

LEFROY JOINT VENTURE

Diamond Drill Core Log

Hole No. : L4A

Date Started : 20th April 1999

Drilled by : Diamond Drilling (Tas.)

Date Completed : 5th May 1999

Logged by : J.G.Purvis

Collar : 110m in hole L4

Hole Details

Northing : 5 448 131.1m

Final Depth : 400.5m

Easting : 499 738.8m

Hole Length : 290.5m

R.L. : 2075.7m

Core Size : HQ3 110-312.8m; NQ3 312.8-400.5m

Dip : -59.5

Bearing : 350 AMG

Purpose : To complete the test of Volunteer and West Volunteer reefs initiated by hole L4.

Summary Results : West Volunteer Reef intersected at 256m (0.4m @ 6.37g/t Au). Volunteer Reef Fault intersected as zone of intense crushing at 267.5 - 270.2m, but little vein quartz present (best assay: 0.8m @ 0.23g/t Au).

From	To	Length	Description	Au	Ag	Cu	Pb	Zn	As
252.4	252.55	0.15	West Volunteer Reef - upper branch: grey quartz vein with aspy	0.72	<1	18	38	50	2170
255.75	256.15	0.4	West Volunteer Reef - lower branch: vein qtz with 30% rock frags	6.37	<1	31	76	129	4850
269.4	270.2	0.8	Volunteer Reef Fault: rock cataclasite with dismembered qtz veins	0.23	<1	48	26	98	700

Comments

Hole L4A cut from cemented hole L4 using chrome barrel, after L4 deviated off target. All casing withdrawn from hole. 3m HQ stem pipe with steel cap left in top of hole.

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From	To	Unit	Code	DESCRIPTION	ALTERATION	STRUCTURE	VEINING	MINERALIZATION
110.0	120.6	SSH	sst	SANDSTONE WITH SHALE BANDS. Cement filling of L4 to 115m. Sst grey, qtz-mica, fine to medium grained. Shale grey & black (latter graphitic & pyritic). Breaks easily along S1.	Sericite-chlorite alt (shales very greasy), with white clay on fract's & cleavage.	Strong cleavage: S1//So 60-70/CA S2 (only visible in shales) 30/CA (opp sense to S1). S1 warped in basal 30cm. Strong fault (crush zone) assoc with F1 fold axis in sericitized grey shale 115-115.5m.	Minor. Qtz-ank veinlets orthogonal to S1, & qtz+-chl veins //S1 incl 5cm qtz-chl vein at 114.75m.	Gen trace to minor dissem py. 2% py in black shale band 115.5-116.5m. 1-2% py 119.7-120.6m.
120.6	127.4	SSH	flt	MAJOR D2 FAULT. Zone of strong shattering, crushing & marked contortion of So/S1 in grey qtz-mica sst. Intervals of puggy cataclasite, esp in greasy grey-black shales in basal 2m.	More strongly sericitized than surrounding rocks. Common white clay on fract's in the sst.	Contacts abrupt: upper 30/CA (cuts S1 same sense); lower 85/CA.	Qtz-ank microveinlets x-cutting S1 in sst.	Minor dissem py. Very rare aspy.
127.4	252.4	SSH	sst	SANDSTONE WITH LESSER SILTSTONE-SHALE. Fine to coarse grained grey sst, ranging from relatively pure qtzose types to qtz-mica sst (sometimes weakly carbonaceous), to qtz-feld-mica-lithic sst. Much lesser greasy grey & black shale & siltstone, as isolated 5-20cm beds or conc in 1-5m bands where sst minor. Black shale often graphitic & pyritic. Sst bioturbated at 152m & current-bedded at 193m. To 220m, sst in graded beds up to 1.5m thick. Ground conditions much improved over those higher in hole: sst gen hard & unbroken, finer rocks tend to break readily along S1 cleavage.	"Background" chlorite> sericite alt, weakening slightly with depth. Common white greasy clay on fract's, esp those assoc with faults & zones of qtz-ank veining (eg: at 171m).	Graded beds fine uphole until 30cm fract & qtz-ank veined zone at 171m. Grading then fines downhole to fold axis in shale at 181.8-185.1m assoc with zone of crush seams 60-80/CA in opp sense to So/S1 (70-85/CA), crushes warp both S1 & S2. Grading is uphole 185-220m. F1 fold axis 237-238.2m. Well developed S1 cleavage //So 55-65/CA, weakening slightly with depth. S2 cleavage visible in some finer-grained rocks, 35/CA (opp sense to S1) except //CA from 211m to small fault (60/CA //S1) at 236.6m.	Common qtz veining. Larger are qtz (+chl-cb> py), av >3cm (to 15cm at 151.3m), sub-// S1 & are gen hosted by chloritized shale. Smaller veins & veinlets are qtz-ank (av <3cm, to 5cm) & orthogonal to S1 130m: 7cm qtz-graph-py vein in shear 55/CA //S1 165.7m: 20cm zone of qtz-ank-py veinlets 30/CA (orthogonal to S1). 171m: 30cm of qtz-ank net-veinlets (rare aspy). 238.3m: 10cm qtz-py-	Trace to minor dissem py, locally to 2% (esp in black shales). 129.5-133m: 1% py>po 156.5-158.7m: 2% py. Trace aspy in fold axis at 182-185m & rare aspy in 30cm zone of qtz-ank veinlets at 171m

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From	To	Unit	Code	DESCRIPTION	ALTERATION	STRUCTURE	VEINING	MINERALIZATION
						Orientations: At 188m So/S1 60/CA (dips 1 to 003 AMG), S2 30/CA (dips 31 to 040 AMG); At 209m S1 55/CA (dips 8 to 304 AMG); At 238.8m So/S1 62/CA (dips 10 to 323 AMG), S2 25/CA (dips 64 to 083 AMG). Minor small faults, strongest: 177.55-177.8m: 70/CA (opp sense to S1) with 5cm qtz-ank-py vein. 189.3-189.45m: 55/CA (opp sense to S1).	graph vein 50/CA //S1.	
252.4	252.55	DRF	min	MINERALIZED QUARTZ VEIN (WEST VOLUNTEER BRANCH REEF - UPPER) Unbroken 15cm grey qtz vein with recemented breccia texture (strongest at base). Minor white cb.	Some pale green sericite in fract's in qtz.	Vein 45/CA (opp sense to S1). Vein marks fault between qtzose sst above & greasy black shale below. 2cm graphitic crush zone with qtz frags, at base of vein.	Veinlets of grey qtz-cb extend 15cm into upper sst. Irreg ank veinlets extend 15cm into lower shale.	2% aspy>py in vein. 1-2% aspy>py in upper sst (15cm). 2-3% py>aspy in lower shale (15cm)
252.55	255.75	SHH	slt	FRACTURED & CLAY-ALTERED SILTSTONE-SHALE. Dk grey carbonaceous siltstone-shale with minor qtz-mica sst.	Much white clay on fract's (clay seams to 3mm). Sericitized & greasy.	Numerous fractures, local shattering - rock is softish & breaks easily. So/S1 65/CA. 255.1m: 5cm crush zone with vein qtz frags, 55/CA x-cuts S1.	Common thin veinlets of qtz-ank, orthogonal to So/S1.	Minor dissem py. Rare aspy below 254.5m
255.75	256.15	DRF	min	MINERALIZED QUARTZ VEIN (WEST VOLUNTEER BRANCH REEF - LOWER) Slightly broken grey vein qtz with 30% cleaved sediment rock frags to 3cm. Trace ank.	Smaller rock frags are silicified.	Vein fills D2 fault between greasy grey shale (above) & sst (below). Contacts abrupt: upper 30/CA (opp sense to So/S1), lower 45/CA (10cm crush with qtz veinlets in sst, x-cuts & folds So/S1).		3-4% aspy-py & rare cp.

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From	To	Unit	Code	DESCRIPTION	ALTERATION	STRUCTURE	VEINING	MINERALIZATION
256.15	267.5	SSH	sst	PARTLY FRACTURED & CRUSHED SANDSTONE. Grey to dk grey qtz-mica-feld-lithic sst, partly carbonaceous to 259m. Dk grey shale in places below 264m.	White clay on fract., most common in sst. Increasingly strong sericitization below 263m.	So/S1 90/CA at top 40/CA at base Fractured & crushed at intervals, increasing with depth. Stronger crushes: 256.6m (10cm, 40/CA, 4cm qtz-ank vein); 259.2m (10cm 90/CA); 263.9m (20cm, 50/CA, x-cuts S1, 10cm bx qtz-ank vein); 265.7m (20cm, 70/CA, x-cuts S1); 266.2m (20cm, 65/CA, x-cuts & warps S1). <i>Orientation: At 263.1m S1 60/CA (dips 30 to 290 AMG).</i>	Common qtz>cb veins to 10cm above 261m (some crushed, // & x-cutting S1). 261-266m numerous veinlets qtz-ank x-cutting S1.	Minor dissem py. Rare aspy in 10cm qtz-ank-py vein at 263.1m.
267.5	270.2	DRF	flt	VOLUNTEER REEF FAULT: INTENSELY CRUSHED ZONE IN BLACK SHALE & GREY SANDSTONE. Crumbly cataclasite (puggy in places), after black graphitic pyritic shale, grey shale & sst HW: soft greasy sericitized grey shale with several crush seams back to 266.2m. FW: (to 271m) harder sericitized qtzose sst with abund qtz-ank microveinlets x-cutting S1	Strong sericitization. Much white clay on fractures in FW to 271m	Fault is D2: So/S1 is contorted. Abrupt contacts; upper broken but high-angle, lower 60/CA (cuts S1 but similar sense). Strong S1 in FW is gently warped to 271m.	Below 268.5m common dismembered poddy qtz veins to 3cm, largest // shearing but some x-cutting qtz-ank veinlets. 20% veining at 268.7-269.4m (qtz & qtz-ank) & 269.9-270.2m (qtz & qtz-chl).	1-3% dissem py in perfect cubes to 2mm, 3%py in black shale 269-269.5m. Rare aspy below 268.3m No sulphides in qtz veining.
270.2	311.8	SSH	sst	SANDSTONE, minor SHALE & SILTSTONE Grey silty to coarse gr qtz-mica sst with minor beds to 25cm of grey-black shale> siltstone.	Mod to locally strong chlorite>>sericite alt. This overprinted above 274m & around fractures //CA at 280-281.4m & 294.5-295.5m, by silica-sericite-white clay alt	Several graded sst beds fine uphole above 300m. Well-developed S1 cleavage 60-70/CA, stronger in zones of silica-sericite alt. S2 cleavage visible in some shales, 30/CA in opp sense to S1.	Patchy qtz-ank veinlets & microveinlets, orthog to S1, abundant above 272.5m & 280-281.4m. At 276.5-280m & below 297.8m, common qtz-chlor veins sub-// S1, to	Minor dissem py. Rare aspy to 271m, & assoc with fract //CA 280-281.4m & 294.5-295.5m.

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					assoc with qtz-ank veining & enhanced cleavage development.	<i>Orientation at 290m: S1 70/CA (dips 6 to 317 AMG).</i>	25cm thick (at 298m). This veining very strong	
					Fine spotting of shales at 306.7m & 311.7m.	Mildly broken by low-angle fract. Small fault 310.7-311m.	309.5-311.8m in broken chloritized shales.	
311.8	314.4	DRF	qvn	ZONE OF STRONG QUARTZ-ANKERITE VEINING (LODE ZONE). Veined zone 20-30/CA, orthogonal to S1 in altered qtz-mica sst with minor black shale.	Silica-sericite-bleaching alt of sst.	Strong S1 50-60/CA. Broken along small fault 15/CA (opp sense to S1) at 313.4- 314.1m (alt strongest here)	Numerous qtz-ank veins & veinlets (abund net- veining 313-314m). Centred on 5cm 20/CA qtz-cb-ank-asy vein at 312.55-312.75m.	312.7-314m: 1-2% asy>py dissem & on fracts, mainly in sst rather than the veins. Trace to minor py>asy elsewhere.
314.4	316.2	SSH	sst	Grey SILTY SANDSTONE, with beds of siltstone & shale.	Weak chlorite alt.	So/S1 60/CA. Basal contact along So, 60/CA.	Minor thin qtz-ank veinlets 20-30/CA.	Trace dissem py.
316.2	321.7	SSH	bsh	SHALE. Dk grey to black carbonaceous shale, graphitic in places.	Fine spotting to 317m.	At 318.5m So 65/CA, S2 25/CA in opp sense. So folded & disrupted 320.2-320.8m	3 qtz veins //S1, to 3cm.	Minor dissem py in grey shale to 320m, then 2% py in black shale.
321.7	371.5	SSH	sst	SILTY SANDSTONE. Pale grey uniform fine to med gr qtz-mica (+feld-lithic) sst, with minor siltstone & shale, mainly above 333m. From 333-358m almost entirely sst. Finer-grained sections commonly show soft-sediment deformation (micro-folds & slumps) as well as scour & fill, & current bedding (eg: 324-328m, 338-342m, 350- 351m). Occasional graded beds in sst. Rip-up clasts of sst in siltst 351.5-352.5m.	Weak chlorite-sericite alteration.	Largely unbroken. Sedimentary facings are upheld to 338.5m & downhole below 360m (no facings 339-360m). S1//So 60-70/CA. S1 weaker below 360m. Weak S2 15-35/CA only visible in some shales. <i>Orientations: At 343.5m S1 67/CA (dips 2 to 359 AMG); At 370.5m So 58/CA (dips 26 to 284 AMG).</i>	Upper contact marked by zone of strong qtz-cb veining extending to 322.7m (50% veins at all angles to 20cm thick) Almost no veining 333- 358m.	1% dissem py to 323m (none in qtz veins). Minor to 1% py to 332m. Trace py below 332m.

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RECOVERIES						SAMPLING			ASSAYS (ppm)															
From	To	Interval	Recov'd	Recov'd (%)	RQD (%)	From	To	Int	Au	Au @	Cu	Pb	Zn	Ag	As									
110.0	112.4	2.4	2.4	100		252.25	252.4	0.15	0.43	0.40	24	37	63	<1	1430									
112.4	114.8	2.4	2.0	83		252.4	252.55	0.15	0.76	0.69	18	38	50	<1	2170									
114.8	115.6	0.8	0.5	62		252.55	252.7	0.15	0.64		34	18	141	<1	905									
115.6	118.4	2.8	2.7	96																				
118.4	119.6	1.2	1.15	96		255.05	255.75	0.7	0.39	0.34	43	31	126	<1	325									
119.6	122.2	2.6	2.15	83		255.75	256.15	0.4	5.70	7.05	31	76	129	<1	4850									
122.2	123.4	1.2	1.15	96		256.15	256.7	0.55	0.07	0.06	21	18	82	<1	135									
123.4	125.7	2.3	1.55	67																				
125.7	127.1	1.4	0.9	64		263.9	264.1	0.2	0.08		24	27	107	<1	220									
127.1	129.2	2.1	1.9	90																				
129.2	130.3	1.1	0.95	86		266.2	266.9	0.7	<0.01	<0.01	50	32	105	<1	60									
130.3	133.4	3.1	2.9	94		266.9	267.5	0.6	<0.01		47	26	105	<1	65									
133.4	136.4	3.0	2.95	98		267.5	268.1	0.6	<0.01		91	27	236	<1	55									
136.4	139.4	3.0	2.85	95		268.1	268.7	0.6	0.01	0.01	76	26	215	<1	70									
139.4	142.3	2.9	2.8	97		268.7	269.4	0.7	0.11		55	21	165	<1	435									
142.3	145.3	3.0	2.9	97		269.4	270.2	0.8	0.24	0.22	48	26	98	<1	700									
145.3	148.3	3.0	3.0	100		270.2	271.1	0.9	<0.01		14	21	46	<1	30									
148.3	151.3	3.0	3.0	100																				
151.3	154.3	3.0	3.0	100		279.9	280.6	0.7	0.05		10	21	35	<1	275									
154.3	157.3	3.0	2.85	95		280.6	281.4	0.8	0.02	0.02	12	19	48	<1	100									
157.3	158.9	1.6	1.6	100																				
158.9	161.9	3.0	2.95	98		311.8	312.8	1.0	0.12		29	27	79	<1	355									
161.9	162.8	0.9	0.85	94		312.8	314.4	1.6	0.61	0.60	16	16	69	<1	2320									
162.8	165.8	3.0	3.0	100																				
165.8	168.8	3.0	2.9	97		371.5	372.45	0.95	0.03	0.02	15	22	55	<1	140									
168.8	171.8	3.0	2.95	98																				
171.8	174.8	3.0	2.9	97																				
174.8	177.8	3.0	2.95	98																				
177.8	180.8	3.0	2.8	93																				
180.8	183.8	3.0	3.0	100																				
						Analabs, Cooee. Method:			F650	F650	A102	A102	A102	A102	A102									

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RECOVERIES						SAMPLING				ASSAYS (ppm)												
From	To	Interval	Recov'd	Recov'd (%)	RQD (%)	From	To	Int	Type	Ti	Zr	V	Nb	Rb	Y	Ba	Sr	Cr	Sn	W	P	
183.8	186.9	3.1	3.0	97		115.75	116.2	0.45	Black shale	3380	139	271	13	198	34	735	106	209	<3	<10	3350	
186.9	188.0	1.1	1.05	95		221.25	221.8	0.55	Fine sst	3260	232	67	12	107	34	395	165	58	7	<10	520	
188.0	190.5	2.5	2.3	92		242.2	243.1	0.9	Fine sst	2890	245	57	11	89	21	330	73	272	4	<10	505	
190.5	193.5	3.0	3.0	100		273.4	273.9	0.5	Qtzose sst	1780	235	31	10	54	25	190	124	37	5	<10	330	
193.5	196.3	2.8	2.9	104		283.0	283.7	0.7	Silty sst	3920	254	92	16	160	35	570	53	222	3	<10	455	
196.3	199.3	3.0	3.0	100		329.2	329.85	0.65	Silty sst	4390	182	108	18	213	31	690	58	85	8	<10	470	
199.3	201.5	2.2	2.1	95		346.5	347.5	1.0	Fine sst	2350	154	48	7	61	44	235	1080	90	5	<10	575	
201.5	204.5	3.0	2.95	98		365.5	366.5	1.0	Fine sst	3990	200	88	15	146	34	510	88	71	6	<10	510	
204.5	206.9	2.4	2.35	98		381.5	382.2	0.7	Fine sst	2780	213	49	11	72	32	240	207	164	4	<10	545	
206.9	209.0	2.1	1.9	90																		
209.0	212.0	3.0	3.0	100																		
212.0	215.0	3.0	3.0	100		Laboratory: Analabs, Cocee. Method:				X401	X401	X401	X401	X401	X401	X401	X401	X401	X401	X401	X401	X401
215.0	218.0	3.0	2.95	98		From	To	Int	Type	Ni	Co	Be	Sc	Th	Ta	Hf	B					
218.0	221.0	3.0	3.0	100																		
221.0	224.0	3.0	3.05	102		115.75	116.2	0.45	Black shale	59	16	2	13	10	<20	<20	58					
224.0	225.8	1.8	1.8	100		221.25	221.8	0.55	Fine sst	20	13	<2	10	14	<20	<20	32					
225.8	228.8	3.0	3.0	100		242.2	243.1	0.9	Fine sst	17	11	.2	8	14	<20	<20	<25					
228.8	231.8	3.0	2.95	98		273.4	273.9	0.5	Qtzose sst	<10	<5	<2	5	13	<20	<20	<25					
231.8	234.8	3.0	3.1	103		283.0	283.7	0.7	Silty sst	27	18	2	13	20	<20	<20	<25					
234.8	237.2	2.4	2.35	98		329.2	329.85	0.65	Silty sst	33	19	3	16	19	<20	<20	26					
237.2	238.8	1.6	1.7	106		346.5	347.5	1.0	Fine sst	12	9	<2	8	10	<20	<20	<25					
238.8	241.9	3.1	3.0	97		365.5	366.5	1.0	Fine sst	27	19	2	13	17	<20	<20	<25					
241.9	245.0	3.1	3.0	97		381.5	382.2	0.7	Fine sst	16	11	<2	8	13	<20	<20	<25					
245.0	250.0	5.0	5.0	100																		
250.0	253.0	3.0	2.9	97																		
253.0	254.2	1.2	1.05	87																		
254.2	256.0	1.8	1.85	103																		
256.0	259.0	3.0	3.0	100																		
259.0	262.0	3.0	3.0	100																		
262.0	263.1	1.1	1.0	91		Laboratory: Analabs, Cocee. Method:				I104	I104	I104	I104	I104	I104	I104	I151					

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