

Phelps Dodge Corporation of Canada

DIAMOND DRILL LOG

PROPERTY: Mary March (294)
HOLE No.: MM294-8
Collar Eastings: 11000.00
Collar Northings: 144.50
Collar Elevation: 0.00
Grid: Mary March -PDC

Collar Inclination: -55.50
Grid Bearing: 180.00
Final Depth: 434.60 metres

Logged by: J.G. Thurlow
Date: July 13, 1999
Down-hole Survey: Tropari

FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	ASSAYS					
						WIDTH	Au (ppb)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)
0	4.6	Overburden									
4.6	46.0	Intermediate to felsic flows									
	4.6	38.0									
	Massive medium to dark green, intermediate flow or intrusive. Generally aphyric but with common leucoxene specks. Rare plagioclase phenocrysts. Nil to incipient sericite alteration. Minor disseminate pyrite. Local weak flow banding, local silica-filled amygdules. Medium hardness. Moderately broken core to 15m, and again from 23m-29m. Locally grades from green to hard, orange alteration which is associated with epidote veining (e.g., 23.0-27.5). Some elongate silica-filled voids. Diabase 36m-37m. Brittle fracturing and shearing picks up beyond this.										
	38.0	43.0									
	Broken core within felsics with bright red (war paint) hematite in late fractures (potential I.P. anomalies!). Local dark purplish colour (weak hematite?).										
	43.0	46.0									
	Weakly hematitic felsic flow with poorly developed pseudofragmental texture and mottling of greenish and brownish colours. Some delicate banding associated with small, elongate chlorite-filled vesicles; some larger silica-filled voids. Some perlitic cracks. Minor broken core. Rare speck										

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	ASSAYS				
						WIDTH	Au (ppb)	Ag (ppm)	Cu (%)	Pb (%)
		disseminated pyrite. Essentially unaltered apart from colour variations and weak hematitization.								
46.0	77.5	Zone of heterogeneous lithologies, brittle shearing, localized broken core and intrusives.								
46.0	65.6	Mafic volcanoclastic rocks, some shears and gouge 60 degrees to core. Darker fragments in lighter matrix; locally abundant calcite amygdules. Weak chloritic alteration, no pyrite. Several gouge zones 52m-56m. Diabase from 57.5-58.0m and several more diabases between here and 64.2m. 10cm gouge at 55 degrees to core at basal contact.								
65.6	70.2	Intermediate-felsic sill, greenish on upper margin, becoming brownish-greenish with weak hematite in core. Elongate silica-filled amygdules.								
70.2	77.5	Medium green intermediate-felsic flow and hyaloclastic breccia, some of which resembles the BJ outcrop. Minor Bleached, light beige-green intermediate-felsic intrusive from 74.3-75.1m. Several metres of broken core with evidence of gouge at basal contact.								
77.5	368.9	Basaltic/andesitic volcanoclastic rocks								
77.5	127.5	Heterogeneous mafic-intermediate breccia characterized by a variety of angular clast types all of which have the same protolith. Variably magnetic from nil to moderate								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	ASSAYS				
						WIOTH Au (ppb)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)
		(k = 0 to 0.55). Incipient silica-sericite alteration (peripheral VMS footwall style) and with same clast varieties as in Hole #7; i.e., 1) dark green-black sericitic-chloritic clasts, some of which are wispy, 2) grey-green intermediate clasts with elongate silica-(calcite)-filled voids/amygdules, 3) light green silica-calcite vesicular clasts, some of which look quite basaltic. All of these clast varieties can be seen to be mutually gradational with differences due to interaction with fluids. Locally common brownish more intermediate-looking clasts. Perlitic cracks in some clasts. No sorting/stratification. Generally aphyric but locally with sericitized plagioclase phenocrysts. Common fine leucoxene throughout. Rare speck pyrite. Minor shear and gouge follows core from 94.0-95.1m. Contains a few specks/splashes of chalcopryrite ground 104m and other minor examples further down, but generally, not as much as hole #7.. Moderately strong shear 122m-123.5m at 50-60 degrees to core and another fair shear at the base of the unit.								
127.5	171.5	Weakly altered basaltic breccia with less distinct fragment:matrix contrast and characterized by clasts with leucocratic altered rims, or partial rims on one side with nebulous contact on other (resembles Pilley's footwall!). Weak chlorite alteration in the matrix with weak calcite alteration/effervescence throughout. Calcite amygdules in scoriaceous fragments. Common specks chalcopryrite in bleached basaltic clasts, especially 140m-onward; mode of occurrence identical to hole #7. Broken core with some shears								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	ASSAYS				
						WIDTH	Au (ppb)	Ag (ppm)	Cu (%)	Pb (%)
		and fault gouge from 154.5m-162m; lithology unchanged and still containing disseminated chalcopyrite. Bleached, synvolcanic, intermediate-(felsic?) sill from 163.4m-166.6m. Several late, chilled, magnetic (k=2.9) diabase dykes/dykelets from 167 to 171.5, some are at low angles to core.								
		171.5 184.6 Somewhat sorted, finer grained mafic volcanoclastics with occasional outsized clasts. Common plagioclase grains/phenocrysts. Some distinctive orange-brown clasts or as anomalous rims on clasts. Weak sericitic alteration. Minor specks chalcopyrite as in sub-unit above. No shear at basal contact; gradational.								
		184.6 207.0 Distinctive, weakly altered and pyritized mafic breccia unit containing a variety of weakly altered and pyritized mafic clasts as well as 1% disseminated pyrite (much of which is dull, fine grained and distal-looking) in the matrix. Specks disseminated chalcopyrite and rarer sphalerite locally. Some quite pyritized clasts are weakly silicified. No felsic clasts. Matrix is moderately chloritized-sericitized. One 10 cm massive, fine grained pyrite clast, like the larger one in hole #7 - appears to be a nearly wholly-replaced mafic clast. From 194m to 207m the unit is less distinctive, coarser grained, containing a lesser variety of altered clasts, but still contains occasional small massive pyrite clast. Gradational and arbitrary basal contact.								
		207.0 233.7 Basaltic volcanoclastic rocks with								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	ASSAYS					
						WIDTH	Au (ppb)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)
		flow or sill. Medium yellowish brownish to dark grey with significant stringers and bands of massive and semi-massive pyrite with silica matrix. Initial 30 cm is 15%-20% disseminated and stringer pyrite; overall 10% pyrite with generally greater concentrations toward the base. Some stringers have fine disseminated chalcopyrite and minor Zn-Pb and are quite conductive - best section is split, other nearly comparable sections are present. Generally, most stringers have only rare specks of base metals. Strongly sericitized, moderately silicified. No direct analogues of this unit in hole #7 - possible sections of correlative lithology around 312m or 329m. Weak shear at basal contact at 35 degrees to core.	294059	395.37	396.85	1.48	197	5.2	0.08	0.05	0.11
			294060	396.85	398.32	1.47	46	2.8	0.02	0.02	0.06
			294061	398.32	399.26	0.94	1020	47.3	0.16	0.49	1.21
			294062	399.26	399.77	0.51	1988	68.9	0.12	1.25	4.70
			294063	399.77	400.73	0.96	2036	164.5	0.03	0.63	0.94
			294064	400.73	401.75	1.02	227	18.9	0.01	0.07	0.19
			294065	401.75	402.28	0.53	8	0.6	NIL	NIL	0.01
MINERALIZED ZONE: Core Angle: 90 True Width: 2.41			398.32	400.73	2.41	1630	98.6	0.10	0.71	1.84	

378.5 388.5 Strongly pyritized, silicified and very strongly sericitized felsic(?) breccia(?) unit (alteration and mineralization obscure the protolith). Moderately foliated, in part friable with foliation 10 degrees to 40 degrees to core. This unit is less competent than enclosing units. Greyish to yellowish green colours. Variable pyrite content up to 10%, generally 3%-5%. Only traces base metal sulphides except for a strong 3cm splash of Zn-Pb-Cu at basal contact. Some vermiform silica-pyrite veining. Breccia textures only locally visible - breccia may have tectonic origin. Basal contact is sharp, 45 degrees to core.

388.5 391.55 Strongly sericitized, weakly

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	ASSAYS					
						WIDTH	Au (ppb)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)
		silicified felsic sill(?), synvolcanic. Light to medium yellowish-greenish, chilled and now sericitized on margins. Notable lack of pyrite (only traces) compared to surrounding lithologies. Common reticulate black fractures in more competent sections.									
391.55	395.37	Strongly pyritized and sericitized sulphide-rich breccia horizon; possibly a continuation of the unit above the sill. Clast lithologies include massive pyrite-(+cpy), pyritized lithics. Clasts are generally less than 3 cm size, weak sorting. One massive pyrite horizon with only traces base metals from 393.0m-393.2m. Common specks disseminations of Zn-Pb-Cu otherwise. Well foliated 40 to 50 degrees to core and with several minor gouge zones throughout.									
395.37	398.32	Altered, pyritized synvolcanic felsic sills with screens of pyritized breccia containing minor base metal sulphide. Minor chilled diabase.									
398.32	399.0	Sheared, friable semi-massive pyrite with disseminated base metal sulphides (estimate 2%-4% combined). Fault gouge on both upper and lower contacts. Strongly sericitized host lithology. Foliation 25 to 45 degrees to core. Around 398.5 is brownish-orangeish-pinkish foliated lithic material - correlates with similar material in Hole #7 at 340.0m and 344.1m.									
399.0	399.26	Chilled diabase sill									

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	ASSAYS				
						WIDTH	Au (ppb)	Ag (ppm)	Cu (%)	Pb (%)
399.26	399.77	Semi massive sulphide with significant sphalerite content. Well foliated 45 degrees to core.								
399.77	400.05	Chilled diabase sill								
400.05	400.26	Well mineralized rock as above diabase and containing base metal sulphide and barite								
400.26	400.50	Chilled diabase sill								
400.50	400.73	Well mineralized diabasic and other rock. Fracture-fill/vein pyrite and minor base metals.								
400.73	401.75	Unseparated diabase, chilled felsic and mineralized, foliated host rocks.								
401.75	402.28	Siliceous, sericitic, baritic rock, well foliated 25 degrees to core.								
402.28	434.6	Altered but virtually unmineralized rocks. Less foliated, less sheared, more competent. Significantly different from mineralized rocks above.								
402.28	422.1	Massive light-medium yellowish green intrusive sill, similar to some of the chilled units within the mineralized zone. Protolith uncertain (lithogeochem								

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FROM	TO	LITHOLOGICAL DESCRIPTION	SAMPLE No.	FROM	TO	WIDTH	Au (ppb)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)
		sample). Resembles sections both above and below the pyritic siltstone in Hole #7 (or may be equivalent to Unit D2. Foliated (40 degrees to core) and chilled near upper contact but becomes more massive. Solid core. Moderate sericitic alteration with traces disseminated pyrite and rare speck sphalerite. Common coarse leucoxene specks. Contains leucocratic, altered, acicular phenocryst phase (amphibole?). Some sections have diffuse, spherical, siliceous, amygdale-like shapes, some of which contains specks sulphide. Trace barite veins. Some fracturing with siliceous, leucocratic introduction. Nebulous basal contact may be an alteration/facies change.									
	422.1 426.2	Hard, siliceous, less sericitized lithology with minor sections which resemble the previous sub-unit (this unit may be a less sericitized facies). Common disseminated and fracture-fill pyrite. May correlate in part with cherty rhyolite at the bottom of Hole #9.									
	426.2 429.5	Variegated lithology comprising yellow-green sericitic sections anastomosing around siliceous material like the previous unit. Moderate alteration. Resembles lithologies occurring below the pyritic siltstone in Hole #7.									
	429.5 434.6	Felsic flow or, more likely, a synvolcanic sill. Moderate sericitic alteration producing pseudofragmental textures. Small, leucocratic plagioclase phenocrysts are evenly distributed. Anomalous disseminated pyrite. Flow banded near upper contact. May Correlate with Hole #7 from 405m-413m.									

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434.6 metres EOH, 109 HQ core trays
Casing left in hole.

Line 110+00 runs at 126 degrees - hole collared at 126 degrees.

Tropari tests:

at 213 metres: 55 degree dip at 137.25 degree true azimuth

at 434.6 metres: 55 degree dip at 139.0 degree true azimuth

Hole is lined to the bottom with small PVC pipe (48mm OD, 40mm ID) to 434.6 metres.

Assay Samples: 294055 to 294065

Lithogeochem samples @ 374.8m, 387.2, 412.2, 434.0m

DOWN-HOLE SURVEY DATA

DEPTH	INCLINATION	BEARING
213.00	-55.00	187.25
434.60	-55.00	189.00

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