ABMINCO N.L.
CLEVELAND MINE

CATEGORY: MINE EXPL^N

HOLE No.: C1395 REF No 18563

GENERAL DATA

Objective: Va Section RL 00m

Area of Operation: 19 Diamond Drill Drive Location: Va Sect RL100m

Collar R.L.: ~~993m~~ 99.559m Co-ordinates: 15 716.138 N, 11048.770 E.

Bearing of Hole: 130° 54' 08" (132) Angle of Hole: -32° 18' 18" (-33½) Final Depth: 396.5m

Drilling Commenced: 15/5/79 Completed: 31/5/79 Logged by:

DRILLING DATA

Drilled by: LONGYEAR

Drilling Rig: EHS 38

Driller(s): P. Chinner, P. Hardy.
K. NEWMAN, S. TROON

Non Coring:

Coring TO: NQ: 29.35m BQ TO 396.5m

Core Recovery:

HOLE SURVEYS

HOLE No.: 1395

NWPS 24164

ABMINCO N.L.
CLEVELAND MINE

CATEGORY: MINE EXPL^N

HOLE No. : C1395

GENERAL DATA

Objective : ~~#9~~ Da Va Section RL 00m

Area of Operation : 19 Diamond Drill Drive Location : Va Sect RL100m

Collar R.L. : ~~993m~~ 99.559m Co-ordinates : 15716.138 N, 11048.770 E.

Bearing of Hole : 130° 54' 08" (132) Angle of Hole : - 32° 18' 18" (-33½) Final Depth : 396.5m

Drilling Commenced : 15/5/79 Completed : 31/5/79 Logged by :

DRILLING DATA

Drilled by : LONGYEAR Non Coring :

Drilling Rig : EHS 38 Coring : NQ: 29.35m BQ TO : 396.5m

Driller(s) : P. Chuniner P. Hardy.

K. Newman, S. Toon Core Recovery :

HOLE SURVEYS

HOLE No. : C1395

NWPS 24164

HOLE No. :

SAMPLE DATA

SHEET No. :

LENS	SAMPLE No.	ROCK TYPE	Σ	INTERVAL From	INTERVAL To	Length (L)	Assays (A) % Snt	Assays (A) % Sns	Assays (A) % Cu	Assays (A) Σ	Product (A x L) P. Snt	Product (A x L) P. Sns	Product (A x L) P. Cu
	248055							0.02	5.46	0.55			
	248056						0.01	0.02		0.04			
	248057						0.01	0.02		0.03			
	248058			231.5	232.1	0.62		0.03		0.22			
	248059	SHALE		232.27	233.04	0.77		0.01	0.02	0.04			
	248060	SHALE		233.06	233.70	0.64		0.01	0.10				
	248061	SHALE		233.70	234.50	0.80	0.01	0.01	0.02	0.03			
	248062	SHALE		234.50	235.24	0.74	0.01	0.01	0.04				
	248063	SHALE		235.24	235.70	0.46		0.02	0.02	0.02			
	248064			235.70	236.20	0.50		0.03	1.57	2.50			
	248065			236.20	236.62	0.42		0.02	0.02	1.15			
	248066	CALC/LST.		236.62	237.32	0.70		0.04		1.75			
	248067	LIMESTONE		237.32	237.91	0.59		0.04		0.12			
	248068	LIMESTONE		237.90	238.55	0.65		0.02		0.20			
	248069	LIMESTONE		238.85	239.43	0.58							
	248070	LODE		239.43	239.74	0.31							

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N.W.P.S.

HOLE No.: C 1395 (...)

SAMPLE DATA

SHEET No.: 5

LENS	SAMPLE No.	ROCK TYPE	Σ	INTERVAL From	INTERVAL To	Length (L)	Assays (A) % Snt	% Sns	% Cu	Zn	Product (A x L) P. Snt	P. Sns	P. Cu
	248071	...LE-CHERT		239.74	...71	0.13	0.04	0.02	0.02	0.01			
	248072	...IMESTONE		...21	3...47	0.26	0.01	0.01	0.03	0.09			
	248073	CHERT		24...49	...17	0.70	0.01	0.01	0.03	0.02			
	248074	...HERT		...41	...77	0.0	0.01	0.02	0.02	0.02			
	248075	...E-LST		...22	...61	0.03	0.04	0.03	0.07	0.20			
	248076	LIMESTONE		...26	246.28	0.72	0.03	0.03	0.03	0.20			
	248077	LIMESTONE		...44	...51	0.73	0.06	0.03	0.05	0.53			
	248078	LIMESTONE		...01	246.20	0.19	0.02	0.02	0.05	0.20			
	248079	LIMESTONE		246.0	246.67	0.67	0.05	0.03	0.06	0.66			
	248080	LIMESTONE		...5	...6	0.21	0.02	0.04	0.05	0.96			
	248081	LIMESTONE		247.36	...1	0.67	0.03	0.03	0.06	0.33			
	248082	LIMESTONE		...-5	-61.01	0.76	0.01	0.03	0.04	0.07			
	248083	LIMESTONE		...91	...22	0.31	0.02	0.03	0.05	0.09			
	248084	LIMESTONE		...73	25...1	0.76	0.02	0.03	0.05	0.04			
	248085	LIMESTONE		252.19	251.39	0.90	0.01	0.03	0.03	0.05			
	~~248086~~												
	248086	...CHERT		253.93	254.30	0.37	0.02	0.05	0.05	0.04			
	248087	...E/LST		254.30	254.52	0.22	0.04	0.04	0.12	2.00			
	248088	LIMESTONE		254.52	254.80	0.28	0.03	0.06	0.05	0.17			

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N.W.P.S.

HOLE No.: [illegible]

SAMPLE DATA

SHEET No.: 4

LENS	SAMPLE No.	ROCK TYPE	Σ	INTERVAL From	INTERVAL To	Length (L)	Assays (A) % Snt	Assays (A) % Sns	Assays (A) % Cu	Assays (A) Zn	Product (A x L) P. Snt	Product (A x L) P. Sns	Product (A x L) P. Cu
	248193	[illegible]		[illegible]	[illegible]	[illegible]	0·04	0·02	0·08	0·65			
	248194	[illegible]		[illegible]	[illegible]	[illegible]	0·01	0·04	0·07	0·08			
	248195	[illegible]		[illegible]	[illegible]	[illegible]	0·02	0·02	0·21	0·30			
	248196	[illegible]		[illegible]	[illegible]	[illegible]	0·02	0·02	0·16	0·05			
	248197	min sh/LST		355·20	356·28	1·08	0·01	0·02	0·13	0·10			
	248198	min ch/sL		356·28	357·08	0·80	0·08	0·02	0·15	1·40			
			Σ	231·65	272·10	40·45							

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N.W.P.B.

mag. −4° for grid

ABMINCO N.L. - Cleveland Mine

Hole No. C 1395

Sheet No.

DIAMOND DRILL HOLE DATA

PROGRAM DATA				SURVEY DATA				INTERPOLATED DATA		
				Instrument Type	Depth	Dip	Azimuth	Depth	Dip	Azimuth
1	Attitude	—	(+) (-)	Survey.	ϕ	−32 1/3°	131°	12½	34	131½
				Camera	9.5	−34	126 (130)	37½	35	132
2	Hole No.	1395		"	30	-35	— (60)	62½	34½	132
				"	45	−34½	— (60)	87½	33½	131½
3	Down Hole Interval	25		"	70	−34	132 (136)	112½	33	131½
				"	100	−33½	131 (135)	137½	32½	131½
4	Collar	15716.138	N	"	130	−32½	131.5 (135.5)	162½	32½	132
				"	160	−32½	— (164.5)	187½	31½	133
5	Co-ords.	11048.770	E	"	190	−31½	133 (137)	212½	30½	134
				"	225.5	−30	— (114)	237½	29	135
6	Collar R.L.	~~99.3~~	99.559	"	251	−28½	136 (140)	262½	28	137
				"	291.5	−27⅝	138 (142)	287½	27	138
7	Halls Sect. Va Intersect Point	15730.490	N	"	326	−27	135 (139)	312½	27	
				"	366.5	−24¼	138 (142)	337½	27	
8		11032.613	E	"	396.5	−23½	— (272)	362½	25	138
								387½	23½	138
9	Battery Sect. FA Intersect. Point	15409.213	N							
10		10838.117	E							
11	Start Plot (Depth)	ϕ	ϕ = Collar							

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DOWN HOLE PLOT

Hole No: 1395

Sheet No:

DEPTH	PLAN			CROSS SECTION		LONG SECTION				DEPTH	PLAN			CROSS SECTION		LONG SECTION			
	N	E	RL	Dist. from H.R.P.	Dist. from B.R.P.	Dist. from Halls	Sect. Va	Dist from Batt.	Sect. FA		N	E	RL	Dist. from H.R.P.	Dist. from B.R.P.	Dist from Halls	Sect.	Dist. from Batt	
ϕ	15716.138	11048.770	99.3	21.61	91.06	0.25		360.95											
25	15702.40	11064.29	85.32	42.33	110.38	0.53		353.46											
50	15688.70	11079.51	70.98	62.81	129.41	0.63		345.89											
75	15674.92	11094.82	56.82	83.41	148.55	0.72		338.27											
100	15661.10	11110.44	43.02	104.26	167.99	1.01		330.73											
125	15647.21	11126.14	29.41	125.23	187.54	1.29		323.15											
150	15633.24	11141.93	15.97	146.31	207.20	1.57		315.53											
175	15619.13	11157.60	2.54	167.39	226.79	1.67		307.74											
200	15604.59	11173.19	-10.52	188.71	246.45	1.40		299.51											
225	15589.63	11188.68	-23.21	210.24	266.18	0.76		290.85											
250	15574.17	11204.15	-35.33	232.08	286.04	-0.28		281.72											
275	15558.02	11219.20	-47.07	254.08	305.77	-2.10		271.80											
300	15541.47	11234.11	-58.42	276.24	325.49	-4.33		261.45											
325	15524.92	11249.01	-69.77	298.41	345.21	-6.55		251.10		325	1552545	11249.58	-69.77	298.47	345.56	-5.77		251.7	
350	15508.36	11263.92	-81.12	320.57	364.93	-8.77		240.74		350	1550970	11265.33	-81.12	320.72	365.82	-6.83		242.4	
375	15491.52	11279.08	-91.68	343.11	385.60	-11.03		230.21		375	1549296	11280.49	-91.69	343.26	385.86	-9.09		231.9	
400	15474.49	11294.42	-101.65	365.93	405.30	-13.32		219.56		400	1547528	11295.83	-101.65	366.07	405.16	-11.38		221.3	

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Feature — Bedding, Foliation, Fragment (size & shape), Shearing, Fault, Vein (c carbonate, q quartz)

MINERALIZATION — Common 5–15%, Abundant 15–60%, Massive > 60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	DEPTH m	MINERALIZATION
1.50	0–2	SANDSTONE Mid-grey fine-medium grained lithic arenite with zones of paler-coloured coarse grained, very poorly sorted. ? Fault - pale brown sandstone few cm either side of quartz-calcite vein		X0.1	sp, cpy blobs.
1.51	2			X0.6	fault ? quartz-calcite vein 4cm thick
3.1	4			X4.0	qtz cpy po veins, 60°, 0.3cm thick veinlet - calcite
				X5.7 X5.8	vein, 1cm thick 60° ∠, cpy, po, sp
0.5	6			X6.0	veinlets cpy, carbonates
				X6.5	vein: qtz py po cpy sp, 1cm thick ∠50°
3.0	8	band of pale grey soft poorly sorted coarse grained sandstone with clayey matrix.		X7.15 X7.3	veinlet po, ca. 2 veinlets quartz chl; qtz po py chl.
0.9	10				
3.01	12			X11.2	vein, 0.3cm thick, 25°, qtz calcite ? po.
				X12.75	calcite veinlet
3.00	14	15.4 fault ? slickensided break at 40° ∠.		X15.2	vein siderite ? pyrite 0.3cm thick
		16.2 broken zone with pyrite vein, then very coarse grained poorly sorted, paler grey sandstone with disrupted bedding.		X16.0	cpy - calcite veinlet
0.4	16			X16.6	vein: qtz - po - gn - ca.
3.03	18			X17.5	vein: qtz po cpy, 0.3cm thick
				X18.55	sp blobs
2.90	20	20.90 coarse grained paler grey zone. badly sorted, massive bedding. - 21.50.		X19.65	sp veinlet
				X20.5	odd blobs and veinlets of sphalerite thro'out → vein qtz calcite sp minor py
3.01	22–24				
0.56	26				
2.27	28				
1.86		change to smaller core barrel.		X29.3	2 veins: qtz, po 20%, cpy 10%
1.23	30	30.7 becomes pale grey, coarse grained		X29.65	12cm thick, ∠45° (second one 70% qtz, 25% po, 5% py) 1% sulphide
		31.12 bleached zones to 31.94 - sss brown, pyrite		X31.54	→ vein 5cm thick, 70% py, 20% po, qtz sp 5% calc ca.
2.98	32			X32.7	→ vein: qtz 70%, po 20%, cpy 10% 4cm thick
100%	34–36	36.23 becomes fine grained and chaotic. 37.57 - 39.27 zone of chaotic bedding, sandstone fragments in shale, overall colour paler.		X36.3	vein: sp, qtz, chl, siderite, minor py
3.03	38			X38.8	interstitial sp in chaotic zone
0.9		Then pale coloured coarse grained unsorted sandstone with disrupted bedding.		X39.55	vein 9cm thick, ∠60°, qtz cpy minor sp
0.4	40	40.15 - .65 zone as above - chaotic.		X40.7	vein qtz
3.04	42	Return to pale coloured coarse grained unsorted lithic arenite generally massive bedding.		X41.4	vein qtz, minor sp
5.0				X42.2	sp blobs
2.9	44			X42.9 X44.0 X44.5	py blobs, then vein 5cm thick pyrite vein, 10cm thick, ∠40°, cpy, sp, po
0.7	46	45.0 - .7 chaotic bedding. 45.7 Return to "normal" mid-dark grey medium grained unsorted sandstone, minor fg. and cg zones.			
3.03	48	48.3 onwards bedding disrupted to chaotic.		X48.9 - 49.1	calcite - sphalerite veins and blobs.
	50			X49.75	veins - qtz calcite

Left margin depths: 1.50, 3.0, 6.0, 6.5, 9.5, 10.5, 15.5, 18.5, 21.5, 24.55, 25.10, 27.50, 30, 30.50, 33.5, 36.5, 39.5, 42.5, 45

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Feature — Bedding; Foliation; Fragment (size & shape); Shearing; Fault; Vein (c carbonate, q quartz)

Mineralization — Trace 1–5%; Common 5–15%; Abundant 15–50%; Massive > 50%

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CORE REC'D	DEPTH m	GEOLOGY
3.04	50–52	SANDSTONE (cont) mid grey fine–medium grained, poorly sorted, bedding ~~qtz~~ usually chaotic. Local paler coloured coarser grained zones
2.75	56	
3.76	58–60	Bedding generally massive below 59.0
2.96	62	
3.01	64–66	63.5–64 Bedding disrupted. Sediments in this zone paler, coarse grained, poorly sorted. Revert to massive mid grey medium grained sandstone. 65.9 shear zone, minor clay present. 66.3–.8 chaotic bedding, some finer grained sandstone
2.96	68	67.5–68.2 chaotic pale grey chert-in shale or very fine grained sandstone
3.06	72	
2.95	74	
3.0	76–78	75.9 zone of coarse-grained paler coloured arenite, well jointed.
3.03	80	78.5–80.7 pale brownish-grey ? pyritic or sideritic soft badly sorted ing SS some shale clasts 3 cm diam. in chaotic sections, remainder disrupted ss (79.5)
2.95	84	83.75–84.0 chaotic thin cross-bedded fine grained sandstone, minor shale ? fault in shale at 84.0
2.97	86	
2.99	88–90	
3.01	92	91.97–93.0 very chaotic fine grained ss and shale.
3.07	94	94.6 black shale band 0.12 m thick.
3.01	96–100	95.65–96.6 chaotic zone, mainly fine grained sandstone.

Run depths (left margin): 51.5, 57.5, 60.5, 63.5, 66.5, 69.5, 72.5, 75.5, 78.5, 81.5, 84.5, 87.5, 90.5, 93.5, 96.5, 99.5

DEPTH m	MINERALIZATION
50.56	qtz veins
51.9	sp blobs
55.7	slickensided break.
55.9	vein 0.2–0.5 cm thick, qtz-ca
58.6	quartz veinlets
61.1	vein 1 cm thick, 40°, qtz minor [illegible]
61.6	vein 3 cm thick, 50°, qtz ca, cpy, sp
62.1	vein: thickness unknown, qtz cpy sid. 3.5 cm long. Then sp blobs in ss.
62.5	vein: 10 cm + thick, qtz also 3 cm long, v. minor cpy
6x	blobs of cpy, minor veinlets.
64.75	sp blobs.
65.9	vein: qtz, siderite, v. minor sp
66.9–67.7	sp blobs
68.97	vein qtz cpy ca sp 30°, 0.5 cm thick, branches
69.8	vein 1 cm thick, 60, qtz cpy po ca
70.4	ca veinlet, minor cpy, qtz.
70.25–71.05	sp blobs throughout
71.46	veinlet sp, cpy minor ca. blobs are cpy; veinlet at 71.45 is [illegible] blobs revert to sp. (py) cpy
73.7–74.3	minor veinlets siderite.
75.3	big blobs sp
78.9	vein qtz, 1 cm thick, 40°
79.5	vein, 5 cm thick, 45°, qtz, minor py
80.6	sp blobs
81.25	vein: qtz ca cpy po.
84.0	sheared, 20°
85.8	cpy blobs
8x.2	sp blobs in wispy fg ss, at contact with ngss below.
90.14	vein, 1 cm thick, 50°, qtz, ca, cpy,
93.0	vein - quartz, 1 cm thick
95.0	vein qtz, minor ca, v. minor cpy.
95.6	veins qtz ca, 0.3 cm thick, 50°
96.0	vein qtz ca, 1 cm thick, 30°, 50°
97.8–98.3	veinlets & blobs cpy, rare qtz & ca
98.65	vein- calcite qtz

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%

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Run (m)	CORE REC'D	DEPTH m (100)	GEOLOGY	DEPTH m	MINERALIZATION
	2.91	102	SANDSTONE (cont) chaotic to 102.6. Reverts to midgrey evengrained disrupted sandstone. 2.2 – .35 sandstone brownish, chaotic.	X0.16	vein 0.3 cm thick, ∠45°, qtz.
				X2.42	vein-qtz, 6 cm thick, ∠45°. veinlets of green soft mineral within the quartz – ? brucite?
102.5	3.08	104	10?.4, veinlet – qtz, calc, 2 cm. 104.3 becomes very chaotic. Matrix to chaos is finegrained sandstone or shale. Brownish grey ?pyritic to 105.5, ... then pale brownish grey chaotic mass to vein at 106.2	X2.5	vein 1 cm thick, ∠40°, qtz ca.
				3.5	vein – qtz ca. 1 cm thick ∠50°
				X3.2	vein – qtz ca cpy 2 cm thick ∠50°
105.5		106		X4.5–.6	vein – qtz, minor ca, 7 cm thick, 45°
	2.99	108	Then midgrey very chaotic medium-fine grained sandstone. Interstitial shale is green chloritic below 106.7 (Rare blobs of sp.) for a few metres.	X6.2–.7	vein: 0.5 m thick; qtz edge, central sulphides po-cpy-central sp. (zoned roughly) 60% po 20% py 10% sp 10% qtz 106.22–6.47. Then sp ...
108.5	3.01	110	Occasional more massive mediumgrained zones	X8.4, 8.57, 9.2	→ veinlet cpy po ca, also at 7.6
				9.7	→ cpy blebs & veinlets / vein – qtz ca po cpy sp
111.5		112		X11.5	cpy blobs
	3.04	114			
114.5	3.02	116		6.6	veins: qtz carbonate
				X6.9–7.4	zone of small veins: qtz ca, minor cpy po sp.; 1–7 cm thick.
117.5	3.03	118			
		120		0.8	veinlet calcite-qtz.
120.5	2.98	122		X21.2–.9	blobs and veinlets of cpy, sp, ± qtz, ca.
123.5	2.97	124	123.5, fault ∠70° – slickensided joint. 124.4–.6 fault zone – core badly broken, veinlets numerous – qtz, ca.	X4.4–.6	veins – qtz, minor po, v. minor py
		126		X6.6–7.1	blobs and veinlets cpy, sp, minor ca.
126.5	2.97	128			
129.5		130		X1.0–.3	veins qtz-ca. minor cpy
	2.95	132	SHALE black, massive, v. finegrained, lower contact ∠60°	X1.9–2.1	vein; fault – slickensided joints
132.5			SANDSTONE as before, chaotic, rare bands of massive black shale.	3.0.2	faults
	3.0	134		4.6	fault ∠80°, slickensided joint with ca.
				X5.2	vein: sp, ca, qtz. 0.5 cm thick ∠30°
135.5		136		6.0	fault – slickensided joint
135.5	3.04	138			
	2.98	140		X9.75	veins – ca, minor qtz
				140.7–.9	well jointed zone with green of qtz 2 cm thick, ∠30°
141.5		142		X2.4	vein, 2 cm thick, ∠60°, qtz
	3.02	144			
144.5	3.02	146	145.88 – 146.9 shale: chaotic or massive silicified dark brown – black.		
147.5		148		X7.7	vein, 2 cm thick, ∠30°, qtz cpy sp py
	2.97	150		9.9	veinlet – calcite

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 150	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
150.5	3.00	152	SANDSTONE (cont) – chaotic, minor bands of black massive shale, occasionally silicified. 151.78-.92 silicified hard dark brown shale						51.1	vein, 1cm thick, ∠50°, qtz calcite ?chlorite
153.5	3.03	154							x3.4	vein: qtz, ca, v. minor cpy, 1cm thick, 70°
		156							x4.1	vein: qtz cpy at ca, sp, 0.5cm thick, (ca 30%), ∠30°
									x5.5	vein: qtz, ?fl, 2cm thick, ∠40°
									x6.0 / x6.1 / .2	vein / vein } qtz 5cm / 2cm } thick, ∠60°
156.5	2.93	158	SHALE 156.93 – 159.66 black very fine grained massive but occasionally chaotic bedding. Most joints have slickensides						8.66	shear zone
159.5	3.01	160 / 162	SANDSTONE as before, bedding is massive to disrupted with minor chaotic zones						x1.05	vein 0.3cm thick, ∠30°, sp, chl, qtz
box 30 162.5									x2.35	veinlets sp, qtz, ca
									x2.5-9	small veins - qtz chl minor ca.
	2.99	164							x3.5	vein - qtz, ca, 1cm thick
									x4.0	vein - qtz 1cm thick
165.5	3.02	166	minor black shale bands							
168.5	2.98	168 / 170	8.3 core badly broken, white clay on one surface. Sandstone is generally massive or occasionally slightly disrupted						8.3	fault zone
									x9.8-.0	vein: qtz, po enclosing cpy, minor sp, 12cm thick, ∠55°
									x9.5-10	veinlets and wisps of sp
171.5	3.0	172 / 174							x3.8	blobs of po.
174.5	3.01	176	sandstone massive, medium-grained, well-sorted						x5.0	vein 0.3cm thick, sp, cpy qtz
									x6.5	vein qtz
177.5	3.07	178 / 180								
180.5	2.9	182	181.0-.3 very fine grained hard khaki ss. 181.4-.75 core badly broken, shale bands present. 182.7-.75 banded ?tuff. Sandstone below has chlorite wisps, then becomes massive fine-medium grained, greenish grey						x21.4	vein network: qtz, minor ca, cpy, sp, ?gn.
183.5	3.08	184							4.1	v– s
186.5	3.01	186 / 188								
189.5	2.99	190 / 192	Bands of very fine grained shale or chert, chaotic						x1.0	vein: qtz, minor cpy, sp, po, 1cm thick
192.5	3.06		Continuous band of shale/chert – chaotic grey purple, becoming grey towards base locally ?chloritic							
193.0	2.32	194								
195.5	3.02	196	Generally fine grained dark-mid grey sandstone, local bands of chaotic chert-shale							
198.5	1.85	198 / 200							x.6	vein qtz, minor carbonate, 2.2cm thick.

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 200	GEOLOGY	DEPTH m	MINERALIZATION
			SANDSTONE as before, massive	0.5 / 1.5	vein: qtz cpy 1 cm thick; ∠ 60° / vein: qtz ?chlorite. 2 cm thick, ∠ 40
201.5	0.97	202	SHALE as below. Initially here-d brown chert silicified at base. (silicified black shale plus ss band)	x2.6	vein qtz chl 0.3 cm thick
202.6	1.94	204	SANDSTONE as before, fairly massive		minor qtz-ca veins
204.5	2.99	206	SHALE: black-very dark brown, usually soft, very fine grained, massive shale. Minor sandstone bands towards base of this unit, similar to underlying sandstone		minor qtz-chl minor ca veins. occasional joints
207.5	3.04	208 / 210	SANDSTONE as before, becoming slightly carbonate-rich.		
210.5	3.06	212	SHALE as before. SANDSTONE as before		
213.5	2.99	214 / 216	SHALE black & v. dark grey, massive. Minor bands of sandstone. Pink mineral in bands and disseminated 215-216. ?jasplite, maybe Sn.	x 3.85 / 5.0 / x5.6-6.04	vein qtz cpy ca sp. / vein, 1.5 cm thick qtz, pink jasplite? 60° / pink hard crystals ? SnO_2? 40°
216.5	3.01	218	CHERT - pinkish-brown very fine grained, v. hard interbedded occasionally with chaotic black shale.	x8.0	vein - qtz ca minor cpy 0.3 cm thick
219.5	2.99	220 / 222	SHALE black - very dark grey massive, very fine grained. Local patches of quartz blebs, wisps or small veins.		
222.5	2.97	224		x2.5	vein - qtz, v. minor cpy, ar 1.5 cm thick
225.5	3.05	226 / 228	becomes very hard - silicified.		
228.5	3.02	230	softer below quartz vein	x.96	vein 2.5 cm thick, qtz ca chl minor py, po
231.5		232	LODE green fine grained, banded & chaotic ?chloritic [illegible]	x	po 40%, cpy 10%, sp 5%, chl-qtz 40%
	2.95	234	SHALE as above but bedding is chaotic shale in shale. V. hard - ? silicified. 233.2 fault. 234.5 becomes siliceous mid-pale grey, lode-bearing	x 3.2	q veins in shatter zone of 0.15 m
234.5	2.97	236 / 238	LODE green chloritic fine grained tuff, minor white-ish breccia / bands of black-brown silicified shale then v. pale grey fine grained well sorted limestone. Pattern repeated randomly. 236.2 shatter zone.	x / x5.6 / x7.43	cpy 10% po 5% sp 30% gn, qtz-chl 55% stockwork, then as above. 236.7 patches: po 40% sp 10% cpy 10%. veinlet ar / veinlet ar (continue to 251.4)
237.5	2.99	240	chert breccia band (white), then pinkish brown chert merging with black shale.		237.53 probably unmineralised, however small patches of sulphides to 251.4, so the lot is sampled.
240.5	2.51	242			
243.5	3.00	244 / 246	243.0 core very badly broken - black shale, patchily silicified. 243.21 pale grey fine grained banded limestone, minor tuff (green) or massive chert (pale brown)	x3.2	extensive veining of qtz-calcite (black & white) from here to 250.7, minor cpy + po (5% and 2%) rare py and ar in veinlets (1% each)
246.5	2.98	248			
249.5		250	249.81 band of black chert (?=silicified black shale) 0.5 m thick, then reverts for 0.15 m	x	po patch in black chert (si shale)

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	DEPTH m	MINERALIZATION
	3.03	250 / 0.5 / 0.35	(CHERT – black, ?silicified shale, then band of green chloritic ?tuffaceous chert, then SHALE reverts to black, hard, v. fine grained, chaotic shale, silicified in part. Bands of white chert locally.		X	veinlets of ar, ca, po or chl.
252.50		252				
252.94	0.38				2.95	veinlet ar
	2.61	254	CHERT – LIMESTONE (253.7) very pale grey, locally green, very fine grained, fairly hard, massive to finely laminated; occasional pink 'chaotic' or white brecciated hard chert bands. Quartz-black calcite veins (rarely with ‖ sides) may carry sulphides. Rock generally reacts with dilute HCl.			veinlets and blebs of sulphide, mainly po, throughout all sampled.
		255				
255.5		256				
	2.94	257	257.0 → pink chert band, minor green laminae		x	po, blebs
258.5		258				
		259				
	2.97	260	SHALE band – hard, massive, black.		10.85	vein – ar 0.3 m thick.
		261				
261.5			chaotic veins of mainly calcite in green chloritic matrix; calcite becomes generally white rather than generally black below this.		X	vein: ar, minor sp, ca.
		262			X	small [illegible]: po 20% sp 15% cpy 1% Ca 10%, qtz chl 50%; part is missing.
		263				
	2.90	264	Fine laminae – pink & green: ?tuffaceous chert.			
264.5		265	pink chert bands, minor green tuff laminae.			
	3.01	266				
		267				po veinlets.
267.5		268				
	2.98	269	Band of dark brown chert, minor black shale		x	cpy blobs
		270	calcite veins, brown chert, minor mudstone (all fine grained). Minor dark green tuff.			
270.5						
271.2	0.35	271	white chert breccia. fault 75° ∠		X 0.9 / 1.2	blebs (cpy 20%, minor po 15% & sp 5%; qtz 50%, [illegible] 10%)
	1.64	272	→ CHERT breccia (white, minor green tuff, then white chert breccia in pink brown chert, then pink-brown chert, v. hard, v. fine grained (may be silicified shale)		x 1.6	cpy blebs, also po blobs.
272.6						
272.8	0.23					
	0.71	273				
273.5					x 3.9	veinlet: cpy ?py
		274				
	2.50	275	Dark pink-brown chert mingles with massive black SHALE. Core badly broken. Numerous joints, some with slickensides			
276.0		276			x 6.4	vein: qtz ca chl ar
		277				

Feature Bedding · Foliation · Fragment (size & shape) · Shearing · Fault · 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
		277	SHALE - black, massive, very fine grained, soft. Minor zones of silicification.						x7.2	vein 1cm thick, qtz, minor ca chl cpy sp.
	3.12	278							x8.0	vein: qtz, chl, ar.
279.25									x9.75	vein: qtz ca chl
		280							x0.4	vein qtz chl ar sp ca
	3.06								x1.0	vein ar minor ca chl
		282	band of harder shale (dark grey) with ca crystals.						x2.75	vein: ar (0.3cm thick)
282.35			SANDSTONE mid grey with a greenish tinge, medium grained, locally fine grained, generally poorly sorted but with massive bedding.							
	3.15	284							x5.1	sp-qtz blebs & veinlets
285.5		286							x5.4	vein: qtz ca cpy
	2.98	288								
288.5									x9.5	vein qtz ar minor ca chl, 1cm thick
	3.05	290	CHERT Band, qtz vein at top; dark pinkish brown						x0.7 -0.6	vein qtz minor ca, v. minor py, sp
291.5		292	Reverts to grey sandstone as above.							
	2.90	294								
294.5									x5.2	vein: qtz chl cpy sp 80°, 2.5cm thick.
	2.99	296	297.0 ss is pyritic and brownish for 10cm.						x5.5 x6.01 x7.2	zone of veinlets - qtz chl carbonate minor sp.
297.5		298							x7.5 x x	vein: ar, cpy, ca sp then veins every 0.3m: qtz chl cpy sp minor ca. to 299.2, all 1cm thick
	3.01	300	sandstone locally mottled below 300.							
300.5	2.95	302							x.0	2 veins, 1cm thick, qtz chl, minor ca, sp
303.5		304	SHALE Black, massive, fairly hard, very fine grained, rare sandstone lenses or brecciated white chert bands. Well jointed. Minor veining - ca chl or qtz.							
	3.9	306	306.9 fault 10°							
306.5			core badly broken - some chert bands							
	2.90	308								
309.5			CHERT-LIMESTONE Mixed unit brecciated white chert, green tuffaceous matrix, band of silicified black shale then alternating white chert & grey limestone							
	1.76	310								
311.2			SHALE-CHERT Dark-pale grey, siliceous or silicified, v. fine grained, generally thinly bedded, tuffaceous in part							
	3.12	312							x7 x9.2	blobs and veinlets po, minor sp ?, mo.
		314	LIMESTONE Initial 0.3m of banded chert and green tuff, then pale grey fine grained, well grained limestone, rare green laminae, numerous calcite veins (? ca often black)							
314.4									x5.7	po blebs
	3.11	316								
317.5		318							x8.15	po blobs
	2.78									
		320	CHERT dark grey and green, very hard, chertrally banded very fine grained sediment. Top & bottom boundaries are pink chert, then white chert breccia on each contact.						x	po blobs
320.3									x	po blobs
	3.11	322	LIMESTONE as before, but contact is alternating grey lst, green fine tuff, dark grey coarse tuff for one metre, then grey limestone with local bands of pink or white chert or laminae of green tuff							
323.4									x3.1	vein: qtz sp minor cpy
	3.09	324							x4.4	po veinlet
		326								

Feature: Bedding / Foliation / Fragment (size & shape) / Shearing / Fault / Vein (c carbonate, q quartz)

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

	CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	DEPTH m	MINERALIZATION
		326				
326.5			LIMESTONE, minor chert & tuff, as before.			
	1.86	328	CHERT - black to dark brown very fine grained silicified shale (black shale in centre). Massive bedding, but chaotic at base.			
328.35	2.17	330	SANDSTONE greenish-grey, fine-medium grained, as before			
330.50	2.94	332	CHERT = SILICIFIED SHALE as before, with sandstone lenses			
333.5		334	LIMESTONE-TUFF-CHERT: greenish grey banded mixture		X	sulphides: cpy 5% sp 10% po 2%
	3.00	336	SHALE - black massive, soft (initially 0.3m of hard dark grey fine grained rock (minor chaotic white bands). Merges into dark grey chaotic shale-in-shale plus ?tuff laminae.			
336.5	3.01	338	Then paler grey, utterly chaotic wispy			
339.5		340			X9.9	quartz-carbonate-sp vein, has py shell for 0.2m below
	2.95	342	341.3 mid-dark grey fine grained wispy utter chaos.			
342.5	3.01	344				
345.5		346				
	3.00	348	Becomes dark grey merges into massive shale. black			
348.5		350	349.2 becomes pale grey, more chaotic		X9.8 / X0.6	veins green ?talc + qtz carb.
	3.04		CHERT - SHALE black-dark grey fine grained massive but locally chaotic, with occasional wisps or bands (of varying thickness) of green tuff			
351.5		352	351.7 becomes pink to pale grey chert			
	2.93	354	then pyritic (ie brown coating) to 354.6		X3.9	cpy blobs
354.5					X4.5	vein, qtz, talc (green), sp, minor ca.
	3.01	356	limestone band		55.3 / 63.4	cpy interstitial in chert breccia for 10 cm. 10cm of local cpy 20% sp 10% po ? chl + qtz sec.
357.5	3.01	358	jasper wisps, then local chert bands then chaotic shale.			
360.5		360				
	2.98	362	361.15-55: local sandstone lens fine grained, greenish grey then black grey within bed			
363.5		364	364.3 shear zone - core broken to 365.0		X.8	cpy blobs
	3.?1	366				
366.5						
	2.90	368	Band of pale brown very fine grained chaotic brecciated chert mottled ... 2 lines		X	... calcite, minor sp
369.5			core badly broken			
	3.10	370	Minor chlorite zones; jasper patches. 370 fault at 60°, siderite-talc (green) lining			
372.5		372	chaotic shale is dark purple.			
	3.01	374				
375.5		376				

Feature | Bedding | Shearing | Mineralization | Trace
Foliation | Fault | Common 5–15%
Fragment size & shape | Vein (c. carbonate, q. quartz) | Abundant 15–60%
Massive >60%

CORE REC'D	DEPTH m	GEOLOGY	VISUAL LOG	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
	376								
2.94	378	377.0–.4: collapse "conglomerate" green tuff in bark chert. white chert breccia in green chloritic matrix 377.9 ? fault – thin calcite vein + bleach zone for ± 15 cm.						379 -80	cpy blobs
378.5									
3.11	380	379.0 ? fault – bleach zone ± 5 cm of talc-ca vein						379.0 ×0	talc-ca vein 1 cm thick or veinlet
381.5	382	TUFF banded, locally chaotic, fine grained pale greenish-grey rock. Some bands show slump structures, minor brecciation.							
2.99	384							383.4	vein: ca, sp, minor qtz
384.5									
2.90	386	band of "collapse conglomerate" – tuff in tuff (matrix green) (or pink) chlorite vein. Core badly broken						386.4	cpy blobs in shear zone
387.5	388	BASALT pale – dark greenish grey fine grained, with chlorite wisps.							
3.05	390	Longitudinal (i.e. 90°∠) slickensided joint 391 – 392, core broken. Bleached zone 388.35 –.75 – shear zone or fault.							
390.5									
3.00	392	Then very dark green fine grained, with chlorite wisps						393.2	qtz epidote vein minor ... plus epidote veinlets above + below for ± 10 cm.
393.5	394								
3.00	396								
396.5		END OF HOLE 396.5							
	398								
	400								

ABERFOYLE

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	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
		SSt. — Qtz Po, Chpy Veining						2.60	Qtz V.
	10							10	Fault 45°
		First Sph 18.5						15.4	F. Carb filled
	20							20	
	30	SS generally coarse grained marked $CaCO_3$ component with minor fine sst.						31.5 m	Fault. 40° CA. chpy Qt Fill
		Shale chaotic 35.6 – 35.9	Black						? Fault Bleaching around.
		38.2 sst						40	Fault 45° C.A
		Splashes of Sph or rarely Po common						42.9	? Fault opened Pyrite filled. 5cms
		Chaotic sst + sh. 40 m – 58						45.5	Fault — Vein Filled Qtz Po Chpy Sph
		Bleaching around faults common						50	
								55.9	Fault.
								60	
								65.8	Fault. Brecciated 45° CA.
								70	
								75.6	Fault over 5cm with pug 40° CA.
								78.9 – 79.3	multiple Faults bleaching
		Fine Carb banding 83.5						84.50	fault
								90	
								94.5	Fault 45°
								96.8	Fault "
								100	
								106.1	Vein Qtz Po Chpy Sph. 50cms. 45° C.A.
								110	
								120	
								124.5	Fault Broken Core.
								130	
		grey shales 132.0 – 132.6							
		Sh. 139.5 – 141						140	
								150	
								160	
								170	
		SST + minor Sh						180	
								190	
		midgrey – brown chaotic shales. Sh. 192.6 – 198.5							
		SSt 198.5 – 201.3; Sh 201.3 – 202.9; SS. 202.9 – 204.3						200	
		dark grey. Sh 204.3 – 208.6							
		SS 208.6 – 212.1; Sh 212.1						210	— Veining becoming Rare.
		Shale mid grey brown locally chaotic minor sst						220	
								228	minor fault 90° C.A.

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	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
		Sh.						225	
		231.9						230	231.8 ? Heald fault Zone
		Po chl. Carb. Lode. clayey Tr Sph. 232.12						233.2	Fault. 60° to CA Rupture 5cm wide Heald.
		Sh. 236.5						235	
		minor blebs of Lode. — LMST + SH. 238.8							
		Sh/ch.						240	
		243.2						241.8	Fault.
		Banded Lode with Carb Vs. & Blebs of Po-Sph. Lmst.						245	
		246.7 LMST							246.7 D/S 24/5/79.
		Sh. 249.9						250	
		LMST. 250.35 sh. 253.85							
								255	
		LMST minor int Sh & ch. Remobilized Carb. fine Banding Present.						260	
								265	
		271.6						270	
		Sh. massive grey.						275	
								280	
		283.15						285	
		SST mass med grey med grained carbonates common.						290	290.5 Fault. Qt filled 30° CA.
								295	
								300	
		303.35 Sh.						305	
								306.9	Fault 80° CA.
		308.8 LMST. Carbonate Veins fine Banding 311	LMST SH					310	
		313.3	LMST					311	[redacted]
								315	
								316.95	Core AM. 28/5/79.
		319.75	Sh/Ch					320	
		321.75	LMST					325	
		327.1	Sh					328	Fault.
		328.95	SST.					328.3	Fault.
		332.05	SST Sh.					330	
		333.8							
		334.8	Sh					335	
		Shale pale brown-grey Very disturbed & chaotic minor blebs of ch.						339.9	Fault ? Vein. Qtz
								340	

23504

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	TRACE	COMMON	ABUNDANT	MASSIVE	DEPTH m	MINERALIZATION
		shales. chaotic.						340	
								345	
								350	350.4 Fault. 70° CA. Heald. 10cm thick.
		Shale massive silicified sh.						355	354.5 Fault. Fl. Sph. 60-70°
								360	
		SSt 361.6 362							
								365	
		euhedral py. sh							367.6. Fault. 45°CA. Breccia. 5cm
								370	
		sh.						375	
								380	
		381.1 ?Vt/Sh							
								385	
		386 hat Vt ~~38~~							
		Vb ~~minor Vt~~ at 510-M						390	
								395	
		396.5m EOH.							
								400	