

DIAMOND DRILL RECORD

Hole Number	C 68				Purpose	To test the geochemical anomalies (Pb, Zn, Cu) and I.P. geophysical anomaly on Line 2200'W, 12.5S, at R.L. 400'.															
Location	Comstock Valley																				
Level	Surface					Core trays spilt - core out of order and stored together :															
Co-ordinates	7478.38'N 2179.54'W (8279.41 m N 5335.68 m E)					223.47 - 229.80 m		361.90 - 367.90 m													
Collar R.L.	1322.75' (374.174 m)					242.16 - 247.97 m		380.20 - 386.20 m													
Length	1593.0' (485.54 m)					265.75 - 271.89 m		403.95 - 410.20 m													
Date Survey Depth	8.7.75	11.7.75																			
	Collar	33.6 m																			
Bearing	179°																				
	57'44"																				
Inclination	-64°45'																				
Rod Size	0 - 2.13 m : 6"				Comments	Hole stopped in poorly mineralised siliceous breccia due to slow drilling and high costs. Neither the geochemical nor the geophysical anomalies were satisfactorily explained.															
	- 33.55 m : No. 4																				
	- 74.42 m : NxCu																				
	- 192.46 m : Nx																				
	- 485.54 m : Bx																				
Machine	F 49 J					Comstock Tuffs : 0 - 1478.5' (450.6 m) including Fossiliferous Limestone (1329.4 - 1333.7') (1385.3 - 1466.9')															
						Queenstown Pyroclastics : 1478.5 - 1593.0' (485.5 m); poorly mineralised Siliceous Breccia.															
Logged by	A. C. Walter				Mineralisation :	643.9 - 650.4' (196.25 - 198.25 m) : 0.70% Pb, 0.12% Zn; in calcareous tuffaceous sediments.															
1:500 Plans						1244.3 - 1252.6' (379.25 - 381.80 m) : 0.11% Cu, 0.08% Pb, 0.09% Zn; in volcanoclastic coarse sandstone.															
1:500 Sections						1460.0 - 1481.6' (445.00 - 451.60 m) : 0.18% Cu, 1.16% Pb, 0.81% Zn; mixed lithologies.															
						1478.5 - 1593.0' (450.65 - 485.54 m) : 0.11% Pb, 0.14% Zn; siliceous breccia.															
					Commenced	7th July, 1975															
					Completed	6th November, 1975															

THE MOUNT LYELL MINING AND RAILWAY COMPANY LIMITED

ADVANCE		RECOVERY		ASSAYS							BULK ASSAYS							REMARKS	
From	To	c m.	%	From	To	m.	%Cu	%FeS ₂	Au _{gm/mT}	Ag _{gm/mT}									
0	4.80	Decomp. & clay.	rock																
	6.10	130	100																
	12.20	240	39																
	16.47	270	63																
	20.74	290	68																
	23.70	235	79																
	27.45	290	79																
	28.06	30	49																
	31.42	190	56																
	33.55	160	75																
	34.77	105	86																
	38.43	280	77																
	40.87	205	84																
	41.78	75	82																
	44.22	220	90																
	44.83	60	98																
	47.27	195	80																
	48.49	85	70																
	49.10	55	90																
	51.54	210	86																
	55.50	280	71																
	58.25	210	76																
	61.30	155	51																
	63.74	100	41																
	64.65	90	99																
	68.93	140	33																
	69.54	55	90																
	70.76	105	86																
	71.98	122	100																
	73.81	145	79																
	75.03	120	98																
	75.64	45	74																
	78.39	255	96																
	80.82	245	100																
	82.04	90	74																
	84.36	230	99																
	85.09	70	96																
	87.39	225	98																
	88.14	75	100																
	90.44	225	98																
	91.19	60	80																
	93.49	225	98																
	94.24	75	100																
	96.54	225	98																
	97.29	65	87																
	98.81	152	100																

THE MOUNT LYELL MINING AND RAILWAY COMPANY LIMITED

1985 ASSAYS M. JONES (GFEL)

ADVANCE		RECOVERY		ASSAYS								BULK ASSAYS						REMARKS		
From	To	Cm.	%	From	To	m.	%Cu	%FeS ₂	Au _{gm/mT}	Ag _{gm/mT}										
98.81	99.42	60	98																	
	101.25	183	100																	
	102.47	110	90																	
	104.00	90	59																	
	105.52	150	99																	
	108.58	305	100																	
	110.10	110	72																	
	111.93	170	93																	
	113.15	120	98																	
	114.98	150	82																	
	116.20	110	90																	
	118.03	183	100																	
	119.25	122	100																	
	121.08	183	100																	
	122.30	120	98																	
	123.82	152	100																	
	125.35	153	100																	
	126.87	140	92																	
	128.40	150	98																	
	129.92	152	100																	
	131.45	153	100																	
	132.97	150	99																	
	134.50	145	95																	
	137.55	245	80																	
	140.60	290	95																	
	141.82	122	100																	
	144.72	290	100																	
	147.92	255	80																	
	149.75	150	82																	
	152.50	240	87																	
	155.25	260	95																	
	158.30	300	98																	
	161.35	305	100																	
	164.40	290	95																	
	166.53	170	80																	
	169.59	215	70																	
	170.20	60	98																	
	172.34	180	84																	
	172.95	50	82																	
	175.38	150	62																	
	176.90	75	49																	
	178.73	95	52																	
	180.56	150	82																	
	182.79	160	72																	
	183.85	106	100																	
	184.62	70	91																	
	186.76	214	100																	

THE MOUNT LYELL MINING AND RAILWAY COMPANY LIMITED

1985 ASSAYS M. SONES (GFEL)

ADVANCE		RECOVERY		ASSAYS								BULK ASSAYS						REMARKS	
From	To	C m.	%	From	To	m.	%Cu	%FeS ₂	Zn	Pb	From	To	m.	%Cu	%FeS ₂	Au gm/mT	Ag gm/mT		Ba
							ppm		ppm	ppm						ppm		ppm	
186.76	189.76	300	100																
	192.46	255	94																
	196.89	443	100	196.25	198.25	2	310	3.6	1230	7000									
	197.95	106	100		200.25	2	80	0.3	290	570									
	201.00	305	100																
	203.44	225	92																
	205.27	135	74																
	206.18	75	82																
	207.71	120	78																
	209.84	200	94																
	210.76	90	98																
	212.59	165	90																
	215.34	275	100																
	215.64	28	100																
	218.69	290	95																
	219.30	20	33																
	220.21	90	99																
	222.35	214	100																
	223.22	35	40																
	225.10	150	82																
	225.40	30	100																
	227.85	195	80																
	229.98	210	99																
	233.03	300	98																
	234.25	95	74																
	235.16	75	82																
	236.68	152	100																
	237.90	122	100																
	239.43	153	100									236	256			0.068		749	
	242.48	290	95																
	244.92	240	98																
	247.06	210	98																
	247.67	60	98																
	250.72	305	100																
	253.77	300	98																
	255.06	225	98																
	256.82	80	45																
	259.87	305	100																
	262.92	305	100																
	265.20	225	99																
	269.02	380	100																
	272.98	375	96																
	273.73	75	100																
	276.03	225	98																
	279.08	300	98																
	281.83	280	100																
	282.74	90	99																

THE MOUNT LYELL MINING AND RAILWAY COMPANY LIMITED

1985 ASSAYS M. SONES (GFEL)

ADVANCE		RECOVERY		ASSAYS							BULK ASSAYS					REMARKS				
From	To	Cm.	%	From	To	m.	%Cu	%FeS ₂	Ag _g /mT	Pb _g /mT	Zn _g /mT	From	To	m.	%Cu		%FeS ₂	Ag _g /mT	Pb _g /mT	
282.74	284.88	180	86				ppm		Zn	Pb										
	287.32	60	25						ppm	ppm		278	287					ppm		
	289.15	110	60															0-040		
	290.98	160	87																	
	293.42	220	90																	
	294.03	61	100																	
	296.78	275	100																	
	298.91	165	77																	
	301.04	213	100																	
	302.56	150	99																	
	305.61	300	98																	
	307.90	225	98																	
	308.66	76	100																	
	311.71	305	100																	
	314.76	305	100																	
	317.81	305	100																	
	320.86	305	100																	
	323.91	305	100																	
	325.45	150	97																	
	330.02	450	98									330	335					<0-01		
	333.98	396	100																	
	338.55	457	100																	
	342.82	430	100																	
	347.40	455	99																	
	350.75	330	99																	
	351.97	122	100																	
	355.02	300	98									360	370						<0-01	
	356.54	150	99																	
	361.12	460	100																	
	365.70	460	100																	
	370.27	450	98																	
	374.84	450	98																	
	377.28	230	94	377.25	379.25	2	50	<0.2	250	55	Volcaniclastic									
	379.41	205	96		381.80	2.55	1100	13.4	930	760	coarse grained									
	383.98	457	100		383.80	2	125	<0.2	220	20	sandstone									
	388.56	450	98																	
	393.14	430	94																	
	394.35	110	91																	
	397.71	335	100																	
	402.29	455	99																	
	406.86	440	96																	
	409.91	290	95																	
	411.43	152	100																	
	416.01	458	100																	
	420.58	455	100																	
	423.94	335	97																	
	425.16	120	98									422	447						<0-01	

ADVANCE		RECOVERY		ASSAYS								BULK ASSAYS				REMARKS		
From	To	Cm.	%	From	To	m.	%Cu	%FeS ₂	Zn	Pb	From	To	m.	%Cu	%FeS ₂		Au gm/mT	Ag gm/mT
425.16	428.21	300	98						Zn	Pb								
	430.05	145	79						%	%								
	434.94	460	94															
	435.85	90	99															
	438.29	220	90															
	440.58	225	98															
	441.95	125	91															
	444.69	220	80	445.00	447.10	2.10	0.10	2.73	0.42	1.40						<0.2	44	
	446.21	135	89		449.45	2.35	0.35	3.86	1.03	1.50						<0.2	46	} 6.6m at 34.2g/4Ag
	449.27	305	100		450.65	1.20	0.04	4.48	1.03	0.54						<0.2	15	
	449.88	61	100		451.60	0.95	0.10	1.65	0.85	0.56						<0.2	12	
	452.60	240	88															
	452.72	10	83				ppm		ppm	ppm								
	453.53	75	93	450.65	451.60	0.95	1000	1.65	8500	5600						ppm	ppm	ppm
	454.75	105	86	451.6	454.25	2.60	210	1.1	230	60		451.6	456.4		115	-242	1.5	
	457.36	245	94		456.25	2.00	330	2.2	330	110			461.4		250	-233	6.5	
	460.55	320	100		458.25		1020	5.9	10000	230			465.35			-040		
	461.77	115	94		460.25		70	0.3	2700	140			467.0			-032		
	462.83	75	71		462.25		140	1.1	3500	270			473.5			-032		
	465.11	205	90		464.25		40	0.2	470	150			485.5			-017		
	465.72	55	90		466.25		110	0.4	680	350								
	466.33	45	74		468.25		90	0.2	1440	520								
	468.25	192	100		470.25		40	0	50	820								
	470.45	120	55		474.00	3.75	110	0.3	380	3600								
	471.52	65	61		476.00	2.00	270	0.2	70	860								
	472.12	50	83		478.00		80	0.3	410	1100								
	473.34	65	52		480.00		130	1.5	190	1900								
	474.25	50	55		482.00		80	0.4	60	560								
	474.70	10	22		485.54	3.54	60	0.4	50	1830								
	475.15	15	33															
	476.82	10	6															
	477.32	50	100															
	478.54	110	90															
	480.52	150	70															
	482.20	120	71															
	482.96	45	60															
	483.26	30	100															
	485.24	50	25															

	DESCRIPTION	REMARKS
0 - 15.8' (4.80 m)	Orange-brown decomposed rock and clay.	
15.8 - 214.6' (4.80 - 65.40 m)	Weathered mottled orange-pink-green, with dark brown manganese oxide staining on joint planes, coarse grained tuff; angular quartz grains to 1 mm in a white and orange-pink clay rich matrix. Occasional layer fragments discernible (chloritic and clay outlined).	Comstock Tuff
	19.7' (6.50 m) : Fault : quartz, broken ground.	
	Rock becomes pinker downhole and coarser grained with greenish-grey chlorite, clay, and leached pinkish siliceous fragments, to 2 cm ⁺ , variably decomposed and leached.	
	Orange-pink feldspar, and quartz grains to 2 mm occur in the matrix with clay.	
	Rock becomes fresher from about 15' (35 m) giving a pinker colour : coarse crystal tuff, quartz and feldspar to 1 mm in a feldspar-clay matrix with siliceous and chloritic fragments to 2 cm, and chlorite \pm sericite forming knots and crude bands.	
	From about 187' (57.0 m) the colour changes from pink and green to white and green corresponding to an increase in the quartz content (matrix and clasts). Very minor fine grained euhedral pyrite occurs as discrete grains. Unit becomes increasingly coarser.	
	193.4 - 196.7' (58.95 - 59.95 m) : no core. From 196.7' (59.95 m) ground is very broken.	Fault
	Rock is altered, and silicification is common, and the quartz contains small pyrite euhedra to $\frac{1}{2}$ mm. Fracturing and leaching is common.	
214.6 - 228.5' (65.40 - 69.65 m)	Dark and light grey laminated siltstone, in part quartz-rich, with minor pyrite occurring as small aggregates and smears along bedding.	Laminated siltstones
	Uphole contact suggests an <u>uphole-younging</u> facing. Graded bedding and small scale channel-fill structures and diagenetic fault displacements (all usually poorly developed) also suggest an <u>uphole-younging</u> facing.	
	S.C.A. at 216.7' (66.05 m) = 30°.	
	Ground is broken.	
	219.8 - 226.4' (67.0 - 69.0 m) : major fault indicated by very high core loss.	Fault
228.5 - 235.4' (69.65 - 71.75 m)	Generally pale to dark green, with patches of chlorite, quartz and silicification with variably preserved textural features and clast outlines due to silicification. Original lithology was a coarse grained poorly sorted siliceous volcanoclastic conglomerate; the clasts are predominantly tuffaceous (acid to intermediate composition) up to approximately 10 cm. Groundmass is very siliceous, and may have resembled a quartz crystal tuff.	Coarse grained volcaniclastic sandstone and conglomerate.
	Calcite alteration is variable, and occurs in veinlets and small knots, as well as disseminated. Some quartz veining \pm vughs \pm euhedral fine grained pyrite occurs.	
235.4 - 243.8' (71.75 - 74.30 m)	Broken ground 235.4 - 242.5' (71.35 - 73.90 m).	
	Dark green mottled with paler (silicified) areas, chloritic, in part calcareous (increasing downhole), medium-coarse grained quartz tuff (in part crystal tuff). Occasional quartz veining with zones of silicification (decreasing downhole), some water-washed vughs and leached zones. Minor sericite in the matrix, and occasionally as pseudomorphs (after feldspar?).	
	Chlorite occurs in the matrix and occasionally as fragments (after ferromagnesian phenocrysts).	
	Occasional small aggregates of fine grained pyrite occurs in the matrix, and small euhedra in veins.	
243.8 - 250.5' (74.30 - 76.35 m)	Pale grey-green to grey coarse grained poorly sorted siliceous volcanoclastic conglomerate; predominantly tuffaceous clasts. Similar to unit described 228.5 - 235.4'.	
250.5 - 254.8' (76.35 - 77.65 m)	Dark dull green-grey chloritic variably calcareous medium-coarse grained quartz-rich tuff. Similar to unit described 235.4 - 243.8'.	
254.8 - 321.52' (77.65 - 98.00 m)	Grey very coarse poorly sorted calcareous siliceous multi-provenance volcanoclastic (tuffaceous) breccia. Fragments range in size from < 2 cm to >15 cm, very angular to rounded (the latter are rare and usually are very siliceous). Clast types include acid tuffs (fine to coarse grained), intermediate tuffs (dark chloritic with quartz phenocrysts - maybe due to alteration, \pm pyrite	

	DESCRIPTION	REMARKS
	aggregates), siltstone (in part brecciated) and fine sandstone rock fragments, and siliceous clasts. Matrix is variable, usually siliceous as a fine-grained quartz-rich tuffaceous deposit between the clasts, or as a general silicification effect; with varying amounts of chlorite and/or sericite. The calcite content is variable, and is generally low and occurs in the matrix and concentrated in fractures. Minor pyrite occurs within zones of silicification as fine grains, within some of the tuffaceous clasts (an original component?) and as rounded pyrite pebbles. Fracturing and water-washed veinlets are relatively common.	
	From about 308.4' (94.00 m) pyrite content increases and occurs along fractures as smears. Clast size decreases downhole from about 311' (95 m). Broken ground 316.7 - 321.52' (96.54 - 98.00 m).	
321.52- 332.5' (98.00 - 101.35 m)	Grey coarse grained volcanoclastic calcareous conglomerate with fragments of acid and intermediate tuff (generally crystal tuff), generally sub-rounded and <2 cm and dark grey siltstone, often angular and up to 4 cm in a siliceous groundmass of medium-coarse grained tightly packed reworked-tuff sandstone. The clasts show a sub-parallel alignment and occupy about 15-30% of the rock. S.C.A. at 328.1' (100.00 m) = 45°.	
332.5 - 336.6' (101.35 - 102.60 m)	Dark grey brecciated siltstone with a network of fine calcite-filled veins. The brecciation is pre-solidification. The siltstone is non-calcareous.	
336.6 - 450.8' (102.60 - 137.40 m)	Variably grey coarse grained poorly sorted trimodal tuffaceous conglomerate. The largest size range includes clasts to 20 cm; the modal size range is 1-10 mm; the smallest size range is siltsize (dark grey) acting as a matrix to the larger clasts. The clasts are generally angular to sub-rounded and show a sub-parallel alignment. Fine grained pyrite occurs occasionally as smears and small aggregates. Calcite veinlets occur. Clasts are generally acid crystal tuff, often with both quartz and sericite (after feldspar) phenocrysts in a siliceous and/or sericitic matrix, often calcitic and occasionally containing minor pyrite. Siltstone clasts are common, are often calcareous, and angular and may be intraformational. White, very carbonate-rich fragments, generally <15 mm in length, are common. Pyrite occurs in some siltstones as a minor component and is usually very fine grained. Some of the tuff fragments are rimmed, usually paler on the outside. A crude bedding is apparent, shown by conglomerate bands with approximately the same size range within them. The coarsest clasts are tuffaceous and generally acid porphyritic. B.C.A. at 353.3' (107.70 m) = 30°; 383.5' (116.90 m) = 25°; 435.9' (132.85 m) = 30°. Note that these readings are from clast alignments and not bedding. Some pebbles appear somewhat distorted and elongated along the bedding direction. Calcite veinlets are common, and fractures are common within the clasts themselves.	
450.8 - 497.5' (137.40 - 151.65 m)	393.9 - 395.0' (120.05 - 120.40 m), 401.2 - 403.5' (122.30 - 123.00 m), 408.0 - 412.6' (124.35 - 125.75 m), 431.6 - 439.1' (131.55 - 133.85 m) : minor bands of dark grey siltstone, with some zones of "impure limestone", usually autobrecciated and slumped, and can contain minor fine grained pyrite. Light grey slightly calcareous coarse grained water-lain tuff, with some bands containing reworked tuff clasts. The clasts are similar to those in the uphole conglomeratic unit, except the size is generally smaller (maximum 10 cm, usually coarsest fraction is about 3 cm); with fewer siltstone clasts. Generally rounding and sorting of the clasts is better than in the above unit. The light grey colour is due to the coarser more tuffaceous nature of the matrix : generally fine-medium grained sand size (compared with the much darker finer grained matrix of the above unit). Minor fine grained pyrite occasionally occurs in the matrix and along some small fractures. Calcite is variable in the matrix, but is common along small fractures. Graded bedding at 476.4' (145.20 m) shows uphole-younging facing.	

	DESCRIPTION	REMARKS
	B.C.A. at 476.4' (145.20 m) = 40°.	
	Banding is common, shown by zones with similar size and sorting characteristics; clast alignment is also common.	
497.5 - 650.4' (151.65 - 198.25 m)	Mixed dark and light grey calcareous fine-coarse grained tuffaceous? sediments ranging from laminated sericitic siltstone to coarse tuffaceous sandstone (possibly crystal lithic tuff?). Slumping and brecciation is very common. Some minor bands of relatively pure quartzite. Calcite content is variable, and occurs consistently in the coarser sediments but variably in the fine sediments. Calcite is frequently concentrated along fractures. Pyrite occurs along some bedding and fracture partings, and is usually fine grained. Minor calcite-quartz veinlets occur.	
	Broken ground 497.5 - 500.3' (151.65 - 152.50 m), 502.6 - 509.4' (153.30 - 155.25 m), 532.5 - 537.7' (162.30 - 163.90 m).	
	B.C.A. at 499.3' (152.20 m) = 25°; 522.1' (159.15 m) = 40°.	
	Calcite veining with brecciation 575.4 - 576.1' (175.38 - 175.60 m).	
	Broken ground 561.4 - 568.1' (171.10 - 173.15 m), 578.4 - 606.0' (176.30 - 184.72 m).	
	S.C.A. at 601.2' (183.25 m) = 45°.	
	623.8 - 626.0' (190.15 - 191.00 m) : Pale grey very fine grained siltstone containing coarse grained pyrite blebs and veinlets.	
	S.C.A. at 644.4' (196.30 m) = 40°.	
	Very minor shiny grey metallic smeared mineral (galena) occurs in minor amounts from about 645 - 650' (196.6 - 198.1 m).	
650.4 - 820.5' (198.25 - 250.10 m)	Red-brown-purple haematitic fine-medium grained slightly calcareous lithic tuff. Very similar to above unit, with pervasive very fine grained haematite. Moderately well-defined banding occurs in some areas. From about 705' (215 m) the unit becomes non-calcareous (except for a few minor calcite veinlets) and the haematite content gradually decreases to give a greyish haematite-speckled rock. The haematite becomes confined to the lithic? clasts and the matrix becomes correspondingly richer in sericite. Coarse grained lithic tuff become increasingly common downhole.	
	Broken ground 716.9 - 719.5' (218.50 - 219.30 m), 729.7 - 738.5' (222.4 - 225.1 m).	
	S.C.A. at 762.5' (232.4 m) = 55°.	
	Small of zones of slightly calcareous rock occur downhole from about 770' (235 m), and occasional small pink feldspar phenocrysts (to 2 mm) can be seen.	
	From about 804 - 815' (245 - 249 m) the rock is a speckled grey, with occasional purplish (haematitic) zones, fine-coarse grained lithic tuff with occasional bands of haematite-rich (e.g. semi-massive, and specular) very coarse slightly calcareous tuff. A gradational change in rock type occurs with the downhole unit.	
820.5 - 830.9' (250.10 - 253.25 m)	Grey-green and red-purplish banded lithic crystal tuff with phenocryst content increasing downhole to about 1%, probably originally feldspar often replaced by calcite and/or haematite; fine to coarse grained; with narrow zones containing angular lithic fragments commonly replaced by sericite and/or haematite.	
	Calcite alteration increases downhole at the expense of haematite.	
	The bedding is generally constant in dip, but shows different orientations suggesting relatively high engery sub-aqueous conditions. Downhole contact is gradational.	
830.9 - 973.9' (253.25 - 296.85 m)	Green-grey calcareous lithic crystal tuff, with minor purplish zones of low haematite alteration usually associated with the brecciated calcite veins and veinlets that occur frequently.	
	The phenocryst content increases downhole:- feldspar replaced by calcite.	
	Veining and fine-grained red-brown haematite decreases downhole.	
	S.C.A. at 858.3' (261.6 m) = 45°.	

	DESCRIPTION	REMARKS
	The rocks are generally fine-medium grained, and the phenocrystal fragments are generally between 0.5 - 2 mm.	
	From about 883' (269 m) : generally dark green speckled fine-coarse grained calcareous crystal lithic tuff with pervasive chlorite. Haematite, and sericite, alteration zones are common and give a red-brown and grey coloration respectively. Phenocrysts are predominantly feldspar (\pm calcite replacement) with minor ferromagnesians, usually replaced by haematite and/or chlorite.	
	Calcite-barite-haematite-quartz veining is common.	
	Cleavage is moderately well developed, and \approx parallel to bedding.	
	S.C.A. at 914.5' (278.75 m) = 50°.	
	927.6 - 942.7' (282.75 - 287.32 m) : grey variably calcareous fine-medium grained lithic tuff.	
	Broken ground 934.6 - 942.7' (284.88 - 287.32 m).	
	942.7 - 948.7' (287.32 - 289.15 m) : dark grey-pink coarse grained crystal lithic tuff.	
	Phenocrysts up to 3 mm of haematite and sericitic material (after \approx ferromagnesians and feldspar respectively).	
	948.7 - 973.9' (289.15 - 296.85 m) : mixed grey \pm pinkish (haematitic) coloration, fine-coarse grained lithic tuff, with minor bands of crystal tuff. Some fine grained haematite occurs in the pinkish zones. Variable calcite content in matrix, and minor calcite veining \pm barite. Occasional narrow veinlets of \approx remobilized sericite.	
973.9 - 1171.1' (296.85 - 356.95 m)	Purple-grey coarse grained variably calcareous crystal tuff with phenocrysts of feldspar and sericite. Fine grained red-brown haematite is variable and occurs within the matrix with sericite.	
	984.1 - 985.1' (299.95 - 300.25 m) : coarse grained volcanoclastic sandstone, containing haematite and calcite in the matrix. Poorly sorted, speckled white and purple-brown and grey. Clasts are siliceous, angular - subrounded.	
	987.7 - 989.7' (301.05 - 301.65 m) : very coarse agglomeratic tuff with acidic clasts to 10 cm, commonly with a haematite alteration rim, with haematite, and sericite pervasive alteration in the matrix which also contains coarse crystal tuff.	
	Calcite veining is relatively common and is generally orientated along cleavage.	
	995.4 - 1005.6' (303.40 - 306.50 m) : rock has a relatively high content of phenocrysts.	
	At 1004.4' (306.15 m) : 10 cm of slump breccia, with calcite matrix, with an underlying partly slumped crystal tuff unit to 1006.4' (306.75 m).	
	Broken ground, with associated silicification, and minor brecciation 1062.5 - 1066.3' (323.85 - 325.00 m).	Fault
	From about 1067.7' (325.45 m) fine grained dark brownish purple haematite occurs as blebs (to 3 mm) and streaks (pseudomorphing ferromagnesian? phenocrysts).	
	At 1070.0' (326.15 m) bright apple-green epidote? occurs in veinlets with calcite-silica-haematite. Zones of calcite rich breccia up to 40 cm wide are common; zones of coarse predominantly lithic tuff with clasts up to 5 cm are common.	
	Calcite \pm quartz, haematite (fine grained, and specular), and chlorite veining is common.	
	Very minor bright dark green chlorite occurs in the matrix from about 1115' (340 m), and increases with depth. Very minor very fine grained pyrite also occurs, with the chlorite.	
	A lighter brighter green coloration occurs in narrow zones due to minor very fine grained epidote occurring in the matrix.	
	S.C.A. at 1166.0' (355.40 m) = 65°.	
	1169.3 - 1171.1' (356.40 - 356.95 m) : veining of epidote, calcite, haematite, silica, and chlorite, with included country rock.	Fault
1171.1 - 1216.5' (356.95 - 370.80 m)	Dark grey-green, with white veinlets and knots of calcite, fine-coarse grained lithic calcareous tuff. Calcite chlorite and haematite alteration of clasts and matrix produces a mottled effect enhanced by the often chaotic textures, e.g. slumping and brecciation. Zones of calcite-rich tuff are brecciated	

	DESCRIPTION	REMARKS
	and/or contorted with pure calcite veinlets. Very minor very fine grained pyrite and epidote are rare in the matrix.	
	The zone resembles the mineralised zone in C 64, but obviously lacks the degree of silicification and mineralisation.	
1216.5 - 1244.3' (370.80 - 379.25 m)	Coarse grained dull green with haematite-purple matrix, often poorly sorted calcareous tuff, with some clast alignment, calcite flecking and veining and fine grained haematite-rich reddish-brown-purple matrix. The coarse texture may be due to diagenetic remobilization of an originally uniform grain size tuffaceous rock, thus producing a "conglomerate" texture of rock with a haematitic matrix. The haematite may be introduced as matrix either at the time of diagenetic movement, or as part of a later alteration. B.C.A. at 1224.4' (373.2 m) = 50°.	
	The "clast" size is variable, generally moderately well sorted within bands, < 0.5 cm to 3 cm+ and clasts are commonly elongated along the bedding (= cleavage, only poorly developed). From about 1237.9' (377.3 m) the unit becomes greyer, finer grained, less haematitic, and more chloritic and sericitic towards the downhole contact.	
1244.3 - 1252.6' (379.25 - 381.80 m)	Dull green-grey well bedded reworked tuff unit, consisting of very fine grained sericite-pyrite tuffaceous shaly sediment grading to coarse sandstone and pebble size conglomerate containing clasts of chert, sulphide (pyrite, minor component), chloritic sericitic and siliceous volcanic fragments (pyroclastic and lavas), generally elongate along bedding/imbricate or tectonic). Matrix consists of fine grained clastic material plus fine-coarse grained pyrite and minor sericite. Bedding contacts between the different size-fraction units are usually very sharp and undisturbed. B.C.A. is generally constant, e.g. at 1247' (380 m) = 60°.	Volcaniclastic coarse grained sandstone.
	The coarser grained units are variably calcareous-calcite is both clastic and in the matrix. Several of the sub-units show a rough graded bedding texture which suggests an uphole-younging facing.	
1252.6 - 1258.2' (381.80 - 383.50 m)	Dull grey-green, flecked with pale grey and pinkish calcite-feldspar and haematite-chlorite phenocrysts, coarse grained calcareous crystal lithic tuff with some calcite veining and diagenetic? brecciation.	
1258.2 - 1259.0' (383.50 - 383.75 m)	Coarse calcareous generally grey green and white veined chloritic sericite lithic tuff, with ?diagenetic brecciation. Red-brown haematite is concentrated on the downhole contact.	
1259.0 - 1288.1' (383.75 - 392.60 m)	Fine-coarse grained grey green calcareous lithic tuff, showing autobrecciation and slumping structures, and calcite remobilization giving a very chaotic and veined appearance. Bands of coarse grained calcareous crystal tuff occur with calcite replacing the original phenocrysts. Some veins show zoning of the coarse grained calcite. Chlorite-sericite "veins" also occur between the rafts of tuff. Broken ground 1279.5 - 1288.1' (390.00 - 392.60 m).	
1288.1 - 1319.7' (392.60 - 402.25 m)	Greenish multicoloured calcareous reworked volcaniclastic sandstones and pebble conglomerates. Fragments include jasper, chert, sulphide-bearing volcanics, pyrite, intermediate and acid volcanics (pyroclastic and/or lavas) in a calcareous fine grained tuffaceous matrix. At 1319.6' (402.3 m), 5 cm quartz-chlorite vein with small water-washed vughs.	
1319.7 - 1322.8' (402.25 - 403.20 m)	Grey-green, flecked with paler calcite spots, medium grained crystal lithic calcareous tuff.	
1322.8 - 1324.8' (403.20 - 403.80 m)	Volcaniclastic coarse grained calcareous sandstone, and pebble conglomerate, very similar to unit 1288.1 - 1319.7'.	
1324.8 - 1329.4' (403.80 - 405.20 m)	Dull green coarse grained lithic and crystal lithic chloritic calcareous tuff, become very coarse downhole.	
1329.4 - 1333.7' (405.20 - 406.50 m)	Red-brown, and dull green, calcareous, fossiliferous, chaotically mixed fine grained (red brown) and coarser grained (green, chloritic, volcaniclastic) unit. Calcite recrystallization is very common, and often colour zoned. Fossil fragments may include	Fossiliferous fine grained calcareous sandstone - impure limestone.

	DESCRIPTION	REMARKS
	brachiopods and trilobite pieces. Red-brown colour is due to fine grained disseminated haematite. Crudely developed flame structures and poor graded bedding indicate an <u>uphole-younging</u> facing, but diagenetic remobilization is obvious and may cause false structures. B.C.A. at 1331.9' (405.95 m) = 45° (maybe a localised bedding feature). Very minor pyrite and galena occur in calcite veinlets.	
1333.7 - 1385.3' (406.50 - 422.25 m)	Dull green-grey banded fine-coarse grained chloritic calcareous volcanoclastic sandstone (water-lain tuffs) and pebble conglomerates, generally well sorted except the coarsest conglomerates which show a wide range of clast sizes. Bedding is both gradational and sharp contact in nature. At 1332.2' (406.05 m), 2 cm band of syngenetic pyrite-galena-barite in a small scour structure. Graded bedding and bottom structures at 1335.6' (407.10 m) suggest an <u>uphole-younging</u> facing. B.C.A. at 1337.9' (407.80 m) = 60°. From about 1350 - 1365' (411 - 416 m), coarse sandstone-pebble conglomerate becomes dominant and the rocks appear more tuffaceous, and include minor bands of coarse grained calcareous crystal lithic tuff(?). From about 1365' (416 m) the unit is generally fine-coarse grained volcanoclastic sandstone, with distinct and gradational banding corresponding to bedding and grain size variations, and showing scour structures. Zones of red-brown fine-grained haematite occur, e.g. 15 cm band at 1371.6' (418.05 m). B.C.A. at 1381' (421 m) = 70°.	
1385.3 - 1466.9' (422.25 - 447.10 m)	White, pale red-blood red, and dark greenish veined limestone. The reddish colouration is due to very fine grained haematite which occurs in "beds" and in "veinlets"; the dark green veins consist of chlorite which infill some fractures. Some scour structures are apparent and these sometimes contain fossil (shell) fragments; bedding is generally indistinct. Diagenetic brecciation and remobilization is common giving a fractured appearance (\pm chlorite infill). Some veining of recrystallized calcite, fine grained haematite, chlorite, and minor quartz, and very minor galena and barite occur. Broken ground 1401.9 - 1411.1' (427.30 - 430.10 m); 1424.5 - 1427.3' (434.20 - 435.05 m); 1429.1 - 1431.3' (435.60 - 436.25 m); 1455.1 - 1464.6' (443.50 - 446.40 m). At 1443.7' (440.95 m) : 2 cm band of coarse grained sandstone containing clasts of reworked limestone (\pm haematite staining, and also containing small lenses of sericite (after clay lenses)). B.C.A. at 1443.7' (440.05 m) = approx. 60°, but the bed is possibly remobilized to some extent. The bedding within the limestone is obscured, or was originally non-existent. S.C.A. at 1443.7' (440.05 m) = 45°. The unit becomes paler downhole, and the breccia fracturing more intense. From 1459' (44.7 m) the red-brown to grey-black haematite becomes dominant in zones and as general alteration coloration. Some fossil fragments occur within the more calcareous bands. Minor quartz veining. 1462.9 - 1466.9' (445.90 - 447.10 m) : semi-massive and massive banded red-brown and grey fine grained sedimentary haematite and paler calcareous units. The banding shows diagenetic mobilization textures including slumping and autobrecciation : angular earthy red haematite fragments in a calcareous matrix. S.C.A. = B.C.A. at 1465.2' (446.10 m) = 45°.	Fossiliferous limestone.
1466.9 - 1474.6' (447.10 - 449.45 m)	Dark greenish polymict volcanoclastic coarse grained sandstone-pebble conglomerate. Clasts are tightly packed and generally elongated parallel to the slightly developed cleavage; clasts are generally acid volcanic rocks (lavas and ?tuffs, and include some cherty fragments), sulphide fragments, sericite, silica, and jasper. Matrix consists of chlorite-sericite with specular and earthy haematite, pyrite chalcopryrite and galena. The unit shows poorly defined banding corresponding to grain size variation. Downhole contact is distinct and apparently conformable.	
1474.6 - 1478.5' (449.45 - 450.65 m)	Pale brown fractured and brecciated very siliceous unit, possibly representing a detrital talus-type deposit, consisting of clasts from the downhole unit (fine grained siliceous (cherty) fragments),	Queenstown Pyroclastics Siliceous fragmental and brecciated mineralised volcanoclastic deposit.

