

RIO ALGOM EXPLORATION INC.

DIAMOND DRILL LOG

PROPERTY: Gullbridge

HOLE No.: GB-138

Collar Eastings: 140.00

Collar Northings: 2560.00

Collar Elevation: 0.00

Grid: Main

Collar Inclination: -59.00

~~Grid~~ Bearing: 118.00

Final Depth: 495.91 metres

Logged by: M.H.Lenters

Date: August 6 to 17, 1990

Down-hole Survey: Tropari

Purpose: Test Gullbridge Mineralized Horizon at depth, below the Southwest Shaft Occurrence

FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
0.00	1.40	OVERBURDEN								
1.40	108.10	QUARTZ-SERICITE-CHLORITE SCHIST (SHEAR FOLIATED RHYOLITE?)	200337	50.00	51.50	1.50	6	12	24	650
			200338	92.50	95.00	2.50	4	20	28	670
			200339	99.00	101.00	2.00	4	24	24	1000
			200340	101.00	103.00	2.00	7	34	30	1060
			200341	103.00	105.00	2.00	12	32	42	1270
			200342	105.00	107.00	2.00	5	48	64	1090
			200343	107.00	108.10	1.10	14	324	455	1010
		- generally well banded/schistose unit with mottly banded, light to medium green-grey to buff-epidote green colours, but including a few, thin (20's of cm), salmon pinkish, more massive zones that appear to be rhyolitic, (remnant less sheared rhyolite flow sections); locally a few zones appear to be shear foliated crystal tuffs, but no blue quartz eyes visible. Massive and foliated sections grade into one another								
		- unit could be shear foliated felsic tuff or rhyolitic flow, now moderately to strongly shear foliated, and altered to qtz-sericite schist.								
		- generally fine-grained, variably schistose, but generally moderate to strong schistosity/foliation at ~ 35 to 45° to CA; foliation is mostly subplanar, and locally wavy banded; with small scale (1cm) kinking. Locally, irregular to folded zones have variable foliation/schistosity from 0 to 90° to CA; minor folds in unit mostly suggest synform downhole although numerous folded areas are too complex to determine major structure directions of small parasitic folds. Unit has qtz ± minor feldspar-sericite composition, and locally contains minor chlorite with sericite in slightly darker grey-green sections. Tan-epidote greenish coloured sections appear to have weak carbonate alteration or possible kaolinitization of feldspars, rather than development of sericite								
		- small zone between 92.50 to about 96.00 includes sections with very vague, 0.5 cm, ovoid porphyroblasts, similar in type (size, concentration) to cord. porphyroblasts, but these have pale green or brown carbonate altered (retrograde?) appearance								
		- locally, a few light green sections (10-50 cm) contain a few percent, small (1 mm), dark cordierite spots/porphyroblasts, now								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		altered to chlorite. One such section sampled between 50.00-51.50 metres - local, thin zones throughout unit have very strong planar foliation and may be mylonitic shear zones - unit is non-magnetic - unit contains moderate to locally abundant quartz/silica veining/patchy concentrations (sweats?) throughout; some pinch & swell foliation parallel veins - unit generally contains about 5% quartz veining, but locally, across 10 to 50 cm zones, has 40-50% irregular crosscutting to patchy quartz veining; veins/patches from hairline to 10 or 20 cm in size; veins/patches have subplanar, but irregular, vein boundaries that are locally somewhat diffuse; qtz veining often contains 2nd phase of fine qtz in fractures - below the cordierite zone (96.00 m), the qtz veins often contain minor yellowish carbonate, and minor specks of orangy/red mineral (garnet or sphalerite), as well as small grains of a grey metallic mineral (tetrahedrite?) - unit generally unaltered except for minor cordierite (92.50-96.00 m and 102.5-106.0 m), and weak chlorite (2102.5 m) with 1 to 3% pyrite above 106 m - unit generally contains trace finely disseminated pyrite, except minor to 1% within cordierite zone (92.50 to 96.00 m), and below cordierite zone in weakly chloritized banded silica/sericite-chlorite zone which contains 1 to 3% finely disseminated and foliation parallel pyrite laminae, particularly below 105 m - core is hard and relatively competent, with 10-50 cm breakage generally parallel to foliation at 40-45° CA - lower contact sharp lithological boundary at 40° to CA								
108.10	117.20	QUARTZ-SERICITE-CHLORITE-PYRITE SCHIST (0.5-1% SPHALERITE)	200344	108.10	110.00	1.90	118	260	4130	200
			200345	110.00	112.00	2.00	115	128	3000	170
		- medium, slightly mauve colored, grey, fine-grained, relatively	200346	112.00	114.00	2.00	726	76	2450	270
		homogenous or uniform schist bed. Probably a single tuff	200347	114.00	116.00	2.00	603	20	158	270

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		horizon/accumulation; unit was probably a fine crystal tuff	200348	116.00	117.20	1.20	249	16	84	170
		- well foliated at 45 to 50° to CA., locally wavy to kinked (1 cm wavelength + amplitude), but generally planar foliation								
		- unit has quartz-sericite composition with 5%, thin, wispy lenses of chlorite (1 to 2 mm x 5 to 15 mm) conforming to foliation; unit contains minor to 10%, small (0.5 cm), weakly stretched and ragged edged cordierite porphyroblasts; these are black green-grey and probably chlorite retrograded; porphyroblasts are folded, conforming to bends/folds in foliation; cordierite increases in abundance downhole through this section from minor to about 10 or 15%								
		- unit is non-magnetic								
		- weak chloritic alteration and moderately pyritic (wk-mod. Fe/Mg addition)								
		- unit contains minor, 1 to 5 cm, irregular to amoeboid patches, locally containing small pyrite or sphalerite crystals								
		- 3-7%, finely disseminated pyrite grains generally concentrated in thin, (1-5 mm) lenses and bands, parallel to foliation; minor to locally 1% sphalerite as blood red (weathered colour), fine crystals in wispy foliation parallel grains and thin (hairline to 2 mm) laminae; sphalerite occurs interstitial to larger pyrite cubes in some heavily disseminated sulphide bands. Sphalerite most common in upper section (above 114 m), particularly the upper 2 metres, and only forms minor concentrations below 114 m. In the upper 2 metres (108.10-110.00 m) sphalerite locally constitutes 2-3% in thin (1 to 20 cm) pyritic-rich zones/bands. One small spot of galena mineralization noted in pyrite/sphalerite band at 109.80 m								
		- no pyrrhotite within unit								
		- unit is relatively hard and competent with 10 to 50 cm breakage along foliation planes at 40 to 50° to CA								
		- lower contact sharp lithological contact at 40° to CA								
117.20	117.65	BANDED ASB TOPP/CHERTY HORIZONS	200349	117.20	117.65	0.45	75	8	248	180

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		- same as 110.15 - 119.90 m								
117.15	118.15	SILICA-CHLORITE CORDIERITE SPOTTED ROCK (INTENSELY PE/HC ALTERED PELVIC TUFF)	200350	117.65	118.15	0.50	406	4	590	180
		- same as 119.90 - 125.00 m								
118.15	119.90	BANDED ASH TUFF/CHERTY HORIZONS	200351	118.15	119.90	1.75	519	4	214	180

- medium to dark grey to grey-green well banded/bedded

- 1 to 10 mm, parallel laminated aphanitic ash tuff and/or Fe-carb? cherty beds/laminae, with some f.g. qtz-sericite tuff bands

- unit appears to be ash tuffs with minor coarser tuff, but includes some Fe-carb?/silica cherty horizons

- bedding/lamination and well developed, wavy, planar foliation at 40 to 60° to CA, though locally slightly folded/crenulated (1-2 cm/and amplitude)

- minor parasitic folds suggest synform downhole

- unit is hard and very siliceous, with some sericite, minor chlorite & locally biotite; 4 to 8%, very finely disseminated pyrite, and 2-3% finely disseminated magnetite

- lower half of unit is more quartz-sericite schistose, and contains 10% coarse (1 cm), ovoid, poorly formed/ragged edged cordierite prophyroblasts

- fine cherty laminae and beds contain extremely finely disseminated pyrite, and coarser (0.5 mm) disseminated magnetite, while coarser and generally more chloritic ash tuff bands contain extremely fine to finely disseminated py and po concentrated in thin (1-5 mm) foliation bands as heavy disseminations

- pyrrhotite often forms on edges of py suggesting local replacement of py by po

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		- unit has moderately to strong Fe addition as sulphides, but only weak chlorite/cordierite alteration - minor irregular, thin (1-5 mm), discontinuous to wavy folded, qtz veins with somewhat diffuse contact boundaries - 5 to 8%, very fine to finely disseminated pyrite concentrated in thin (1-5 mm), foliation parallel laminae and bands - relatively hard competent core with minor breakage parallel to bedding/foliation - lower contact is somewhat gradational, but then sharp across foliation parallel surface at 40° to CA								
119.90	125.00	SILICA-CHLORITE/CORDIERITE SPOTTED ROCK (INTENSELY PE/MG ALTERED FELSIC METAVOLCANIC)	200352	119.90	121.00	1.10	4370	TRACE	312	30
			200353	121.00	123.00	2.00	910	TRACE	158	30
			200354	123.00	125.00	2.00	1185	52	284	160
		- spotted appearance with dark grey, porphyroblastic cordierite spots on fine-grained, medium green, relatively homogeneous chloritic groundmass - unit is fine grained, relatively hard, mod. to strongly magnetic - relatively uniform rock with weak to mod. foliation at ~60° to CA - groundmass has fine quartz-silica-chlorite composition, with 20%, large (0.5 to 2%), irregular, poikiloblastic (poorly formed or partially retrograded), ragged edged cordierite porphyroblasts; locally these appear to follow foliation but in other places, they appear to overprint foliation and have randomly oriented long axes - intense Fe/Mg (po, py, chlorite, cordierite) altered felsic metavolcanic with small siliceous grains throughout groundmass the only indication of possible previous felsic origin - minor, thin (2-5 mm), subplanar quartz veinlets/lenses - 5 to 10%, finely (2 mm) disseminated to irregular, but foliation subparallel, sulphide veinlets; (sulphides are mostly								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		po with minor pyrite and cpy). Cpy + po locally from stockwork like sulphide bands/veinlets; po often surrounds larger py grains and appears to be replacing py.								
		- very competent core with minor breakage on fractures at 45 to 70° to CA								
		- lower contact sharp lithological/alteration contact at 55° to CA								
125.00	130.05	VARIABLY ALTERED (MOD TO INTENSE PE/MG) FELSIC METAVOLCANICS WITH MINOR TO A FEW % SPHALERITE - CPT IN THIN CHERT BANDS	200355	125.00	126.20	1.20	70	4	180	560
			200356	126.20	126.65	0.45	53	TRACE	236	180
			200392	126.65	127.55	0.90	37	TRACE	168	550
		- interbedded/interbedded unit of quartz-sericite schist, quartz-sericite-chlorite schists, qtz-chlorite-cordierite spotted rock, and several thin, grey cherty horizons	200393	127.55	128.90	1.35	359	1	84	360
			200394	128.90	129.70	0.80	148	TRACE	64	590
			200395	129.70	130.30	0.60	3240	24	246	80
			200396	130.30	132.30	2.00	308	12	204	800
		- the schistose rocks are felsic in composition with some recognizable fine (1mm to 3 cm) lapilli tuff horizons and good crystal tuff horizons. Some of the less recognizable qtz-sericite schists were probably ash tuffs.	200397	132.30	134.30	2.00	42	8	1035	440
			200398	134.30	136.30	2.00	331	2	1040	460
			200399	136.30	137.25	0.95	264	8	450	490
			200400	137.25	138.05	0.80	443	4	1040	180
			200401	138.05	138.60	0.55	13	6	822	1030
		- beds vary from 1 to 10 cm for ash tuffs and cherts, while crystal and lapilli tuff units are quite homogeneous/distinct across 0.5 to 2 metre wide zones/bands	200402	138.60	139.00	0.40	347	2	266	80
			200403	139.00	141.50	2.50	59	4	820	900
			200404	141.50	142.15	0.65	5640	8	16900	90
			200405	142.15	143.50	1.35	416	4	608	410
		- felsic metavolcanic bands are generally fine-grained with some larger flattened lapilli fragments now almost unrecognizable, except as slight compositional differences across thin bands	200406	143.50	145.90	2.40	22	8	226	1330
			200407	145.90	146.80	0.90	157	100	764	120
			200408	146.80	147.25	0.45	6	12	266	840
			200409	147.40	149.40	2.00	6	8	308	1210
		- felsic metavolcanic bands are weak to moderately foliated and well banded at 50-70° to CA, locally complexly and irregularly folded (12 cm scale wavelength and amplitude) with a few large (5 cm scale) folds recognizable								
		- felsic metavolcanic bands have quartz-sericite-chlorite and minor biotite composition, and generally exhibit moderate to locally intense Pe/Mg (chlorite, cordierite, py) alteration								
		- felsic metavolcanics are variably cordierite spotted with minor to 25%, small (0.5) to large (2 cm), generally partially chloritized, ragged edged porphyroblasts. These are locally folded by late kinking								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		- felsic volcanic units are non- to weakly magnetic and contain variable amounts of sulphides from 1 or 2%, to locally 10%, as fine disseminations concentrated in thin (1-10cm) bands and patches parallel to the foliation. Locally minor po, cpy and sphalerite occur with the pyrite - chert bands are light greenish grey, aphanitic, siliceous, massive and contain 1 to several % py as extremely fine-grained disseminations, as well as fine crystalline pyrite and lesser pyrrhotite in thin sulphide bands subparallel to the chert bedding at 60 to 70° to CA. Locally Fe-sulphide-rich bands in some cherts contain minor to a few % cpy and/or sphalerite - unit contains 5%, irregular to wormy, somewhat diffusely banded, quartz veins/lenses/pods - relatively hard competent unit, with moderate breakage mostly parallel to bedding/foliation - separate subunits below are the most distinct zones, though smaller sub-units in this interbedded sequence could still be extracted.								
125.00	126.20	Quartz-Sericite-Chlorite Schist (Coarse Lapilli Tuff?)								
		- with 20%, large, dark green (chloritized) cordierite porphyroblasts, and 10%, irregular, quartz veining; 2-3% disseminated pyrite								
126.20	126.65	Silica-Chlorite-Cordierite Spotted Rock								
		- same as 119.90 to 125.00 - 1-2% dis py + 1 to 2% dis po								
126.65	127.55	Qtz-Sericite-Chlorite Banded Schist								
		- mod. chloritized with bands containing 20-25% cordierite (chloritized) porphyroblasts (some small fragments suggest protolith a lapilli to ash tuff); non-magnetic; 1-2% dissemination pyrite								
127.55	128.90	Qtz-Sericite-Chlorite Schist								
		- weakly chloritized - well developed, wavy laminations at 40° to CA; 20% vague cordierite spotting; 3-4% very finely dis py; non-magnetic								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
128.90	129.70	Interbanded Massive Cherty Ash Tuff and Qtz-Sericite:Chlorite Schist - as above; unit exhibits well developed, folded (5 to 10 cm scale) foliation; 1-2% disseminated pyrite								
129.70	130.30	Thin (1-5 m), grey chert beds with numerous, thin (1-70 mm), tuffaceous (qtz-chlorite-schist) laminae - foliation folds suggest synform downhole; - tuffaceous bands contain banded pyrite, while chert contains abundant disseminated pyrite; section has 5-6% py; wk-mod magnetic								
130.30	134.30	Qtz-Sericite:Chlorite Schist - similar to 127.55 - 128.90 m; recognizable, but flattened, fine (1-2 cm) lapilli tuff; moderate Fe/Mg (chlorite-cord-py) altered; strongly wavy-kinked foliated schist; 10-15%, small, poorly formed, folded cordierite porphyroblasts with chloritized corona (retrograde) rims - 1-2% finely disseminated pyrite, locally slightly concentrated in thin (1-10 mm), more heavily disseminated bands; thin (3 mm) disseminated pyrite band at 133.08 m contains minor sphalerite with pyrite								
134.30	136.30	Felsic Metavolcanic Crystal Tuff - slightly wine-red, medium grey, with 20%, large (1-2 cm), bluish grey, cordierite? poikiloblastic porphyroblastic growths; quartz-sericite-biotite (reddish biotite) composition with fine-grained granular texture; locally good qtz eyes; 0.5% pyrite disseminated throughout, but locally concentrated in thin (1-2 mm), heavily disseminated bands								
136.30	137.25	Felsic Crystal-Lithic Lapilli - tuff with several large (1-5 cm) chert and felsic volc. fragments in finer crystal/lapilli tuff matrix; foliation at 60° CA; moderately Fe/Mg altered, mod. (5%), iron yellow-brown coloured (re-carb altered?) cordierite? porphyroblasts. 1% disseminated pyrite mostly within tuffs surrounding chert fragments								
137.25	138.05	Grey Banded Chert & Tuffaceous Chert - 80% chert, with 20% tuffaceous bands; 5% very finely disseminated py, as well as thin (1-3 mm), foliation parallel pyrite bands composed of coarse (sl mm), pyrite crystals. Pyrite								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		seems to be concentrated on foliation/bedding parallel fractures in the chert. Pyrite bands have small (0.5-1 mm), red sphalerite associated with them, giving unit minor to 0.25% sphalerite content. Foliation at 60° to CA. Tuff bands are moderately well altered, though chert doesn't exhibit alteration effects								
138.05	138.60	Qtz-Sericite:Chlorite, Cordierite Spotted Schist - similar to 130.30 - 134.30 m, but small cordierite? porphyroblasts with chloritic rims exhibit interiors with yellowish-tan Fe-carb? altered composition. Foliation @ 60° CA. Minor to 0.5% finely disseminated pyrite, and a few, thin (1 mm), wispy disseminated red sphalerite bands/laminae along foliation planes								
138.60	139.00	Grey Chert - massive with 5%, irregular, wormy qtz veining; 2-3% finely disseminated py, as well as minor py + trace red sphalerite on fractures								
139.00	141.50	Quartz-Sericite:Biomite/Chlorite, Cordierite Spotted Schist - moderately Fe/Mg altered (chlorite, biomite, cordierite); wavy foliation at 45-60° CA; 15-20%, large, cordierite porphyroblasts with chloritic rims and yellow-tan Fe-carb altered interiors; exhibits crystal tuff and fine lapilli character; section is similar to 138.05 - 138.60 m; minor pyrite								
141.50	142.15	Grey Chert (Cpy, Sphalerite) - massive, greenish-grey chert with crackled appearance due to thin (hairline to 1 mm), network silica veining. Section contains several, irregular, patchy, 0.5 to 2 cm wide sulphide bands, sub-parallel to bedding at 73° to CA with sulphides (particularly cpy) also on crosscutting late fractures. Sulphide bands consist of 80% fine pyrite in coarser (1-2 mm) aggregates, and 20% red sphalerite with minor cpy observed on one fracture band; section probably contains 5-8% py, 0.5-1% sphalerite and 0.25% cpy; non-magnetic								
142.15	143.50	Interbedded grey chert bands, and Qtz-sericite + biomite/chlorite, cordierite spotted schists (moderately Fe/Mg altered & strongly Qtz veined/flood banding); 1-2% disseminated pyrite and minor red sphalerite wisps/laminae concentrated in chert bands at 142.65-142.72 m, 142.82-142.91 m and 143.27-								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		143.50 m								
		143.50 145.90 Qtz-Sericite/Biotite/Chlorite, Cordierite Spotted Schist - abundant large, bent and elongated, lapilli fragments, suggesting coarse (1-5cm) lapilli tuff; minor (5-10%), irregular chloritized cordierite spotting; moderately strong Fe/Mg (chlorite, biotite, cordierite) altered - 1-2% finely disseminated pyrite; very irregular contorted foliation								
		145.90 146.80 Grey Chert - massive chert with 5%, very finely disseminated pyrite, and 3%, coarser pyrite on fractures and bedding supparallel bands; locally minor extremely finely disseminated, and hairline fracture laminae, red sphalerite								
		146.80 147.20 - same as 143.50-145.90 m with abundant, white qtz lenses/pods; several large chert fragments; minor py								
		147.20 147.40 Grey Chert - massive with 5-8% finely disseminated pyrite								
		147.40 152.05 Pelvic Lapilli Tuff (similar to 138.05-138.60 m and 139.00-141.50 m) - light-medium greenish grey, quartz-sericitechlorite, cordierite spotted schist (Mod. Fe/Mg altered chlorite- cordierite); lapilli tuff protolith with numerous elongated and plastically deformed (flattened and folded) fragments visible, including a few, large (1-10 cm), chert fragments parallel to bedding/foliation with planar contacts @ 148.70-148.75 m; above 149.35 m cordierite porphyroblasts appear very weakly hematized, and below 149.35 m they have yellowish-tan colouration (Fe-carb? content); 1% finely disseminated pyrite - foliation is very variable and irregular with large (1 metre scale) fold through section, and tighter (1-2 cm) folding throughout								
		152.05 152.45 Grey Chert - massive, with 5%, network, thin (hairline to 1 mm), locally offset, fracture silica veinlets; 3-4% finely dis. pyrite								
		152.45 153.05 Same as 147.40 to 152.05 m;								

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							ASSAYS			
FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		- medium grey, quartz-sericite:minor chlorite, cordierite (Fe-carb) spotted (yellow-tan colored cord.) schist - some irregular/folded foliated zones; minor py; wk-mud. Fe/Mg altered (ch)-cord)								
153.05	155.40	INTERBEDDED CHERT AND QUARTZ-SERICITE:MINOR CHLORITE/BIOTITE, CORDIERITE SPOTTED SCHIST								
		- 50%, thin (1 cm to 20 cm), grey, to more commonly slightly or moderately hematitic red, ferruginous chert beds, interbedded with schistose, fine lapilli tuff (same as 152.45-153.05 m) - cherts are massive, with red cherts weak to strongly magnetic and lesser gray cherts non- to weakly magnetic - bedding/banding + foliation at 60 to 75° to CA - minor finely disseminated pyrite - moderately competent unit - unit boundaries taken at top of first reddish chert band and bottom of last reddish chert band, but qtz-sericite:chlorite, cord. spotted schists within unit is same as those to either side - lower contact is sharp bedding contact at 80° to CA								
155.40	164.63	VARIABLELY ALTERED (WK TO MOD. FE/MG) FELSIC METAVOLCANIC CRYSTAL AND FINE LAPILLI TOPPS (QUARTZ-SERICITE:CHLORITE SCHIST)								
		- light to medium grey and green-grey sections, generally fine-grained, schistose, well developed wavy foliation at 50 to 60° to CA - protolith was felsic ash and crystal tuff, with some horizons of fine (2 cm) lapilli tuffs - quartz-sericite composition, with local zones containing more or less chlorite, and 5-15%, small (0.5 cm), vague, cordierite porphyroblasts, locally covering 50% of rock								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		- non-magnetic - weak chloritic, and moderate cordierite alteration - minor white qtz patches/lenses - minor finely disseminated pyrite - competent core, with 15-50 cm breakage, generally on foliation surfaces - lower contact sharp compositional boundary at 65° to CA								
164.63	171.47	MAFIC (CHLORITIC) METAVOLCANIC? (POSSIBLY IN PART FELSIC METAVOLCANIC) - medium to slightly bluish green, and medium dark brownish grey, wispy mottled, fine-grained, non- to weakly magnetic - generally moderately planar schistose/foliated, and irregularly mottled @ 45-50° to CA - plagioclase-silica-chlorite:biotite composition; weakly chloritized mafic metavolcanic?, although in a few small zones, the unit appears to have a fine felsic tuff character - 5%, irregular quartz-epidote: garnet patches/irregular bands - minor irregular to wavy quartz veining/patches - minor pyrite, as small grains and small disseminated grains patches - moderately competent core, with moderate breakage on irregular fractures at 10-30 cm intervals - lower contact is thin (1-3 mm), gouge slip at 70° to CA								
171.47	178.35	FELSIC METAVOLCANIC CRYSTAL/LITHIC TUFF - medium grey to slightly greenish-grey, fine-grained quartz-sericite:minor chlorite schist	200410	171.47	173.00	1.53	13	20	118	320
			200411	173.00	175.00	2.00	15	16	80	350
			200412	175.00	177.00	2.00	17	28	84	510
			200413	177.00	178.35	1.35	18	28	104	390

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FROM TO		LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		- moderately (Fe/Mg) altered (chlorite, cordierite, pyrite) - minor, small (0.5 cm), quartz blebs, and a few, thin (1-5 mm), wavy, very diffuse quartz veins - 1-2% disseminated pyrite, locally concentrated on thin (hairline to 1 mm), foliation parallel surfaces - moderately hard, competent core - lower contact gradational into felsic crystal tuff								
183.55	185.80	Felsic Crystal Tuff - light to medium, slightly greenish to reddish-brown grey, fine-grained, moderately well developed planar to slightly wavy, foliation at 50 to 60° to CA - quartz-sericite and minor chlorite (5%)/biotite (10%) composition, with 5% very vague and elongated chloritic remnants or poorly formed cordierite porphyroblasts; biotite has reddish-brown (zinc-rich?) colour - chlorite forms as thin (1 by 5mm), wavy, foliation parallel wisps - weak to moderate Fe/Mg (chlorite, cordierite, biotite, py) altered, and has very siliceous (pervasively silicified) appearance - minor, irregular to wavy, quartz vein patches/lenses/sweats with diffuse boundaries - 0.5%, very finely disseminated pyrite, and minor fine red sphalerite in thin (1 mm), discontinuous foliation parallel wisps - very hard competent core, with minor breakage along chloritic slips parallel to foliation - lower contact is sharp, slightly undulating lithological contact								
185.80	189.65	Intensely silicified Felsic Metavolcanic Ash Tuff with 5 cm Massive Sulphide (Pyrite) Band - greyish white to light grey, very siliceous, very fine to fine-grained, non-magnetic, massive to weakly wavy laminated at 45 to 60° to CA - quartzose composition with some sericite & minor chlorite/biotite. Unit generally an ash tuff, although vague crystals in a few zones containing more sericite/chlorite/biotite suggest they may have been crystal rich; the latter also exhibit up to 25%, greenish cordierite porphyroblasts; these are 0.5 to 1 cm and locally coalesce into one another forming large aggregate patches of the porphyroblastic mineral - minor felsic metavolcanic lapilli (up to 0.5 by 3 cm)								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		fragments locally occur within the tuff - intensely silicified, and minor to moderate Fe (cordierite, pyrite, chlorite/biotite) altered - minor quartz patches and subplanar veins all exhibiting diffuse contacts with adjacent silicified wallrock - 1 to 4%, disseminated pyrite locally concentrated in thin (hairline to a few mm wide) bands of disseminated sulphides and including a 5 cm wide, massive sulphide band with sharp planar contacts between 189.22 to 189.28 m at 55° to CA; band consists of 90%, ≤ 1 mm, pyrite grains packed together with about 5%, interstitial silica and includes two, large (0.5 x 1 cm), rounded, felsic volcanic fragments (clasts) suggesting pyrite band is transported accumulation - very hard competent core, with minor breakage parallel to foliation - lower contact somewhat irregular, but generally sharp lithological change 189.65 194.60 Felsic Metavolcanic Lithic/Lapilli Tuff - mottled and spotted, dark greenish-grey to grey, weak to moderately foliated at 45 to 60° to CA - numerous, small to larger (up to 1 cm x 10 or 20 cm) sub-rounded/partly flattened, fine rhyolitic clasts in fine quartz-sericitic/chloritic/minor biotitic matrix; section exhibits 5 - 50%, small (0.5-1 cm), ovoid moderately developed cordierite porphyroblasts, with thin, chloritic rims surrounding light brownish, Fe-carbonate altered cores - non- to locally very weakly magnetic - elongated axis of clasts parallel to foliation direction - moderately to strongly Fe/Mg altered (chlorite, cordierite, pyrite), with relatively strong chloritic groundmass - 5%, irregular to swirled quartz lenses/patches/blowouts, both subparallel and crosscutting foliation - 3-5%, disseminated pyrite, concentrated on discontinuous foliation parallel bands as extremely fine-grained to 2 mm in size crystals - contains thin, semi-massive sulphide band between 190.72 to 190.78 m, which consists of 60%, fine to 1 mm pyrite grains in foliation parallel vein-type bands; also about 5%, large pyrrhotite, as overgrowths/replacement of pyrite and 5% cpy; above this sulphide band the felsic tuff unit contains about 5 to 10% disseminated pyrite & lesser pyrrhotite across a 20 cm width - lower contact at irregular quartz veined zone								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
194.60	195.10	Fine-grained Chloritic-Biotitic-Silica Rock - intruded by 60%, irregular, quartz veining/lenses in chaotic discontinuous blebs/patches and lenses - contains 1-4% disseminated pyrite, and 1-2%, small (2-5 mm long), poorly to moderately developed disseminated pyrrhotite needles - lower contact at end of quartz veined zone								
195.10	207.25	Quartz-Chlorite-Sericite Schist (Felsic Lapilli and Crystal Tuffs) - variably (mostly moderate to intensely) Fe (chlorite, pyrite, pyrrhotite, magnetite) altered, medium to dark, grey-green felsic metavolcanic tuffs, with several weak to moderately altered zones of medium grey, recognizable felsic crystal tuffs - section has well developed planar, but locally wavy folded/crenulated, foliation at $\approx 50^\circ$ to CA - locally, abundant, small felsic metavolcanic lapilli recognizable throughout; upper half of section contains thin, grey chert band between 200.30 to 200.85 m - weakly magnetic - moderate to strongly chloritized groundmass; locally chlorite surrounding bluish qtz eyes. Section contains no cordierite porphyroblasts, which is uncommon for chlorite altered sections - 3-5%, small (1-5 mm), irregular to wavy (ptygmatic) folded, quartz veins, generally crosscutting foliation - 1-2% finely disseminated pyrite and lesser pyrrhotite - moderately soft, but competent core with moderate breakage along foliation parallel, chloritic slip/parting surfaces - lower contact somewhat gradational into more mafic looking chloritic schists								
207.25	241.52	CHLORITIC MAFIC METAVOLCANIC (FLOWS?) - relatively homogenous, medium green, fine-grained, soft, chloritic rock with well developed planar foliation at $\approx 60^\circ$ to CA - unit exhibits 3-5%, small (1-2 mm), ovoid, silica amygdulose suggesting a mafic metavolcanic protolith, but locally the unit has a slightly siliceous granular appearance suggesting that it may partly contain intensely chloritized felsic tuff bands	200431	207.25	209.50	2.25	7	20	76	46
			200432	212.50	214.40	1.90	21	12	64	50
			200433	217.00	219.00	2.00	16	64	102	120
			200434	229.80	231.80	2.00	808	18	110	90

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		- chlorite-silica composition, generally with 1-5% finely disseminated magnetite grains - unit is moderately, to locally strongly magnetic - strong Fe/Mg altered (chlorite, magnetitic, po + py) - unit contains 1-3%, finely disseminated, often crystalline (3mm long needles) pyrrhotite and pyrite. Po + py also form thin (1-5 mm), foliation parallel bands. Po/Py often forms parts of same sulphide crystal shape suggesting replacement - minor chalcopyrite as small grains in some disseminated pyrrhotite and pyrite bands, and locally as small grains in the central part of silica amygdules - 5-10% silica in amygdules, and in small (1-5 mm) patches/lenses/bands and pygmatic to irregular quartz veins 229.12-229.25 m Small fault zone (brecciated/sheared quartz vein fragments) with contacts @ 60° to CA - relatively soft core, mod. breakage along foliation surfaces, and irregular fractures - lower contact is sharp, but undulating at ~ 70° to CA, and cuts across foliation of underlying unit								
241.52	248.25	CHLORITIC MAFIC TUFF/VOLCANICLASTIC								
		- dark green, very fine-grained, weak to moderately magnetic, moderately well laminated/planar foliation at 45 to 60° to CA; numerous, small (0.5 - 2 cm), parastic folds all suggest synform downhole - generally moderately hard, with silica-chlorite composition, but locally dark brownish colored with abundant fine biotite instead of chlorite; the biotitic zones have a chaotic tight folding and include 15 - 25%, discontinuous, wavy quartz-calcite banding suggesting a metamorphic sweating; long axis of banding is foliation parallel								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		- weak to moderately magnetic suggesting minor fine-grained magnetite content - moderate chloritic (Fe/Mg) composition/alteration, but unit is relatively homogenous - contains one, thin, recognizable quartz biotite medium horizon (233.90-234.15 m), with 2 poor graded beds showing tops downhole (questionable on one bed), and folding suggesting synform downhole - 5%, small (1-5 mm), irregular, white, quartz-calcite lenses/sweats/bands/veins, often subparallel to foliation - no visible sulphides - competent core with 50 - 100 cm breakage across foliation, suggesting slight hornfels or pervasive silicification of unit - lower contact relatively sharp planar break at 45° to CA								
248.25	286.00	COARSELY PORPHYROBLASTIC MAFIC METAVOLCANIC (POSSIBLY ROBERTS ARM DYKE) - generally dark green, very weakly to weakly magnetic, relatively homogenous unit with 80%, large (0.5 to 3 mm), rounded, porphyroblasts that appear close packed with fine-grained schistose matrix material in interstices; locally porphyroblasts exhibit weak elongation parallel to foliation - the upper part of the unit has a 0.5 m zone of less (smaller) porphyroblastic material, while lower zone is relatively fine-grained below 282 metres, suggesting chilling at edges of large flow or dyke - relatively unaltered unit, except for minor epidote-carbonate:silica alteration veining - where apparent in epidote-carbonate-silica altered zones, the porphyroblasts can be seen to be composed of several fine minerals including plagioclase and chlorite, but individual large porphyroblastic porphyroblasts appear to be one unit/crystal								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		- unit has weak to moderately well developed foliation at $\approx 45^\circ$ to CA - 3 to 5% epidote-carbonate(calcite)/silica veining/alteration patches, generally as foliation parallel, wavy banded veins and patches generally 1 to 10 cm wide. Epidote alteration affects matrix material more than porphyroblasts which stand out in altered zones. Also several white, coarser-grained (1-10 mm), discontinuous lenses to subplanar calcite veins at 30 to 45° to CA - includes one large xenolithic block between 270.50 to 271.35 metres of chloritic mafic tuff/volcaniclastic material similar to 241.52 to 248.35 m. This section has sharp foliation parallel contacts at $\approx 50^\circ$ to CA, with upper contact along thin diabase dykelet - one, thin, aphanitic (chilled), purplish cherty dykelet between 270.42 to 270.50 m with sharp contacts at 50° to CA - unit contains no visible sulphides - unit has relatively sharp, planar foliation contacts; across lower contact schistosity becomes wavy, and underlying unit is more biotitic and fine-grained								
286.00	307.50	SILICIFIED MAFIC METAVOLCANIC (TUFF?) OR CHLORITIC PELSIC METAVOLCANIC TUFF?/VOLCANICLASTIC - similar to chaotic folded biotitic zones in chloritic mafic tuff/volcaniclastic unit between 241.52 to 248.25 metres - medium to dark grey-green to green-grey, fine-grained, hard to very hard (pervasively silicified), weak to moderately magnetic - unit appears to have plagioclase-silica-chlorite/biotite composition with intensely deformed, small-scale kinked and chaotically deformed/broken foliation and banding of chloritic and biotitic laminations/thin bands with silicified bands. Thin ($\leq 1-3$ or 4 mm) banding/foliation irregularly developed and discontinuous. Unit also includes several small (1-5 mm),								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		silica/quartz blebs in irregularly contorted zones, which could be silica flood concentrations or remnants of broken/boudinaged quartz veins - fine scale lamination/banding locally gives unit a sedimentary/volcaniclastic appearance - unit appears to be moderately pervasively silicified and although described as wavy banded, this texture is generally subdued. Locally thin (1-2 mm), calcite-epidote wavy folded veinlets/bands give unit an irregularly striped/banded appearance - minor to 1% late fracturing containing white, coarse-grained calcite - no large quartz veining - minor to 0.5%, finely disseminated pyrrhotite/pyrite scattered throughout unit - lower contact sharp foliation parallel lithology change at 50' to CA								
307.50	322.47	PELSIC METAVOLCANIC CRYSTAL/FINE LAPILLI TUFF - speckled medium gray, relatively homogenous and unaltered - non- to weakly magnetic, with a few moderately magnetic (magnetite) zones - unit probably a redeposited crystal tuff as it contains chert and rhyolite fragments (ripups of chert?), although unit does not exhibit any graded bedding or separate bedding contacts within unit - generally 80 to 95%, fine to medium-grained crystal tuff, with 5%, white, subhedral, 0.5-1 mm, plagioclase in fine weakly schistose tuffaceous matrix, including small to large (up to 2 by several cm) flat, red, chert fragments locally forming foliation parallel bands. (these appear as beds, but are also large fragments lying parallel to foliation/bedding). Unit also includes a few, large, grey feldspar phryic rhyolite fragments.								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		Unit exhibits minor, small, rounded quartz eyes								
		- chert fragments are purplish red, aphanitic, hard and generally non-magnetic								
		- weak to moderately well developed schistosity at 50 to 65° CA								
		- one minor parasitic fold in chert fragment? suggests synform downhole								
		- locally a few zones with 10 to 20%, smaller (1x5 mm wide to 3 cm long), relatively flat, lapilli fragments that parallel foliation								
		- unit contains a few, thin, silica veinlets along fractures at various angles to core axis, generally with thin (1-10 mm), irregular and diffusely banded epidote								
		- relatively unaltered unit								
		- trace to minor amounts of finely disseminated pyrite : pyrrhotite								
		- lower contact relatively sharp at 60° to CA, along quartz veined, weakly brecciated zone a few cm wide								
322.47	325.10	PELSIC METAVOLCANIC (RYHOLITE FLOW?/TOFF?)								
		- medium gravel grey, fine-grained, subdued, homogenous appearance								
		- non-magnetic, massive, very hard, siliceous composition								
		- probably rhyolitic ash tuff, but lack of foliation/schistosity gives a rhyolitic flow? appearance								
		- 5-10%, thin (hairline to a few mm), irregular to networked fracture filling, white to grey silica veining, locally somewhat contorted and swirled								
		- unit is not altered								
		- no visible sulphides								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	ASSAYS				
						WIDEN	Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		- includes a thin (1 cm), red chert band/fragment as in typical in overlying unit, which suggests this unit is a tuff/volcaniclastic and not a rhyolitic flow - lower contact sharp intrusive contact								
325.10	325.83	FELSPAR PORPHYRITIC NAPIC (DIABASE) DYKE								
		- dark greenish grey, aphanitic dyke with several percent small (<1 mm), white, euhedral, often zoned, plagioclase phenocrysts concentrated in central, non-chilled, section of dyke - massive, homogenous, moderately magnetic - no veining, alteration or visible sulphides - sharp intrusive contacts at about 45° to CA								
325.83	331.85	FELSIC METAVOLCANIC CRYSTAL/FINE LAPILLI TUFF								
		- similar to 307.50-322.47 m, but slightly more chloritic - weak to moderately foliated at 50 to 70° to CA; unit is weak to moderately magnetic - dark greenish-grey, fine crystal tuff texture, with 5 to 10%, fine (<1 mm), white, subhedral, plagioclase; several rounded, somewhat diffuse quartz phenocrysts - unit includes 5%, small to larger, lapilli fragments generally of rhyolite or red chert composition - unit has quartz-feldspar-chlorite:sericite composition; minor chlorite alteration - minor to 3% fracturing with thin, silica veining exhibiting thin (< 5 cm) adjacent epidote altered envelopes; minor, hairline epidote fracturing - minor finely disseminated iron sulphides								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		- lower contact is sharp, lithological break parallel to foliation at 70° to CA								
331.85	356.90	FELSIC METAVOLCANIC TUFFS INCLUDING TWO POSSIBLE MAFIC TUFF DYKES	200435	345.20	346.88	1.68	31	24	70	550
			200436	355.70	356.90	1.20	83	26	268	130
		- variable tuffaceous section with definite crystal/lapilli tuff sections, but including some fine-grained, weakly foliated somewhat massive and homogenous sections, two of which could be mafic feeder dykes.								
		331.85 343.45 definite felsic tuff unit consisting of ash to ash/crystal tuffs, with some (locally 5-10%), coarse, lapilli fragments mostly of red ferruginous chert up to a few cm in size; upper half of section contains about 5% chert fragments								
		- weak chloritic alteration and weak to moderate silicified appearance								
		- silica-plagioclase-chlorite-sericite composition								
		- generally weakly developed foliation, and elongation of lapilli fragments at 55 to 80° to CA								
		- non- to weakly magnetic								
		- 5%, irregular, wormy silica veining and irregular patches								
		- no epidote-carbonate alteration, except very locally on small fractures								
		- minor disseminated iron sulphides, including one, small (3 mm by 25 mm), elongated sulphide clast?								
		- irregular, but relatively sharp, contact at irregular quartz vein, separating felsic tuffs from mafic unit								
		343.45 344.20 Mafic Metavolcanic								
		- dark green, fine-grained, non-magnetic, moderately hard, relatively homogenous, massive to very weakly foliated unit								
		- plagioclase-chlorite composition, but relatively unaltered								
		- foliation at 50 to 60° to CA								
		- could be Roberts Arm mafic intrusive or possibly mafic tuff?								
		- minor silica veining								
		- trace, very fine disseminated iron sulphides								
		- lower contact at irregular quartz vein/bleb = 80° to CA								
		344.20 345.20 Chloritic Felsic?/Mafic Tuff								
		- similar to 343.45 to 344.20 m, but more foliated and minor, irregular, network vein/patchy epidote alteration, as well as 5%, irregular to wormy, quartz blebs/patches								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Sn(ppm)	Ba(ppm)
		- foliation at 60 to 70° to CA; generally planar, but locally finely contorted - 0.5 to 1%, disseminated pyrite, locally concentrated into small foliation parallel wisps/blebs - lower contact sharp, planar/foliation parallel lithological change								
345.20	346.88	Felsic Metavolcanic Crystal Tuff (quartz-feldspar-chlorite-sericite); similar to 325.83-331.85 m, but no lapilli fragments - 5%, irregular, wormy to patchy quartz veining/blebs - 0.5% to 1%, very finely disseminated pyrite								
346.88	356.90	- similar to 286.00 to 307.50 m, although this unit has no biotite and some pyrite - mottled to patchy, medium to dark green-grey to grey colour - fine-grained, relatively homogenous silica?-plagioclase-chlorite composition, with 5%, patchy, discontinuous, epidote-carbonate(calcite):silica networking patches, locally with minor garnet. Also contains a few, larger (0.5 to 2 cm), irregular quartz patches - moderately magnetic - weak to moderate foliation, generally subplanar at 50 to 60° to CA - weak to moderate pervasive silicified appearance; silicified mafic flow unit, but could be chloritic, fine mafic/felsic? volcanoclastic tuff unit - unit contains variable amounts of very finely disseminated pyrite, locally from trace amounts to several percent, but about 0.5 to 1%, occurring as fine grains to wispy grains parallel to the foliation - lower contact is gradational over a few cms into definite grey felsic metavolcanic tuffs								
356.90	367.50	QUARTZ-SERICITE-CHLORITE SCHIST (QUARTZ-FELDSPAR CRYSTAL TUFF)	200437	356.90	357.90	1.00	53	14	196	290
			200438	357.90	359.50	1.60	58	12	78	960
			200439	359.50	361.00	1.50	216	10	62	1030
			200440	361.00	363.00	2.00	2	12	48	970
			200441	363.00	364.50	1.50	TRACE	106	40	500
			200442	364.50	365.20	0.70	2	10	92	550
			200443	365.20	367.50	2.30	TRACE	12	56	100
		- medium slightly purplish, tanish or greenish grey, fine-grained, non- to weakly magnetic, weak to moderately foliated/schistose - has quartz-feldspar-sericite-chlorite:biotite composition, with irregular, small (1-3 by 3 to 10 mm) blebs/clots of								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		chlorite or biotite swirled in wavy banded foliation/schistosity - foliation averages about 60° to CA but is swirled and kinked - weak Fe/Mg (chlorite, pyrite ± biotite) alteration, locally with heavy Fe (py) addition, as well as weak, pervasive silicification (unit has a homogenized or subdued appearance due to pervasive silification) - 5%, irregular, thin (2-20 mm), milky white quartz lenses/blebs/patches, and discontinuous, wavy (disfusedly bounded) veining - unit contains about 2-4%, coarsely disseminated/buckshot type pyrite throughout, as well as several, thin to thicker (0.2 to 40 cm) bands consisting of heavily disseminated/buckshot (1-2 mm rounded) pyrite and minor pyrrhotite. Pyrite bands often surrounded by thin aureoles of more chloritic wallrock. Locally, small (1 or 2 mm), variably orientated needle-like Fe-sulphide crystals occur within chloritized zones; 363.75-363.90 m and 364.50-365.00 m are zones with 40-50% heavily disseminated buckshot pyrite and minor pyrrhotite; locally minor chalcopyrite, generally along quartz blebs/veins - lower contact, relatively sharp intrusive contact								
367.50	373.35	PELSDSPAR PORPHYRITIC INTERMEDIATE TO MAFIC DYKE - medium to dark greenish grey, hard, fine-grained, with definite chilled margins, and 2-3%, 1-3 mm, subhedral to rounded plagioclase phenocrysts - moderately magnetic, massive (non-foliated), very homogenous with 65-70% plagioclase, 15% chloritized mafic (amphibole?) mineral, and 5% black biotite. Probably some silica in matrix as unit is very hard - includes several, small (up to 2 cm), irregular to ragged edged, coarse-grained (2-5 mm), plagioclase-pyroxene? xenolithic (gabbroic/roctolitic?) fragments of the parent magma? - unit is unaltered								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		- 0.5%, pyrite as fine disseminations, small (2-3 mm), rounded concentrations, and minor fracture fillings								
		- no veining								
		- lower contact sharp chilled margin at 80' to CA								
373.35	393.70	PELSIC METAVOLCANIC LAPILLI/CRYSTAL TUFF	200444	373.35	375.00	1.65	6	14	58	80
			200445	375.00	377.00	2.00	16	6	58	20
		- weak to locally moderately Fe/Mg (pyrite, chlorite, magnetite) altered, and weak to moderately pervasively silicified	200446	377.00	378.40	1.40	19	2	58	30
			200447	378.40	380.45	2.05	10	4	22	40
			200448	380.45	382.00	1.55	2	156	28	120
		- medium grey, speckled crystal tuffs, and mottly banded lapilli tuffs. Very weak to locally moderately planar foliated at 65 to 85' to CA; minor quartz-sericite-chlorite schistose zones exhibit tight, and somewhat irregular, crenulated/folded foliation	200449	382.00	383.50	1.50	TRACE	4	50	20
			200450	383.50	386.00	2.50	TRACE	40	34	50
			200451	386.00	388.50	2.50	2	28	20	90
			200452	388.50	391.00	2.50	6	120	38	50
			200453	391.00	393.70	2.70	1	4	24	70
		- unit has variable quartz-feldspar-sericite-chlorite composition, locally with 1-3% magnetite and up to several percent pyrite								
		- about half of unit has granular crystal tuff appearance, with white, plagioclase phenocrysts, and half is probably a lapilli tuff containing subrounded fragments up to several cm in size. Minor fragments also occur in crystal tuff sections; well developed crystal tuff section from 378.40-380.20 m; different facies grade into one another and have partial subdued/ homogenized appearance due to later alteration								
		- unit exhibits weak to moderate Fe/Mg alteration as additional pyrite/pyrrhotite, magnetite and chlorite, as well as weak pervasive silicification								
		- magnetite occurs as fine disseminations, and locally in thin, foliation parallel stringers, with/replaced by iron sulphides								
		- pyrite and lesser pyrrhotite occur as fine wispy disseminations, and thin laminae/stringers/bands/patches of concentrated, fine to coarse, wispy to buckshot pyrite; hands/patches vary in thickness from hairline width to zones up to 10 cm in size; several pyrite concentrations appear to be sulphide fragments with definite compositional contrast between								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		matrix of sulphide fragment and adjacent host rock, but most appear to be pyrite replacement bands; sulphide bands are generally foliation subparallel although locally irregular to crosscutting								
		- minor epidote alteration spots and patches, locally with spotted, (1-3 mm) ovoid, porphyroblastic appearance (not cordierite)								
		- no significant veining, but minor, irregular, quartz blebs/lenses/patches								
		- lower contact somewhat gradational, but taken at a foliation parallel, relatively sharp change into somewhat more chloritic felsic metavolcanics								
393.70	408.10	CHLORITIC ALTERED FELSIC METAVOLCANIC? ROCK	200454	393.70	396.00	2.30	TRACE	TRACE	58	10
			200455	396.00	398.00	2.00	TRACE	12	46	20
		- somewhat similar to parts of overlying unit between 373.35 to 393.70 m, but more Fe/Mg altered (more chloritic) with more magnetite; no definite crystal tuff sections	200456	398.00	400.00	2.00	TRACE	TRACE	50	20
			200457	400.00	402.00	2.00	TRACE	18	62	50
			200458	402.00	404.00	2.00	TRACE	24	56	50
			200459	404.00	405.60	1.60	TRACE	12	60	10
		- dark green-grey, fine-grained, moderately to strongly magnetic, massive to weakly foliated, and moderately hard	200460	405.60	406.70	1.10	30	10	32	TRACE
			200461	406.70	408.10	1.40	TRACE	TRACE	66	10
		- unit locally has variable, patchy, slight (weak) porphyroblastic appearance, and locally exhibits somewhat fragmental (lapilli) appearance, both being homogenized by moderate Fe/Mg (chlorite, Fe sulphide) alteration								
		- unit was probably a felsic tuff/volcaniclastic, much like bottom part of this hole from 452 to 495.91 metres, but appears now like a siliceous mafic rock								
		- has plagioclase-silica-chlorite composition								
		- minor silica blebs/lenses/patches, as well as offset to discontinuous veinlets with slightly diffuse contacts								
		- unit contains about 5%, irregular, patches to disseminated bands of py, po + mt, as well as 1-5%, finely disseminated magnetite; Fe-sulphides form thin to thicker (hairline to several cm wide) bands, often in small, shear bands with								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		abundant chloritic alteration; section has weak to moderately developed Fe-sulphide stockwork veining system. Most of Fe-sulphides occur as coarse (1 mm), rounded, tightly packed grains, or as buckshot concentrations								
		- contains 2 to 3%, irregular, small (0.5 - 5 cm), lighter green, epidote altered patches								
		- foliation and sulphide banding generally at 60 to 70° to CA								
		- unit includes a thick Fe-sulphide-calcite-silica-magnetite band between 405.60 to 406.60 m, consisting of coarsely granular pyrite & lesser pyrrhotite & 5% magnetite, with interstitial white calcite, as well as bands of silica with chlorite and hematite. Blood red hematite in silica part of band appears to be altered magnetite. Section forms a silica-Fe flood zone/vein/band								
		- unit contains a few, irregular (angular), small (0.5 to 1 by a few cm long) chert fragments, suggesting a possible lapilli character for unit								
		- lower contact gradational (change in alteration character and intensity)								
408.10	436.00	SILICIFIED MAFIC METAVOLCANIC FLOWS (PILLOWED?)	200462	409.10	410.00	1.90	23	18	110	80
			200463	428.00	429.90	1.90	90	TRACE	158	58
		- somewhat mottled, medium to dark grey-green, fine-grained, moderate to strongly magnetic, massive to weakly foliated at ~60° to CA. Relatively hard, homogenous unit	200464	429.90	430.15	0.25	12	TRACE	62	10
			200465	430.15	432.15	2.00	57	TRACE	122	20
		- unit was probably a mafic flow, possibly pillowed, with some flow/breccia sections								
		- unit contains 5-10%, irregular crackled/networking, to thin (1-15 cm), irregular, bands of silica-epidote/Fe-carbonate/magnetite banding, oriented subparallel to foliation. These appear to be epidotized, siliceous, interpillow/interflow sedimentary accumulations, or pillow/flow selvages								
		- moderately pervasively silicified, with original plagioclase-ferromagnesian mafic mineral composition, with mafic minerals now mostly chloritized; minor to 2%, disseminated or small								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		stringers of magnetite								
		- unit contains 0.5 to 1%, pyrite and pyrrhotite, as irregular concentrations in epidotized bands/sclveges, and irregular, small fracture zones (1-3 mm). Below 426 metres, unit contains several, 1 to 30 cm thick bands of massive magnetite (30-60%), pyrite (30-60%), and po (5 to 10%); includes massive magnetite (50%), pyrrhotite (40%), and pyrite (10%) band between 429.90 and 430.15 metres								
		- no significant quartz veining								
		- competent unit, with 25 to 100 cm breakage on irregular to foliation parallel fractures								
		- lower contact sharp at 75° to CA								
436.00	452.70	SHEARED, INTERBEDDED METASEDIMENTARY UNIT								
		- unit consists of interbedded cherts and cherty argillite including a chaotic purplish argillite (similar to bottom of GB-139), as well as some felsic metavolcanic tuffs								
436.00	444.50									
		- mottled medium purplish (hematitic) grey to green-grey, with abundant, irregular network epidote alteration banding								
		- unit is very hard (siliceous), fine-grained, massive to weakly foliated, but locally brecciated and contorted; weak to moderately magnetic								
		- generally appears to be cherty metasediment (argillite), and altered ash tuffs								
		- foliation at 65 to 80° CA, where not brecciated or contorted								
		- 10 to 20%, irregular epidote-pinkish calcite patches and anastomosing network veinlets coalescing into braided bands. Some of these appear somewhat early with subdurd edges, but most are sharp crosscutting late fracturing								
		- unit is moderately silicified and epidote altered								
		- minor to 2%, thin (1-5 mm), discontinuous, offset quartz veins/lenses								
		- minor disseminated iron sulphides								
		- moderately broken core (5-20 cm), with some rubbly broken sections, including large rubbly recovered zone between 442.25								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		to 443.50 metres - lower contact gradational into more abundant chaotic purplish cherty argillite								
	444.50 450.60	- chaotic, sheared cherty argillitic melange (similar to bottom of GB-139), including irregular fragments and clasts of various lithologies including chert, mafic volcanic and intrusives (granite?) - mostly irregularly network mottled to chaotic tightly folded purple (hematitic) cherty argillite with 10 to 25% interconnected, wavy folded, green, fine to medium-grained, chloritic, altered network veining - weak to moderately magnetic - wavy foliation probably averages about 60 to 65° to CA, but generally chaotic and variable - moderately chloritic matrix and shear slips - locally unit looks more like sheared lapilli tuff, because purplish unit is coarser (with granular texture) than the argillite in GB-139 - unit contains about 1%-30%, small (1 mm) to large (70 cm), angular to subrounded, fragments and blocks of various lithologies including cherts, which form largest fragments, mafic metavolcanics, and some pinkish-white coarse (1-3 mm), intrusive clasts. Clasts are bent and folded by chaotic shearing - minor (1-5%), epidote altered fracturing - no significant quartz veining - trace iron sulphides - relatively hard competent core, but well broken on chloritic slips subparallel to foliation at 50-75° to CA - lower contact somewhat gradational, but taken at start of thick gray chert unit								
	450.60 452.70	- similar to 436.00 to 444.50 m, but with 80% tuffaceous chert, and 20% thin, interbanded chloritic tuffaceous bands - cherts vary from grey and non-magnetic, to reddish (hematitic) and weakly magnetic. Cherts are internally well shear foliated parallel to well developed foliation in tuffaceous bands at 50 to 75° CA. Cherts probably individual beds, but could be transported blocks/clasts - minor brecciation of cherts, with breakage into small (1 cm), elongate boulders surrounding/enveloped by more sheared matrix								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		material - 5%, late, epidote network fracturing - no visible sulphides - lower contact somewhat gradational, but taken at end of red chert								
452.70	495.91	SILICEOUS PELTIC METAVOLCANIC FINE LAPILLI AND FELDSPAR CRYSTAL TUFF/GRAYWACKE?/ARKOSE? - medium grey, hard, siliceous, fine to medium-grained (≤2 mm), generally weakly magnetic, massive to moderately foliated at ± 50 to 75° to CA - generally has subdued (pervasively silicified) granular appearance of a crystal tuff, but could be reworked crystal tuff material. Locally subhedral, white feldspar, and small (1-2 mm), ovoid, blue quartz eyes; some finer-grained sections appear as homogenous fine ash tuff or greywacke accumulations - granular texture generally subdued, because of moderate pervasive silicification; no significant Fe/Mg alteration - unit contains a few, thin (1-50 cm), sheared cherty sediment, or sheared, grey chert bands - 5%, irregular epidote/silica and/or calcite patches and fracturing - 5 to 7%, thin (hairline to 1 cm), irregular, pyramatic to wormy, white silica veinlets oriented at various orientations to core axis - several thin, shear/fracture zones with adjacent epidote fracturing; largest shear at 466.70 m as planar slip, with 10 cm wide brecciated epidote zone, oriented at 20° to CA - minor disseminated iron sulphides - hard competent core with 25 to 100 cm breakage on planar fractures - lower contact not encountered	200466	478.00	479.00	1.00	10	20	106	760

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)

495.91 END OF HOLE

CASING LEFT IN HOLE

DOWN-HOLE SURVEY DATA

DEPTH	INCLINATION	BEARING
53.64	-54.00	118.00
104.24	-52.00	120.50
177.19	-52.00	125.00
314.55	-45.00	125.00
391.97	-41.00	134.00
494.39	-43.00	132.00
495.91	-43.00	132.00