

ABMINCO N.L.
CLEVELAND MINE

CATEGORY

Surf.
Exp.

HOLE No.: C 1250

REF No 18550

GENERAL DATA

Objective :

Area of Operation : Eastern Ridge Location : AH - AI sectⁿ.
Collar R.L. : 468.50 m. Co-ordinates : 14925.05 N, 11181.86 E.
Bearing of Hole : 295° Angle of Hole : -49½° Final Depth : 205 m.
Drilling Commenced : 4-1-78 Completed : 16-1-78 Logged by :

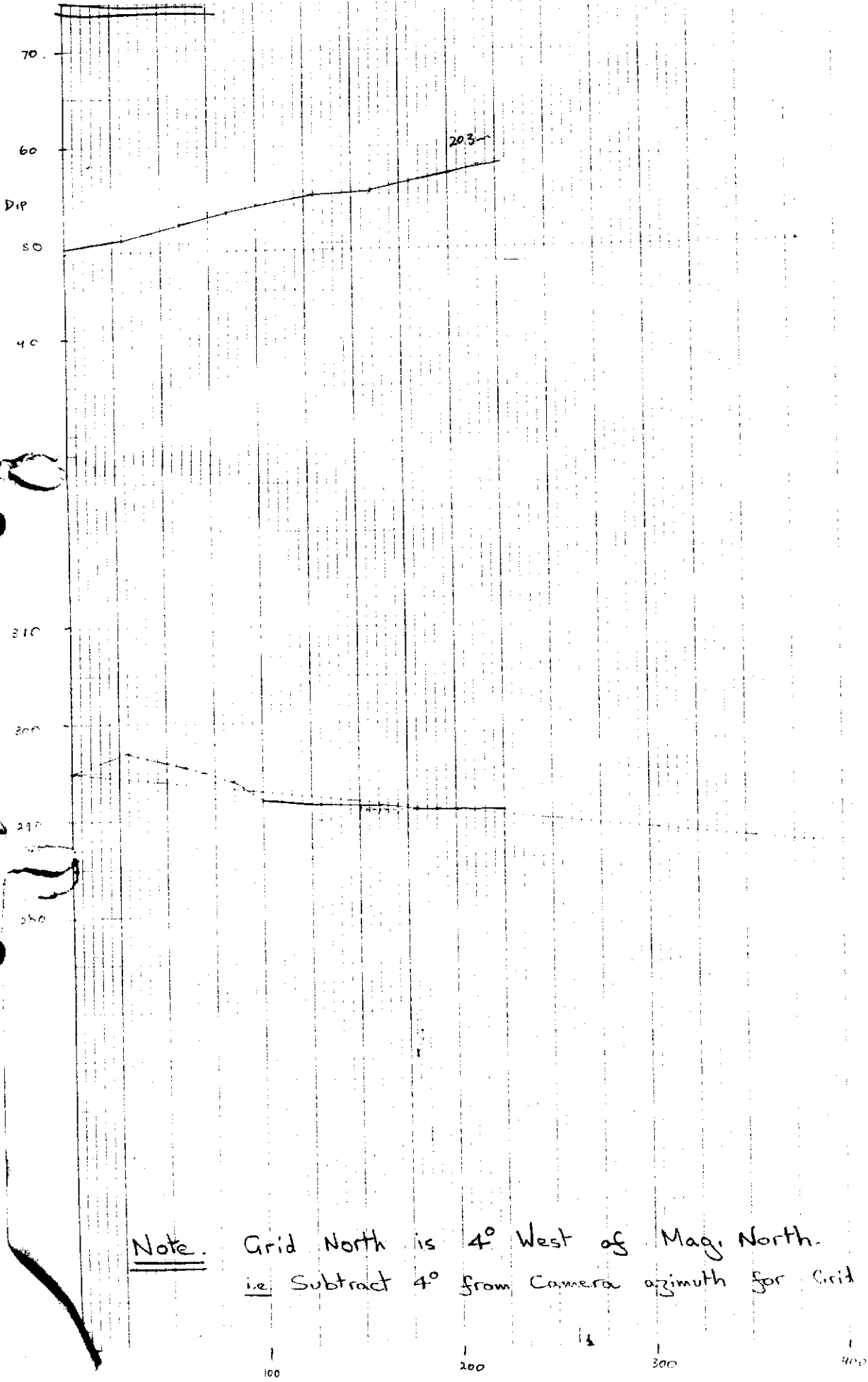
DRILLING DATA

Drilled by : LONGYEAR Non Coring :
Drilling Rig : 44 Coring :
Drillers(s) : P. LEFTERUK, B. M^c CONAGHY
Core Recovery :

HOLE SURVEYS

HOLE No. :
1250

C 1250.



Note. Grid North is 4° West of Mag. North.
i.e. Subtract 4° from Camera azimuth for Grid azimuth.

Note: Grid Azimuth is camera reading less 4°

ABMINCO N.L. - Cleveland Mine

Hole No. C 1250
Sheet No.

DIAMOND DRILL HOLE DATA

PROGRAM DATA				SURVEY DATA				INTERPOLATED DATA		
				Instrument Type	Depth	Dip	Grid Azimuth	Depth	Dip	Azimuth
1	Attitude	—	(+) (-)	Survey	0	49½	275	12½	50	275
				Camera	30	50½	277 (273)	37½	50¾	276½
2	Hole No.	C 1250			60	52	275½ (271)	62½	52	275½
					79	53¼	294 (278)	87½	53½	273½
3	Down Hole Interval	25			101	54	292 (276)	112½	54½	291¾
					130	55	291½ (275)	137½	55	291½
4	Collar	1492505	N		160	55¼	291½ (275)	162½	55½	291¼
					180	56¼	271 (275)	187½	56½	291
5	Co-ords.	11181-86	E		202	57	291 (275)	212½	57¾	291
6	Collar R.L.	+62.50								
7	Halls Sect.	15278.44	N							
8	Intersect Point	10634.39	E							
9	Battery Sect.	15117.54	N							
10	Intersect. Point	107200-	E							
11	Start Plot (Depth)	0	ø = Collar							



DIAMOND DRILL LOG

Hole No 1250 Page No 1

Feature: Bedding, Foliation, Fragment-size & shape, Shearing, Fault, Vein, carbonate quartz

Mineralization: Trace 1-5%, Common 5-15%, Abundant 15-60%, Massive >60%

Table with columns: CORE REC'D, DEPTH m, GEOLOGY, VISUAL LOG, DEPTH m, MINERALIZATION. Contains handwritten geological descriptions and depth measurements.

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DIAMOND DRILL LOG

Hole No 1250 Page No 2

Feature : Bedding
 Foliation
 Fragment-size & shape

Shearing
 Fault
 Vein
 c carbonate
 q quartz

Mineralization : Trace 1-5%
 Common 5-15%
 Abundant 15-60%
 Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	THICKNESS	CONTAMINATION	GRAIN SIZE	DEPTH m	MINERALIZATION
0-20	18.0	pale greenish grey shale interbedded fracture planes are chloritized and mineralized. weak banding or layering present @ 60° C.A. Core is broken and fractured. Lower contact appears to be gradational.						less 1% pyrite developed on joint and fracture planes.
0-05	35	<u>Cryshales</u> A sequence of pale greenish/grey shales highly disrupted and irregularly layered. Dark grey to black thin bedded interbed. Upper 3 metres seems to be slightly greener and generally more massive (probably siliceous and slightly buffaceous). Core is fractured and broken. Cleavage planes are weakly mineralized and chloritized. Minor faults and slump structures are present with bedding varying from subparallel to C.A to about 60 to C.A. Rare sandier units up to 2cm towards the base. Interbedded grey & black shales in last 5cm.						less 1% pyrite smeared on fracture planes.
1-50	40	<u>Limestone / Shale</u> - Interbedded sequence of greyish limestone and black / grey shale. Limestone is finely laminated with shales deformed and layered. Minor fragments of limestone in shale. Lower contact sharp.						less 1% pyrite developed as cryshals on fractures and within calcite veins. Bed's 60° to C.A.
1-30	43.8	<u>Grey Shales</u> - fine grained greyish shales - first metre disrupted and irregular with minor limestone and sandstone fragments - remainder is finely laminated and consistent. Several lighter coloured inclusions, spotty (chlorite with hematitic cores) towards base of sequence.						Rare pyrite - as irregular stringers and clumps of cryshals within sediments and on fracture planes.
1-20	45	<u>Red / Brown (Chertite) Shales</u> . Fractured and broken red/brown fine grained shales with minor fossiliferous green interbeds. Layering appears to be continuous over lower contact.						Cryshal lapelle buff shale with chloritized fragments.
0-45	46-40	Cryshal shales or buffaceous shales with apparent lapelle fragments (?). finely laminated. FAULT ZONE 46-55 - 47-70						Pyrite associated with fault zone breccia fragments and fault.
1-25	50	<u>Red / Brown Shales</u> . Monotonous sequence of fine grained, finely laminated						

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DIAMOND DRILL LOG

Hole No 1250 Page No 3

Feature : Bedding Shearing
 Foliation Fault
 Fragment-size & shape Vein c carbonate
 q quartz

Mineralization : Trace 1-5%
 Common 5-15%
 Abundant 15-60%
 Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
	3-00	brown shales. Small scale slump structures and micro faulting occur. Irregular blocks and patches of greyish/green shale.							less than 1% pyrite in sequence occurring primarily on cleavage planes and joints as single grains and aggregates of crystals.
	2-95	Subrounded limestone clasts at 52-60 and 53-95 and 63 a pale greyish/green chloritic shale.							Rarely within chloritic zones as long stringer vein.
	55	Chlorite developed of cleavage planes and as irregular veinlets.							
	3-00	Laying generally around 45° to C.A. with slight variations							
	60	parallel to C.A.							
	3-00								
	1-35								
	1-50								
	65								
	3-90	Finely interbedded sequence of grey shale / brown shale / greyish green shale from 64-9 to 66.80. May reflect compositional variation.							
	70								
	2-90	From 67-20 the sequence is more massive with rare brownish shale clasts occurring. Calcite veins developed during the last four metres - generally at 45° to C.A. upto 1cm across and parallel to C.A. as thin irregular veinlets.							
	1-15								
	75	Grey/green heterogeneous Shales (!).							

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DIAMOND DRILL LOG

Hole No 1250 Page No 4

Feature :

Bedding

Foliation

Fragment - size & shape

Shearing

Fault

Vein

carbonate
 quartz

Beccia

Mineralization :

Trace 1-5%
Common 5-15%
Abundant 15-60%
Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
	74.10	Chaotic sequence of finely bedded greyish-green siliceous buffaceous(?) shales with minor limestone. Composed mainly of fragments, sections of micro faulted bedded shales. Possible fault between 74.70 and 75.1 which has been healed by calcite. Network of calcite veins at 75.20							less 1% pyrite associated with the fault zone and as rare clots or patches
	80	Limestone blocks at 80.7, finely bedded and boudinaged in a chaotic shale matrix, End at 81.6							
	85	Calcite infilled tension cracks regularly oriented whitish calcite or carbonate veins within micro faults and cross cutting the core							
	87-75	Contact with unit below quite sharp.							
	87-10	Limestone Fractured limestone with interbedded shale. Beccia at 88.50 with calcite veins.							
	90	<u>Grey Shales</u> Monotonous sequences of sheared fine grained evitic grey shales with interbedded block shales and minor limestone. Micro faults are quite common. The unit often appears quite fragmented and the core is broken. Limestone clasts occur within the shaly matrix at 90.60 94.65 - 95.10, 99.50.							
	95								
	100								

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DIAMOND DRILL LOG

Hole No **1250** Page No **6**

Feature : Bedding Shearing
 Foliation Fault
 Fragment - size & shape Vein carbonate
 size & shape q quartz

Mineralization : Trace 1-5%
 Common 5-15%
 Abundant 15-60%
 Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
	130	The shales are generally the same as previously mentioned. Some areas are sheared (127.9-128.6, 132.8) Limestone units - 6cm at 127.50, 126-126.5 - generally massive, bandaged and faulted (breccia, calcite - parallel to core axis) Possible graded bed'g at 126.25 showing sequence youngs up the hole Bed'g. ~ 45° C.A. 129.90 - 129.50 - limestone unit with minor interbedded shale, crosscutting calcite veins and calcite filled breccia zones - generally well bedded - graded bed'g. younging up hole at 129.20, bed'g 50° C.A. chaotic shales, more massive for remainder of sequence. Contact with lower unit is sharp. Bed'g. 45° to C.A.							fine grained pyrite in limestone units generally as discrete crystal, rarely seen in shaly rocks.
	135	<u>Limestone</u> Massive generally well bedded pale grey fine grained porous limestone, with minor shaly interbeds. Sections are broken and fractured with network of tension cracks giving a fragmental appearance. Sporadic calcite veining and fracture filling generally 2mm but to 1cm, distributed a several angles to core. Bed'g 45° C.A. at 137.5 Thin 2cm finely laminated grey slt at 143.80 Bed'g 40° C.A. lower contact not seen Minor micro faulting associated with tension cracks.							Finely disseminated pyrite with local concentrations on joint planes and within shaly chloritic sections along tension cracks. < 1%.
	145	<u>Grey Shale</u> - Poorly bedded grey shale with fractures filled by calcite.							
	3.00	<u>Chert</u> - Well bedded 95% HCB fine g. grey.							
	3.00	<u>Grey Shale</u> - Finely laminated fine grained grey shale - chlorite alteration in its adjacent to calcite veins							
	3.00	<u>Chert</u> - pale grey fine grained poor to moderately well bedded chert with dendritic fracture pattern.							
	2.20	<u>Grey Shale</u> - chaotic poorly bedded fine grained grey shale - chlorite alteration in carbonate veins. lower contact possible faulted - carb fill, slickensided							
	150	<u>Chert</u>							

23 32 5



DIAMOND DRILL LOG

Hole No 1250 Page No 7

Feature : Bedding Shearing
 Foliation Fault $\frac{F}{-}$
 Fragment-size & shape Vein c carbonate
 q quartz

Mineralization : Trace 1-5%
 Common 5-15%
 Abundant 15-60%
 Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
	1-25	fine grained, greyish poorly bedded chert - dendritic fracture pattern							
	1-35	Grey Shales - poorly bedded, fractured and disrupted - sideritic micro veins.							Minor disseminated pyrite in fractures and veins.
	0-75	<u>Chert</u> Pale grey fine grained chert with dendritic fracture pattern. Pale calcite veining - 1/2 cm at 154.2 - contains qtz and calcite some open cavities with partial re-crystallized quartz - possible fault 50° to C.A.							
	155	Fault at 157.12 - filled with calcite and chlorite slickensides present 48° to lower contact sharp.							
	157-45	Grey/Brown Shales - finely bedded grey shales and grey/brown shales, transitional phase. Irregularly fractured with calcite & chlorite fill. Bed's 45° C.A. Fragmental texture towards base. Contact with underlying unit 30° to C.A, possible breccia and alteration. Micro faulting common.							
	160	Grey/Green Tuffaceous Shale Finely laminated siliceous buff/shale. Tension cracks commonly filled by chlorite and calcite - micro faulting common. Contact with unit below is gradational over last 10 cm. Bed's 50° to C.A.							Minor embedded pyrite, fine grained chertopyrite
	165	Red/Brown Shale Massive to poorly bedded with micro faults and green patchy altered chloritic shale clasts.							
	165-90	Grey/Green/Brown Shale - Finely bedded shales - minute calcite veins, fractures filled with chlorite. Bed's 60° to C.A. lower contact gradational. Fault - disruption of bed's - chlorite calcite filled! 45° C.A.							
	170	Red/Brown Shales/Tuffs. Finely laminated fine grained shales with grey/green interbedded tuffaceous shales. The brown shales are monotonous with streaky or patchy greenish alteration zones. Mainline fractures filled with calcite, chlorite oriented at irregular angles. Finely laminated tuffaceous shales.							Minor sulphides, but 2% pyrite with minor chertopyrite occurring in green tuff between 172-45 - 172-98 The pyrite occurs as round balls upto 1/2 cm in diameter but more commonly 2mm, in thin veins and fractures and as fine grained crystals on cleavage
	175								

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DIAMOND DRILL LOG

Hole No **1250** Page No **8**

Feature : Bedding Shearing
 Foliation Fault
 Fragment-size & shape Vein carbonate
 quartz

Mineralization : Trace 1-5%
 Common 5-15%
 Abundant 15-60%
 Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
	0.0	greyish green in colour from 170.86 - 171.30, 172.45 - 172.98, 173.64 - 173.74, 178.36 - 179.88. - All units are fine grained with chlorite developed on fracture planes. Calcite/chlorite vein at 172.72 and chloritic patches with small scale fracturing occurs between 172.45 - 172.98.							planes: Dissemination of pyrite within brown shales on cleavage planes Minor patchy aggregates of chalcopyrite associated with veins.
	180	Beddy 30° to C.A. at 172.72.							
	181.40	Tuffaceous Shale - fine grained well bedded grey to green grey buff / shale fractured, with chlorite and calcite fill.							
	182.40	Red / Brown Shales	880						
	183	Monotonous sequence of red / brown shales altered and irregularly bedded. varying from fine scale lamination, to fragmented broken areas.							
	185	Chlorite developed in tension cracks, adjacent to calcite veins, as irregular patches and on several cleavage planes.							
	186	Sections of the core are fragmented - 182.00 - 182.15, 183.30 - 184.10, 188.50 - 188.55, 193.30 - 194.00, 194.60 - 194.67.							
	190	Fragments vary 1cm to 2cm across but usually 1/2 cm.							
	191	Calcite vein 45° to C.A. at 184.73 and 185.30 - 3mm thick.							
	195	Other randomly oriented minor veins throughout core.							
	198								
	200								

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DIAMOND DRILL LOG

Hole No 1250 Page No 9

Feature : Bedding Shearing
 Foliation Fault c carbonate
 Fragment - size & shape Vein q quartz

Mineralization : Trace 1-5%
 Common 5-15%
 Abundant 15-60%
 Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
3-1		Lower contact is gradational.							
		Grey/Green Tuff shale. Fine grained greyish siliceous shaly buff - conchoidal and irregularly bedded - clots of fine grained porous carbonate.							Minor pyrite developed on cleavage or fracture planes.
1-2		Fault zone - calcite filled - shale fragments.							Greater than 60% calcite associated with fault zone
2-3		Limestone - pale greyish fine grained porous generally well bedded. Several calcite veins - slight tension cracks and minor disruption - Bed's 95° CA. minor shale after fault zone							Pyrite found in carbonate veins.
	2-5	EOM							

23 329

338 82

1.3
3.0

1.4 = 4.6
-100
7.0 = 4.4
1.4
1.0

GEOLOGICAL LOG

SHEET No. 1

HOLE No. C.1250

From To

LIFTS			DRILL INTERVAL			BEDDING Angle to Core Axis	ROCK TYPE	DESCRIPTION	ASSAYS		
From	To	Recovery	From	To	Length				% Snt	% Sns	% Cu
0	3.0	TRICONE	0	3.0	3.0		No Core.	Tricone drilling.			
3.0	6.0	H core 1.00	3.0	7.0	4.0	Parallel	weathered choc shales	Basic Red brown shales altered to light grey with abundant limonite goethite veins and stains minor units of light grey brown soft friable clays? Structure is chaotic in nature with and parallel to C.A. it may be the result of tectonics but could be local in nature no foreign fragments appear to be present.			
6.0	9.00	1.30									
9.00	12.00	1.40									
12.00	15.00	0.45									
15.00	17.40	0.60									
17.40	18.00	0.15									
18.00	19.00	0.90									
19.00	22.00	0.50 N core.									
22.00	23.20	1.00									
23.20	24.00	0.60	7.0	7.20	0.20	45°	? Fault?	Massive goethite limonite vein appears to be brecciated			
24.00	24.60	0.50									
24.60	26.0	1.40	7.20	23.20	16.00		weathered grey shales	light grey shales with minor dark grey shale units and rare rounded blobs of soft friable limonite clays? limonite staining on joints very common and core is highly fractured general habit of unit is chaotic. Minor massive goethite veins present.			
26.00	26.60	0.20									

N.W.P.S.

GEOLOGICAL LOG

SHEET No.

HOLE No. C 1250

From To

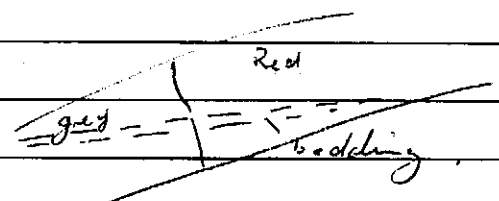
LIFTS			DRILL INTERVAL			BEDDING	ROCK TYPE	DESCRIPTION	ASSAYS			
From	To	Recovery	From	To	Length	Angle to Core Axis			% Snt	% Sns	% Cu	
26.60	28.0	1.20						27.80 - 22	grey shales contain			
28.0	28.40	0.40							minor trace of sulphides (pyrite)			
28.40	29.40	0.65							and shreds of dark grey shales			
29.40	30.00	0.05							Pyrite appears to be syngenetic.			
30.00	31.0	0.30							B.S. appears to be the end of			
31.00	32.50	1.10							major limonite staining on joints			
32.50	33.5	0.65	28.20	28.40	5.20		Red Argillites		red shales with minor grey			
33.50	34.0	0.60							and some varietal in tones of			
34.00	35.10	1.05							red.			
35.10	36.40	0.70							Upper contact appears to be interfingering			
36.40	37.00	0.50							of grey & Red rocks.			
37.00	39.40	1.50							Core still broken pyrite present on			
39.40	40.80	1.30							joints.			
									Minor banding present as part of			
									soft red deformation minor			
									sulfidation present in irregular			
									patches			

HOLE No. C1250

GEOLOGICAL LOG

SHEET No.

From To

LIFTS			DRILL INTERVAL			BEDDING	ROCK TYPE	DESCRIPTION	ASSAYS		
From	To	Recovery	From	To	Length	Angle to Core Axis			% Snt	% Sns	% Cu
40.80	43.0	1.65	39.95	43.80	3.85	45°-5°	grey shales	light to mid grey banded shales			
43.00	44.0	1.00						banding disturbed in detail.			
44.00 44.00	45.39	1.20						contact with limestone sharp.			
45.39 45.39	47.70	0.95						Core still broken along bedding.			
47.70 47.70	49.00	1.25	43.80	45.75	1.95		Red argillites.	fine pyrite along some bedding (syngenetic) med. Red argillites minor tonal			
49.00	52.00	3.00						variations in colour & minor			
52.00	55.00	2.95						variation in grain size Bedding			
55.00	58.00	3.00						disturbed.			
			45.75	46.55	0.80		grey shales	high grey pyritic shales this appears to be a variation of the red units as bedding is continuous across the colour contact			
											
			46.55	47.70	1.15	45°	Fault.	Pyritic and carbonate infilled breccia of grey and red rocks			

GEOLOGICAL LOG

HOLE No. C1250

SHEET No.

From To

LIFTS			DRILL INTERVAL			BEDDING	ROCK TYPE	DESCRIPTION	ASSAYS		
From	To	Recovery	From	To	Length	Angle to Core Axis			% Snt	% Sns	% Cu
58.00	61.00	3.00	47.70	73.95	26.25	45°	Red. Argillite	Red finegrained shales.			
61.00	62.40	1.35						Upper fault contact grey for 5m			
62.40	64.00	1.50						Unit disturbed in detail			
64.00	67.00	2.90						52.55 and 53.2 ^{62.95} Sub rounded to			
67.00	69.20	2.00						rounded. 5cm hard cobbles of			
69.20	70.00	0.80						white fine grained limestone in grey shales.			
70.00	73.00	2.90						Tonal variation in colour			
73.00	74.80	1.75						display the disturbed nature of			
74.80	78.00	3.10						the unit. Pyrite is common in			
78.00	80.00	2.00						veins and on joints.			
80.00	81.80	1.80						Joints near parallel to C.A.			
81.80	83.40	1.50	73.95			0-80	grey shales.	mid to light grey. highly chaotic and			
83.40	85.90	2.25		74.80		45	FAULT (carb. infill)	disturbed shales. minor variation in			
85.90	88.00	2.10						grainsize (fine-medium) and colour.			
88.00	91.00	1.60						Banding if recognizable varies in			
								less than 1 meter from parallel			
								to CA to 80°.			
								Chlorite infill of fine tension			
								fractures.			

N.W.P.S.