

RIO ALGOM EXPLORATION INC.

DIAMOND DRILL LOG

PROPERTY: Gullbridge

HOLE No.: GB-142

Collar Eastings: 25.00

Collar Northings: 3300.00

Collar Elevation: 0.00

Grid: Main

Collar Inclination: -65.00

~~Grid~~ Bearing: 100.00

Final Depth: 416.97 metres

Logged by: M.H.Lenters/S.Sears

Date: September 10 to 18, 1990

Down-hole Survey: Tropari

Purpose: Test Gullbridge Mineralized Horizon between Mineral Point Deposit and SW Shaft Occurrence

FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
0	3.66	OVERBURDEN								
3.66	282.24	RHYOLITE AND SHEAR FOLIATED RHYOLITE	200496	56.00	57.80	1.80	2	8	26	610
			200497	113.50	115.50	2.00	TRACE	16	42	1050
			200498	276.15	278.20	2.05	16	28	16	1380
			200499	278.20	280.20	2.00	6	34	12	1000
			200500	280.20	282.24	2.04	15	42	12	970
		3.66 41.55 20%, slightly salmon pinkish grey, aphanitic, rhyolite; and 80%, weak to moderately sheared, fine-grained, shear foliated rhyolite, locally forming quartz-sericite schist								
		- rhyolite and shear foliated sections grade into one another; locally rhyolite exhibits up to 3%, small (1 mm), subhedral, white plagioclase phenocrysts, as well as occasional, small (1 mm), ovoid, quartz eyes								
		- most of section has some foliation @ 30-45° CA								
		- 5%, irregular, patchy quartz lensing/veining with somewhat diffuse edges, and abundant salmon pink altered wallrock edges								
		- most rhyolitic zones are intensely microfractured with thin (hairline to a few mm wide), networking/cross-cutting silica veinlets								
		- 5%, pale green carbonate-epidote coatings on late, irregular, but generally subplanar, fracturing								
		- no visible sulphides								
		- hard core, but relatively broken (5 to 20 cm) along fractures								
		- lower contact is gradational change into salmon pink rhyolitic section								
		41.55 99.40 Massive, salmon-pink (orange), quartz and feldspar phytic, aphanitic rhyolite, with 3 short (1-2 m), grey, fine-grained, quartz-sericite schistose sections								
		- rhyolite is non-magnetic, massive, with 1-3%, small (1-2 mm), subhedral, white feldspar phenocrysts, and ovoid quartz eyes								
		- thin, grey, quartz-sericite sections have moderately developed foliation at ~ 40° CA; locally these contain small (1-5 mm long), flattened fiamine? and these zones may represent welded tuffs between rhyolitic/rhyodacitic flows								
		- 5-10%, thin (1 to 10 mm), somewhat regular, subparallel and subplanar, quartz veining with sharp edges, generally at 40-50° CA. Also several percent, more irregular, networking silica microfracturing								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Fe(ppm)	Ba(ppm)
		- 2-3%, thin (hairline to 2 mm), irregularly subplanar epidote-carbonate fractures at 45° CA - no visible sulphides - hard, competent core, but relatively well broken (5-15 cm) with several rubbly broken zones - lower contact is relatively gradational change into green-grey quartz-sericite schists								
99.48	119.48	Possibly interflow tuff, or possibly a shear foliated rhyolite, although this section does not include any massive rhyolitic patches - medium grey to grey-green, fine-grained, moderately foliated quartz-sericite schist, locally containing 5 to 20%, large (0.5-2 cm), ragged, ovoid, tan to reddish coloured (sericitized and hematized) altered cordierite? porphyroblasts (weak Fe/Mg alteration) - foliation generally subplanar and 30-60° CA, with average of about 45° CA; foliation exhibits minor, small scale folding and kinking - non-magnetic - no significant quartz veining - 2-3%, thin, epidote-carbonate fracturing - no visible sulphides - lower contact gradational into rhyolite								
119.48	126.40	Similar lithology to 41.55-99.48 m (salmon pink to purplish coloured, aphanitic, feldspar phyric rhyolite), but upper section exhibits more (5 to 15%), light greenish epidote-carbonate fracture veining and epidote-carbonate alteration of rhyolite adjacent to these fractures								
126.40	247.90	Alternating zones of rhyolite and shear foliated rhyolite from 10's of cm to several metres wide; variably mottled, massive, pinkish to purplish grey, feldspar phyric rhyolite patches, and alternating zones of fine-grained, medium green-grey to grey-green, quartz-sericite schist with moderate to well developed subplanar foliation at 30-70° CA, but averaging ~ 45°. These latter zones appear to be shear foliated zones of rhyolite, and not separate (interbedded) felsic tuff units (no blue quartz eyes). Rhyolite shows all gradations into shear foliated quartz-sericite schist. Schist zones may contain minor chlorite, but no cordierite or any other porphyroblast minerals - section contains ~ 5%, irregular quartz patches/blebs/veins,								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		as well as about 5%, thin epidote-carbonate fracturing - no visible sulphides or Fe/Mg alteration - moderately hard, competent core, but relatively broken (10-50 cm) with breakage generally on fractures parallel to foliation - lower contact gradational into brecciated rhyolite section								
	247.90 252.90	Salmon pink, brecciated and quartz veined, massive rhyolite similar to above rhyolites - section contains 10-20%, irregular quartz veining with subdued edges that grade into pervasively silicified rhyolite - section has 5-10%, intense epidote-carbonate coated fracturing, locally producing thin (1-10 cm) breccia zones with rhyolite fragments in network fractured alteration bands								
	252.90 273.80	Same as 126.40-247.90 m, but more zones of greenish quartz-sericite schist than rhyolite. Generally somewhat more sericitic than upper section. Foliation at $\approx 45^\circ$ CA - includes zone between 165.15-271.27 m with a few to 10%, vague, large (0.5-2 cm), ovoid but ragged, tan coloured (carbonate altered) cordierite? porphyroblasts								
	273.80 282.24	Feldspar phyric rhyolite - slightly purplish grey to salmon-pink, massive, aphanitic, like 41.55-99.48 m, but weakly magnetic - 5%, small, wormy, irregular quartz veining/patches - no visible sulphides - hard competent core, with core recovered in 25-100 cm pieces - lower contact is sharp, planar, foliation/shear slip surface at 40° CA.								
282.24	307.65	INTERBEDDED RED CHERT, GREY CHERT, AND ASH TOPPS - complexly interbedded/interbanded zone of red ferruginous cherts, grey-black cherts, and some ash tuffs; locally the unit is strongly brecciated into chaotic zones containing large (1-5 cm), angular chert fragments	201995	282.24	285.00	2.76	28	28	40	1250
			201996	285.00	286.30	1.30	4	376	42	7150
			201997	286.30	287.10	0.80	7	28	52	3590
			201998	287.10	288.05	0.95	30	2	10	2710
			201999	288.05	288.20	0.15	47	162	16	6410
			202000	288.20	288.80	0.60	5	72	50	7450
			5320	288.80	289.35	0.55	3	4	8	3320
			5321	289.35	291.45	2.10	19	24	48	1690
			5322	291.45	293.30	1.85	78	10	72	740
			5323	293.30	294.10	0.80	16	4	28	680
			5324	294.10	297.20	3.10	73	12	74	210
			5325	297.20	299.00	1.80	58	20	36	150
			5538	305.55	306.05	0.50	26	32	56	640
	282.24 285.00	Dark greenish-grey chert to argillaceous chert - weak to moderately bedded, and weakly foliated at $\approx 45^\circ$ CA - moderately to strongly magnetic - weakly brecciated/sheared, but moderately crackled and intruded by irregular to network silica/quartz veining. Quartz veining has somewhat diffuse contact edges								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		- no visible sulphides	5539	106.05	307.65	1.60	11	20	258	410
285.00	287.10	Well brecciated chert zone - abundant, large (1-20 cm), well laminated, ferruginous, red and grey, angular, rotated chert fragments, cut by 5-25%, thin (1-5 mm), complexly networked, but locally bedding parallel, silica and opaque pinkish white (barite?) veins. These opaque veins are locally banded parallel to bedding and folded with bedding, suggesting either formation as bed or predeformation vein - veining and brecciation are more intense between 285.00-285.50 m and 286.30-287.10 m, with the bedded zone of grey chert between these broken zones exhibiting bedding at ~ 30° CA - no visible sulphides								
287.10	288.05	Dark grey, massive, aphanitic, weakly laminated, moderate to strongly magnetic, grey chert, locally with weak nodular appearance at lower contact - no visible sulphides								
288.05	288.20	Dark red, ferruginous, massive to weakly laminated (35° CA) chert - no visible sulphides - lower contact slip surface at 30° CA								
288.20	288.80	Intensely sericitized ± carbonate altered rock (felsic ash tuff?) - mottled, medium tan to greenish greys, fine-grained, soft, non-magnetic - has weak shear foliation at 30-35° CA - no visible sulphides								
288.80	289.35	Same as 288.05-288.20 m								
289.35	291.45	Grey laminated chert, with fine ash tuff - laminations at 25-30° CA - locally slightly brecciated, with chert laminae/bands broken & boudinaged in felsic tuff matrix - strongly magnetic - minor, small quartz blebs - no visible sulphides								
291.45	293.30	Felsic to mafic? ash tuff/volcaniclastic - dark grey green, v.f.g., chloritic, weakly schistose with								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	ASSAYS			
						Wt%	Cu(ppm)	Pb(ppm)	Ba(ppm)
		some thin cherty laminae parallel to schistosity at 30-40° CA - contains one, 2 cm, angular chert fragment - weak to moderately magnetic - minor quartz blebs - no visible sulphides							
293.30	294.10	Banded, reddish, argillaceous chert with 3-5%, thin (1-5 mm), discontinuous, opaque white veinlets, similar to overlying brecciated section between 285.00-287.10 m - banding @ 30-35°, and locally weakly sheared - no visible sulphides - lower contact is conformable bedding contact at ~ 40° CA							
294.10	297.20	Pelvic to mafic? ash tuff/volcaniclastic - similar to 291.45-293.30 m - dark green, chloritic, v.f.g., weak to moderately schistose at 35-40° CA, weakly magnetic, and containing some thin cherty laminae - 5%, irregular, discontinuous, wavy, light green epidote-silica/calcite alteration bands and elongated patches (1-10 mm) - no visible sulphides							
297.20	307.65	Grey chert and argillaceous chert, with some red ferruginous chert beds - well bedded and laminated, with beds (0.5-10 cm) and fine (< 1 mm) laminations at 60-80° CA - beds are planar, only locally exhibiting minor small scale (1-2 cm) folding - weak to moderately magnetic - 5-7%, irregular quartz blebs and patches from 0.5-5 cm - chert exhibits network microfractured/tension fracturing containing clear silica, and mm scale offsets - no visible sulphides - section is generally hard and competent, but locally rubbly fractured over short intervals (10-50 cm). - lower contact conformable at 70° CA							
307.65	334.98	MAFIC METAVOLCANIC							
		- medium to dark greyish green; fine to medium-grained, massive							
307.65	320.50	Fine-grained, massive to locally moderately foliated section; dark grey-green; weak-moderate foliation							

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		Ø = 30-40° CA; very homogenous; weak to locally moderately magnetic; probably weak chlorite alteration (i.e. chloritic slips) and minor epidote:quartz-calcite alteration patches and bands - no visible sulphides								
	320.50 320.85	Thin, brecciated and sheared zone within the mafic metavolcanic; sheared Ø = 40-45° CA; contains abundant quartz, calcite, epidote and chlorite with soft reddish "fragments" parallel to the foliation; the upper and lower contacts appear to be gradational into the mafic; the breccia also acts as a thin interval separating overlying f.g. mafic rock from underlying, medium-grained mafic metavolcanic								
	320.85 334.98	Medium-grained, non- to locally weakly magnetic; generally massive section, but finer-grained in the last 3-4 m; section has a moderate grainy appearance consisting of irregularly-shaped plagioclase crystals and lesser mafic crystals in a f.g. mafic matrix; rare, anhedral quartz crystals (possibly filled vesicles); section exhibits a weak pervasive epidote alteration, except for the last 3-4 m; also patchy strong epidote:quartz-calcite alteration; minor chlorite along some fractures; last 3-4 m exhibit weak pervasive chlorite alteration; possible vague cordierite Ø = 312.50 m; 2-5%, planar, qtz ± calcite veins 1 mm to 1 cm wide; last 50 cm contains minor, dark greyish, moderately magnetic cherty material - no visible sulphides - section is very competent - lower contact is sharp Ø = 75-80° CA, and is probably conformable with the underlying cherty section.								
334.98	337.15	INTERBEDDED RED CHERT AND CHERTY ASH TUFF	5540	335.10	335.25	0.15	58	20	132	340
		- thin (up to 8-10 cm), purplish-red chert bands (± 15% of overall unit), interbedded with dark green-grey, f.g., cherty ash tuffs; the unit is banded, generally at ± 70-80° CA, but there is local folding near the upper contact; minor vague bluish, 1-3 mm, qtz eyes in the ash tuff bands - the cherty ash tuffs are non- to weakly magnetic, whereas the purplish-red cherts are moderately to strongly magnetic								

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							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		- the ash tuffs are weakly to moderately chloritic; minor epidote alteration associated with qtz veining = 40 cm below upper contact - = 5-10%, irregular, quartz veining generally occurring as qtz-flooded zones, resulting in broken and fragmented pieces of chert and cherty material within the qtz veins - no visible sulphides - competent core - lower contact is sharp @ = 80° CA, and probably conformable with the underlying mafic metavolcanic.								
337.15	371.80	MAFIC METAVOLCANIC (ROBERTS ARM DYKE?)								
		- same as 307.65-334.98 m - medium to dark greenish grey, fine to medium-grained, very weakly magnetic, weak foliation at = 45° CA - includes small, red, laminated chert zone/fragment? 361.35-361.55 m; laminated at = 80° CA								
355.85	355.95	Small shear zone at 45° CA								
		- minor visible sulphides - lower contact conformable lithological contact oriented at 80° CA.								
371.80	378.95	INTERBEDDED RED AND GREY CHERTS	5541	371.95	372.18	0.23	67	56	46	350
			5542	376.18	376.73	0.55	11	92	68	120
		-contains minor tuffaceous/volcaniclastic horizons - 50%, brownish red, massive to laminated, red chert beds that are non- to weakly magnetic - 50%, laminated argillaceous chert, and v.f.g. felsic-mafic? tuffaceous/volcaniclastic sediment; grey cherts are weak to locally strongly magnetic								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		- weak foliation in tuffs, and bedding/laminations at 70-80° CA, locally with minor folding - minor zones with small (3-5 mm), subvoid, ragged edged, cordierite porphyroblasts - cherts locally crackled by 5% silica veinlets, and locally up to 5-10%, irregular, wormy veins - tuffs exhibit 3-5%, thin (1-5 mm), foliation subparallel, epidote alteration bands - no visible sulphides - lower contact wavy planar at 35° CA.								
378.95	383.10	GREY CHERT AND PELTIC/MAFIC TUFFACEOUS VOLCANICLASTIC								
		- mostly aphanitic, grey, siliceous chert, with some more tuffaceous laminae/bands, and some (20%), chloritic, siliceous volcaniclastics - unit is non- to weakly magnetic - foliation, bedding/lamination variable from 30-70° CA, with most 45° CA. Variation due to larger (10-100 cm scale) folding - 2% quartz veining - no visible sulphides - core is hard and competent - lower contact somewhat irregular but obscure due to rubbly core.								
383.10	399.66	MAFIC METAVOLCANIC (ROBERTS ARM DYKE)								
		- similar to 337.15-371.80 m and 307.65-334.98 m - slightly finer-grained (< 1.5 mm) and with weak foliation at 45-55° CA								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	ASSAYS			
							Cu(ppm)	Pb(ppm)	Zn(ppm)	Ba(ppm)
		- trace finely disseminated sulphides								
		- lower contact, sharp bedding contact at 60° CA.								
399.66	416.97	PELSIC METAVOLCANIC ASH AND FELDSPAR/QUARTZ CRYSTAL TUFTS	5543	400.00	402.00	2.00	15	18	58	390
		- upper section (above 406 m) is finer-grained, grey ash tufts and grey, non- to weak and locally moderate magnetic cherts, with bedding and fine laminations at 60-70° CA	5544	404.00	405.00	1.00	TRACE	10	46	1110
		- fine qtz-feldspar matrix with sericite and minor chlorite	5545	412.00	413.00	1.00	TRACE	28	50	320
		- minor, small (3-4 mm), elongate cordierite porphyroblasts								
		- lower section (below 406 m) is fine crystal tufts, with 5%, vague, feldspar phenocrysts, and local zones with 1-5%, small (1-2 mm), bluish quartz eyes								
		- non- to weakly magnetic								
		- relatively homogeneous section, with weak foliation at 60-70° CA								
		- minor, vague, small cordierite porphyroblasts locally slightly hematized, but section relatively unaltered								
		- hard, competent core								
		- no visible sulphides								
		- 1-2%, small, irregular quartz veins/patches								
		- lower contact not encountered.								
416.97	EOH									
		CASING LEFT IN HOLE								

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

DOWN-HOLE SURVEY DATA

DEPTH	INCLINATION	BEARING
60.96	-67.00	106.00
159.11	-61.00	110.00
274.62	-60.00	115.00
350.82	-63.00	123.00
403.25	-63.00	125.00
416.97	-63.00	125.00