0.025 mm).

There is a reasonably well-defined foliation developed in the biotite of the host rock (often "wrapping around" the andalusite porphyroblasts), but none is apparent in the fragment, where the biotite is randomly oriented.

Thin quartz veinlets, ocasionally with associated sulfides, cross the slide, replacing the andalusite and therefore later than the metamorphism. On the whole, the rock is not wel. altered or mineralized; the fragment, though, is much better mineralized, with both pyrrhotite and pyrite visible in hand

DDH 2 @ 440': SPOTTED ANDALUSITE-BIOTITE HORNFELS

Very similar to the host rock of the previous sample at 164' in this hole. Pale-coloured coarse andalusite porphyroblasts up to 0.5 cm long are set in a dark biotitic matrix. Sulfides appear to be still predominantly pyrrhotite, and the rock is still weakly magnetic like the specimen from 164'. In thin section, the minerals are:

Andalusite		50%
Quartz		20%
Biotite		20%
Opaques:	Carbonaceous matter	7%
	Pyrrhotite	2%
	Oxides (ilmenite)	1%
Apatite, monazite		tr

The biotite in this rock is the same deep red-brown variety seen in the host rock in the previous slide. There is no sericite in this specimen, though; this correlates with the lack of pyrite and overall lesser amount of sulfide, possibly indicating that the pyrrhotite and sericite are related to hydrothermal activity that occurred after the andalusite, biotite, and pyrrhotite of the hornfels facies.

Quartz is clear, and apart from the matrix portion of 0.02 mm diameter grains, is also in larger (0.05 to 0.1 mm) grains which are often concentrated (with lesser biotite) along the boundaries between adjacent andalusite grains of a porphyroblast. These minerals have presumably been excluded during growth of the andalusite. Ther are also rare minute apatite grains in these areas.

Andalusite is as described for the previous sample, except that smaller grains (incipient porphyroblasts) are clearly visible between the larger ones. They contain even higher proportions of the carbonaceous matter: it is as if the larger ones have had time to rid themselves of some of their impurities (acquired as they grew and incorporated them) by diffusion of impurities to the grain boundaries.

Sulfides include pyrrhotite as anhedral grains up to 1 mm across but generally less than 0.1 mm. Some sulfides are closely associated with (grown inside of) carbonaceous matter. Opaque oxide phases are minute (10 to 20 micron long) grains that are occasionally lath-shaped euhedra, but often anhedral also. They are not distinctly anisotropic as is the ilmenite in DDH-1, but their shape is suggestive of ilmenite rather than magnetite or chromite; this identification is confirmed by SEM-EDS analysis (see Fig. 1 for photo of grains and analysis of ilmenite). The ilmenite grains contain even smaller (1-2 micron) rounded blebs of much higher reflectivity material, which looks like pyrrhotite also, and were also confirmed by SEM analysis. Thus these minor phases are not Pt-bearing.

The only economically interesting minerals discovered during the SEM work were rare-earth bearing phosphate, probably monazite. These tiny grains, 2 to 4 microns long, show high concentrations of yttrium, plus other rare earths such as gadolinium and possibly dyspropium (see Fig. 2 for SEM scans). Although these phases are very small and probably not volumetrically important, their occurrence in the andalusite grains suggests that it might be worthwhile obtaining rare-earth analyses, plus U and Th, for a few samples.

Overall, this hornfelsed sedimentary rock does not appear prospective for platinum-group elements: there are no obvious indications of ultramafic rocks, chromite, or platinum-group minerals in this suite, even as fragments, and little

DH 2 @ 572': HORNFELSED AMYGDALOIDAL ANDESITE

Grey-green porphyritic amygdular intermediate volcanic rock with white plagioclase phenocrysts to 2 to 3 mm long and large clear quartz amygdules up to 1 cm in diameter, set in a green mafic matrix. Cut by a broad (0.5 cm) vein of dark green amphibole with quartz grains similar to those in the amygdules. In thin section, the minerals are:

Plagioclase (Oligoclase-andesine)	60%
Amphibole (hornblende)	25%
Quartz	10%
Opaques (FeTi oxides)	5%

The plagioclase forms phenocrysts, microphenocrysts, and matrix microlites (elongated laths) down to 0.2 mm long. The composition appears to be andesine or oligoclase-andesine, about An30-47 (extinction angles Y^010 are about 15-25 degrees, Z^001 larger than this, up to 30 degrees, and both indices are above that of quartz). ...e grains are euhedral and well-twinned, often mildly flecked by minute grains of amphibole, sericite, and carbonate.

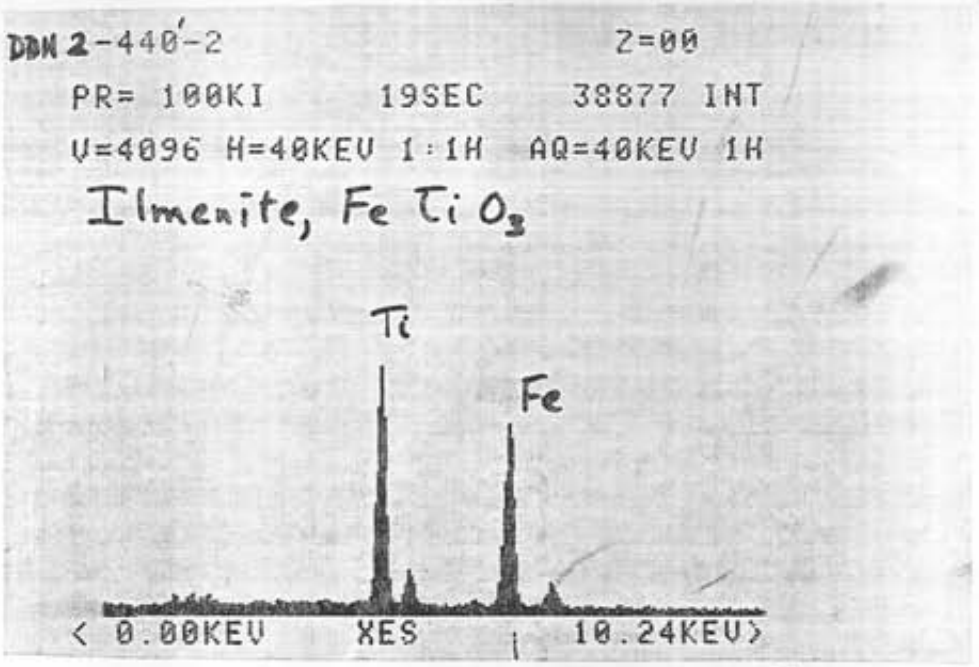
Amphibole in this sample is pleochroic from green to pale greenis brown, and forms small stubby prismatic grains of subhedral habit up to 0.2 mm long, but averaging less than 0.05 mm. It is probably a hornblende (extinction angle about 25' degrees), and its form of growth (appearing to replace all other minerals, with a random orientation) suggests that it is hornfelsic. It would be exactly the sort of precursor espected of the chlorite-biotite psuedomorphs seen in the specimen from DDH 1 @ 407', and the plagioclase in the two specimens is also similar, suggesting that the sample from DDH 1 is in fact a volcanic wacke, derived from a volcanic source such as the current specimen.

Quartz amygdules are made up of coarse, clear grains up to 1 mm in diameter, showing no signs of strain (undulose extinction or boundary suturing) and no alteration. The amygdules are often composed of quartz and bladed, radiating aggregates of the hornblende found in the matrix and the vein.

The opaque grains, averaging about 0.03 mm in diameter, are euhedral and probably an oxide of Fe and Ti, such as ilmenite. They do not suggest chromite, although polished section analysis would be required to confirm this.

Craig H.B. Leitch, M.Phil, P. Eng.

January 15, 1988.



Analysis of ilmenite at location 2.

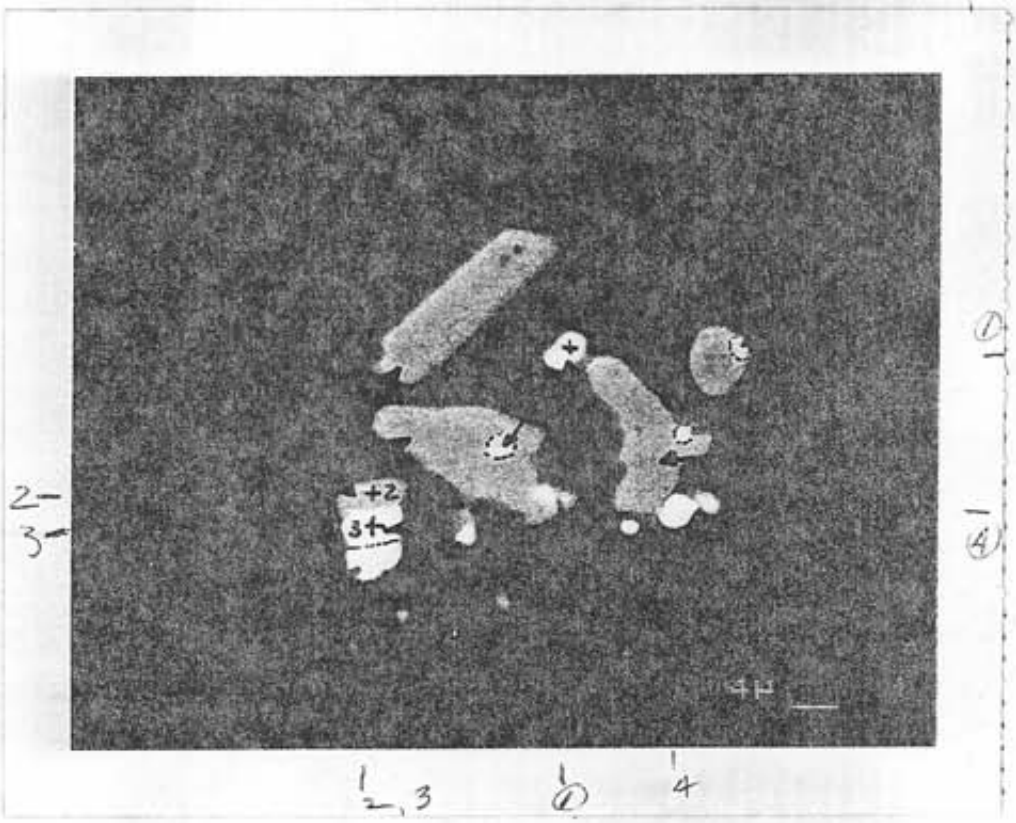
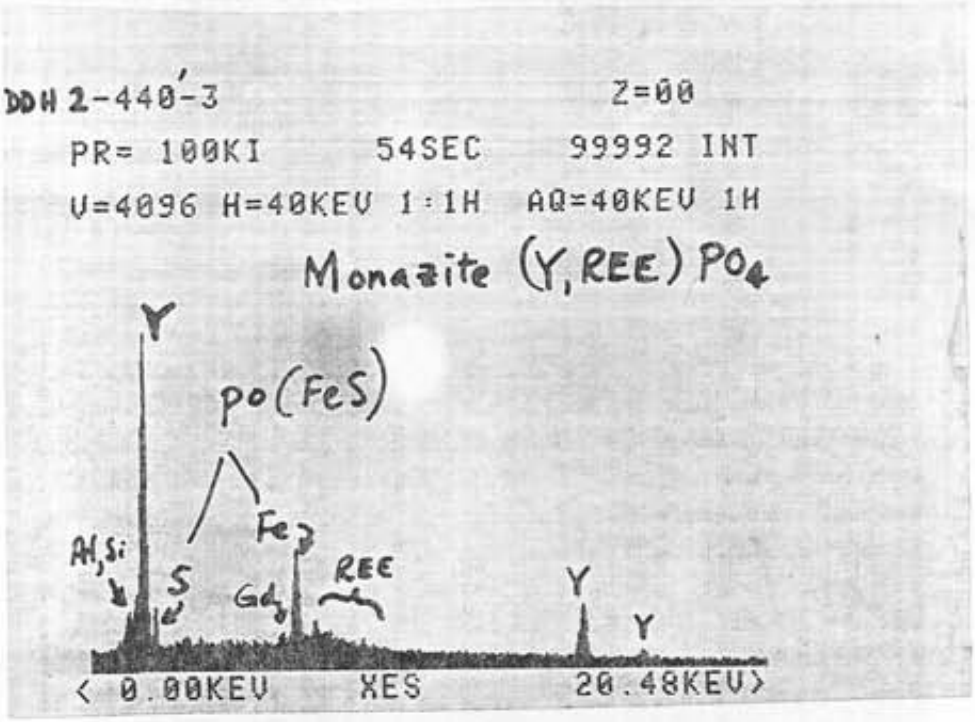


Fig. 1: Photomicrograph showing location of grains.



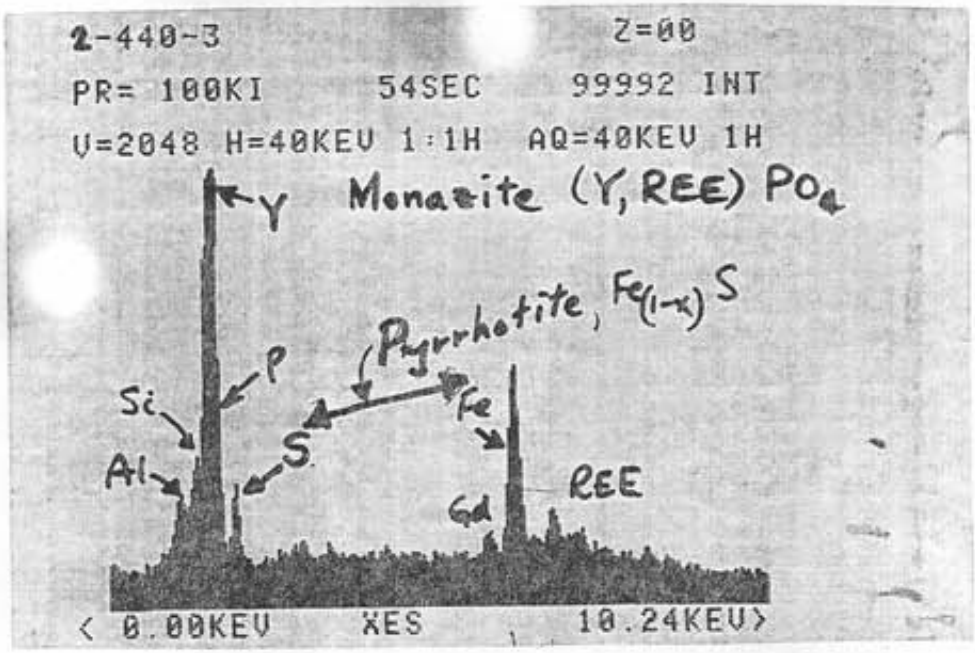
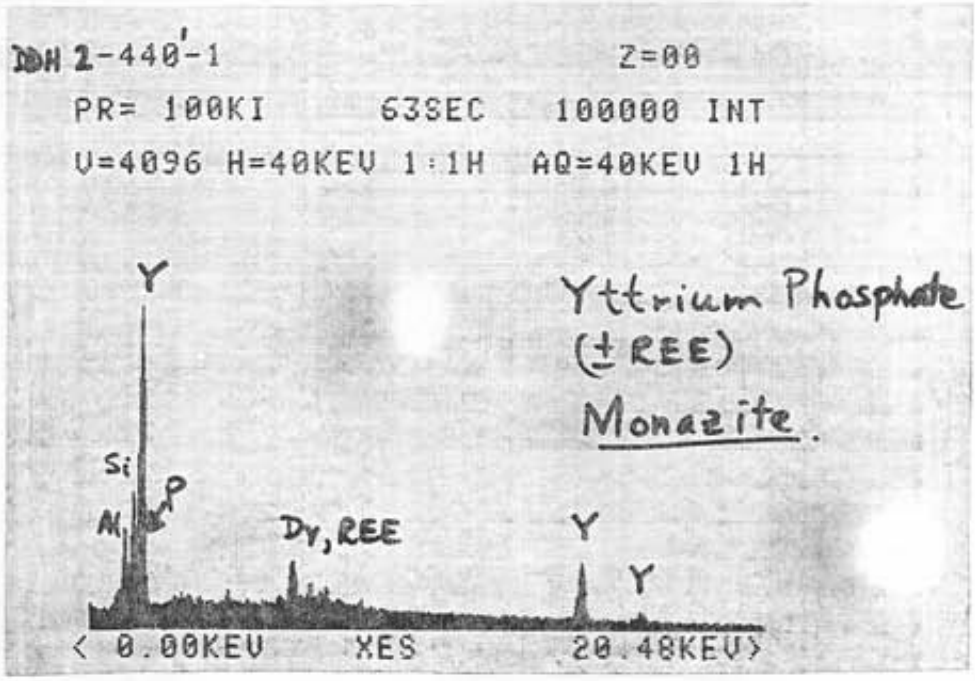


Fig. 2(a) Analyses of monazite and pyrrhotite at spot 3.



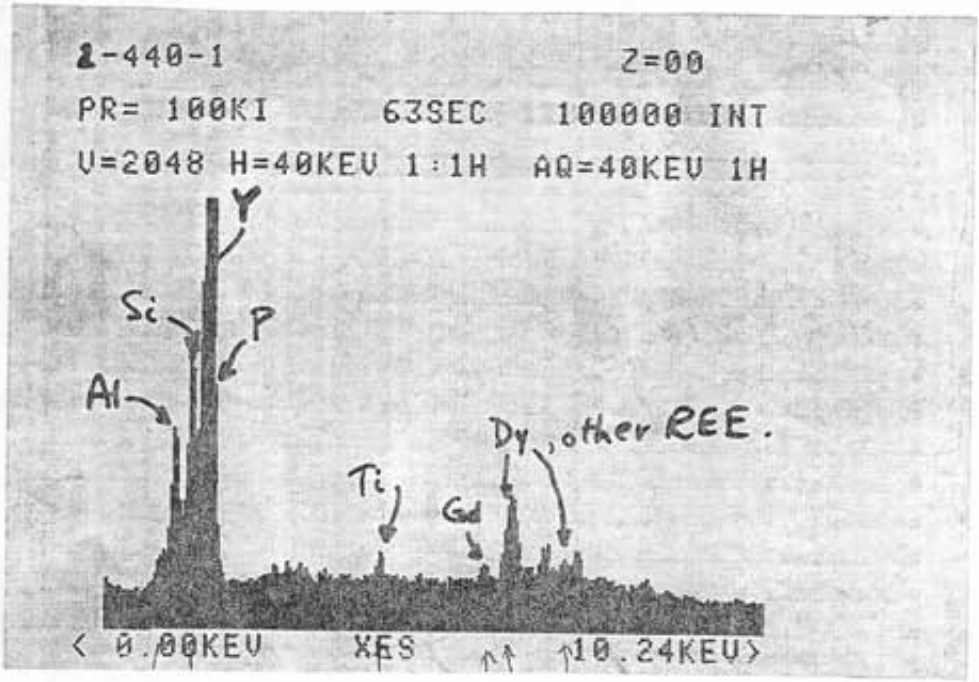


Fig. 2 (b): Analyses of monazite at location 1.

APPENDIX D

MIN-EN LABORATORIES LTD.

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Certificate of ASSAY

Company:DARLENE O'NEILL
Project:PHANTOM
Attention:DARLENE O'NEILL

File:8-171/P1
Date:FEB 17/88
Type:ROCK ASSAY

We hereby certify the following results for samples submitted.

Sample Number	AU-FIRE G/TONNE	AU-FIRE OZ/TON	PD-FIRE G/TONNE	PD-FIRE OZ/TON	PT-FIRE G/TONNE	PT-FIRE OZ/TON	TE PPM
D2 456-472	.26	0.008	.01	0.001	.01	0.001	1.6

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Certificate of GEOCHEM

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Project:PHANTOM
Attention:DARLENE O'NEILL

File:8-171/P1
Date:FEB 17/88
Type:ROCK GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AU-FIRE PPB	PD-FIRE PPB	PT-FIRE PPB	TE PPM
DI 3005	87	4	1	1.9

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